Australian Government
Cancer Australia

Cancer Research in Australia

An overview of funding for cancer research projects and programs in Australia 2012 to 2020

Evidence to inform research investment -analysis of funding trends to cancer research projects and programs in Australia 2003 to 2020

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Acronyms

ARC	Australian Research Council
AIHW	Australian Institute of Health and Welfare
ANZ	Australia and New Zealand
AUD	Australian dollars
B	Billion
CAD	Canadian dollars
CCRA	Canadian Cancer Research Alliance
CNS	Central nervous system
CRC	Cooperative Research Centre
CSO	Common Scientific Outlines
CUP	Cancer of unknown primary site
DALY	Disability-Adjusted Life Year
GBP	British pounds
ICRP	International Cancer Research Partnership
M	Million
MRFF	Medical Research Future Fund
NCRI	National Cancer Research Institute
NHMRC	National Health and Medical Research Council
PdCCRS	Priority-driven Collaborative Cancer Research Scheme
RDAG	Research and Data Advisory Group
UK	United Kingdom
US	United States of America
NHMRC	National Health and Medical Research Council
PdCCRS	Priority-driven Collaborative Cancer Research Scheme
RDAG	Research and Data Advisory Group
UK	United Kingdom
US	United States of America
USD	US Dollar
YLD	Years Lost due to Disability
YLL	Years of Life Lost (due to premature mortality)

Chief Executive Officer's Foreword

I am pleased to present the third edition of Cancer Australia's *Cancer Research in Australia: an overview of funding for cancer research projects and programs in Australia 2012 to 2020* analysing the findings of an audit of funding to cancer research projects and programs in Australia.

Cancer outcomes in Australia are among the best in the world however cancer still places a significant burden on the population. In Australia, approximately 2 in 5 people will be diagnosed with cancer by the age of 85.[1]

Cancer Australia was established by the Australian Government in 2006 to provide national leadership in cancer control to improve outcomes for all Australians affected by all cancers. Cancer Australia's functions, specified in its Act, include overseeing a dedicated budget for research into cancer and guiding scientific improvements in cancer prevention, treatment and care.

The Australian Government is the biggest investor in national cancer research and Cancer Australia contributes a small proportion of total funding compared with the National Health and Medical Research Council (NHMRC) and the Medical Research Future Fund (MRFF). However, we maximise the value of our investment by filling research gaps and catalysing research growth in priority areas through strategic collaborative partnerships with other government and non-government funders of cancer research.

This report provides an in-depth analysis of national patterns of investment in cancer research projects and programs, using data from both government and non-government funding sources. The report includes a description of investment versus burden of disease, investment across the cancer research continuum, investment in specific tumour streams, the extent of research collaborations, sources of funding and international comparisons.

The report will be of interest and relevance to all funders of cancer research, policy makers, and researchers, as it provides the evidence base to inform future cancer research funding investments and lays the foundation for maximising the benefit and impact of cancer research funding efforts.

I sincerely thank all funding organisations that participated in this audit. I would also like to acknowledge the support of the many individuals and groups who contributed to the development of this report. In particular I am grateful to the members of the Audit Working Group; Professor Karen Canfell; Professor Jon Emery; Ms Lillian Leigh; Professor Christine Paul and members of Cancer Australia's Research and Data Advisory Group.

Professor Dorothy Keefe PSM MD
Cancer Australia Chief Executive Officer

Synopsis

Cancer Research in Australia: An overview of funding for cancer research projects and research programs in Australia, 2012 to 2020 is Cancer Australia's third National Audit of cancer research funding in Australia. This report builds on previous audits published by Cancer Australia and looks at the national patterns of funding provided directly to cancer research projects and programs, for the years 2012 to 2020, allowing for trend analysis over six triennia covering the period 2003–2020.

The report includes a description of investment versus burden of disease, investment across the cancer research continuum and investment in specific tumour streams. The report also describes the extent of research collaborations, the sources of funding to cancer research in Australia, and international comparisons of funding patterns. An understanding of the national landscape of cancer research funding over the period 2003–2020 will assist in the identification of gaps where future strategic investment could make the most impact on national cancer control.

Of the 425 organisations contacted, 124 (113 national, 11 international) provided details of grants awarded directly to cancer-related research projects and programs in the period 2012–2020. A number of organisations contacted (175) did not fund cancer research projects and programs at all or across this time period, whilst 116 did not respond to the invitation. As many more organisations were contacted for this audit than for the audit of 2006–2011, it is likely that many non-responders did not fund cancer research projects and programs. Fourteen organisations could not provide data due to resourcing or time constraints and 10 declined to participate.

It should be noted that this audit captures funding provided directly to cancer research projects and programs but does not capture funding of:

- cancer clinical trials funded partly or wholly by industry
- infrastructure and equipment
- fellowships or scholarships awarded to individuals
- in-kind support provided by staff in cancer research
- routine clinical care, support services, data collection and ongoing monitoring of service delivery and outcomes.

Key findings

Direct funding to and number of cancer research projects and programs

In the period 2012 to 2020, 4,813 cancer research projects and programs were funded across Australia, with a total value of $2.12B.

Across the six triennia from 2003–2005 to 2018–2020, 9,241 cancer research projects and programs were funded across Australia, with investment increasing from $292M in 2003–2005 to $934M in 2018–2020. The total funding over the six triennia was $3.43B. The number of cancer research projects and programs and the total direct funding provided increased for all states and territories except Tasmania.

Sources of funding for cancer research

In the period 2012 to 2020, 88% (4,277) of cancer research projects and programs were funded by a single identified funding source (representing 89% of direct funding).

The Australian Government was the largest funder of cancer research projects and programs, providing 58% of the direct funding identified in the audit.

Pattern of funding to cancer research areas – the Common Scientific Outline

In the period 2012 to 2020, over half (61%) the direct funding for cancer research projects and programs was provided to the Common Scientific Outline (CSO) categories of Biology (23%; which includes basic laboratory research) and Treatment (38%). From 2003–2005 to 2018–2020, the number of funded cancer research projects and programs increased for Aetiology, Diagnosis and Prognosis, Treatment and Cancer Control, Survivorship and Outcomes research, decreased for Biology, and stayed at about the same level for Prevention. The direct funding increased for all CSO categories, although not continuously for Biology and Prevention. Whilst proportional funding to Prevention research remained consistent across triennia, funding remained proportionally low compared to the other categories. Future research investment could also be prioritised for prevention research projects and programs. The largest decrease in proportional funding over this time was to the CSO category of Biology. The largest increase in direct funding and proportional funding over this time was to the CSO category of Treatment.

Pattern of funding to cancer research areas – tumour streams

A 'tumour stream' comprises a collective group of like cancer types. In the period 2012 to 2020, $1.4B (66%) of direct funding was provided to cancer research projects and programs which focused on the study of single or multiple tumour streams, with the remaining $712M (34%) in broader areas of cancer research.

From 2003–2005 to 2018–2020, the proportion of funding to cancer research projects and programs which focused on one or more specific tumour streams increased from 40% in 2003–2005 to 64% in 2018–2020. During the same period, the number of cancer research projects and programs focusing on single or multiple tumour streams more than doubled from 675 to 1,726. From 2003–2005 to 2018–2020, both the amount of direct funding and the number of cancer research projects and programs funded increased for each tumour stream.

Pattern of funding to cancer research areas – tumour types

In the period 2012 to 2020, 3,405 cancer research projects and programs (71%) focused on a single tumour type. From 2003–2005 to 2018–2020, direct funding and the number of cancer research projects and programs funded increased across all 22 tumour types analysed.

Cancer clinical trials

This report identified 419 cancer clinical trials, with a total of $315M, directly funded through cancer research projects and programs in the period 2012 to 2020. The Australian Government ($147M, 47%, 193 clinical trials) and State and Territory governments ($77M, 24%, 45 clinical trials) provided the majority of this funding. For some tumour types, the number of clinical trials receiving grant funding were fewer than might be expected when considering their burden of disease on the community.

From 2003–2005 to 2018–2020, direct funding to cancer clinical trials research increased triennium-on-triennium from $23.5M (2003–2005) to $194M (2018–2020).

Research collaborations

In the period 2012 to 2020, 60% (2,892) research projects and programs involved one or more named collaborators. Of the cancer research projects and programs which provided location details of collaborators, 78% had named collaborators at the same institution, and 18% had a named international collaborator. From 2003–2005 to 2018–2020, the proportion of funding to cancer research projects and programs which involved named collaborators increased from 58% in 2003–2005 to 81% in 2015–2017 and was 68% in 2018–2020.

Interstate and international comparisons of the pattern of funding

From 2003–2005 to 2018–2020, the proportional amount of funding provided and changes across triennia to each CSO category for Australian states, including New South Wales, Queensland, Victoria, Western Australia, and South Australia, were broadly similar to the overall national pattern of funding. Australia's national CSO pattern of funding was broadly similar to the pattern of funding for the United Kingdom (UK) and Canada.

Optimising investment in cancer research – considerations for the future

Data provided in this report informs funders and policymakers of cancer research investments to date, provides the evidence base to inform future cancer research funding investments, and lays the foundation for maximising the benefit and impact of cancer research funding efforts through national and international collaborations. Some considerations for the future include:

Co-funding

In the period 2012 to 2020, 88% (4,227) of cancer research projects and programs were supported by a single identified funding source. The development of a considered model of co-funding which brings together additional funders could enhance collaborative research capacity.

Targeted research investment

The proportional funding to research in many cancers, as well as clinical trials funded for these cancers, was low compared with their burden on the Australian population. Research funding investment could be prioritised for cancers which have a high impact (incidence and mortality) and burden of disease – Disability-adjusted life years (DALYs). Given the increased long-term funding to Early Detection, Diagnosis, Prognosis and Treatment, future research and project activities are relatively well placed to consider cancers with high population impact. It should also be noted that the number of funded cancer research projects and programs in Prevention did not substantially increase over the audit period. Prevention programs have the potential to deliver positive outcomes at the population level, and targeted funding of prevention research may be a consideration for future research funding prioritisation.

International funding

Opportunities exist to support international cancer research, with similarities identified in the patterns of funding across the research continuum between Australia, the UK and Canada. The identification of common areas of research endeavour and need provides an opportunity to collaborate, direct and co-fund future research investments.

1 Background

1.1 Cancer Australia

Cancer Australia was established by the Australian Government in 2006 to benefit all Australians affected by cancer, their families and carers. Cancer Australia leads and coordinates national, evidence-based interventions across the continuum of care that aim to reduce the impact of cancer, address disparities and improve outcomes for people affected by cancer.

Cancer Australia published the first national audit of cancer research funding in 2008. '*Cancer research in Australia: an overview of cancer research projects and programs in Australia 2003 to 2005*' [2] identified, for the first time, the national pattern of investment in cancer research projects and programs. The second national audit of cancer research funding was published in 2014 and covered research projects and programs from 2006 to 2011. [3]

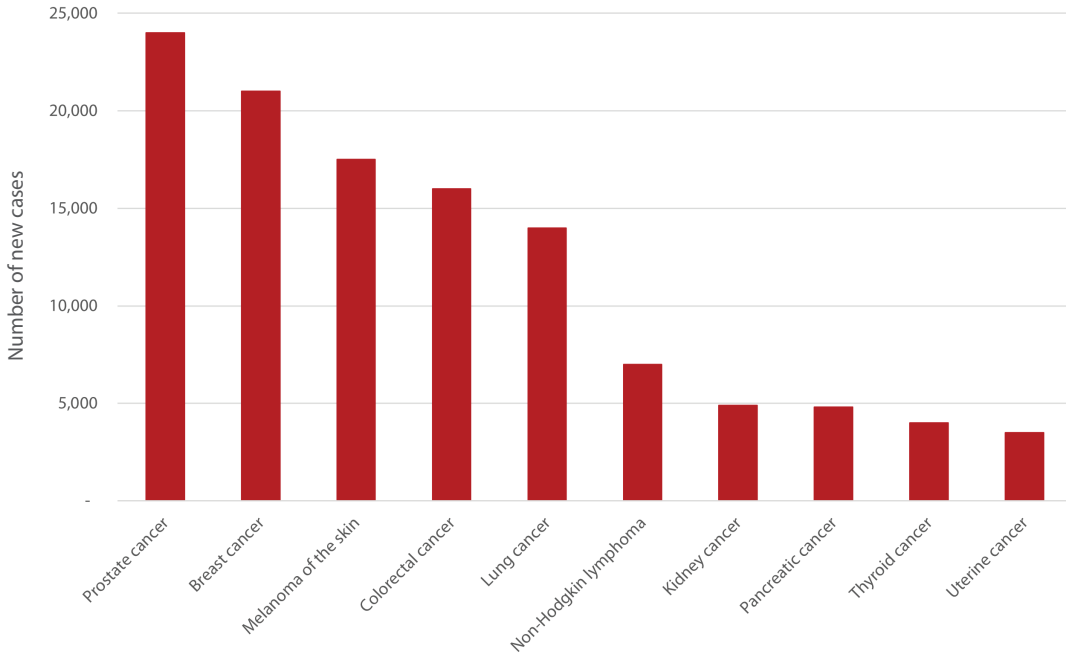
This report documents the third national audit of cancer research funding in Australia and covers the period 2012 to 2020. Key findings from the national audit reports provide valuable data on cancer research funding and have been used by Cancer Australia and other cancer research funders to guide strategic investment in cancer research projects and programs.

1.2 Cancer incidence in Australia

Approximately two in five people in Australia will be diagnosed with cancer by the age of 85. In 2022, it is estimated that 162,163 people (88,982 men and 73,181 women) will have a new diagnosis of cancer in Australia. This number is three times higher than the number of people diagnosed with cancer in 1982 (47,414 new cases). When changes in the size and average age of Australia's population are taken into consideration (the age-standardised rate), this represents an increase in cancer incidence from 383 per 100,000 people in 1982 to 507 per 100,000 people in 2022. [1]

Figure 1.1 shows estimates for the most common cancers diagnosed in Australia in 2022. [1] In 2022, it is estimated that prostate cancer will be the most common cancer diagnosed in Australian men and breast cancer the most common cancer diagnosed in Australian women.

Figure 1.1 Most common cancers diagnosed in Australia (estimates), 2022



Source: Australian Institute of Health and Welfare 2022. Cancer data in Australia. Cat. No. CAN 122. Canberra: AIHW.

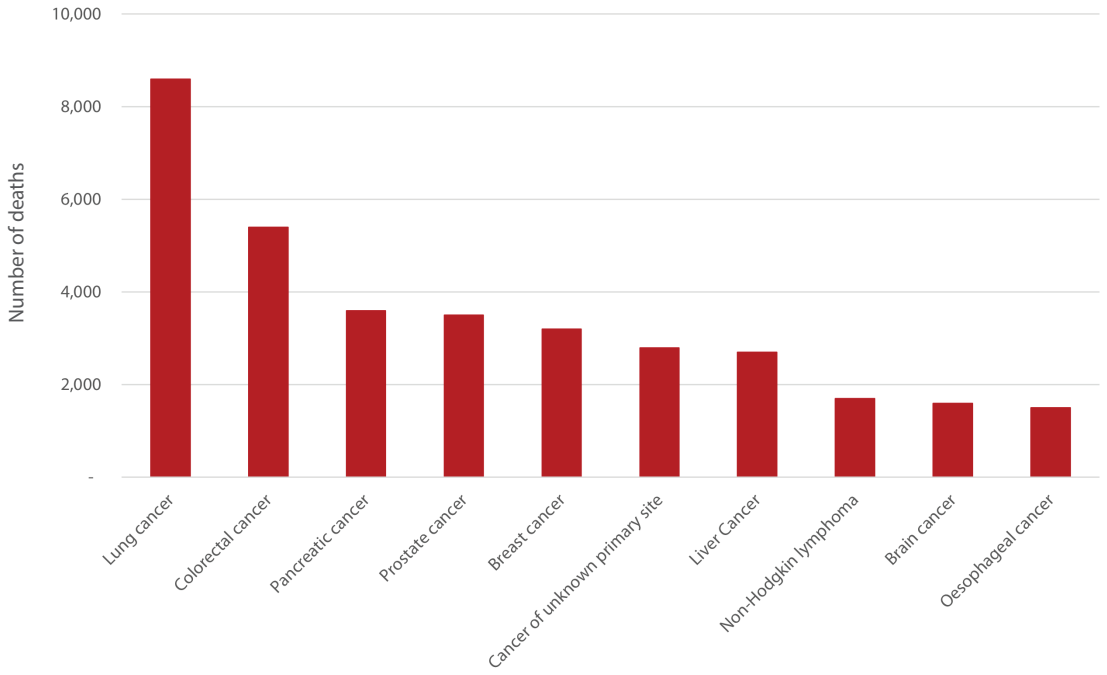
1.3 Cancer mortality in Australia

Cancer is a leading cause of death in Australia, accounting for almost one-third (30%) of all deaths in 2020.[1, 5, 6]

In 2022, it is estimated that 49,996 people (28,002 men and 21,974 women) will die from cancer in Australia. Between 1982 and 2022, the total number of deaths from cancer increased from 24,915 to 49,996. However, the age-standardised mortality rate from cancer has decreased from 209 per 100,000 people in 1982 to 145.3 persons per 100,000 in 2022.[1]

Figure 1.2 shows estimates for the most common causes of cancer-related death in Australia.[1] In 2022, it is estimated that lung cancer will be the most common cause of cancer-related death among men and women in Australia.

Figure 1.2 Most common causes of cancer-related death in Australia (estimates), 2022



Source: Australian Institute of Health and Welfare 2022. Cancer data in Australia. Cat. No. CAN 122. Canberra: AIHW.

1.4 Cancer survival in Australia

Relative survival compares the survival of a group of people diagnosed with cancer to the expected survival of similarly aged people in the general population. Survival rates, such as relative survival, provide information on the likelihood that a person will be alive at a specified point in time (such as five years) following a diagnosis of cancer.[5]

Five-year relative survival for cancer has improved over the past 30 years increasing from 52.2% in 1989–1993 to 70.1% in 2014–2018.[1]

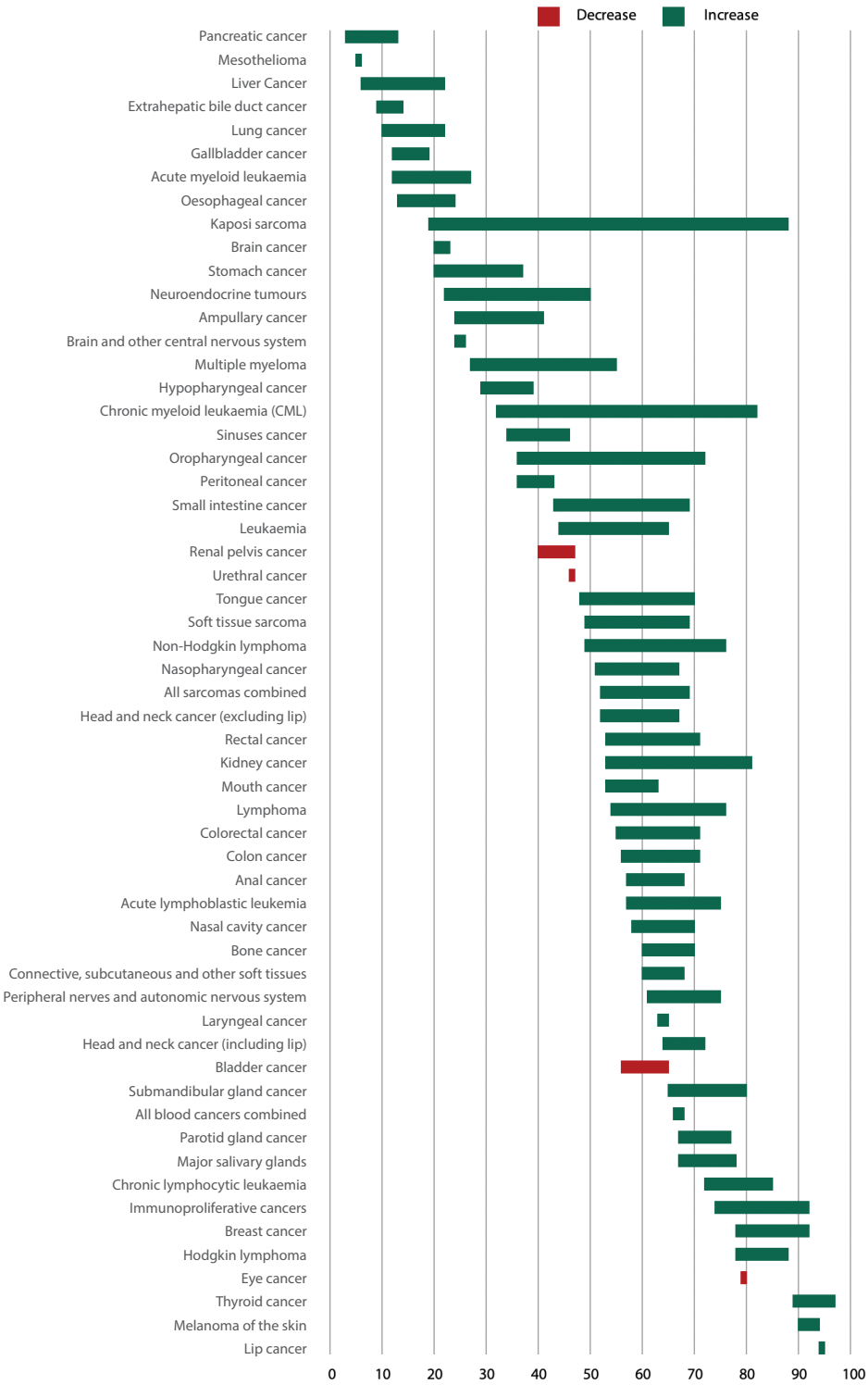
Across the 30 years from 1989–1993 to 2014–2018 five-year relative survival has improved for most cancer types (see Figure 1.3). However, improvements have not been consistent across all cancers. For some cancers, such as mesothelioma and cancers of the lip, larynx, blood and brain, there has been little improvement in survival. For cancers of the bladder, eye, kidney and urethra, survival may have actually decreased (see Figure 1.3).[1]

1.5 Cancer prevalence in Australia

At the end of 2017 in Australia:

- more than 120,000 people living had been diagnosed with cancer in that year
- more than 460,000 people living had been diagnosed with cancer in the previous five years (2013–2017)
- more than 1,200,000 people living had been diagnosed with cancer in the previous 36 years (1982–2017).[1]

Figure 1.3 Change in five-year relative survival by cancer type in Australia from 1989–1993 to 2014–2018



Source: Australian Institute of Health and Welfare 2022. Cancer data in Australia. Cat. No. CAN 122. Canberra: AIHW.

1.6 Cancer burden in Australia

Cancer has a major impact on the Australian community and is the leading contributor to burden of disease. The 'disability-adjusted life year' (DALYs) is a measure of disease burden. It combines data on the extent of premature death with the health impacts of living with a disease. Cancer burden is described as the number of DALYs lost over a specified time period.

In 2018, cancer caused a loss of 881,094 DALYs. This represents 18% of the total burden of disease in Australia in this year. By comparison, cardiovascular disease, musculoskeletal conditions, mental health and substance use disorders each accounted for 13% of the burden of disease.[7]

1.7 Aim of the national audit of funding to cancer research projects and programs

Since 2007, Cancer Australia has provided grant funding for cancer research projects in identified priority areas via the *Priority-driven Collaborative Cancer Research Scheme (PdCCRS)*. Priority areas for the *PdCCRS* are evidence-based and informed by analysis of the national and international cancer research funding landscape. Such evidence is essential to identify opportunities for strategic investment that will have the greatest impact on cancer practice, care, and outcomes.

The aim of this national audit of funding to cancer research projects and programs is to provide evidence to inform research priorities. Audit data may also be of interest to other funders of cancer research and to policy makers, researchers and consumers.

1.8 Scope of the new national audit

This national audit identified direct funding to cancer research projects and programs in Australia over the last three triennia (2012–2014, 2015–2017 and 2018–2020). Together with findings from the two previous audits, it shows how funding for cancer research projects and programs in Australia has changed over six triennia from 2003 to 2020.

Cancer Australia contacted 425 funding organisations identified as potentially providing funding for research in Australia. Correspondence with the organisations confirmed 175 did not fund cancer research projects and programs in the period of 2012–2020. Of the remaining 250 organisations, 124 (50%) provided data on funding for cancer research and programs in the period of 2012–2020.

Funding sources include government and non-government sources. The audit classified cancer research project and programs using the internationally recognised system for classifying cancer research: the Common Scientific Outline (CSO), which uses six main research categories (Biology; Aetiology; Prevention; Early Detection, Diagnosis and Prognosis; Treatment; Cancer Control, Survivorship and Outcomes Research).[8]

This report describes:

- the amount of funding provided to cancer research projects and programs in Australia
- the number of cancer research projects and programs funded in Australia

- the proportional distribution of funding across the six CSO categories, nationally and in each state and territory
- the amount of funding and CSO pattern of funding to different tumour streams and tumour types
- funding to different tumour streams and tumour types by major funding sector
- funding provided to cancer clinical trials research
- the extent of research collaborations.

The report also compares national direct research funding for the main CSO categories in Australia with those for Canada and the United Kingdom (UK), as well as international patterns of research funded by the International Cancer Research Partnership.

1.8.1 Caveats to audit data

While the audit captures clinical trials activity funded in the period 2012–2020 (specifically clinical trials funded through research project and program grant funding), it does not capture clinical trials activity funded by industry or outside specific grant funding.

Commencing in 2019, the NHMRC restructured its funding schemes and introduced the Investigator Grant scheme in place of previous Fellowship schemes. These Fellowship scheme grants were not included in this audit of cancer research projects and programs, being specifically people support grants. Investigator Grants were included as they involve significant and sizeable project/program funding for specific research activities.

The number of organisations providing funding for cancer research in Australia is unknown. While every effort was made to capture all relevant funding sources, the list may not be complete.

The audit did not directly seek information on funding intended for:

- infrastructure
- equipment
- fellowships or scholarships awarded to individuals
- in-kind support provided by staff in cancer research
- routine clinical care, support services, data collection and ongoing monitoring of service delivery and outcomes.

The audit did not capture or measure outputs, findings, or the impact of the funded research.

Information on funding specifically allocated to policy initiatives or practice imperatives is also not included in this report.

In some instances funding data was provided by financial year, with 2019-20 as the most recent period of available data at the time the information was provided. This included grants which were executed in 2020 after the 2019-20 financial year and in such instances, the funding amount was apportioned by the number of calendar years funded by the grant with one calendar year of funding allocated to 2020.

This report presents dollar figures without any adjustment for inflation.

2 Audit methodology

2.1 Approach to the audit

This audit provides updated funding data for cancer research projects and programs conducted in 2012–2020 and uses data from the previous two audits to compare patterns of investment across six triennia: 2003–2005; 2006–2008; 2009–2011; 2012–2014; 2015–2017; and 2018–2020.

Cancer Australia used the same methodology taken in the previous two audits, using a top-down approach to obtain information about cancer research funding in Australia. Potential national and international funders of cancer research were asked to provide simple details of cancer-related research project and program grants for the period 2012–2020. Data received were coded using the CSO classification system.[8]

2.2 Data sources

A more expansive approach was undertaken to identify funders of cancer research for this audit. Organisations previously been invited to contribute to audits were contacted, and a further list of organisations, identified through a comprehensive search of cancer research funding websites and annual reports of organisations undertaking cancer research, were also invited. A total of 425 organisations were identified as providing funding for research in Australia (see Appendix A). This included:

- 361 Australian organisations (including National Health and Medical Research Council (NHMRC) and Australian Research Council (ARC), non-government organisations (including national and state-based Cancer Councils), cancer charities, foundations and medical research institutes)
- 64 international funding agencies and organisations.

Of the 425 organisations contacted, 124 (113 national, 11 international) provided details of grants awarded directly to cancer-related research projects and programs in the period 2012–2020.

Of the remaining organisations:

- 116 did not respond to the invitation
- 175 did not provide data because they did not fund cancer research projects and programs during the 2012–2020 period or did not fund research in Australia
- 14 were unable to provide information due to constraints of time/resources
- 10 (8 national, 2 international) declined to participate in the audit.

Whilst the number of funding organisations that participated in this audit (124) was slightly lower than the previous audit (134), all the major funders of cancer research participated.

2.3 Data collection

Between October 2020 and March 2021, Cancer Australia contacted the 425 organisations identified as providing funding for cancer research in Australia and invited them to provide details of any cancer research funding provided in the period 2012–2020 (see Appendices A–C). Non-responders were followed up approximately four weeks after the initial invitation to verify receipt of the request and answer any questions.

Organisations were asked to provide:

- details of the Chief Investigator and named collaborators/co-Chief Investigators (where available)
- a summary or abstract of the research funded
- amount of funding granted in each calendar year to each cancer research project or program.

Information was requested in an electronic spreadsheet. Following submission to Cancer Australia, data were checked for relevance and inclusion in the audit. Data outside the audit scope (e.g. scholarships, fellowships, special research initiatives) were removed.

2.4 Classification, coding, and analysis of cancer research projects and programs

All data received were entered into a Microsoft Excel database for analysis. Research projects and programs were classified according to the International Cancer Research Partnership (ICRP) coding system for cancer research: the Common Scientific Outline (CSO),[8] and a standard cancer type coding scheme. Coding used an automated coding system followed by manual coding in cases where the automatic coding failed to provide reliable results.

The CSO is a cancer -specific research classification system developed and maintained by the ICRP. The ICRPa[a] maintains a database of research classified by CSO categories.

The CSO system classifies cancer research projects and programs into six simple areas:[b]

1. Biology
2. Aetiology
3. Prevention
4. Early Detection, Diagnosis, and Prognosis
5. Treatment
6. Cancer Control, Survival and Outcomes Research.

[a] Membership of the ICRP includes the United States (US) National Cancer Institute, other US cancer research funding agencies and the UK National Cancer Research Institute.

[b] Seven areas were used for the trienniums 2003–2005, 2006–2008 and 2009–2011, with the addition of 'Research into model systems'.

Each of these codes is subdivided into more specific areas of cancer research, resulting in a total of 34 individual codes (see Appendix D).

Notes relevant to the audit

Data relating to CSO codes relating primarily to infrastructure and person support (i.e. codes 1.5, 2.4, 3.6, 4.4, 5.7, 6.9) were not specifically requested or collected in the audit and are therefore under-represented.

Changes to CSO codes were made in 2015. Research into model systems (CSO 7) is now included in relevant 'Resources & Infrastructure' categories of the six main CSO categories.

Awards previously coded as CSO 1.6 are now coded to either CSO 1.1, 1.2, 1.3, 1.4 or 1.5; and awards previously coded to CSO 6.8 are now coded to CSO 6.1.

2.5 Tumour stream and tumour type

Following allocation to the relevant CSO code, individual cancer research projects and programs were classified by tumour stream and tumour type or types (Appendix E). Tumour stream categories were: Breast cancer; Brain and nervous system cancers; Colorectal cancer; Genitourinary cancers; Gynaecological cancers; Haematological cancers; Head and neck cancers; Lung cancer (including mesothelioma); Musculoskeletal cancer; Skin cancers; Cancer of unknown primary (CUP); and Upper gastrointestinal cancers. Grants for research projects and programs that were not specific to a tumour stream(s) were classified as 'Not tumour stream-specific'.

2.6 Location of research, collaborations and co-funding

Each cancer research project and program was allocated to the state or territory of the Chief Investigator's institution or to the Administering Institution. The number and location of named collaborators was also noted where relevant. Details of organisation(s) co-funding the research were also recorded where relevant.

2.7 Clinical trials, health disciplines, and translational focus

Information about funding for clinical trials was recorded, including the trial phase where applicable, tumour type and health discipline(s) involved in the trial (see Appendix F).

The translational focus of cancer research projects and programs was determined using the CSO code and translational research categories were assigned in accordance with the ICRP Translational Research Methodology (see Appendix G).[8]

2.8 Coding and analysis

For most of the cancer research projects and programs provided, the research description was a media or lay summary rather than a scientific abstract. An analysis of the summary (including the title and keywords where provided) was used to classify the research to an appropriate CSO code.

Coding for around three-quarters of the summaries was performed by the ICRP using an automated coding classification program. Manual coding was undertaken by the ICRP for the remaining projects.

2.9 Ownership and access to data

Data supplied by participants are held in confidence by Cancer Australia. Access to identifiable information is protected and can only be accessed by Cancer Australia staff involved in the audit. Details of individual research projects and programs and their funding amounts will not be published and cannot be accessed without prior agreement from the relevant funding organisation(s).

2.10 Data not included in the audit

This audit should not be regarded as a record of all types of cancer research funding in Australia. The audit does not include funding assigned to infrastructure, equipment, person support, fellowships or scholarships, in-kind support, routine clinical care, support services, data collection and ongoing monitoring of service delivery and outcomes. In addition, the audit does not include direct funding from organisations to cancer research where allocations to specific cancer research projects could not be identified. Funding within these categories includes: funding of in-house research by some state/territory Cancer Councils; funds provided to research institutes by internal foundations that was not in the form of a specific award or grant; and funds towards the establishment of centres conducting cancer research.

2.11 Oversight and review of the audit

The audit scope and methodology were informed by input from members of Cancer Australia's Research and Data Advisory Group (RDAG). This group includes experts in cancer research, data and policy and includes consumer representation (see Acknowledgements).

An expert Working Group was established with members from the RDAG to provide advice on data collection, analysis and reporting (see Acknowledgements). The Working Group provided advice on data items to be collected, potential funders to be approached, inclusion and exclusion criteria and analysis of the final data set.

The Working Group and members of the RDAG reviewed and provided input on a draft of the audit report.

3 Direct funding for cancer research projects and programs

Key findings

- In the period 2012–2020:
  - $2.12 billion (B) was provided in direct funding to 4,813 cancer research projects and programs in Australia.
- Across the six triennia from 2003–2005 to 2018–2020:
  - a total of $3.43B was provided in direct funding to 9,241 cancer research projects and programs in Australia:
    - **2003–2005**: $292 million (M) for 1,332 projects
    - **2006–2008**: $413M for 1,596 projects
    - **2009–2011**: $596M for 2,100 projects
    - **2012–2014**: $539M for 1,870 projects
    - **2015–2017**: $652M for 2,152 projects
    - **2018–2020**: $934M for 2,231 projects.
  - the total direct funding provided and the number of cancer research projects and programs increased for all states and territories except Tasmania.

3.1 Organisations included in the audit

The 124 organisations included in this report are major funders of cancer research that contributed to the two previous national audits, including the NHMRC, Cancer Australia, Cancer Councils, state government agencies, research institutes and major national cancer foundations. In addition, the Health and Medical Research Office (Medical Research Future Fund, MRFF, the Department of Health and Aged Care) was also approached.

3.2 National research investment

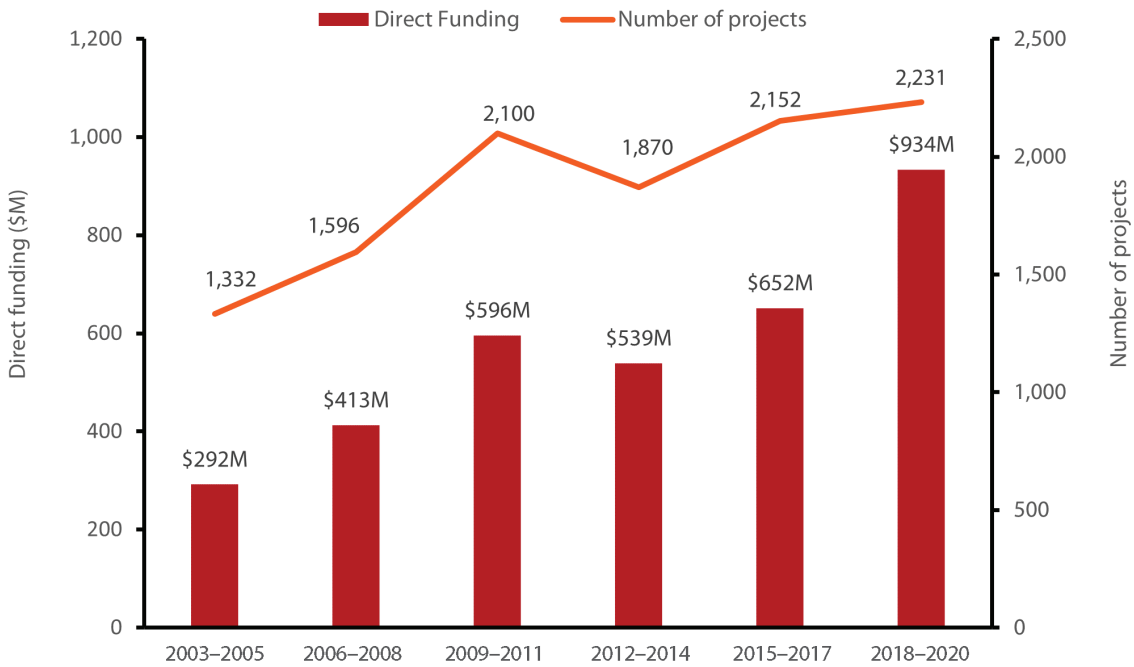
This audit identified total direct funding of $2.12B for 4,813 cancer research projects and programs in Australia during the period 2012–2020.

Adding to the results of the two previous national audits, this means a total of $3.43B in direct funding for 9,241 cancer research projects and programs was identified in the six triennia from 2003–2005 to 2018–2020 (see Figure 3.1).

Direct funding to cancer research projects and programs generally increased across each triennium. A decrease was observed in the 2012–2014 triennium, which could be due in part to a difficulty for some participating organisations in accessing older funding data at the time this audit was undertaken. Overall, from 2003–2005 to 2018–2020, there was a 220% increase in direct funding to cancer research projects and programs.

The number of cancer research projects and programs funded generally increased across each triennium. A similar decrease was observed for the 2012–2014 triennium as that described for direct funding. Overall, from 2003–2005 to 2018–2020, there was a 67% increase in the number of cancer research projects and programs funded. Please note: some cancer research projects and programs were funded in more than one triennium.

Figure 3.1 Direct funding to and number of cancer research projects and programs in Australia, 2003–2005 to 2018–2020

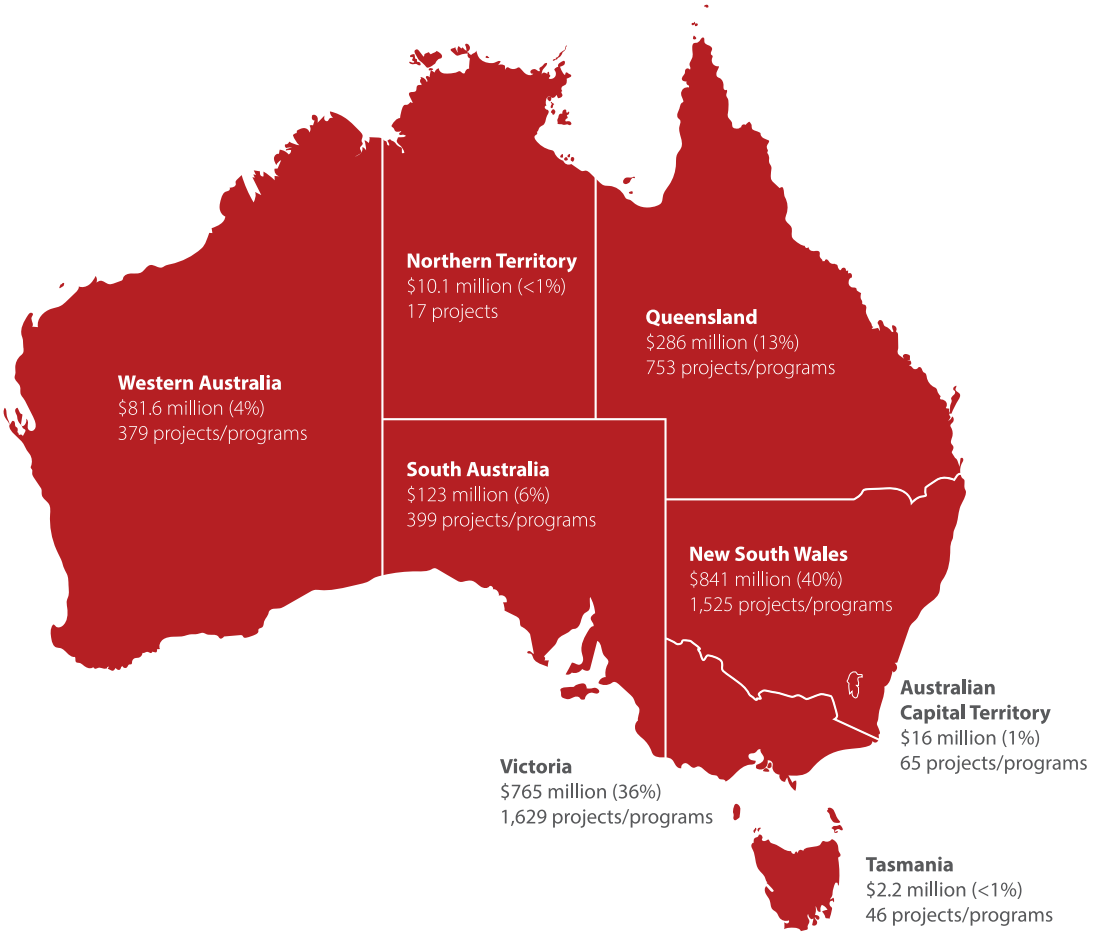


Note: Some projects and programs overlap triennia, thus the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium from 2003–2005 to 2018–2020.

3.3 State and territory distribution of funding

Figure 3.2 shows the state and territory distribution of direct funding to cancer research projects and programs in the period 2012–2020. Funding distribution was allocated by the location of the Chief Investigator's Institution or Administering Institution.

Figure 3.2 State and territory distribution of direct funding to cancer research projects and programs in Australia, 2012–2020



In the period 2012–2020, New South Wales, Victoria and Queensland together received 89% of identified direct funding to cancer research projects and programs in Australia. Table 3.1 provides a detailed comparison of direct funding provided to each state and territory over the six triennia from 2003–2005 to 2018–2020.

The total funding to cancer research projects and programs increased between 2003–2005 and 2018–2020 for all states and territories except Tasmania.

Table 3.1 State and territory distribution of direct funding to cancer research projects and programs by triennium, 2003–2005 to 2018–2020

State/Territory	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
New South Wales						
Funding	$72.6M	$118M	$175M	$203M	$238M	$400M
% of funding	25%	29%	29%	38%	36%	43%
No. projects/ programs	379	445	627	632	675	716
Queensland						
Funding	$56.8M	$69.6M	$95.1M	$87.4M	$96.3M	$102M
% of funding	19%	17%	16%	16%	15%	11%
No. projects/ programs	264	285	359	298	364	317
South Australia						
Funding	$24.4M	$27.7M	$35.7M	$35.0M	$34.8M	$53.1M
% of funding	8%	7%	6%	6%	5%	6%
No. projects/ programs	135	129	179	147	146	188
Tasmania						
Funding	$3.6M	$4.8M	$7.8M	$0.4M	$0.3M	$1.5M
% of funding	1%	1%	1%	<1%	<1%	<1%
No. projects/ programs	28	37	40	16	11	22
Victoria						
Funding	$114M	$168M	$249M	$181M	$246M	$332M
% of funding	39%	41%	42%	34%	38%	36%
No. projects/ programs	413	566	721	599	738	756
Western Australia						
Funding	$16.3M	$18.7M	$28.0M	$23.8M	$26.4M	$31.1M
% of funding	6%	5%	5%	4%	4%	3%
No. projects/ programs	91	113	151	136	171	165
Australian Capital Territory						
Funding	$3.4M	$5.2M	$3.9M	$3.9M	$5.5M	$6.7M
% of funding	1%	1%	<1%	<1%	<1%	<1%
No. projects/ programs	18	19	19	26	32	25
Northern Territory						
Funding	$0.1M	$0.6M	$1.2M	$3.9M	$4.2M	$2.0M
% of funding	<1%	<1%	<1%	<1%	<1%	<1%
No. projects/ programs	3	2	4	8	6	8

Note: Some projects and programs overlap triennia; the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium from 2003–2005 to 2018–2020.

4 Sources of funding for cancer research projects and programs

Key findings

» In the period 2012–2020:

- the Australian Government [c] was the largest funder of cancer research projects and programs, providing 58% of the direct funding identified in the audit
- 4,277 cancer research projects and programs (88%) were funded by a single funding source (representing 89% of direct funding)
- 586 cancer research projects or programs (12%) were co-funded from two or more funding sources:
  - the Australian Government and cancer foundations co-funded 359 cancer research projects and programs (61% of co-funded projects)
  - Cancer Australia funded 143 cancer research projects and programs (24% of co-funded projects).

» Between 2003–2005 and 2018–2020:

- the amount of direct funding provided by all major funding sources to Australian cancer research projects and programs increased in each triennium
- direct funding from cancer foundations for cancer research projects and programs increased more than nine-fold and funding from state and territory governments increased almost five-fold.

4.1 Sources of direct funding for cancer research projects and programs in Australia[d]

Figure 4.1 shows the proportion of funding provided by different funding sources to cancer research projects and programs in Australia. Total direct funding and number of cancer research projects and programs provided by major funders in the period 2012–2020 were:

[c] Australian Government sources includes the NHMRC, MRFF and other Australian Government departments and agencies, including Cancer Australia.

[d] For co-funded cancer research projects or programs, the total funding amount was allocated to the funding partner providing the majority of funds; this funding partner is listed as primary funder. For co-funded cancer research projects and programs where the majority funder was not identified, total funding was allocated to the funder that submitted the funding data to Cancer Australia.

- NHMRC: $1.0B (47% of total funding), 1,400 research projects and programs
- other Australian Government sources:[e] $220M (10% of total funding), 410 research projects and programs:
  - Medical Research Future Fund (MRFF):[f] $112M (5.2% of total funding), 108 research projects and programs
  - Cancer Australia: $74.6M (3.5% of total funding), 207 research projects and programs
  - Australian Research Council: $20.1M (0.9% of total funding), 73 research projects and programs
  - Department of Health and Aged Care:[g] $7.3M (0.4% of total funding), 16 research projects and programs)
  - AusIndustry: $5.6M (0.3% of total funding), 4 research projects and programs
  - Department of Veterans' Affairs and Commonwealth Department of Industry, Science, Energy and Resources combined: $0.3M (less than 0.1% of total funding), 1 research project each
- State and territory governments: $252M (12% of total funding), 255 research projects and programs
- State and Territory Cancer Councils: $199M (9% of total funding), 711 research projects and programs
- Cancer foundations:[h] $229M (11% of total funding), 842 research projects and programs
- Medical research institutes, hospitals and foundations:[i] $96.2M (5% of total funding), 682 research projects and programs
- International funders: $50.2M (2% of total funding), 96 research projects and programs
- Universities: $35.6M (2% of total funding), 366 research projects and programs
- Other sources:[j] $35.2M (2% of total funding), 17 research projects and programs
- Industry: $2.1M (0.1% of total funding), 15 research projects and programs
- Philanthropy: $1.8M (0.1% of total funding), 19 research projects and programs.

[e] Other Australian Government sources include many other Australian Government departments and agencies. The major source of funding were the Department of Health, the Department of Industry, the Australian Research Council and Cancer Australia.

[f] MRFF investment data is accurate as at October 2020. Where additional grants/projects were executed in 2020 but funding allocated after the 19-20 financial year, the funding amount is indicative, i.e., apportioned to 2020 taking total funding period into account.

[g] Department of Health and Aged Care funding does not include MRFF funding.

[h] Cancer foundations include foundations that provide funds specifically to cancer research (e.g. National Breast Cancer Foundation, Leukaemia Foundation, and Prostate Cancer Foundation of Australia).

[i] This category includes medical research institutes and hospitals, their associated foundations and foundations dedicated to medical research.

[j] Other sources of funding were Cancer Therapeutics CRC, CRC for Biomarker Translation and pharmaceutical industry.

Figure 4.1 Proportion of funding to cancer research projects and programs by funding source, 2012–2020

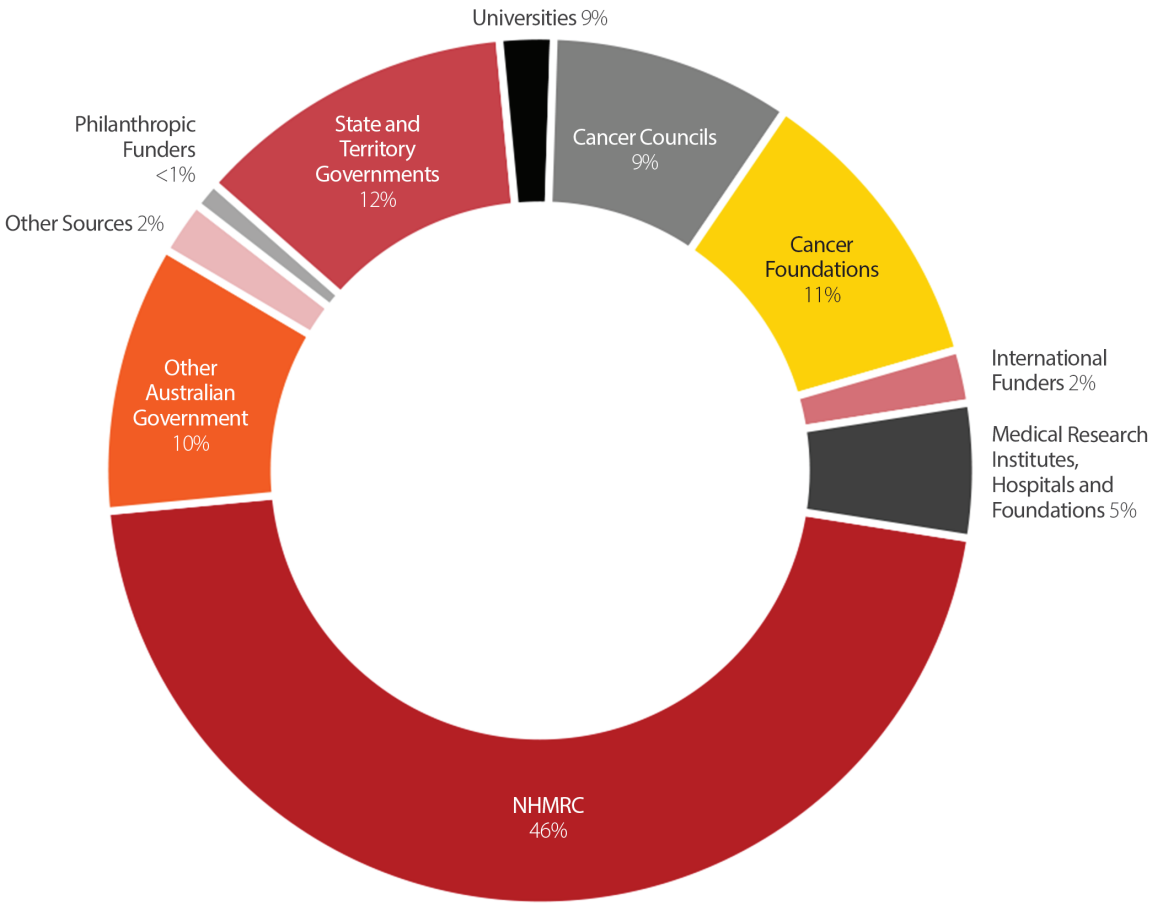


Table 4.1 compares the funding provided and number of cancer research projects and programs funded in each of the triennia 2003–2005 to 2018–2020, by funding source. While there was some variation between triennia, direct funding and number of cancer research projects and programs funded increased from most sources between 2003–2005 and 2018–2020. The exception was total funding and number of projects funded by international funders and philanthropic funders, both of which were lower in 2018–2020 compared with 2003–2005.

Table 4.1 Total direct funding, percentage of total direct funding and number of cancer research projects and programs funded, by major funding source and triennium, 2003–2005 to 2018–2020

Funding source	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Australian Government						
Funding	$190M	$285M	$380M	$346M	$361M	$518M
% of funding	65%	70%	64%	64%	55%	55%
No. projects/ programs	572	741	968	857	908	850
Cancer Councils						
Funding	$24.2	$41.7M	$54.0M	$64.1M	$68.8M	$66.4M
% of funding	8%	10%	9%	12%	11%	7%
No. projects/ programs	257	340	371	304	333	276
State and territory governments						
Funding	$9.2M	$23.1M	$52.5M	$42.6M	$84.2M	$124.8M
% of funding	3%	6%	9%	8%	13%	13%
No. projects/ programs	13	62	147	85	119	128
Cancer foundations						
Funding	$10.2M	$20.5M	$53.4M	$59.2M	$73.3M	$96.6M
% of funding	4%	5%	9%	11%	11%	10%
No. projects/ programs	99	185	292	289	348	428
International funders						
Funding	$37.6M	$25.4M	$16.9M	$8.7M	$16.2M	$25.2M
% of funding	13%	6%	3%	1.6%	2.5%	2.7%
No. projects/ programs	158	89	51	44	45	41
Other sources						
Funding	$7.6M	$6.4M	$22.7M	$0.03M	$17.3M	$17.7M
% of funding	3%	2%	4%	(<0.1%)	2.7%	1.8%
No. projects/ programs	6	10	21	2	7	10
Medical research institutes, hospitals and foundations						
Funding	$6.9M	$6.8M	$12.4M	$16.0M	$15.4M	$64.9
% of funding	2%	2%	2%	3%	2%	7%
No. projects/ programs	118	79	141	195	232	333
Universities						
Funding	$4.2M	$2.3M	$3.3M	$2.3M	$15.2M	$18.1M
% of funding	1%	0.1%	0.1%	0.4%	2.3%	1.9%
No. projects/ programs	96	71	94	87	151	144

Funding source	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Philanthropic funders						
Funding	$1.3M	$0.9M	$1.5M	$0.6M	$0.2M	$0.9M
% of funding	<1%	<1%	<1%	0.1%	<0.1%	0.1%
No. projects/ programs	15	19	15	6	5	9

Note: Some projects and programs overlap triennia, thus the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium from 2003–2005 to 2018–2020.

4.2 Co-funding of cancer research projects and programs by funding sector

In the period 2012–2020, 4,227 cancer research projects and programs (88%) were supported by a single funding source ($1.9B, representing 89% of total direct funding). The remaining 586 cancer research projects or programs (12%) were supported by two or more co-funders ($238M, representing 11% of total direct funding).[k]

Of the 586 co-funded cancer research projects and programs:

- 493 (84%) were funded by two sources
- 67 (11%) were funded by three sources
- 19 (3%) were funded by four sources
- 7 (1%) were funded by five sources.

4.2.1 Co-funding across the six triennia from 2003-2005 to 2018-2020

Table 4.2 shows there has been an increase in total funding and proportion of funding allocated to co-funded projects over time. The number of projects funded also initially increased but has plateaued since the 2009–2011 triennium, which coincides with the establishment of Cancer Australia's Priority-driven Collaborative Cancer Research Scheme (PdCCRS).

Table 4.2 Total direct funding, percentage of total direct funding and number of cancer research projects and programs co-funded, 2003—2005 to 2018–2020

Co-funding	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Funding	$4.3M	$16.3M	$50.9M	$53.1M	$67.3M	$118M
% of funding	1.5%	3.9%	8.6%	9.8%	10.3%	12.6%
No. projects/ programs	39	121	259	249	246	274

[k] The co-funder could not be identified for 39 projects.

4.2.2 Impact of the Priority-driven Collaborative Cancer Research Scheme on co-funding of cancer research projects and programs

In 2007, Cancer Australia commenced the Priority-driven Collaborative Cancer Research Scheme (PdCCRS). In this scheme, Cancer Australia collaborates with other funding organisations to co-fund peer-reviewed cancer research projects in identified priority areas. The first projects funded under this scheme commenced in 2008.

In the period 2012–2020, the PdCCRS funded 259 cancer research projects, 144 (56%) of which were co-funded. This represents 25% of all co-funded cancer research projects and programs during this period.

Since the introduction of the scheme in the 2006–2009 triennium to the 2018–2020 triennium, the PdCCRS has funded 387 cancer research projects, 234 (60%) of which were co-funded. Projects co-funded through the PdCCRS represent 26% of the 902 co-funded cancer research projects and programs during this period, with a total value of $64.4M. This represents 21% of the $305.5M in co-funding provided during this period.

Co-funding from Cancer Australia through the PdCCRS

Across the triennia from 2006–2008 to 2018–2020, co-funding from Cancer Australia increased proportionally from 16% (2006–2008) to 42% (2009–2011) of all co-funding. Co-funding from Cancer Australia decreased in each subsequent triennium to 11% in 2018–2020, indicating that co-funding from other funding sources proportionally increased over this time.

By triennium, Cancer Australia's co-funding is summarised as follows:

- 2006–2008: 18 projects/programs (15% of all co-funded projects; 1.1% of all research projects and programs), $2.7M(16% of co-funding; 0.6% of total direct funding)
- 2009–2011: 89 projects/programs (34 % of all co-funded projects; 4.2% of all research projects and programs), $21.6M (42% of co-funding; 3.6% of total direct funding)
- 2012–2014: 74 projects/programs (30 % of all co-funded projects; 4.0% of all research projects and programs, $15.9M (31% of co-funding; 3.0% of total direct funding)
- 2015–2017: 58 projects/programs (24% of all co-funded projects; 2.7% of all research projects and programs, $11.2M (17% of co-funding; 1.7% of total direct funding)
- 2018–2020: 60 projects/programs (22% of all co-funded projects; 2.7% of all projects), $12.7M (11% of co-funding; 1.4% of total direct funding).

5 Classification of cancer research funding by Common Scientific Outline

Key findings

- In the period 2012–2020, of the $2.12B in direct funding for cancer research projects and programs in Australia:
  - 38% ($808M) was for **Treatment** research
  - 23% ($488M) was for **Biology** research
  - 18% ($373M) was for **Early Detection**, **Diagnosis** and **Prognosis** research
  - 10% ($203M) was for **Aetiology** research
  - 9% ($192M) was for **Cancer Control**, **Survivorship and Outcomes Research**
  - 3% ($61.2M) was for **Prevention** research.
- Between 2003–2005 and 2018–2020:[I]
  - direct funding increased for all CSO categories (with some variation up and down by individual triennium)
  - the largest increase in direct funding ($55.0M to $394M) and proportional funding (19% to 42%) was for Treatment research
  - direct funding for Biology research increased from $148M to $156M but this represented the largest overall decrease in proportional funding (51% to 17%)
  - the number of cancer research projects and programs funded increased for most CSO categories (with the exception of a decrease seen for Biology and no substantive change for Prevention).
- Translational research categories between 2003–2005 and 2018–2020:
  - direct funding increased for all translational research categories, with the largest increase in the early translational research category
  - the number of cancer research projects and programs funded increased for all translational research categories, with the exception of Not translational
  - proportional funding decreased for Not translational, increased for Early translational and Translational/clinical and remained fairly consistent for Translational (larger increase in 2018–2020) and Patient-oriented translational research.

[I] 'Scientific Model Systems' was a seventh CSO category up to 2015; research funded under this category has been included in the relevant 'Resources & Infrastructure' categories of CSO 1 to CSO 6. CSO 7 is not included as a category in this report; proportional distributions are calculated based on funding provided in categories CSO 1 to CSO 6 only and, as such, a small amount of the total funding may not be included in totals up to 2015.

5.1 National pattern of funding to CSO categories

Each cancer research project or program was classified using the CSO category and sub-category (see Table 5.1) that best reflected the primary focus of the research project or program.

Table 5.1 Research sub-categories in each CSO category

CSO category	Sub-categories
Biology	Normal functioning
	Cancer initiation: alterations in chromosomes
	Cancer initiation: oncogenes and tumour suppressor genes
	Cancer progression and metastasis
	Resources and infrastructure
Aetiology	Exogenous factors in the origin and cause of cancer
	Endogenous factors in the origin and cause of cancer
	Interactions of genes and/or genetic polymorphisms with exogenous and/or endogenous factors
	Resources and infrastructure related to aetiology
Prevention	Interventions to prevent cancer: personal behaviours (non-dietary) that affect cancer risk
	Dietary interventions to reduce cancer risk and nutritional science in cancer prevention
	Chemoprevention and other medical interventions
	Vaccines
	Complementary and alternative prevention approaches
	Resources and infrastructure related to prevention
Early Detection, Diagnosis and Prognosis	Technology development and/or marker discovery
	Technology and/or marker evaluation with respect to fundamental parameters of method
	Technology and/or marker testing in a clinical setting
	Resources and infrastructure related to detection, diagnosis, or prognosis
Treatment	Localised therapies – discovery and development
	Localised therapies – clinical applications
	Systemic therapies – discovery and development
	Systemic therapies – clinical applications
	Combinations of localised and systemic therapies
	Complementary and alternative treatment approaches
	Resources and infrastructure related to treatment and the prevention of recurrence

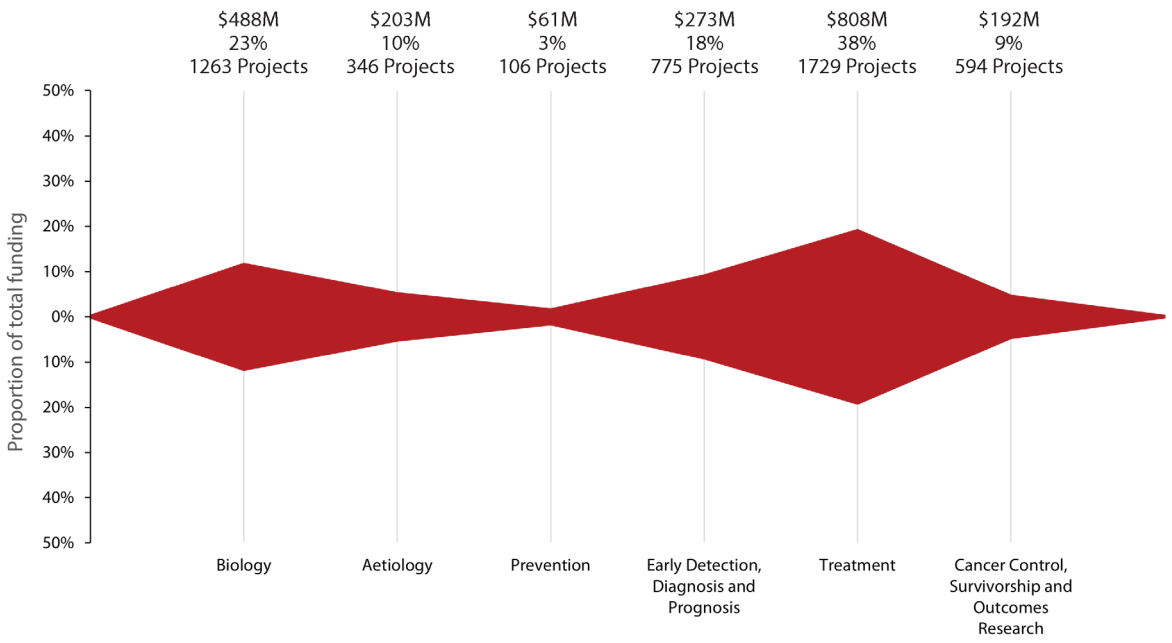
CSO category	Sub-categories
Cancer Control, Survivorship, and Outcomes Research	Patient care and survivorship issues
	Surveillance
	Population-based behavioural factors
	Health services, economic and health policy analyses
	Education and communication research
	End-of-life care
	Research on ethics and confidentiality
	Resources and infrastructure related to cancer control, survivorship, and outcomes research

5.1.1 Funding pattern 2012-2020

Figure 5.1 shows the proportional distribution of funding to the main CSO categories for cancer research projects and programs during 2012–2020.

The highest proportion of direct funding for cancer research projects and programs was for Treatment research (38%). The smallest proportion was for Prevention research (3%).

Figure 5.1 Proportion of direct funding for cancer research projects and programs in Australia by CSO category, 2012–2020



5.1.2 Comparison of funding patterns by triennium, 2003-2005 to 2018-2020

Table 5.2 lists the level of funding and number of cancer research projects and programs in each CSO category by triennium from 2003–2005 to 2018–2020.

When comparing the first and last triennia, **direct funding** for cancer research projects and programs increased for all CSO categories. The most consistent year-on-year increase in direct funding was seen for Treatment; other categories saw some variation up and down by individual triennium.

The pattern of direct funding for each CSO category by triennium between 2003–2005 and 2018–2020 was:

1. **Biology:** increased from $148M in 2003–2005 to $194M in 2009–2011, decreasing to $156M in 2018–2020
2. **Aetiology:** increased from $19.9M in 2003–2005 to $78.9M in 2018–2020, with some fluctuations across triennia
3. **Prevention:** increased from $15.2M in 2003–2005 to $21.7M in 2018–2020, with a drop to $8.7M in 2006–2008
4. **Early Detection, Diagnosis and Prognosis:** increased from $21.9M in 2003–2005 to $196M in 2018–2020 with fluctuations across triennia
5. **Treatment:** increased consistently by triennium from $55.1M in 2003–2005 to $394M in 2018–2020
6. **Cancer Control, Survivorship and Outcomes Research:** increased from $27.4M in 2003–2005 to $87.1M in 2018–2020 with fluctuations across triennia.

When comparing the first and last triennia, the **number** of funded cancer research projects and programs increased for most CSO categories, with the exception of Biology (in which the number decreased) and Prevention (which stayed at about the same level).

The pattern of number of cancer research projects and programs funded between 2003–2005 and 2018–2020 was:

1. **Biology**: decreased from 602 in 2003–2005 to 455 in 2018–2020, with a peak of 689 projects funded in 2009–2011
2. **Aetiology**: increased from 80 in 2003–2005 to 129 in 2018–2020, with a peak of 177 projects funded in 2012–2014
3. **Prevention**: similar number across triennia (42 in 2003–2005 and 49 in 2018–2020), with a peak of 52 projects funded in 2009–2011

4. Early Detection, Diagnosis and Prognosis: increased from 120 in 2003–2005 to 408 in 2018–2020, with a fairly consistent increase seen in most triennia
5. Treatment: increased from 290 in 2003–2005 to 900 in 2018–2020, with an increase seen in each triennium
6. Cancer Control, Survivorship and Outcomes Research: increased from 176 in 2003–2005 to 290 in 2018–2020, with fluctuations across triennia.

Table 5.2 Direct funding and number of cancer research projects and programs funded in Australia by CSO category, 2003–2005 to 2018–2020

CSO category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Biology						
Funding	$148M	$156M	$194M	$167M	$164M	$156M
No. projects/ programs	602	557	689	609	620	455
Aetiology						
Funding	$19.9M	$40.6M	$48.4M	$63.8M	$60.5M	$78.9M
No. projects/ programs	80	146	143	177	159	129
Prevention						
Funding	$15.2M	$8.7M	$13.6M	$21.3M	$18.2M	$21.7M
No. projects/ programs	42	42	52	44	46	49
Early Detection, Diagnosis and Prognosis						
Funding	$21.9M	$54.6M	$94.5M	$73.5M	$103M	$196M
No. projects/ programs	120	199	296	257	299	408
Treatment						
Funding	$55.1M	$110M	$168M	$169M	$245M	$394M
No. projects/ programs	290	414	558	569	786	900
Cancer Control, Survivorship and Outcomes Research						
Funding	$27.4M	$29.6M	$54.5M	$44.5M	$60.6M	$87.1M
No. projects/ programs	176	175	261	214	242	290

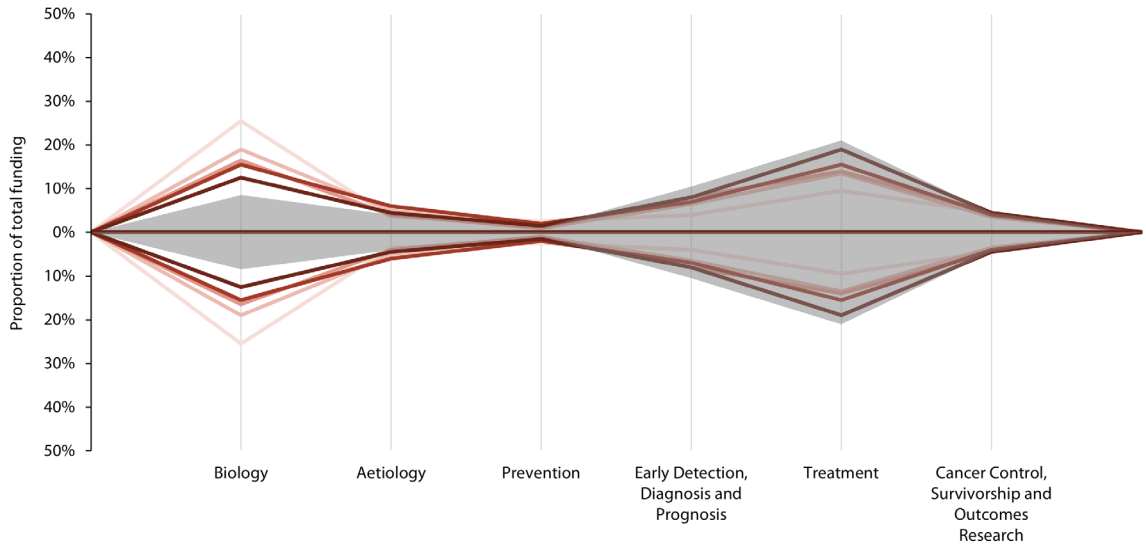
Note: Some projects and programs overlap triennia, thus the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium from 2003–2005 to 2018–2020.

Figure 5.2 shows the changes in pattern of proportional funding to each CSO category across the six triennia.

The overall pattern of proportional funding by CSO category between 2003–2005 and 2018–2020 was:

1. **Biology:** decreased from 51% in 2003–2005 to 19% in 2018–2020
2. **Aetiology:** fairly consistent over time (7% of funding in 2003–2005 and 8% in 2018–2020) with small changes by triennium
3. **Prevention:** consistently the lowest in each triennium (5% in 2003–2005 decreasing to 2% in 2018–2020)
4. **Early Detection, Diagnosis and Prognosis:** increased from 8% in 2003–2005 to 21% in 2018–2020
5. **Treatment:** largest increase from 19% in 2003–2005 to 42% in 2018–2020
6. **Cancer Control, Survivorship and Outcomes Research:** consistent at 9% in 2003–2005 and 2018–2020.

Figure 5.2 Proportional funding for cancer research projects and programs in Australia by CSO category as a percentage of total direct funding, 2003–2005 to 2018–2020



	Triennium	Proportion of total funding by CSO category and triennium					
	2003–2005	51%	7%	5%	8%	19%	9%
	2006–2008	38%	10%	2%	13%	27%	7%
	2009–2011	33%	8%	2%	16%	28%	9%
	2012–2014	31%	12%	4%	14%	31%	8%
	2015–2017	25%	9%	3%	16%	38%	9%
	2018–2020	17%	8%	2%	21%	42%	9%

5.2 Analysis of direct funding to CSO sub-categories

5.2.1 Biology (CSO category 1)

Table 5.3 shows the pattern of direct funding for each Biology sub-category between 2003–2005 and 2018–2020.

CSO sub-categories for Biology

1.1 Normal functioning
1.2 Cancer initiation: alterations in chromosomes
1.3 Cancer initiation: oncogenes and tumour suppressor genes
1.4 Cancer progression and metastasis
1.5 Resources and infrastructure

The pattern of direct funding in each Biology sub-category was:

1.1 **Normal functioning:** decreased from $93.2M in 2003–2005 to $41.2M in 2018–2020; fluctuations were seen by triennium with the lowest level in 2012–2014 ($22.9M)

1.2 **Cancer initiation: alterations in Chromosomes**: increased from $17.5M in 2003–2005 to $38.1M in 2012–2014, decreasing to $24.4M in 2018–2020

1.3 **Cancer initiation: oncogenes and tumour suppressor genes**: increased from $14.9M in 2003–2005 to $44.7M in 2012–2014, decreasing to $29.1M in 2018–2020

1.4 **Cancer progression and metastasis:** increased from $22.0M in 2003–2005 to $55.9M in 2012–2014, decreasing to $50.3M in 2018–2020

1.5 **Resources and infrastructure:**[m] remained below $1M between 2003–2005 and 2009–2011 and then increased to $10.M in 2018–2020.

[m] The 'Resources and Infrastructure' sub-category deals with research support mechanisms and, since 2012, development of new model systems. As this audit focused on direct funding to cancer research projects and programs, we would not expect spending in this sub-category to be well represented for some CSO categories, particularly prior to 2012.

Table 5.3 Direct funding for cancer research projects and programs in CSO 1 Biology, 2003–2005 to 2018–2020

CSO 1 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Normal functioning						
Funding	$93.2M	$63.5M	$68.2M	$22.9M	$27.3M	$41.2M
No. projects/ programs	309	158	184	83	79	49
Cancer initiation: alterations in chromosomes						
Funding	$17.5M	$24.8M	$32.7M	$38.1M	$36.5M	$24.4M
No. projects/ programs	91	101	143	105	118	87
Cancer initiation: oncogenes and tumour suppressor genes						
Funding	$14.9M	$37.3M	$36.3M	$44.7M	$35.9M	$29.1M
No. projects/ programs	87	125	156	185	163	94
Cancer progression and metastasis						
Funding	$22.0M	$30.3M	$46.6M	$55.9M	$54.4M	$50.3M
No. projects/ programs	114	171	203	208	242	201
Resources and infrastructure						
Funding	$0.07M	$0.3M	$0.4M	$4.1M	$10.0M	$10.2M
No. projects/ programs	1	2	3	20	16	17

5.2.2 Aetiology (CSO category 2)

Table 5.4 shows the pattern of direct funding for each Aetiology sub-category between 2003–2005 and 2018–2020.

CSO sub-categories for Aetiology

2.1 Exogenous factors in the origin and cause of cancer
2.2 Endogenous factors in the origin and cause of cancer
2.3 Interactions of genes and/or genetic polymorphisms with exogenous and/or endogenous factors
2.4 Resources and Infrastructure related to aetiology

The pattern of direct funding in each Aetiology sub-category was:

2.1 **Exogenous factors in the origin and cause of cancer:** increased from $3.3M in 2003–2005 to $13.1 M in 2009–2011, decreasing to $10.7M in 2018–2020

2.2 **Endogenous factors in the origin and cause of cancer:** increased from $8.5M in 2003–2005 to $52.1M in 2018–2020

2.3 **Interactions of genes and/or genetic polymorphisms with exogenous and/or endogenous factors:** increased from $4.9 M in 2003–2005 to $15.4 M in 2012–2014, decreasing to $5.0M in 2018–2020

2.4 **Resources and infrastructure related to aetiology:** increased from $3.2M in 2003–2005 to $12.4 M in 2018–2020, with fluctuations across triennia.

Table 5.4 Direct funding for cancer research projects and programs in CSO 2 Aetiology, 2003–2005 to 2018–2020

CSO 2 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Exogenous factors in the origin and cause of cancer						
Funding	$3.3M	$11.5M	$13.1M	$11.3M	$8.5M	$10.7M
No. projects/ programs	31	47	52	49	36	27
Endogenous factors in the origin and cause of cancer						
Funding	$8.5M	$7.6M	$12.4M	$24.8M	$31.7M	$52.1M
No. projects/ programs	28	39	40	85	81	68
Interactions of genes and/or genetic polymorphisms with exogenous and/or endogenous factors						
Funding	$4.9M	$12.2M	$14.4M	$15.4M	$10.3M	$5.0M
No. projects/ programs	10	43	36	31	29	22
Resources and infrastructure related to aetiology						
Funding	$3.2M	$9.3M	$8.4M	$12.4M	$9.7M	$10.3M
No. projects/ programs	11	17	15	11	12	11

5.2.3 Prevention (CSO category 3)

Table 5.5 shows the pattern of direct funding observed for each Prevention sub-category between 2003–2005 and 2018–2020.

CSO sub-categories for Prevention

3.1 Interventions to prevent cancer: personal behaviours that affect Cancer Risk
3.2 Dietary interventions to reduce cancer risk and nutritional science in cancer prevention
3.3 Chemoprevention and other medical interventions
3.4 Vaccines
3.5 Complementary and alternative prevention approaches
3.6 Resources and infrastructure related to prevention

The pattern of direct funding in each Prevention sub-category was:

3.1 **Interventions to prevent cancer: personal behaviours that affect cancer risk**: increased from $0.7M in 2003–2005 to $4.3M in 2018–2020 with fluctuations across triennia

3.2 **Dietary interventions to reduce cancer risk and nutritional science in cancer prevention:** increased from $0.2M in 2003–2005 to $3.9M in 2009–2011, decreasing to $0.4M in 2018–2020

3.3 **Chemoprevention and other medical interventions:** decreased from $3.5M in 2003–2005 to $0.5M in 2006–2008, increasing to $7.3M in 2018–2020 with fluctuations across triennia

3.4 **Vaccines:** fluctuated across triennia, with the highest investment in 2003–2005 ($10.1M) and the lowest in 2009–2011 ($1.4M)

3.5 **Complementary and alternative prevention approaches:** no funding in 2003–2005 and 2018–2020; ranged from a high of $2.6M in 2006–2008 to a low of $0.8M in 2012–2014

3.6 **Resources and infrastructure related to prevention:** below $1M in the first four triennia, increasing to $7.5M in 2018–2020.

Table 5.5 Direct funding for cancer research projects and programs in CSO 3 Prevention sub-categories, 2003–2005 to 2018–2020

CSO 3 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Interventions to prevent cancer: personal behaviours that affect cancer risk						
Funding	$0.7M	$3.3M	$4.6M	$2.2M	$3.0M	$4.3M
No. projects/ programs	5	15	17	10	9	15
Dietary interventions to reduce cancer risk and nutritional science in cancer prevention						
Funding	$0.2M	$0.4M	$3.9M	$2.9M	$2.3M	$0.4M
No. projects/ programs	3	4	16	8	3	5
Chemoprevention and other medical interventions						
Funding	$3.5M	$0.5M	$1.8M	$5.2M	$4.0M	$7.3M
No. projects/ programs	14	5	5	18	24	19
Vaccines						
Funding	$10.1M	$1.5M	$1.4M	$6.9M	$2.0M	$1.9M
No. projects/ programs	18	11	7	3	6	2
Complementary and alternative prevention approaches						
Funding	$0M	$2.6M	$1.6M	$0.8M	$1.2M	$0M
No. projects/ programs	0	6	6	2	1	0
Resources and infrastructure related to prevention						
Funding	$0.7M	$0.7M	$0.2M	$0.3M	$5.7M	$7.5M
No. projects/ programs	2	1	1	1	3	7

5.2.4 Early Detection, Diagnosis and Prognosis (CSO category 4)

Table 5.6 show the pattern of direct funding in each sub-category of Early Detection, Diagnosis and Prognosis between 2003–2005 and 2018–2020.

CSO sub-categories for Early detection, diagnosis and prognosis

4.1 Technology development and/or marker discovery
4.2 Technology and/or marker evaluation with respect to fundamental parameters of method
4.3 Technology and/or marker testing in a clinical setting
4.4 Resources and infrastructure related to detection, diagnosis, or prognosis

Each sub-category of Early Detection, Diagnosis and Prognosis saw a similar pattern of increasing investment, with some fluctuations across triennia. The increases seen between 2003–2005 and 2018–2020 were:

4.1 **Technology development and/or marker discovery:** $12.0M in 2003–2005 to $73.6M in 2018–2020

4.2 **Technology and/or marker evaluation with respect to fundamental parameters of method:** $3.1M in 2003–2005 to $22.1M in 2018–2020

4.3 **Technology and/or marker testing in a clinical setting:** $6.6M in 2003–2005 to $40.7M in 2018–2020

4.4 **Resources and infrastructure related to detection, diagnosis, or prognosis:** $0.3M in 2003–2005 to $52.3 M in 2018–2020.

Table 5.6 Direct funding for cancer research projects and programs in CSO 4 Early Detection, Diagnosis and Prognosis, 2003–2005 to 2018–2020

CSO 4 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Technology development and/or marker discovery						
Funding	$12.0M	$32.0M	$60.6M	$40.9M	$50.3M	$73.6M
No. projects/ programs	75	134	189	145	170	184
Technology and/or marker evaluation with respect to fundamental parameters of method						
Funding	$3.1M	$4.3M	$9.1M	$6.3M	$12.2M	$22.1M
No. projects/ programs	23	23	38	30	31	46
Technology and/or marker testing in a clinical setting						
Funding	$6.6M	$3.9M	$6.0M	$15.0M	$25.5M	$40.7M
No. projects/ programs	20	21	34	50	73	104
Resources and infrastructure related to detection, diagnosis, or prognosis						
Funding	$0.3M	$14.3M	$18.7M	$10.0M	$12.6M	$52.3M
No. projects/ programs	2	21	35	30	33	51

5.2.5 Treatment (CSO category 5)

Table 5.7 shows the pattern of direct funding in each Treatment sub-category between 2003–2005 and 2018–2020.

Most sub-categories of Early Detection, Diagnosis and Prognosis saw a similar pattern of increasing investment over time. The highest level of funding in each triennium was in the sub-category of Systemic therapies – discovery and development.

CSO sub-categories for Treatment

5.1 Localised therapies – discovery and development
5.2 Localised therapies – clinical applications
5.3 Systemic therapies – discovery and development
5.4 Systemic therapies – clinical applications
5.5 Combinations of localised and systemic therapies
5.6 Complementary and alternative treatment approaches
5.7 Resources and infrastructure related to treatment and the prevention of recurrence

The pattern of direct funding in each Treatment sub-category was:

5.1 **Localised therapies – discovery and development:** increased from $4.6M in 2003–2005 to $18.9M in 2018–2020 with fluctuations across triennia

5.2 **Localised therapies – clinical applications:** increased from $3.8M in 2003–2005 to $13.6M in 2018–2020 with fluctuations across triennia

5.3 **Systemic therapies – discovery and development:** increased from $36.2M in 2003–2005 to $226M in 2018–2020 with fluctuations across triennia

5.4 **Systemic therapies – clinical applications:** increased from $7.9M in 2003–2005 to $50.5M in 2018–2020 with fluctuations across triennia

5.5 **Combinations of localised and systemic therapies:** increased from $2.2M in 2003–2005 to $7.2M in 2009–2011, decreasing to $2.8M in 2018–2020

5.6 **Complementary and alternative treatment approaches:** increased from $0.1M in 2003–2005 to $2.3M in 2012–2014, decreasing to <$0.1M in 2018–2020

5.7 **Resources and infrastructure related to treatment and the prevention of recurrence:** was not recorded in 2003–2005; increased from $0.8M in 2006–2008 to $75.7M in 2018–2020.

Table 5.7 Direct funding for cancer research projects and programs in CSO 5 Treatment, 2003–2005 to 2018–2020

CSO 5 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Localised therapies – discovery and development						
Funding	$4.6M	$4.1M	$6.5M	$6.5M	$6.9M	$18.9M
No. projects/ programs	29	30	35	36	41	51
Localised therapies – clinical applications						
Funding	$3.8M	$6.4M	$9.9M	$7.5M	$11.2M	$13.6M
No. projects/ programs	29	37	43	39	40	32
Systemic therapies – discovery and development						
Funding	$36.2M	$71.4M	$121.2M	$112.5M	$169.1M	$226.3M
No. projects/ programs	175	235	355	391	554	611
Systemic therapies – clinical applications						
Funding	$7.9M	$21.5M	$17.2M	$17.6M	$27.3M	$50.5M
No. projects/ programs	46	74	66	52	79	104
Combinations of localised and systemic therapies						
Funding	$2.2M	$4.8M	$7.2M	$3.0M	$3.0M	$2.8M
No. projects/ programs	10	26	30	13	14	14
Complementary and alternative treatment approaches						
Funding	$0.1M	$0.4M	$0.5M	$2.3M	$0.6M	$0.03M
No. projects/ programs	1	6	8	6	5	2
Resources and infrastructure related to treatment and the prevention of recurrence						
Funding	$0M	$0.8M	$5.5M	$17.8M	$24.7M	$75.7M
No. projects/ programs	0	6	21	20	33	57

5.2.6 Cancer Control, Survivorship and Outcomes Research (CSO category 6)

Table 5.8 shows the pattern of direct funding to each of the sub-categories of Cancer Control, Survivorship and Outcomes Research between 2003–2005 and 2018–2020.

The highest level of funding in each triennium was in the sub-category of Patient care and survivorship issues.

CSO sub-categories for Cancer Control, Survivorship and Outcomes Research

6.1 Patient care and survivorship issues
6.2 Surveillance
6.3 Population-based behavioural factors
6.4 Health services, economic and health policy analyses
6.5 Education and communication research
6.6 End-of-life care
6.7 Research on ethics and confidentiality
6.9 Resources and infrastructure related to cancer control, survivorship, and outcomes research

The pattern of direct funding in each sub-category of Cancer Control, Survivorship and Outcomes Research by triennium was:

6.1 **Patient care and survivorship issues:** increased in each triennium from $7.2M in 2003–2005 to $57.9M 2018–2020

6.2 **Surveillance:** decreased from $6.4M in 2003–2005 to $0.8M in 2006–2008, increasing to $6.2M in 2018–2020

6.3 **Population-based behavioural factors:** decreased from $4.9M in 2003–2005 to <$0.1M in 2012–2014, increasing to $1.5M in 2018–2020

6.4 **Health services, economic and health policy analyses:** increased from $3.1M in 2003–2005 to $17.8M in 2018–2020, with fluctuations across triennia

6.5 **Education and communication research:** increased from $2.3M in 2003–2005 to $4.9M in 2009–2011, decreasing to $1.0 M in 2018–2020

6.6 **End-of-life care:** varied ranging from a low of $0.5M in 2006–2008 to a high of $2.2M in 2009–2011 and 2018–2020

6.7 **Research on ethics and confidentiality:** below $1M in each triennium

6.9 **Resources and infrastructure related to cancer control, survivorship, and outcomes research:** increased from $1.6M in 2003–2005 to $6.5M in 2015–2017, decreasing to $0.6M in 2018–2020.

Table 5.8 Direct funding for cancer research projects and programs in CSO 6 Cancer Control, Survivorship and Outcomes Research, 2003–2005 to 2018–2020

CSO 6 sub-category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Patient care and survivorship issues						
Funding	$7.2M	$9.7M	$18.7M	$25.8M	$35.M	$57.9M
No. projects/ programs	62	73	98	149	170	204
Surveillance						
Funding	$6.4M	$0.8M	$4.9M	$1.9M	$3.6M	$6.2M
No. projects/ programs	20	4	25	10	11	15
Population-based behavioural factors						
Funding	$4.9M	$3.2M	$4.1M	$0.02M	$0.9M	$1.5M
No. projects/ programs	32	17	25	1	4	3
Health services, economic and health policy analyses						
Funding	$3.1M	$7.4M	$12.1M	$12.1M	$10.9M	$17.8M
No. projects/ programs	17	36	61	29	34	42
Education and communication research						
Funding	$2.3M	$2.3M	$4.9M	$2.5M	$1.7M	$1.0M
No. projects/ programs	22	22	28	12	9	6
End-of-life care						
Funding	$1.7M	$0.5M	$2.2M	$1.1M	$1.8M	$2.2M
No. projects/ programs	15	5	9	7	11	12
Research on ethics and confidentiality						
Funding	$0.3M	$0.3M	$0.3M	$0.3M	$0M	$0.03M
No. projects/ programs	5	2	2	3	0	1
Resources and infrastructure related to cancer control, survivorship, and outcomes research						
Funding	$1.6M	$5.3M	$6.1M	$0.9M	$6.5M	$0.6M
No. projects/ programs	3	12	8	2	3	7

Note: CSO 6.8 Complementary and Alternative Approaches for Supportive Care of Patients and Survivors: Since 2015, awards are coded to CSO 6.1.

5.3 Translational Research

Cancer research projects and programs were categorised by their Translational Research focus. Translational Research focus is determined from CSO sub-categories, with a description of the methodology and full list of codes available in Appendix G.

Translational research categories

1. Not translational
2. Early translational
3. Translational
4. Translational/clinical
5. Patient-oriented translational research

Table 5.9 lists the level of funding and number of cancer research projects and programs according to Translational Research focus from 2003–2005 to 2018–2020.

When comparing the first and last triennia, direct funding for cancer research projects and programs increased for all translational research categories. The largest increase was seen in the early translational research category, followed by translational research.

The pattern of direct funding for each translational research category by triennium between 2003–2005 and 2018–2020 was:

1. **Not translational:** increased from $168M in 2003–2005 to $243M in 2009–2011, decreasing to $235M in 2018–2020
2. **Early translational:** increased from $55.8M in 2003–2005 to $341M in 2018–2020, with some fluctuations across triennia
3. **Translational:** increased from $21.8M in 2003–2005 to $138M in 2018–2020, with some fluctuations across triennia
4. **Translational/clinical:** increased from $20.9M in 2003–2005 to $125M in 2018–2020
5. **Patient-oriented translational research:** increased from $21.0M in 2003–2005 to $81.0M in 2018–2020.

When comparing the first and last triennia, the number of funded cancer research projects and programs increased for most translational research categories, with the exception of Not translational (in which the number decreased).

The pattern of number of cancer research projects and programs funded between 2003–2005 and 2018–2020 was:

1. **Not translational:** decreased from 682 in 2003–2005 to 584 in 2018–2020, with a peak of 832 projects funded in 2009–2011
2. **Early translational:** increased from 302 in 2003–2005 to 829 in 2018–2020
3. **Translational:** increased from 64 in 2003–2005 to 138 in 2018–2020
4. **Translational/clinical:** increased from 106 in 2003–2005 to 290 in 2018–2020, with an increase seen in each triennium
5. **Patient-oriented translational research:** increased from 156 in 2003–2005 to 275 in 2018–2020.

Table 5.9 Direct funding for cancer research projects and programs in translational research categories, 2003–2005 to 2018–2020

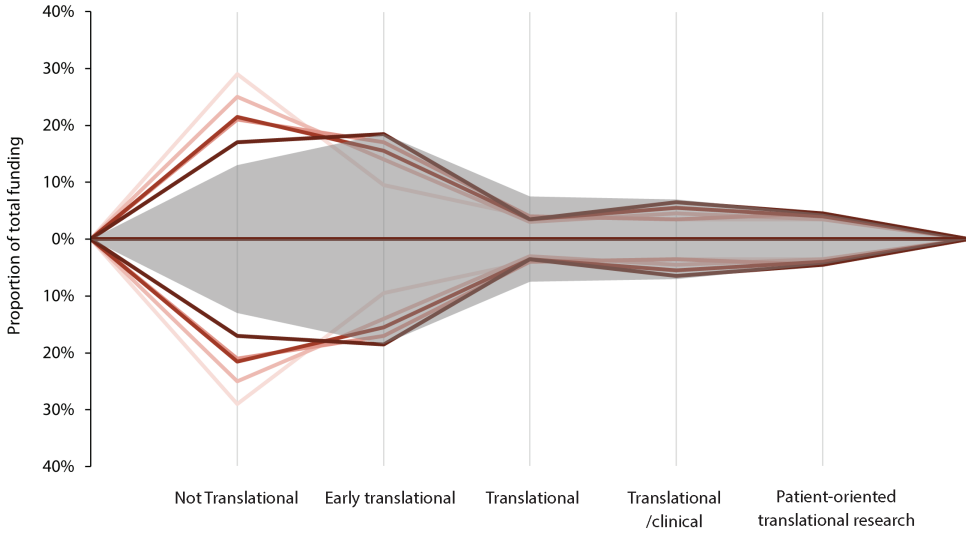
Research focus	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Not translational						
Funding	$168M	$197M	$243M	$230M	$225M	$235M
No. projects/ programs	682	703	832	784	779	584
Early Translational						
Funding	$55.8	$112M	$197M	$167M	$238M	$341M
No. projects/ programs	302	422	617	590	771	829
Translational						
Funding	$21.8M	$24.6M	$42.7M	$35.4M	$43.9M	$138M
No. projects/ programs	64	73	133	73	86	138
Translational/clinical						
Funding	$20.9M	$37.1M	$40.8M	$61.5M	$82.8M	$125M
No. projects/ programs	106	164	181	192	248	290
Patient-oriented Translational Research						
Funding	$21.0M	$28.8M	$49.6M	$42.7M	$57.0M	$81.0M
No. projects/ programs	156	171	236	204	231	275

Figure 5.3 shows the changes in pattern of proportional funding to each Translational research category across the six triennia.

The overall pattern of proportional funding by Translational research category between 2003–2005 and 2018–2020 was:

1. **Not translational:** decreased from 58% in 2003–2005 to 26% in 2018–2020
2. **Early translational:** increased from 19% in 2003–2005 to 37% in 2018–2020
3. **Translational:** remained consistently low across triennia (6 to 8%) before increasing to 15% in 2018–2020
4. **Translational/clinical:** increased from 7% in 2003–2005 to 14% in 2018–2020
5. **Patient-oriented translational research:** fairly consistent over time (7% of funding in 2003–2005 and 9% in 2018–2020) with small changes by triennium.

Figure 5.3 Proportional funding for cancer research projects and programs in Australia by Translational research category as a percentage of total direct funding, 2003–2005 to 2018–2020



	Triennium	Proportion of total funding				
	2003–2005	58%	19%	8%	7%	7%
	2006–2008	50%	28%	6%	9%	7%
	2009–2011	42%	34%	8%	7%	9%
	2012–2014	43%	31%	7%	11%	8%
	2015–2017	34%	37%	7%	13%	9%
	2018–2020	26%	37%	15%	14%	9%

6 Tumour stream focus of cancer research projects and programs

Key findings

- In the period 2012–2020, of the $2.12B in direct funding for cancer research projects and programs in Australia:
  - $1.4B (66%) was for cancer research projects and programs with a specific tumour stream focus (single or multiple tumours)
  - $712M (34%) was for cancer research projects and programs with no specific tumour focus.
- Between 2003–2005 and 2018–2020:
  - proportional funding for cancer research projects and programs with a single/multiple tumour stream focus increased from 41% (2003–2005) to 64% in 2018–2020, with the highest proportion seen in 2012–2014 (69%)
  - the number of cancer research projects and programs with a single/multiple tumour stream focus increased from 675 (51%) to 1,726 (77%).

6.1 Analysing cancer research by tumour stream focus

Each cancer research project and program identified in the audit was categorised according to the tumour stream focus of the research. A 'tumour stream' is a collective group of cancer types (see Appendix E for the tumour streams used in this audit).

Tumour stream focus

- **Not tumour stream-specific:** research not specific to any particular tumour stream
- **Single tumour stream:** research specific to a single tumour stream
- **Multiple tumour streams:** research directly addressing multiple tumour streams

6.1.1 Direct funding to tumour streams

Figure 6.1 shows the proportion of direct funding in the three tumour stream categories by triennium.

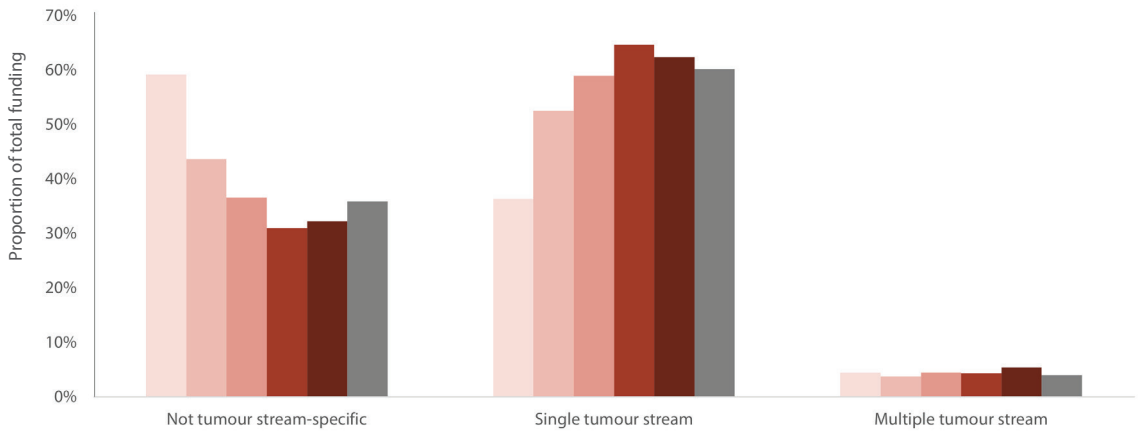
Total direct funding by tumour stream in the period 2012–2020 was:

- **not tumour stream-specific**: $712M
- **single tumour stream**: $1.3B
- **multiple tumour streams**: $96M.

Direct funding increased in each tumour stream category between 2003–2005 and 2018–2020, with fluctuations across triennia. The increases in direct funding for each tumour stream category were:

- **not tumour stream-specific**: $174M in 2003–2005 to $335M in 2018–2020
- **single tumour stream**: $110M in 2003–2005 to $562M in 2018–2020
- **multiple tumour streams**: $7.4M in 2003–2005 to $37.1M in 2018–2020.

Figure 6.1 Pattern of direct funding for cancer research projects and programs by tumour stream category, 2003–2005 to 2018–2020



2003–2005	59%	36%	4%
2006–2008	44%	53%	4%
2009–2011	37%	59%	4%
2012–2014	31%	65%	4%
2015–2017	32%	62%	5%
2018–2020	36%	60%	4%

Note: Due to rounding, each row may not add up to 100%.

6.1.2 Number of cancer research projects and programs by tumour stream category

Table 6.1 lists the number of cancer research projects and programs funded in each tumour stream category, along with the total direct funding provided.

In the period 2012–2020:

- 3,502 cancer research projects and programs were specific to a **single tumour stream**
- 1,153 cancer research projects and programs were **not tumour stream-specific**
- 158 cancer research projects and programs covered **multiple tumour streams**.

While total funding increased across all three tumour stream categories, the number of cancer research projects and programs funded fluctuated across triennia. The overall pattern was:

- **not tumour stream-specific**: decreased from 657 in 2003–2005 to 505 in 2018–2020
- **single tumour stream:** increased from 651 in 2003–2005 to 1660 in 2018–2020
- **multiple tumour streams**: increased from 24 in 2003–2005 to 66 in 2018–2020.

Table 6.1 Direct funding and number of cancer research projects and programs by tumour stream category, 2003–2005 to 2018–2020

Stream focus	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Not tumour stream-specific						
Funding	$174M	$180M	$218M	$167M	$210M	$335M
% of funding	60%	44%	37%	31%	32%	36%
No. projects/ programs	657	566	679	489	511	505
Single tumour stream						
Funding	$110M	$217M	$351M	$349M	$406M	$562M
% of funding	38%	52%	59%	65%	62%	60%
No. projects/ programs	651	980	1362	1310	1560	1660
Multiple tumour streams						
Funding	$7.4M	$15.5M	$26.6M	$23.3M	$35.2M	$37.1M
% of funding	3%	4%	4%	4%	5%	4%
No. projects/ programs	24	49	59	71	81	66

Note: Some projects and programs overlap triennia, thus the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium from 2003–2005 to 2018–2020.

6.1.3 Proportional funding to tumour stream categories

Of the $2.12B in direct funding for cancer research projects and programs in Australia between 2012 and 2020:

- 34% ($95.5M) was for research that was **not tumour stream-specific**
- 62% ($712M) was for research in a **single tumour stream**
- 4% ($1.32B) was for research covering **multiple tumour streams**.

Between 2003–2005 and 2018–2020, the pattern of proportional funding by tumour stream category shifted. In 2003–2005, the majority of funding (60%) was for research that was not tumour stream-specific. However, by 2012–2014, the majority of funding was for research in a single tumour stream (65%), decreasing to 60% in 2018–2020. Research in multiple tumour streams has remained consistently low (≤5% of all research) across all triennia.

6.2 Analysing cancer research by tumour stream and CSO category

Cancer research projects and programs in each tumour stream were analysed by CSO category, to understand changes in:

- the pattern of direct funding
- the proportional distribution of funding
- the number of cancer research projects or programs.

Because of the small amount of funding in each triennium for research covering multiple tumour streams, funding by CSO category for single and multiple tumour stream research was combined.

6.2.1 Research that is not tumour stream-specific, by CSO category

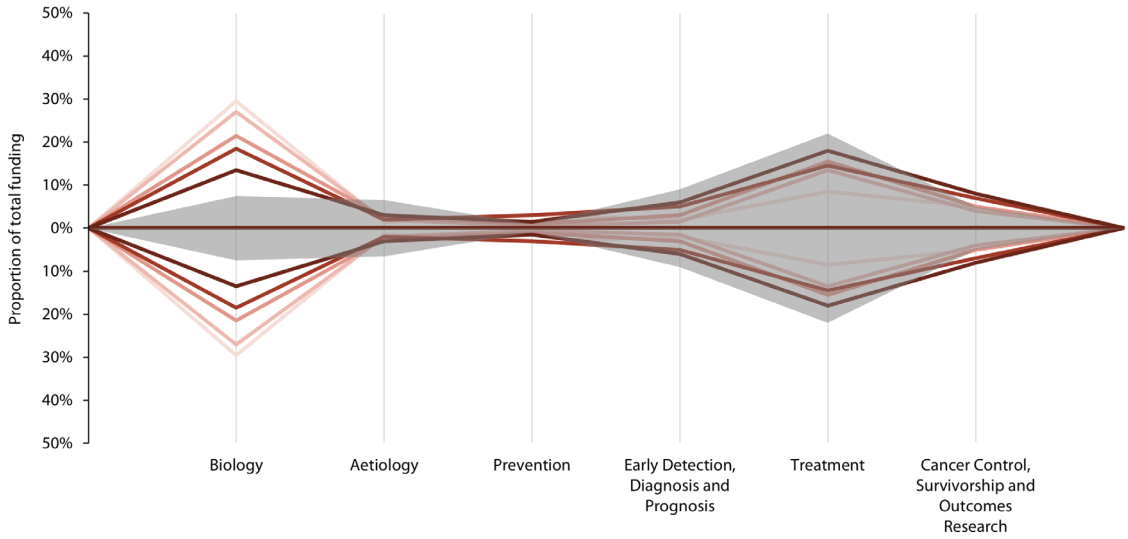
Direct funding (not tumour stream-specific)

Figure 6.2 shows the distribution of direct funding for research that was not tumour stream-specific by CSO category and triennium.

Between 2003–2005 and 2018–2020, total direct funding for research that was not tumour stream-specific:

- decreased for **Biology** research in each triennium
- decreased for **Prevention** research, with fluctuations across triennia
- increased for **Aetiology**, **Early Detection**, **Diagnosis and Prognosis** and **Treatment** research, with fluctuations across triennia
- stayed the same for **Cancer Control**, **Survivorship** and **Outcomes Research**, with fluctuations across triennia.

Figure 6.2 Proportional distribution of direct funding for cancer research projects and programs for research that was not tumour stream-specific, by CSO category, 2003–2005 to 2018–2020



	Triennium	Proportion of funding for research which was not tumour stream-specific					
	2003–2005	59%	3%	6%	4%	17%	10%
	2006–2008	54%	4%	1%	3%	27%	8%
	2009–2011	43%	5%	2%	6%	31%	10%
	2012–2014	37%	4%	6%	10%	29%	14%
	2015–2017	27%	6%	3%	12%	36%	16%
	2018–2020	15%	13%	2%	18%	44%	10%

Number of cancer research projects and programs (not tumour stream-specific)

Table 6.2 lists total direct funding and number of cancer research projects and programs funded that were not tumour stream-specific by CSO category and triennium.

Between 2003–2005 and 2018–2020, the number of cancer research projects and programs funded in each CSO category for research that was not tumour stream-specific:

- decreased for **Biology** in each triennium
- fluctuated for **Aetiology**, **Prevention**, and **Cancer Control, Survivorship and Outcomes Research**
- increased for **Early Detection, Diagnosis and Prognosis, and Treatment**, with fluctuations across triennia.

Proportional funding (not tumour stream-specific)

Between 2003–2005 and 2018–2020, proportional funding for research that was not tumour stream-specific:

- decreased for **Biology** in each triennium
- increased for **Aetiology**, **Early Detection**, **Diagnosis and Prognosis**, and **Treatment**, with fluctuations across triennia
- fluctuated for **Prevention**, and **Cancer Control**, **Survivorship and Outcomes Research**.

Table 6.2 Direct funding, proportional funding, and number of cancer research projects and programs by CSO category for research that was not tumour stream-specific, 2003–2005 to 2018–2020

CSO category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Biology						
Funding	$101M	$97.3M	$93.6M	$62.0M	$57.0M	$49.4M
% of funding	59%	54%	43%	37%	27%	15%
No. projects/ programs	353	283	282	176	165	125
Aetiology						
Funding	$5.0M	$7.1M	$10.4M	$7.2M	$13.4M	$42.2M
% of funding	3%	4%	5%	4%	6%	13%
No. projects/ programs	17	21	21	19	23	19
Prevention						
Funding	$11.2M	$2.6M	$4.1M	$9.5M	$6.2M	$5.3M
% of funding	6%	1%	2%	6%	3%	2%
No. projects/ programs	16	12	18	7	9	14
Early Detection, Diagnosis and Prognosis						
Funding	$7.1M	$5.4M	$12.8M	$16.7M	$24.6M	$59.4M
% of funding	4%	3%	6%	10%	12%	18%
No. projects/ programs	25	27	47	40	35	55
Treatment						
Funding	$29.5M	$49.1M	$68.6M	$47.7M	$75.8M	$146M
% of funding	17%	27%	31%	29%	36%	44%
No. projects/ programs	130	133	182	155	173	168
Cancer Control, Survivorship and Outcomes Research						
Funding	$16.9M	$13.6M	$21.9M	$24.0M	$33.0M	$32.7M
% of funding	10%	8%	10%	14%	16%	10%
No. projects/ programs	108	63	95	92	106	124

Note: The first three triennia total do not match Table 6.1 due to Scientific Model Systems not being included.

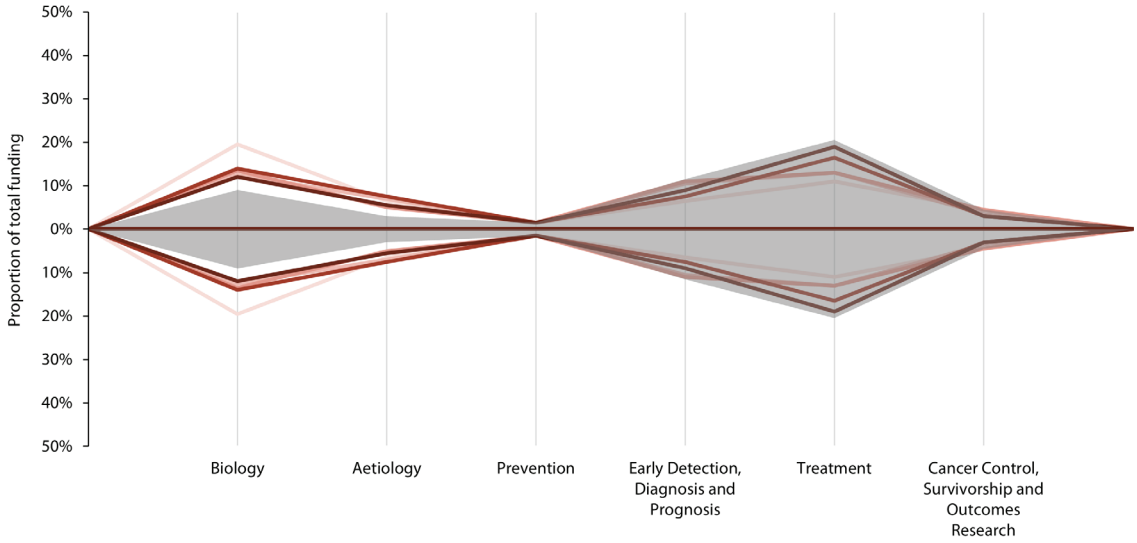
6.2.2 Single and multiple tumour stream research by CSO category [n]

Direct funding (tumour stream-specific)

Figure 6.3 shows the distribution of direct funding for tumour stream-specific cancer research projects and programs by CSO category and triennium. Between 2003–2005 and 2018–2020, direct funding for tumour stream-specific research:

- increased for **Biology**, **Aetiology**, **Prevention**, **Early Detection**, **Diagnosis and Prognosis**, and **Cancer Control, Survivorship and Outcomes Research**, with fluctuations across individual triennia
- increased for **Treatment** in each triennium.

Figure 6.3 Proportional distribution of direct funding for tumour stream-specific cancer research projects and programs by CSO category, 2003–2005 to 2018–2020



	Triennium	Proportion of funding for tumour stream-specific research					
	2003-2005	39%	13%	3%	13%	22%	9%
	2006-2008	25%	14%	3%	21%	26%	7%
	2009-2011	27%	10%	3%	22%	26%	9%
	2012-2014	28%	15%	3%	15%	33%	6%
	2015-2017	24%	11%	3%	18%	38%	6%
	2018-2020	18%	6%	3%	23%	41%	9%

[n] Single tumour stream-specific research and multiple tumour streams have been combined for this analysis.

Number of cancer research projects and programs (tumour stream-specific)

Table 6.3 lists total direct funding and number of cancer research projects and programs funded that were tumour stream-specific by CSO category.

Between 2003–2005 and 2018–2020, the number of cancer research projects and programs that were tumour stream-specific:

- increased for **Biology**, **Early Detection**, **Diagnosis and Prognosis**, and **Cancer Control**, **Survivorship and Outcomes Research**, with fluctuations across triennia
- fluctuated for **Aetiology** and **Prevention**
- increased for **Treatment** in each triennium.

Proportional funding (tumour stream-specific)

Between 2003–2005 and 2018–2020, proportional funding for tumour stream-specific research:

- decreased for **Biology**, with fluctuations across triennia
- fluctuated for **Aetiology**, and **Cancer Control**, **Survivorship and Outcomes Research**
- remained consistently low (3%) for **Prevention**
- increased for **Early Detection**, **Diagnosis and Prognosis**, with fluctuations across triennia
- increased for **Treatment** in each triennium (except for 2009–2011 when it remained at the same level).

Table 6.3 Direct funding, proportional funding, and number of tumour stream-specific cancer research projects and programs by CSO category, 2003–2005 to 2018–2020

CSO category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Biology						
Funding	$45.6M	$59.0M	$101M	$105M	$107M	$107M
% of funding	39%	25%	27%	28%	24%	18%
No. projects/ programs	250	274	407	433	455	330
Aetiology						
Funding	$14.9M	$33.5M	$38.0M	$56.6M	$47.1M	$36.6M
% of funding	12%	14%	10%	15%	11%	6%
No. projects/ programs	63	125	122	158	136	110
Prevention						
Funding	$4.0M	$6.1M	$9.5M	$11.8M	$12.0M	$16.5M
% of funding	3%	3%	3%	3%	3%	3%
No. projects/ programs	27	30	34	37	37	35

CSO category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Early Detection, Diagnosis and Prognosis						
Funding	$14.9M	$49.2M	$81.6M	$56.7M	$78.7M	$137M
% of funding	13%	21%	22%	15%	18%	23%
No. projects/ programs	95	172	249	217	264	353
Treatment						
Funding	$25.6M	$60.4M	$99.3M	$121M	$169M	$248M
% of funding	22%	26%	26%	33%	38%	41%
No. projects/ programs	158	281	376	414	613	732
Cancer Control, Survivorship and Outcomes Research						
Funding	$10.5M	$16.0M	$32.6M	$20.5M	$27.7M	$54.4M
% of funding	9%	7%	9%	6%	6%	9%
No. projects/ programs	68	112	166	122	136	166

Note: The first three triennia total do not match Table 6.1 due to Scientific Model Systems not being included.

7 Funding to cancer research projects and programs by tumour stream

Key findings

» In the period 2012–2020, of the 4,813 cancer research projects and programs funded in Australia:

- 3,502 (73%) focused on a **single tumour stream**; of these:
  - 704 were in Breast cancer, 616 were in Haematological cancers and 272 were in Skin cancers. Together these three streams represented 45% of the single tumour stream projects or programs funded
  - the tumour streams with the smallest number of projects/programs funded were Cancers of unknown primary (9), Musculoskeletal cancers (78) and Head and neck cancers (79)
  - 158 (3%) focused on **multiple tumour streams**; the most common tumour streams were Breast cancer, Upper gastrointestinal cancers and Colorectal cancer.

» Between 2003–2005 and 2018–2020:

- direct funding and number of cancer research projects and programs increased for each tumour stream
- the largest increases in direct funding to a single tumour stream were:
  - Cancers of unknown primary: $0.1M to $5.9M (59-fold increase)
  - Cancers of the central nervous system: $3.5M to $64.6M (19-fold increase)
  - Lung cancer: $2.5M to $32.0M (13-fold increase).
- the lowest increases in direct funding to a single tumour stream were:
  - Breast cancer: $33.4M to $91.3M (2.7-fold increase)
  - Genitourinary cancers: $13.0M to $37.4M (2.9-fold increase)
  - Colorectal cancers: $13.6M to $47.5M (3.2-fold increase).

7.1 Analysing single tumour stream research

In the period 2012–2020, 3,502 cancer research projects and programs focused on a single tumour stream.[o] The specific tumour stream focus for research in this category was recorded for each triennium. A comparison was undertaken between research funded in the three triennia 2012–2014 to 2018–2020 and that funded in 2003–2005 to 2009–2011.

[o] A tumour stream comprises a collective group of cancer types. The tumour streams used in this audit are listed in Appendix E.

7.1.1 Direct funding for single tumour stream research

Table 7.1 details the direct funding for single tumour stream research projects and programs by tumour stream between 2003–2005 and 2018–2020.

Direct funding increased in each triennium for Brain and nervous system cancers, Gynaecological cancers, Upper gastrointestinal cancers, Haematological cancers, Skin cancers, and Head and neck cancers. For all other tumour streams, direct funding increased between 2003–2005 and 2018–2020 with fluctuations across triennia.

7.1.2 Number of single tumour stream research projects and programs

Table 7.1 lists the number of cancer research projects and programs funded in each tumour stream between 2003–2005 and 2018–2020.

The number of funded cancer research projects and programs increased in each triennium for Haematological cancers and Gynaecological cancers. For all other tumour streams, the number of cancer research projects and programs increased between 2003–2005 and 2018–2020 but there were fluctuations across individual triennia.

Table 7.1 Direct funding and number of single tumour stream cancer research projects and programs, 2003–2005 to 2018–2020

Tumour stream	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Breast cancer						
Funding	$33.4M	$57.4M	$85.9M	$81.7M	$81.9M	$91.3M
No. projects/ programs	167	309	317	293	332	287
Haematological cancers						
Funding	$18.5M	$33.6M	$55.4M	$58.5M	$78.6M	$125M
No. projects/ programs	112	126	218	232	274	303
Colorectal cancer						
Funding	$13.6M	$27.0M	$47.8M	$37.1M	$27.3M	$47.5M
No. projects/ programs	76	82	125	124	120	145
Genitourinary cancers						
Funding	$13.9M	$26.7M	$44.4M	$32.8M	$43.4M	$37.4M
No. projects/ programs	87	131	209	138	203	175
Skin cancers						
Funding	$11.1M	$25.6M	$33.5M	$34.9M	$51.3M	$58.6M
No. projects/ programs	59	88	120	119	127	115

Tumour stream	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Upper gastrointestinal cancers						
Funding	$5.6M	$12.1M	$24.1M	$25.3M	$29.4M	$41.8M
No. projects/ programs	36	73	103	85	124	142
Gynaecological cancers						
Funding	$5.2M	$13.5M	$19.3M	$25.6M	$35.6M	$44.0M
No. projects/ programs	38	60	75	98	107	116
Lung cancers						
Funding	$2.5M	$7.8M	$16.3M	$14.8M	$21.4M	$32.0M
No. projects/ programs	22	48	78	69	83	106
Brain and nervous system cancers						
Funding	$3.5M	$8.8M	$16.0M	$29.0M	$26.5M	$64.6M
No. projects/ programs	21	38	77	199	123	188
Head and neck cancers						
Funding	$2.2M	$2.8M	$3.8M	$4.1M	$4.5M	$9.0M
No. projects/ programs	21	17	23	21	31	42
Musculoskeletal cancers						
Funding	$0.9M	$1.2M	$4.6M	$3.5M	$5.0M	$4.8M
No. projects/ programs	10	9	16	26	30	37
Cancers of unknown primary						
Funding	$0.1M	$0M	0.1$M	$1.0M	$1.5M	$5.9M
No. projects/ programs	1	0	1	4	6	4
Single stream totals						
Funding	$111M	$217M	$351M	$349M	$404M	$559M
No. projects/ programs	6501	981	1362	1310	1559	1659

Note: Some projects and programs overlap triennia; the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for 2003–2005 to 2018–2020.

7.1.3 Proportional funding for single tumour stream research

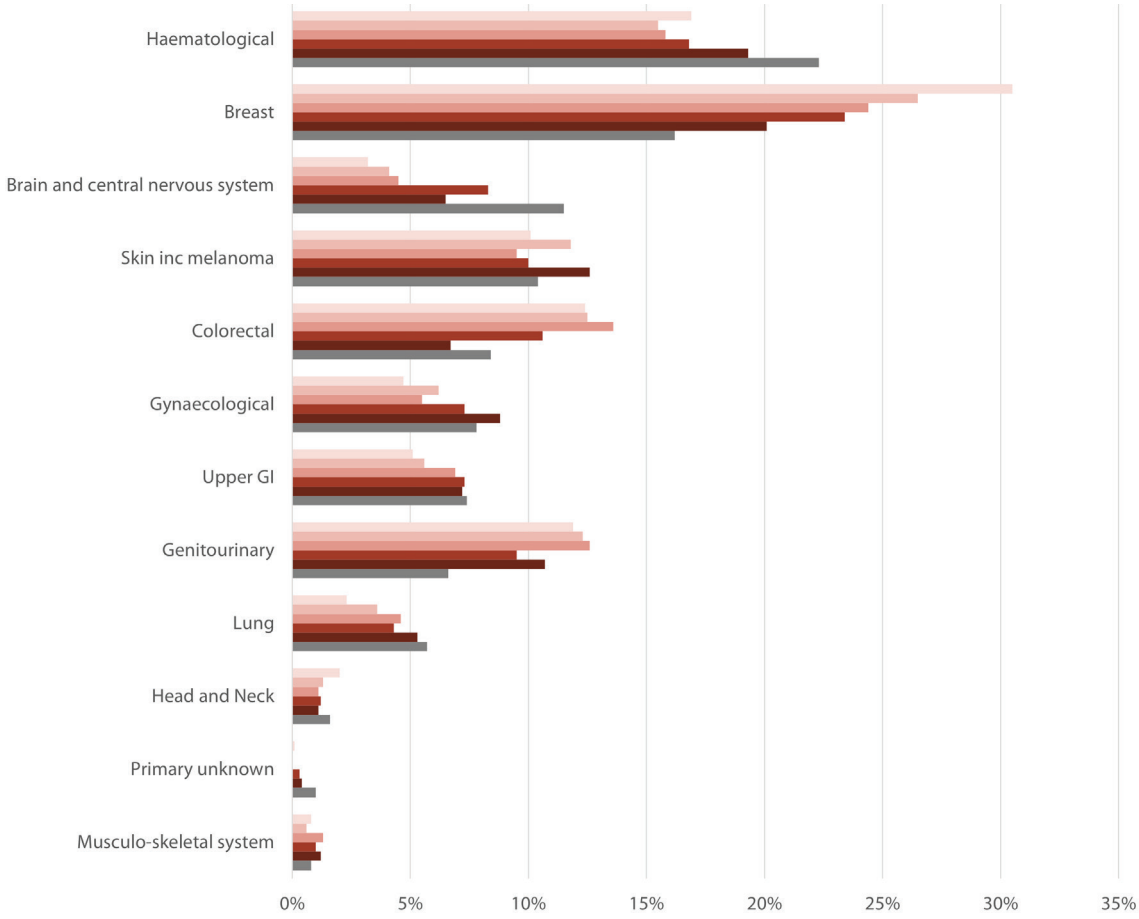
Figure 7.1 shows the proportional distribution of funding to single tumour stream cancer research projects and programs between 2003–2005 and 2018–2020.

The largest change in proportional funding for single tumour stream research was for Breast cancer (decrease from 30% in 2003–2005 to 16% in 2018–2020).

Proportional funding for single tumour stream cancer research projects and programs fluctuated across triennia; the overall change between 2003–2005 and 2018–2020 was:

- **Breast cancers:** decreased from 30% to 16%
- **Haematological cancers:** increased from 17% to 22%
- **Colorectal cancers:** decreased from 12% to 8%
- **Genitourinary cancers:** decreased from 12% to 7%
- **Skin cancers:** stayed at around 10%
- **Gynaecological cancers:** increased from 5% to 8%
- **Lung cancers:** increased from 2% to 6%
- **Brain and central nervous system cancers:** increased from 3% to 11%
- **Upper gastrointestinal cancers:** increased from 5% to 7%
- **Head and neck cancers:** stayed at around 2%
- **Cancer of unknown primary:** increased from 0.1% to 1%
- **Musculo-skeletal cancers:** stayed at around 1%.

Figure 7.1 Proportional funding to single tumour stream cancer research projects and programs, 2003–2005 to 2018–2020



		Musculo-skeletal system	Primary unknown	Head and Neck	Lung	Genitourinary	Upper GI	Gynaecological	Colorectal	Skin inc melanoma	Brain and central nervous system	Breast	Haematological
	2003–2005	0.8%	0.1%	2.0%	2.3%	11.9%	5.1%	4.7%	12.4%	10.1%	3.2%	30.5%	16.9%
	2006–2008	0.6%	0.0%	1.3%	3.6%	12.3%	5.6%	6.2%	12.5%	11.8%	4.1%	26.5%	15.5%
	2009–2011	1.3%	0.0%	1.1%	4.6%	12.6%	6.9%	5.5%	13.6%	9.5%	4.5%	24.4%	15.8%
	2012–2014	1.0%	0.3%	1.2%	4.3%	9.5%	7.3%	7.3%	10.6%	10.0%	8.3%	23.4%	16.8%
	2015–2017	1.2%	0.4%	1.1%	5.3%	10.7%	7.2%	8.8%	6.7%	12.6%	6.5%	20.1%	19.3%
	2018–2020	0.8%	1.0%	1.6%	5.7%	6.6%	7.4%	7.8%	8.4%	10.4%	11.5%	16.2%	22.3%

7.2 Analysing multiple tumour stream research

In the period 2012 to 2020, 158 [p] cancer research projects and programs focused on multiple tumour streams. The primary tumour stream of focus, secondary and (if applicable) tertiary tumour stream foci were determined from the research abstract. Where a hierarchy of tumour streams was not apparent, tumour streams were recorded in the order listed in the abstract. (i.e., the first named tumour stream was deemed to be the primary tumour stream).

7.2.1 Number of multiple tumour stream research projects and programs

Figure 7.2 shows the stratification of multiple tumour stream cancer research projects and programs by primary, secondary and tertiary tumour streams in the period 2012–2020.

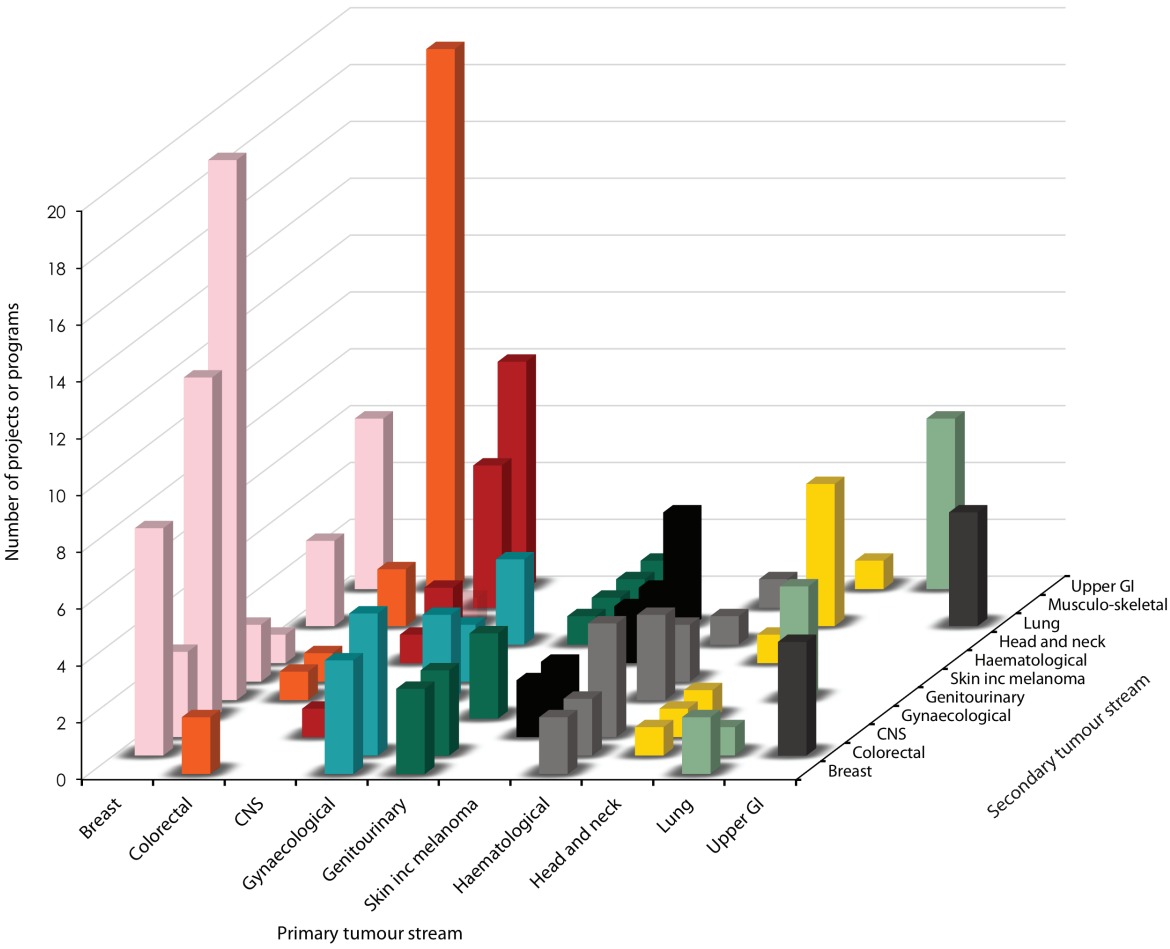
In the period 2012–2020, of the 158 cancer research projects and programs that focused on multiple tumour streams:

- **Breast cancer** was the primary tumour stream in 44 multiple tumour stream cancer research projects and programs, with the following secondary and tertiary streams:
  - Genitourinary cancers: 18 projects and programs
  - Gynaecological cancers: 12 projects and programs
  - Colorectal cancer: 8 projects and programs
  - Upper gastrointestinal cancer: 6 projects and programs.
- **Colorectal cancers** were the primary tumour stream in 22 projects and programs; 19 of these focused on Upper gastrointestinal cancers as a secondary or tertiary stream
- **Brain and central nervous system cancers** were the primary tumour stream in 15 projects and programs, with the following secondary/tertiary streams:
  - Upper gastrointestinal cancer: 8 projects and programs
  - Musculo-skeletal cancers: 5 projects and programs
  - Head and neck cancers: 2 projects and programs.
- **Gynaecological cancers** were the primary tumour stream in 14 projects and programs, with the following secondary and tertiary streams:
  - Colorectal cancers: 5 projects and programs
  - Genitourinary cancers: 3 projects and programs.

[p] Some cancer research projects and programs overlap trienniums.

- **Genitourinary cancers** were the primary tumour stream in 12 projects and programs, with the following secondary/tertiary streams:
  - Gynaecological cancers: 3 projects and programs
  - Colorectal cancers: 3 projects and programs.
- **Skin cancers** were the primary stream in 12 projects and programs, with the following secondary/tertiary streams:
  - Lung cancers: 4 projects and programs
  - Brain and central nervous system cancers: 2 projects and programs
  - Head and neck cancers: 2 projects and programs.
- **Haematological cancers** were the primary tumour stream in 11 projects and programs, with the following secondary/tertiary streams:
  - Brain and central nervous system cancers: 4 projects and programs
  - Genitourinary cancers: 3 projects and programs
  - Colorectal cancers: 2 projects and programs.
- **Head and neck cancer** was the primary tumour stream in 10 projects and programs; 5 of these also focused on lung cancer
- **Upper gastrointestinal cancers** were the primary tumour stream in 8 projects and programs, with the following secondary/tertiary streams:
  - Colorectal cancers: 4 projects and programs
  - Lung cancers: 4 projects and programs.
- **Lung cancer** was the primary stream in 10 projects and programs, with the following secondary/tertiary streams:
  - Upper gastrointestinal cancers: 6 projects and programs
  - Genitourinary cancer: 4 projects and programs
  - Breast cancer: 2 projects and programs.

Figure 7.2 Tumour stream combinations in multiple tumour stream research projects and programs, 2012–2020



8 Funding to single tumour type cancer research projects and programs

Key findings

In the period 2012–2020:

- 3,405 cancer research projects and programs (71%) focused on a single tumour type.

Between 2003–2005 and 2018–2020:

- the top 22 tumour types by funding together received 96% of all single tumour type funding
- direct funding and the number of cancer research projects and programs funded increased for all 22 tumour types analysed
- direct funding increased in each triennium for: Leukaemia, Melanoma, Lymphoma (Hodgkin's and non-Hodgkin's), Sarcoma, and cancers of the Brain, Ovary, Pancreas, Blood (other than myeloma, leukaemia, and lymphoma) and Endometrium
- the largest increases in direct funding were for Cancer of unknown primary site, Lymphoma, and cancers of the brain and blood.

8.1 Analysing single tumour type research

The 3,405 cancer research projects and programs identified as having a single tumour type focus in 2012–2020 were analysed to identify the specific tumour of focus (see Appendix E). Due to the large number of tumour types, only the top 22 funded tumour types were analysed.

8.1.1 Direct funding to single tumour type research

Table 8.1 details direct funding and number of cancer research projects and programs for each of the 22 tumour types identified in single tumour type research in each triennium.

Between 2003–2005 and 2018–2020:

- direct funding increased to each of the 22 tumour types
- increases in direct funding were continuous for Blood cancers (other than Myeloma, Leukaemia and Lymphoma), Brain cancer, Endometrial cancer, Leukaemia, Lymphoma (Hodgkin's and non-Hodgkin's), Melanoma, Ovarian cancer, Pancreatic cancer and Sarcoma

» Significant increases in direct funding were observed for:

- Cancer of **unknown primary site**: $0.1M (1 project) to $5.9M (4 projects); 41-fold increase
- **Brain cancer**: $1.5M (10 projects) to $54.1M (161 projects); 36-fold increase
- **Blood cancers** (**other than myeloma, leukaemia, and lymphoma**): $0.5M[q] (2 projects) to $14.2M (5 projects); 28-fold increase
- **Lymphoma**: $0.7M (11 projects) to $15.2M (36 projects); 22-fold increase.

Table 8.1 Direct funding and number of single tumour type cancer research projects and programs, 2003–2005 to 2018–2020

Tumour type	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Breast						
Funding	$33.4M	$57.4M	$85.9M	$81.7M	$81.9M	$91.3M
No. projects/ programs	167	309	317	293	332	287
Leukaemia						
Funding	$15.3M	$20.8M	$39.7M	$40.5M	$50.5M	$67.9M
No. projects/ programs	81	78	141	159	181	180
Brain						
Funding	$1.5M	$4.9M	$11.3M	$20.0M	$19.8M	$54.1M
No. projects/ programs	10	32	61	81	105	161
Melanoma						
Funding	$8.5M	$19.1M	$24.6M	$29.2M	$41.8M	$52.3M
No. projects/ programs	40	55	89	83	101	98
Colorectal						
Funding	$13.6M	$26.7M	$47.2M	$36.0M	$23.7M	$43.6M
No. projects/ programs	76	79	120	118	114	141
Prostate						
Funding	$13.2M	$25.8M	$41.6M	$28.7M	$41.2M	$34.2M
No. projects/ programs	82	122	195	126	188	161
Ovary						
Funding	$2.2M	7.2$M	$11.7M	$16.4M	$25.4M	$31.2M
No. projects/ programs	20	31	42	62	73	84

[q] Data are from 2006–2008 as no data were identified for 2003–2005.

Tumour type	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Lung and mesothelioma						
Funding	$2.5M	$7.8M	$16.3M	$14.8M	$21.1M	$30.9M
No. projects/ programs	22	48	78	69	81	102
Pancreas						
Funding	$0.8M	$1.9M	$5.3M	$5.8M	$9.8M	$17.0M
No. projects/ programs	7	19	22	18	52	65
Blood (other than myeloma, leukaemia, and lymphoma)						
Funding	n.d.	$0.5M	$0.1M	$3.1M	$7.0M	$13.5M
No. projects/ programs	0	2	1	4	6	4
Lymphoma[r]						
Funding	$0.7M	$2.9M	$3.4M	$5.6M	$7.3M	$15.2M
No. projects/ programs	11	17	20	27	32	36
Myeloma						
Funding	$1.3M	$3.2M	$3.0M	$2.6M	$6.8M	$14.7M
No. projects/ programs	12	9	17	15	21	42
Liver						
Funding	$1.1M	$2.5M	$7.2M	$9.0M	$7.8M	$11.4M
No. projects/ programs	10	15	29	24	28	39
Neuroblastoma						
Funding	$1.9M	$3.9M	$4.7M	$9.0M	$6.7M	$10.5M
No. projects/ programs	10	6	16	18	18	27
Stomach						
Funding	$1.5M	$3.9M	$5.6M	$5.0M	$5.5M	$7.2M
No. projects/ programs	8	17	26	18	21	21
Skin (not melanoma)						
Funding	$1.3M	$2.7M	$4.8M	$5.4M	$9.5M	$6.3M
No. projects/ programs	13	9	15	33	26	17

[r] Lymphoma represents the sum of funding to cancer research projects or programs which focused on either Hodgkin's lymphoma or non-Hodgkin lymphoma or both.

Tumour type	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Cancer of unknown primary site						
Funding	$0.1M	n.d.	$0.1M	$1.0M	$1.5M	$5.9M
No. projects/ programs	1		1	4	6	4
Cervix						
Funding	$2.1M	$2.5M	$2.7M	$3.1M	$4.5M	$5.5M
No. projects/ programs	12	13	14	12	14	9
Sarcoma						
Funding	$0.2M	$0.6M	$2.0M	$2.7M	$4.8M	$4.6M
No. projects/ programs	2	4	4	23	29	35
Gastrointestinal tract						
Funding	n.d.	$0.5M	$0.6M	n.d.	$2.8M	$4.1M
No. projects/ programs		5	3		2	2
Endometrium						
Funding	$0.8M	$3.0M	$3.0M	$3.8M	$4.4M	$3.0M
No. projects/ programs	3	12	8	16	15	13
Oesophagus						
Funding	$1.7M	$3.1M	$5.3M	$4.5M	$3.9M	$2.8M
No. projects/ programs	5	16	23	22	18	10
Bone						
Funding	$0.7M	$0.6M	$2.7M	$0.8M	$0.2M	$0.2M
No. projects/ programs	8	5	12	3	1	2
Thyroid						
Funding	$0.9M	$0.6M	$0.5M	$0.4M	$0.8M	n.d.
No. projects/ programs	6	4	5	2	4	
Gallbladder						
Funding	n.d.	n.d.	n.d.	n.d.	$0.5M	n.d.
No. projects/ programs					1	
Kidney						
Funding	$0.4M	$0.5M	$0.8M	$1.8M	$0.02M	$1.5M
No. projects/ programs	3	3	2	4	1	5
Testes						
Funding	n.d.	$0.2M	$1.0M	$1.0M	$1.3M	$0.8M
No. projects/ programs		3	5	3	7	5

Tumour type	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Bladder						
Funding	n.d.	$0.2M	$0.5M	$1.4M	$0.9M	$0.8M
No. projects/ programs		2	2	4	6	3
Anal cancer						
Funding	n.d.	n.d.	$0.01	$1.1M	$1.5M	$0.5M
No. projects/ programs			1	6	5	3
Genital System, Female						
Funding	n.d.	n.d.	n.d.	$1.4M	$0.5M	$3.5M
No. projects/ programs				6	4	6

Note: Some projects and programs overlap triennia; the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for 2003–2005 to 2018–2020. n.d. indicates no funding was detected.

8.1.2 Proportional funding to single tumour type research

Figure 8.1 shows the proportional distribution of funding to each of the 22 tumour types identified in single tumour type cancer research projects and programs by triennium.

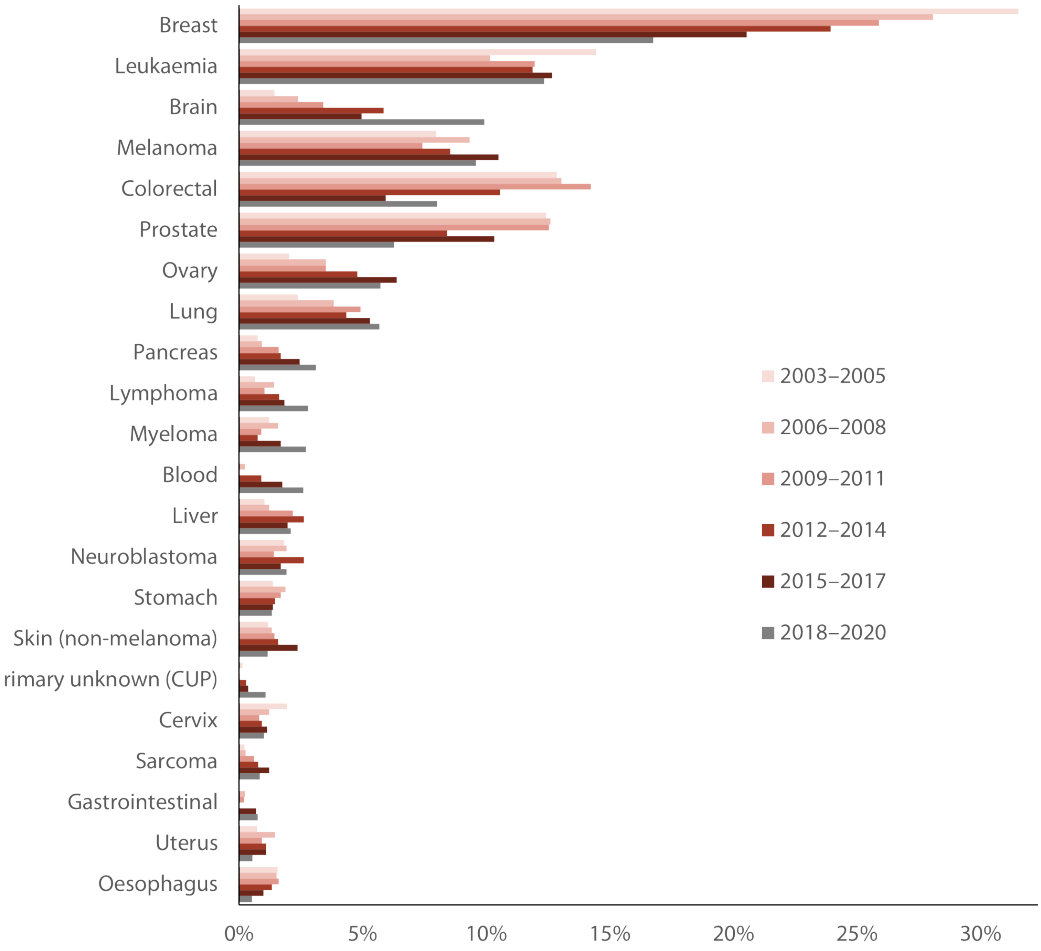
Between 2003–2005 and 2018–2020, changes in proportional funding for single tumour type research were:

- **Breast cancer**: decreased in each triennium from 32% to 17% (biggest decrease in proportional funding for all single tumour type research)
- **Brain cancer**: increased in each triennium from 1% to 10% (biggest increase in proportional funding for all single tumour type research)
- **Colorectal cancer**: decreased from 13% to 8%, with fluctuations across triennia
- **Leukaemia:** decreased slightly from 14% to 12%, with fluctuations across triennia
- **Melanoma**: increased slightly from 8% to 10%, with fluctuations across triennia
- **Lung cancer and mesothelioma**: increased from 2% to 6%, with fluctuations across triennia.

Proportional funding for single tumour type research in the remaining 16 cancers[5] each represented 3% or less of direct funding for single tumour type specific research across the six triennia.

[5] Pancreatic cancer, Lymphoma, Myeloma, Blood cancers (other than myeloma, leukaemia and lymphoma), Liver cancer, Neuroblastoma, Stomach cancer, Skin cancer (non-melanoma), Cancer of unknown primary, Cervical cancer, Sarcoma, cancers of the Gastrointestinal tract (other than colorectal cancer), Oesophageal cancer, Gallbladder cancer, Cancers of the small intestine and stomach and Endometrial cancer.

Figure 8.1 Proportional funding to single tumour type cancer type research projects and programs, 2003–2005 to 2018–2020



	Oesophagus	Uterus	Gastrointestinal	Sarcoma	Cervix	Unknown primary (CUP)	Skin (non-melanoma)	Stomach	Neuroblastoma	Liver	Blood	Myeloma	Lymphoma	Pancreas	Lung	Ovary	Prostate	Colorectal	Melanoma	Brain	Leukaemia	Breast
2003–2005	2	1	0	0	2	0	1	1	2	1	0	1	1	1	2	2	12	13	8	1	14	32
2006–2008	2	1	0	0	1	0	1	2	2	1	0	2	1	1	4	4	13	13	9	2	10	28
2009–2011	2	1	0	1	1	0	1	2	1	2	0	1	1	2	5	4	13	14	7	3	12	26
2012–2014	1	1	0	1	1	0	2	1	3	3	1	1	2	2	4	5	8	11	9	6	12	24
2015–2017	1	1	1	1	1	0	2	1	2	2	2	2	2	2	5	6	10	6	11	5	13	21
2018–2020	1	1	1	1	1	1	1	1	2	2	3	3	3	3	6	6	6	8	10	10	12	17

8.2 Direct funding to single tumour type research from non-government and community-based organisations

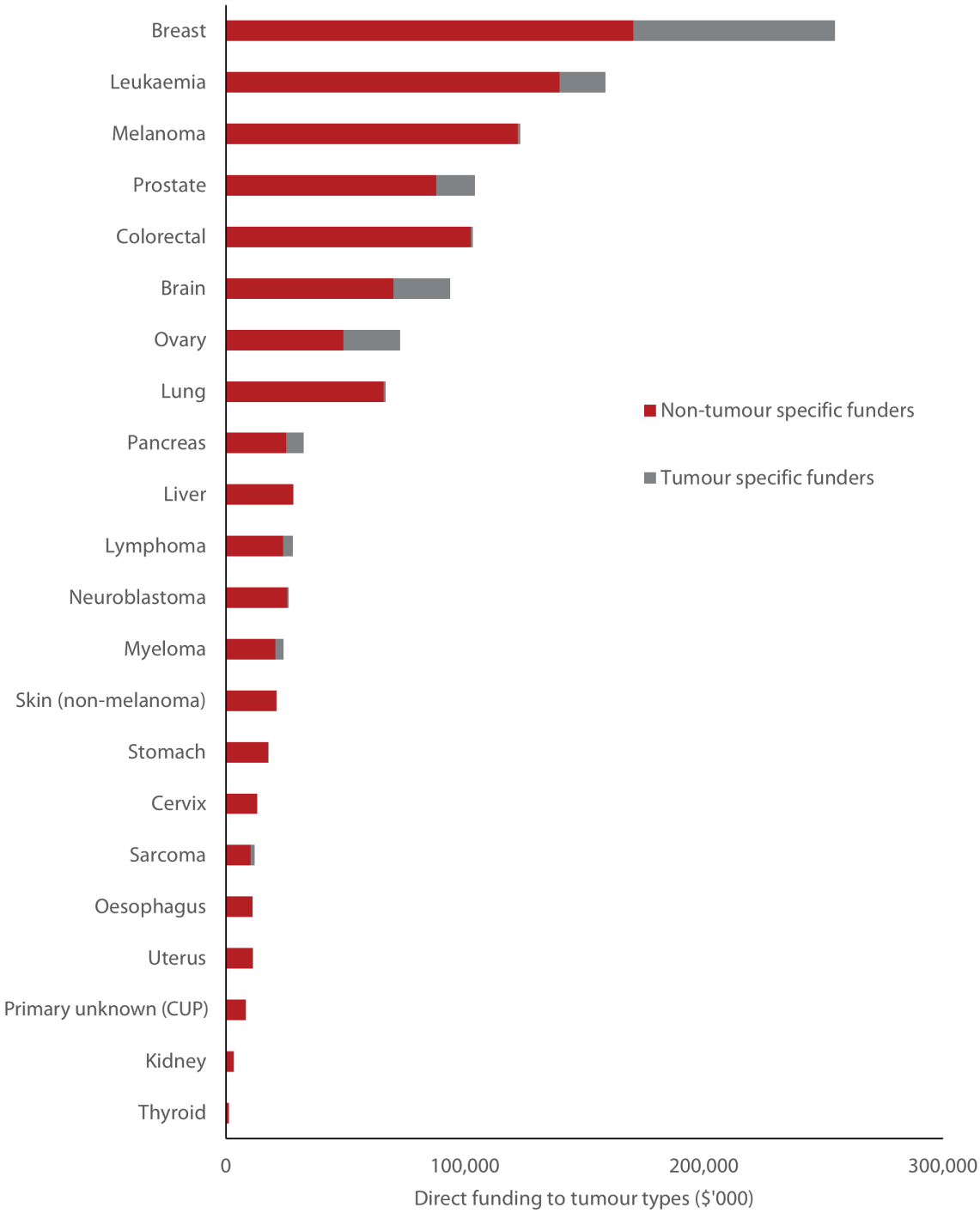
Many non-government and community-based organisations raise funds for research in specific tumours. The audit identified 38 organisations that mostly funded research in a single tumour type during the period 2012–2020. Funding from these organisations represented 15% of the direct research funding identified during this period.

Figure 8.2 shows the proportional contribution of direct funding for research from these organisations in each of the 22 tumour types analysed.

In summary, in the period 2012–2020 the proportion of direct funding from organisations that fund specific tumour types was as follows:

- **Prostate cancer:** 34%
- **Breast cancer:** 33%
- **Ovarian cancer:** 32%
- **Pancreatic cancer:** 22%
- **Brain cancer:** 19%
- **Myeloma:** 16%
- **Sarcoma:** 14%
- **Leukaemia:** 11%
- **Lymphoma:** 6%
- **Melanoma**, **Neuroblastoma**, and cancers of the **Colorectal**, **Lung**, **Skin**, and **Stomach**: each less than 1%
- No direct funding to cancers of the **Liver**, **Cervix**, **Oesophagus**, **Thyroid** or **Cancer of unknown primary site** was identified from tumour-specific funders.

Figure 8.2 Contribution by tumour type-specific funders and non-tumour type-specific funders to direct funding of tumour type-specific cancer research projects and programs, 2012–2020



8.3 Direct funding to single tumour type research compared to disease impact and burden

Direct funding to cancer research projects and programs focused on a single tumour type was analysed relative to measures of disease impact and burden. These measures included incidence, mortality, disability-adjusted life years (DALYs),[t] and change in 5-year relative survival.

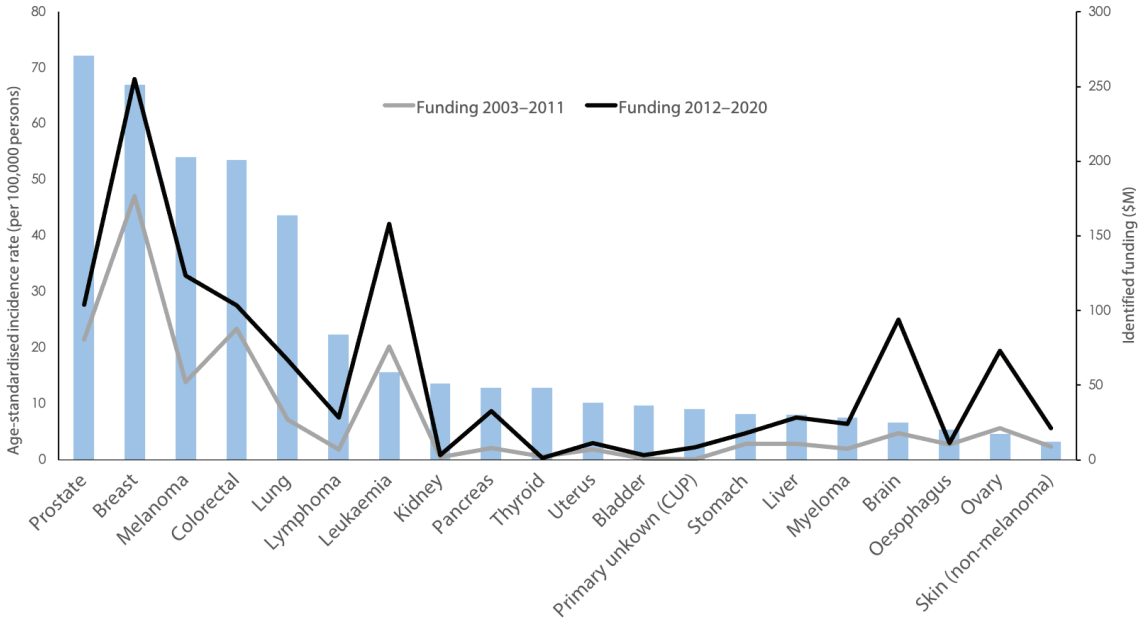
8.3.1 Direct funding for single tumour type research relative to cancer incidence

Figure 8.3 shows direct funding in the period 2003–2011 and 2012–2020 to single tumour type cancer research projects and programs relative to cancer incidence in 2018.

Relative to incidence, direct research funding was proportionally lower for cancers of the Prostate, Colorectal, Lung, Kidney, Thyroid, Uterus, Gallbladder, Bladder, Stomach, and for Lymphoma and Cancer of unknown primary.

[t] DALYs represent the summed estimated years of life lost due to premature death (YLL) and years of health life lost to disability (YLD).

Figure 8.3 Direct funding to single tumour type research projects and programs, 2003–2011 and 2012–2020 compared with cancer incidence in Australia, 2018



Notes:

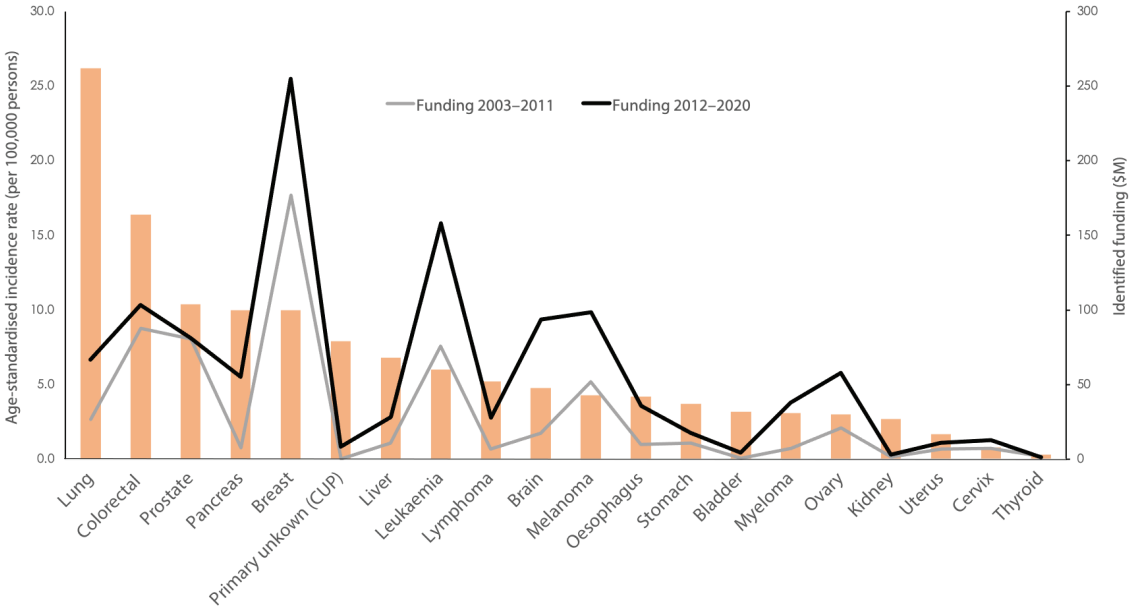
1. AIHW lung cancer and mesothelioma incidence data have been summed to allow comparison with categories used in the audit.
2. Lymphoma incidence data represents the sum of AIHW data for cancer sites C81–C85 & C96.
3. Direct funding for lymphoma represents the sum of direct funding data for Hodgkin's disease and non-Hodgkin's lymphoma.
4. Direct funding for endometrial cancer is allocated to cancer of the uterus for consistency with AIHW data.

8.3.2 Direct funding for single tumour type research relative to mortality

Figure 8.4 shows direct funding in the period 2003–2011 and 2012–2020 to single tumour type research relative to cancer mortality in 2020.

Relative to mortality, direct research funding was proportionally lower for cancers of the Lung, Colorectal, Pancreas, Liver, Oesophagus, Stomach, Gallbladder, Bladder, Kidney, and for Lymphoma and Cancer of unknown primary.

Figure 8.4 Direct funding to single tumour type research projects and programs, 2003–2011 to 2012–2020, compared with cancer mortality in Australia, 2020

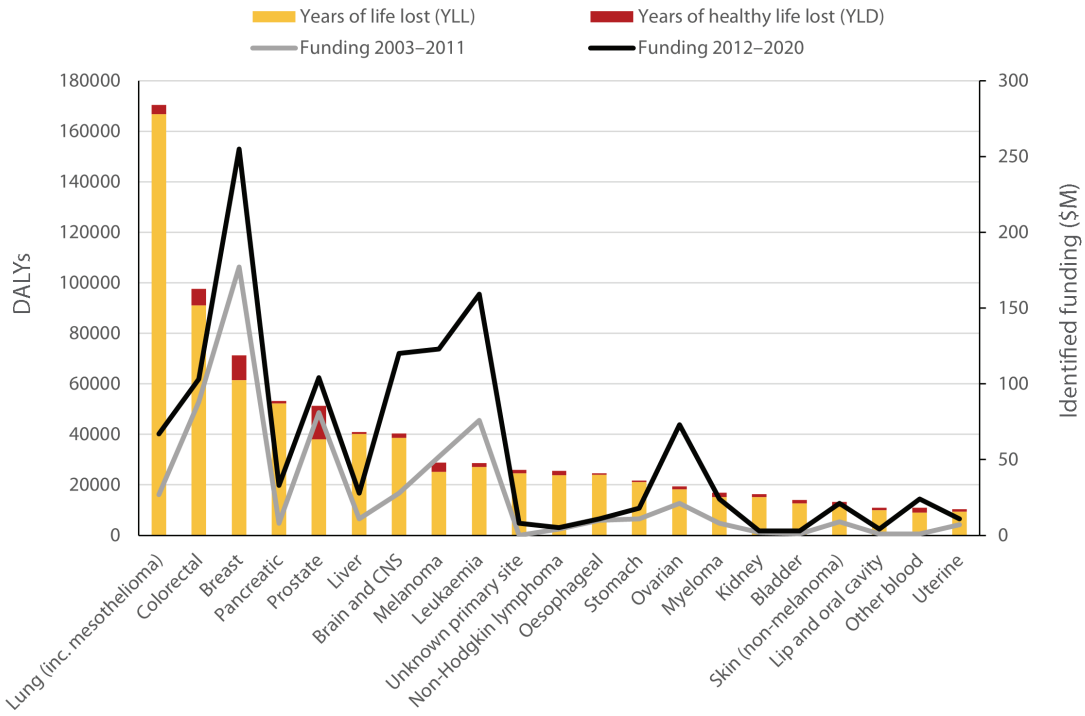


1. AIHW lung cancer and mesothelioma mortality data have been summed to allow comparison with categories used in the audit.
2. Lymphoma mortality data represents the sum of AIHW data for cancer sites C81–C85 & C96.
3. Direct funding for lymphoma represents the sum of direct funding data for Hodgkin's disease and non-Hodgkin's lymphoma.
4. Direct funding for endometrial cancer is allocated to cancer of the uterus for consistency with AIHW data.

8.3.3 Direct funding for single tumour type research relative to disability-adjusted life years

Figure 8.5 shows direct funding in the period 2003–2011 and 2012–2020 for single tumour type research relative to burden of disease by DALYs in 2018. Relative to DALYs, direct research funding was proportionally lower for cancers of the Lung, Colorectal, Pancreas, Skin (non melanoma), Liver, Oesophagus, Stomach, Kidney, Bladder, Lip and oral cavity and Cancers of unknown primary.

Figure 8.5 Direct funding to single tumour type research projects and programs, 2003–2011 to 2012–2020, compared with cancers by DALYs in Australia, 2018

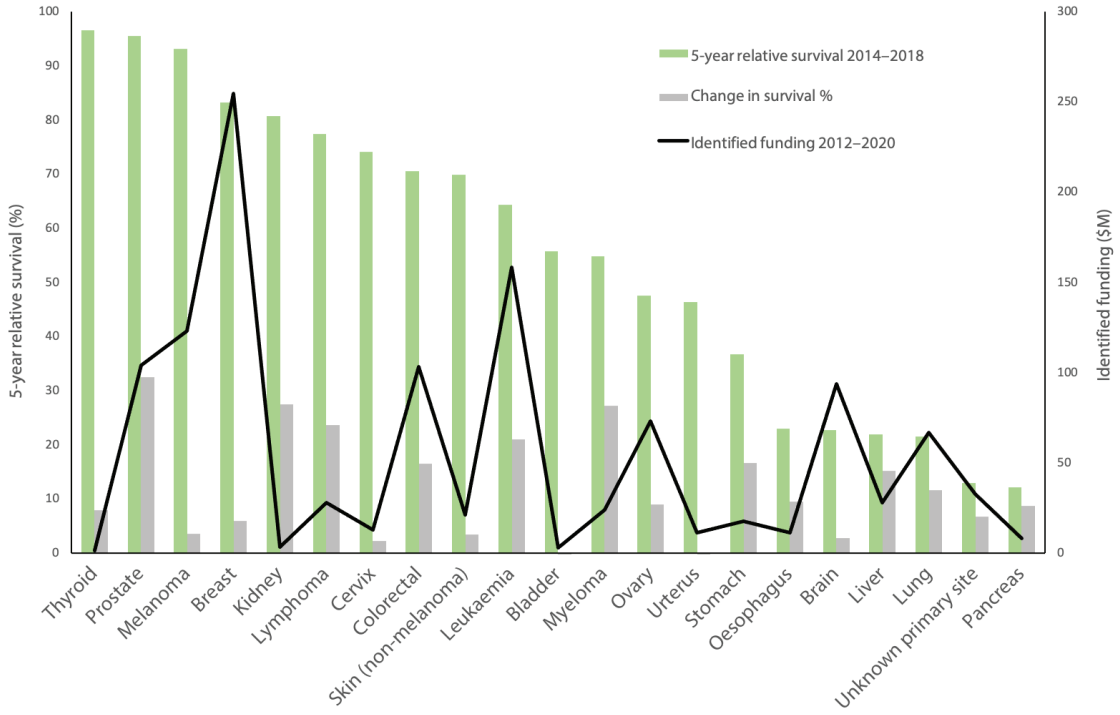


1. Direct funding for endometrial cancer is allocated to cancer of the uterus for consistency with AIHW data.

8.3.4 Direct funding for single tumour type research relative to improvement in relative survival

Figure 8.6 shows direct funding in the period 2012–2020 for single tumour type research relative to improvements in 5-year relative survival between 2014 to 2018. This statistic is a measure of the probability that a person will survive at least five years after diagnosis of cancer compared with the general population.[u]

Figure 8.6 Direct funding to single tumour type research projects and programs, 2012–2020, compared with improvement in 5-year relative survival in Australia since 2014–2018



[u] A notable improvement in 5-year relative survival has been observed for prostate cancer, kidney cancer, lymphoma, leukaemia, colorectal, breast, stomach, and liver cancers in the time period included in this audit.

9 Patterns of cancer research funding to specific tumour types

Key findings

- Between 2003–2005 and 2018–2020:
  - the pattern of proportional funding across CSO categories for Breast and Prostate cancer research projects and programs was similar to that for all cancer research projects and programs combined
  - the pattern of proportional funding across CSO categories for other tumour types varied and reflected the predominant areas of research focus for individual tumour types
  - proportional funding to Biology and Treatment was highest, and to Prevention research was lowest, for most tumour types examined.
- The pattern of proportional funding across CSO categories was analysed for selected tumour types with the highest level of direct research funding in the period 2012–2020, and tumour streams/types that are a focus of Cancer Australia's program of work:
  - Breast cancer
  - Prostate cancer
  - Melanoma
  - Lung cancer and mesothelioma
  - Brain cancer
  - Gynaecological cancers
  - Colorectal cancer
  - Pancreatic cancer
  - Haematological cancers.
- Changes in the pattern of proportional funding by CSO category were analysed for each tumour stream and/or type, over the triennia 2003–2005 to 2018–2020.

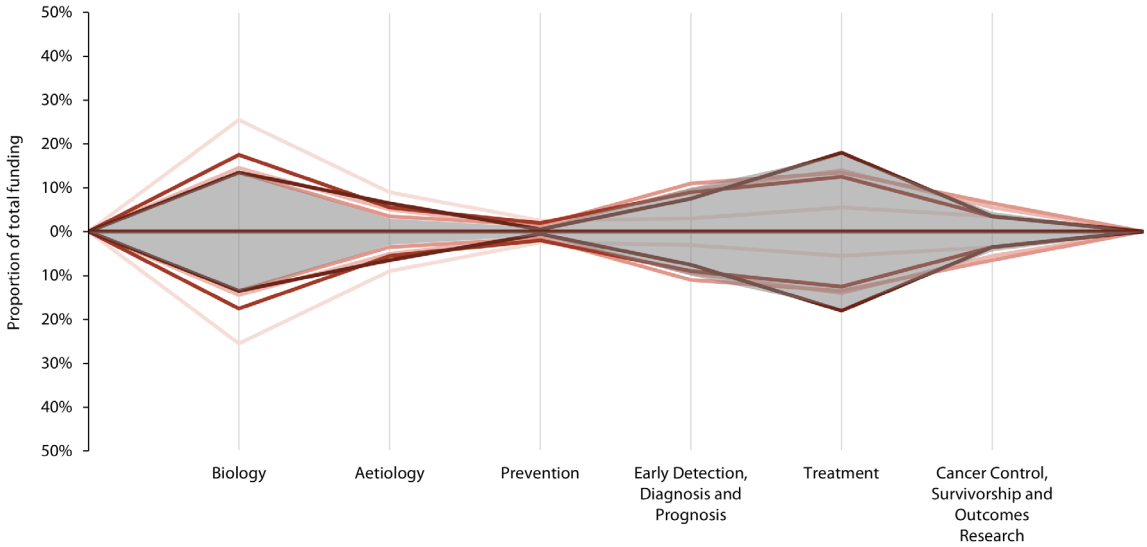
9.1 Breast cancer

Figure 9.1 shows the pattern of proportional funding by CSO category for Breast cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Breast cancer research projects and programs increased from $33.4M in 2003–2005 to $91.3M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for Biology and Treatment:
  - **Biology**: accounted for 51% of direct funding in 2003–2005, decreasing to 27% by 2009–2011 and mostly remaining at this level to 2018–2020
  - **Treatment**: increased over triennia, from 11% of direct funding in 2003–2005 to 35% in 2018–2020.
- **Aetiology**: decreased over triennia, from 18% of direct funding in 2003–2005 to 6% in 2018–2020
- **Early Detection, Diagnosis and Prognosis**: increased over triennia, from 6% of direct funding in 2003–2005 to 20% in 2018–2020
- **Cancer Control, Survivorship and Outcomes Research**: fluctuated between 7% and 13% of direct funding across the triennia
- **Prevention**: received the lowest level of funding, accounting for only 2% of direct funding in 2018–2020.

Figure 9.1 Pattern of proportional funding by CSO category for Breast cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Breast cancer research projects and programs					
	2003–2005	51%	18%	5%	6%	11%	7%
	2006–2008	29%	10%	2%	19%	28%	11%
	2009–2011	27%	7%	3%	22%	27%	13%
	2012–2014	35%	11%	4%	18%	25%	7%
	2015–2017	27%	13%	1%	15%	36%	7%
	2018–2020	27%	6%	2%	20%	35%	9%

9.2 Prostate cancer

Figure 9.2 shows the pattern of proportional funding by CSO category for Prostate cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Prostate cancer research projects and programs increased from $13.2M in 2003–2005 to $34.2M in 2018–2020, (although was more than $41M in 2009–2011 and 2015–2017).

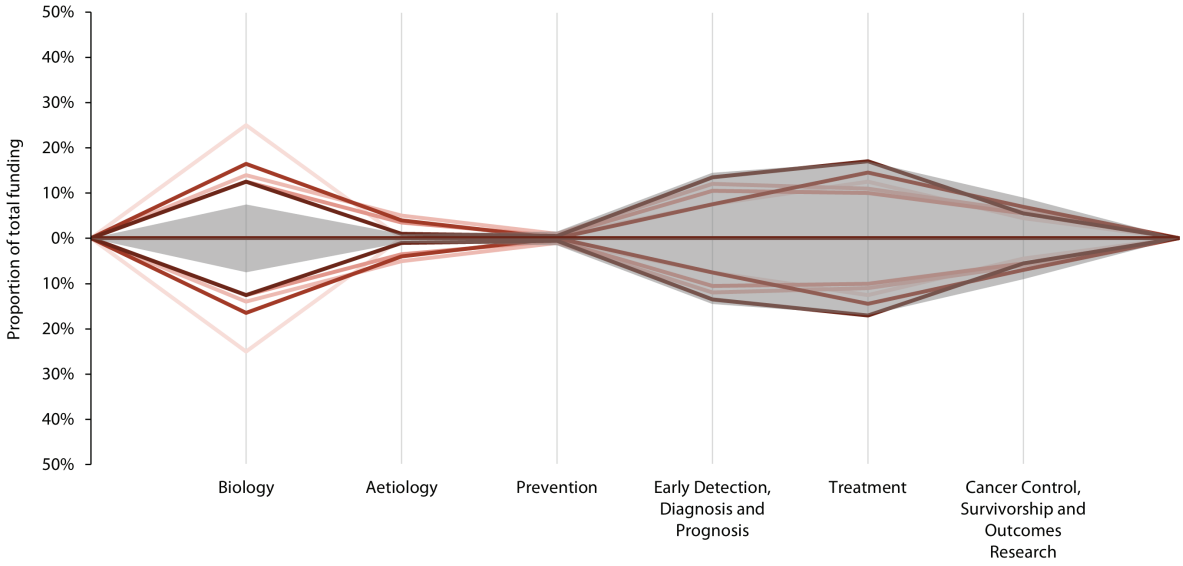
Notable patterns of proportional funding by CSO category across triennia are outlined below:

» the highest proportions of direct funding were for **Biology** and **Treatment**:

- **Biology**: accounted for 50% of all direct funding in 2003–2005, decreasing to 15% in 2018–2020
- **Treatment:** increased over triennia from 25% of direct funding in 2003–2005 to 34% in 2018–2020

- **Early Detection, Diagnosis and Prognosis**: increased over triennia from 15% of direct funding in 2003–2005 to 29% in 2018–2020
- **Cancer Control, Survivorship and Outcomes Research**: increased over triennia from 9% of direct funding in 2003–2005 to 18% in 2018–2020
- **Aetiology**: fluctuated between 0% and 10% of direct funding across triennia
- **Prevention**: received the lowest level of funding, accounting for 3% or less of direct funding in each triennium.

Figure 9.2 Pattern of proportional funding by CSO category for Prostate cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Prostate cancer research projects and programs					
	2003–2005	50%	0%	1%	15%	25%	9%
	2006–2008	28%	10%	2%	24%	22%	12%
	2009–2011	25%	7%	1%	21%	20%	11%
	2012–2014	33%	8%	0%	15%	29%	14%
	2015–2017	25%	2%	1%	27%	34%	11%
	2018–2020	15%	2%	3%	29%	34%	18%

9.3 Melanoma

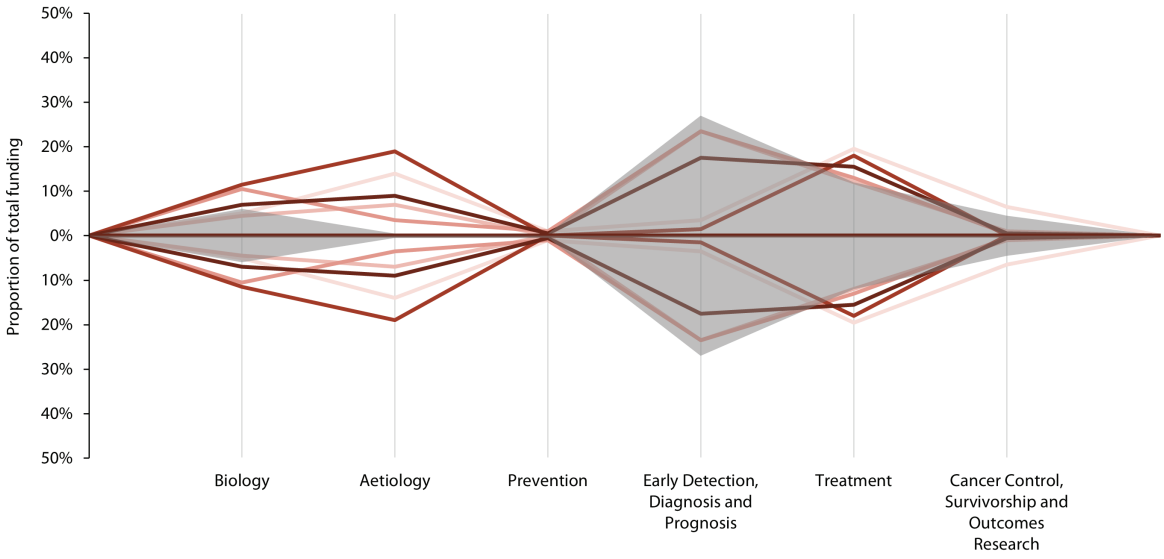
Figure 9.3 shows the pattern of proportional funding by CSO category for Melanoma research projects and programs between 2003–2005 and 2018–2020.

Direct funding to melanoma research projects and programs increased in each triennium from $8.5M in 2003–2005 to $52.3M in 2018–2020. Proportional funding fluctuated quite markedly across triennia.

Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for **Early Detection and Diagnosis** and **Treatment**:
  - **Early Detection, Diagnosis and Prognosis**: increased over triennia from 7% of direct funding in 2003–2005 to 54% in 2018–2020
  - **Treatment**: fluctuated by triennium, ranging from 24% to 39% of direct funding
- **Aetiology**: fluctuated markedly by triennium from a low of 1% of direct funding to a high of 38%
- **Biology**: fluctuated by triennium from a low of 9% of direct funding to a high of 23%
- **Cancer Control, Survivorship and Outcomes Research**: accounted for 13% of direct funding in 2003–2005 and 9% in 2018–2020, but dropped as low as 0% during the other triennia.
- **Prevention**: received the lowest level of funding, accounting for 2% or less of direct funding in each triennium.

Figure 9.3 Pattern of proportional funding by CSO category for Melanoma research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Melanoma cancer research projects and programs					
	2003–2005	10%	28%	2%	7%	39%	13%
	2006–2008	9%	14%	0%	47%	24%	2%
	2009–2011	21%	7%	2%	47%	26%	1%
	2012–2014	23%	38%	0%	3%	36%	0%
	2015–2017	14%	18%	1%	35%	31%	1%
	2018–2020	12%	1%	1%	54%	24%	9%

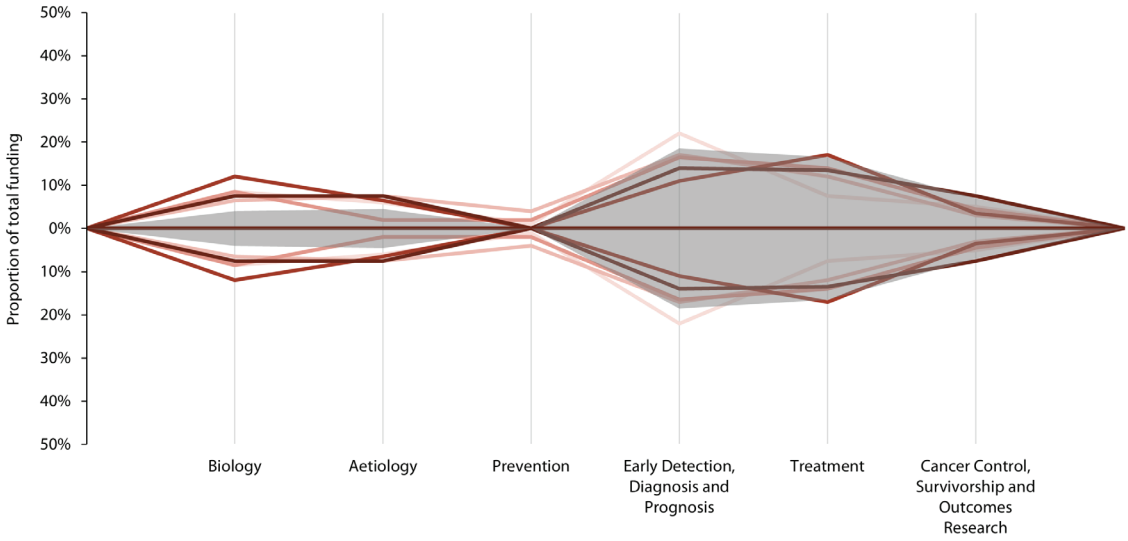
9.4 Lung cancer and mesothelioma

Figure 9.4 shows the pattern of proportional funding by CSO category for Lung cancer and mesothelioma research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Lung cancer and mesothelioma research projects and programs increased from $2.5M in 2003–2005 to $30.9M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for **Early Detection**, **Diagnosis and Prognosis** and **Treatment**:
  - **Early Detection**, **Diagnosis and Prognosis**: decreased slightly from 44% in 2003–2005 to 37% in 2018–2020
  - **Treatment**: increased from 15% in 2003–2005 to 33% in 2018–2020
- **Biology**: fluctuated by triennium from a low of 8% of direct funding to a high of 24%
- **Aetiology**: fluctuated by triennium from a low of 4% of direct funding to a high of 15%
- **Cancer Control, Survivorship and Outcomes Research**: fluctuated across triennia from a low of 6% of direct funding to a high of 15%
- **Prevention:** received the lowest level of funding, accounting for 2–8% of direct funding in the first three triennia and no funding in the subsequent three triennia.

Figure 9.4 Pattern of proportional funding by CSO category for Lung cancer and mesothelioma research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Lung cancer and mesothelioma research projects and programs					
	2003–2005	17%	12%	2%	44%	15%	10%
	2006–2008	13%	15%	8%	34%	24%	6%
	2009–2011	17%	4%	4%	33%	28%	9%
	2012–2014	24%	13%	0%	22%	34%	7%
	2015–2017	15%	15%	0%	28%	27%	15%
	2018–2020	8%	9%	0%	37%	33%	14%

9.5 Brain cancer

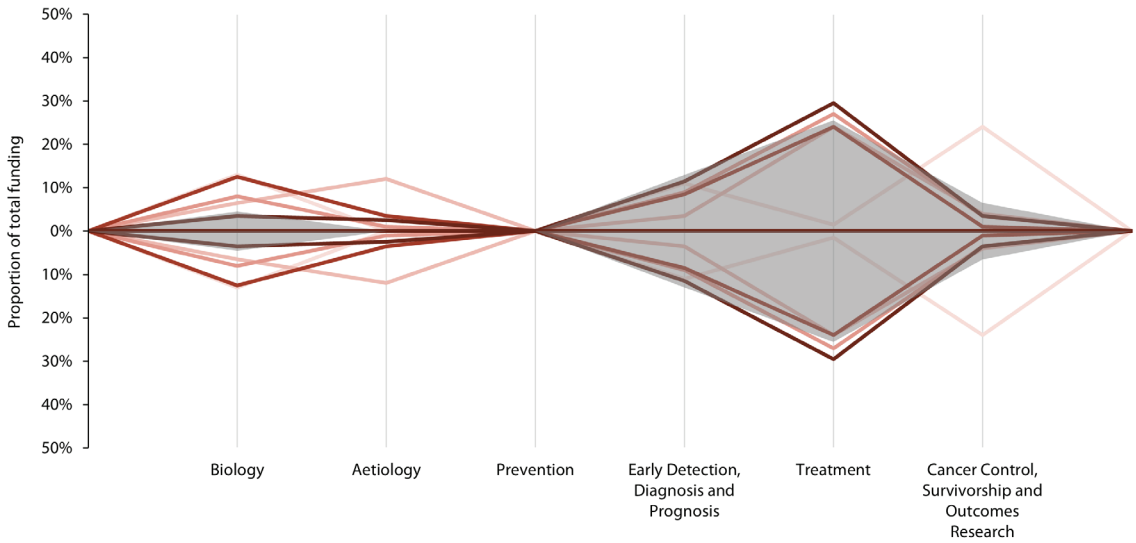
Figure 9.5 shows the pattern of proportional funding by CSO category for Brain cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Brain cancer research projects and programs increased from $1.5M in 2003–2005 to $54.1M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- **Treatment**: accounted for the highest proportion of direct funding, increasing from a low of 3% in 2003–2005, to range from 48% to 59% in subsequent triennia
- **Biology**: accounted for 13–26% of direct funding in the first four triennia, decreasing to 9% in 2018–2020
- **Early Detection, Diagnosis and Prognosis**: accounted for 17% to 26% of direct funding, with the exception of a decrease to 7% in 2006–2008

- **Aetiology**: accounted for 7% or less of direct funding in most triennia, with a high of 24% in 2006–2008
- **Cancer Control, Survivorship and Outcomes Research**: accounted for 48% of all direct funding in 2003–2005 but subsequently decreased, ranging from 2% to 13% in subsequent triennia
- **Prevention**: received no research funding in any triennium.

Figure 9.5 Pattern of proportional funding by CSO category for Brain cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Brain cancer research projects and programs					
	2003–2005	26%	0%	0%	22%	3%	48%
	2006–2008	13%	24%	0%	7%	48%	8%
	2009–2011	16%	2%	0%	18%	54%	7%
	2012–2014	25%	7%	0%	17%	48%	2%
	2015–2017	7%	5%	0%	23%	59%	7%
	2018–2020	9%	0%	0%	26%	51%	13%

9.6 Gynaecological cancers

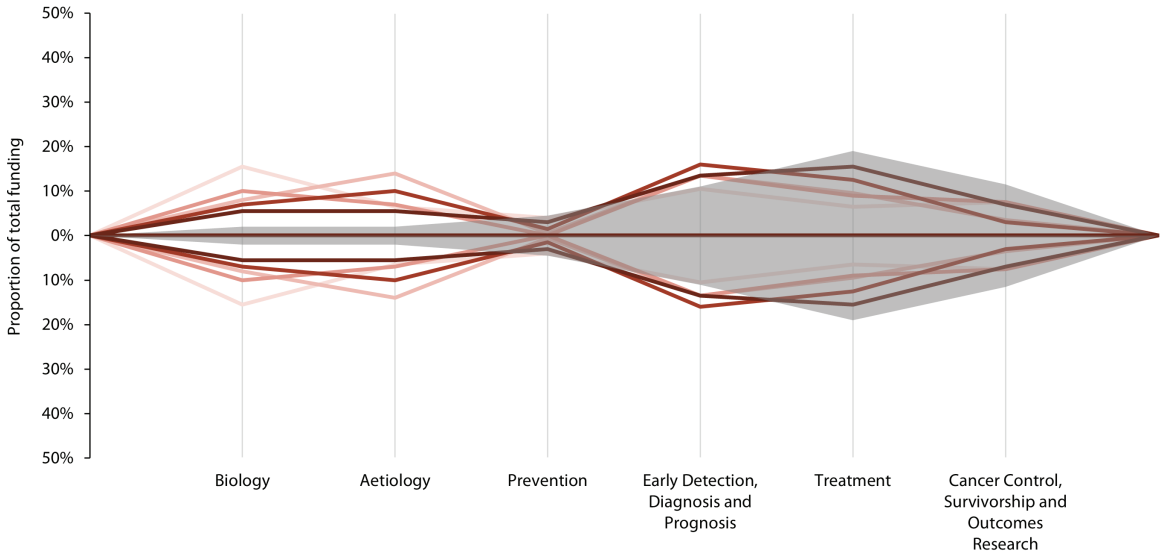
Figure 9.6 shows the pattern of proportional funding by CSO category for Gynaecological cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Gynaecological cancer research projects and programs increased from $5.2M in 2003–2005 to $44.0M in 2018–2020. Notable patterns of proportional funding by CSO category across

triennia are outlined below:

- the highest proportions of direct funding were for **Early Detection**, **Diagnosis** and **Prognosis and Treatment**:
  - **Early detection**, **Diagnosis and Prognosis**: stayed reasonably consistent across triennia, ranging from 21% to 32% of direct funding, with fluctuations across triennia
  - **Treatment**: increased from 13% of direct funding in 2003–2005 to 38% in 2018–2020.
- **Biology**: decreased from 31% of direct funding in 2003–2005 to 4% in 2018–2020
- **Aetiology**: ranged from 11% to 28% of direct funding, dropping to a low of 4% in 2018–2020
- **Cancer Control**, **Survivorship and Outcomes Research**: fluctuated by triennium, ranging from 6% to 23% of direct funding
- **Prevention**: received the lowest level of funding, ranging from 0% to 9% of direct funding, with fluctuations across triennia.

Figure 9.6 Pattern of proportional funding by CSO category for Gynaecological cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Gynaecological cancer research projects and programs					
	2003–2005	31%	13%	8%	21%	13%	15%
	2006–2008	16%	28%	1%	27%	19%	7%
	2009–2011	20%	14%	0%	27%	18%	15%
	2012–2014	14%	20%	3%	32%	25%	6%
	2015–2017	11%	11%	6%	27%	31%	14%
	2018–2020	4%	4%	9%	22%	38%	23%

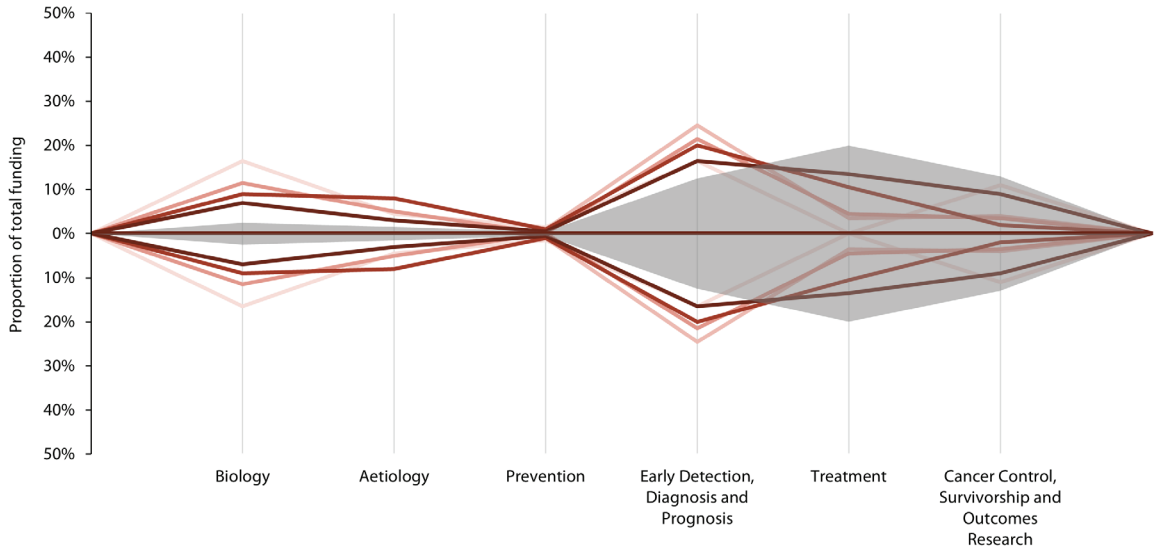
9.6.1 Ovarian cancer

Figure 9.7 shows the pattern of proportional funding by CSO category for Ovarian cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Ovarian cancer research projects and programs increased from $2.2M in 2003–2005 to $31.2M in 2018–2020. Funding for ovarian cancer represents the largest component of funding for Gynaecological cancer research. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- Early Detection, Diagnosis and Prognosis: accounted for the highest proportion of direct funding, increasing from 33% in 2003–2005 to 49% in 2006–2008, decreasing to 25% in 2018–2020
- Biology: decreased markedly from 33% of direct funding in 2003–2005 to 5% in 2018–2020
- Treatment: increased markedly from 0% of direct funding in 2003–2005 to 40% in 2018–2020
- Aetiology: fluctuated by triennium, ranging from 3% to 16% of direct funding
- Cancer Control, Survivorship and Outcomes research: fluctuated across triennia, ranging from 4% to 26% of direct funding
- Prevention: received the lowest level of funding, ranging from 0% to 3% of direct funding.

Figure 9.7 Pattern of proportional funding by CSO category for Ovarian cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Ovarian cancer research projects and programs					
	2003–2005	33%	9%	3%	33%	0%	22%
	2006–2008	18%	16%	2%	49%	7%	8%
	2009–2011	23%	10%	0%	43%	9%	7%
	2012–2014	18%	16%	2%	40%	21%	4%
	2015–2017	14%	6%	1%	33%	27%	18%
	2018–2020	5%	3%	1%	25%	40%	26%

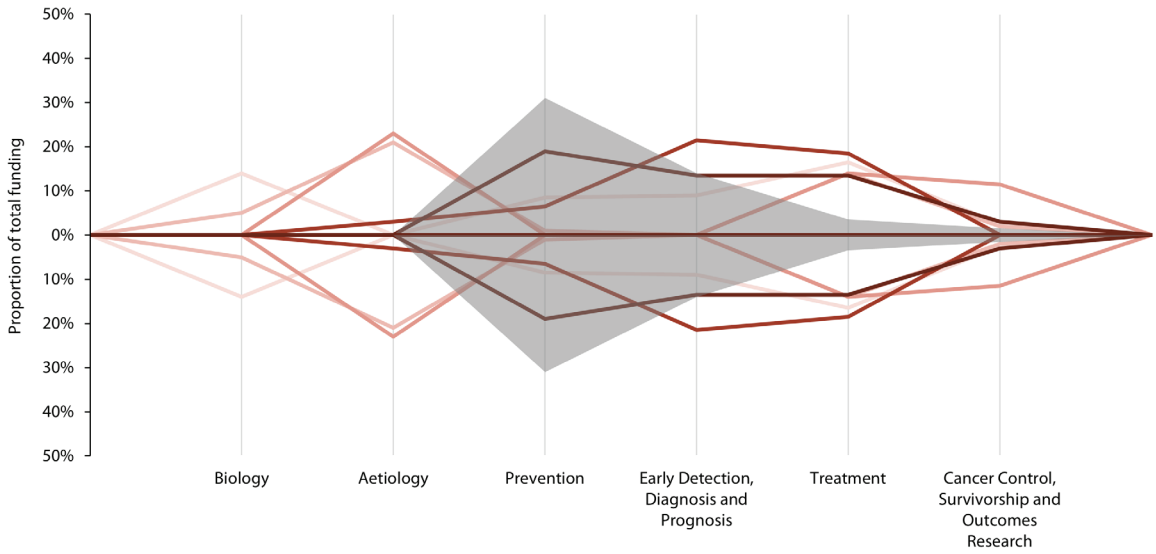
9.6.2 Cervical cancer

Figure 9.8 shows the pattern of proportional funding by CSO category for Cervical cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Cervical cancer research projects and programs increased from $2.1M in 2003–2005 to $5.5M in 2018–2020. Due to the level of funding for this tumour type, only a small number of research projects and programs were funded in each CSO category. This makes it difficult to assess and interpret patterns of proportional funding over time. The most notable patterns of proportional funding by CSO category across triennia are outlined below:

- Aetiology: accounted for 42% and 46% of direct funding in 2006–2008 and 2009–2011, respectively but accounted for minimal levels in other triennia
- Prevention: accounted for 38% and 62% of direct funding in 2015–2017 and 2018–2020, respectively, with fluctuations in other triennia
- Treatment: remained relatively stable at 27% to 37% of direct funding between 2003–2005 and 2015–2017, decreasing to 7% in the last triennium (2018–2020).

Figure 9.8 Pattern of proportional funding by CSO category for Cervical cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for cervical cancer research projects and programs					
	2003–2005	28%	0%	17%	18%	33%	5%
	2006–2008	10%	42%	2%	0%	28%	4%
	2009–2011	0%	46%	0%	0%	28%	23%
	2012–2014	0%	6%	13%	43%	37%	0%
	2015–2017	0%	0%	38%	27%	27%	6%
	2018–2020	0%	0%	62%	28%	7%	3%

9.6.3 Endometrial cancer

Figure 9.9 shows the pattern of proportional funding by CSO category for Endometrial cancer research projects and programs between 2003–2005 and 2018–2020.

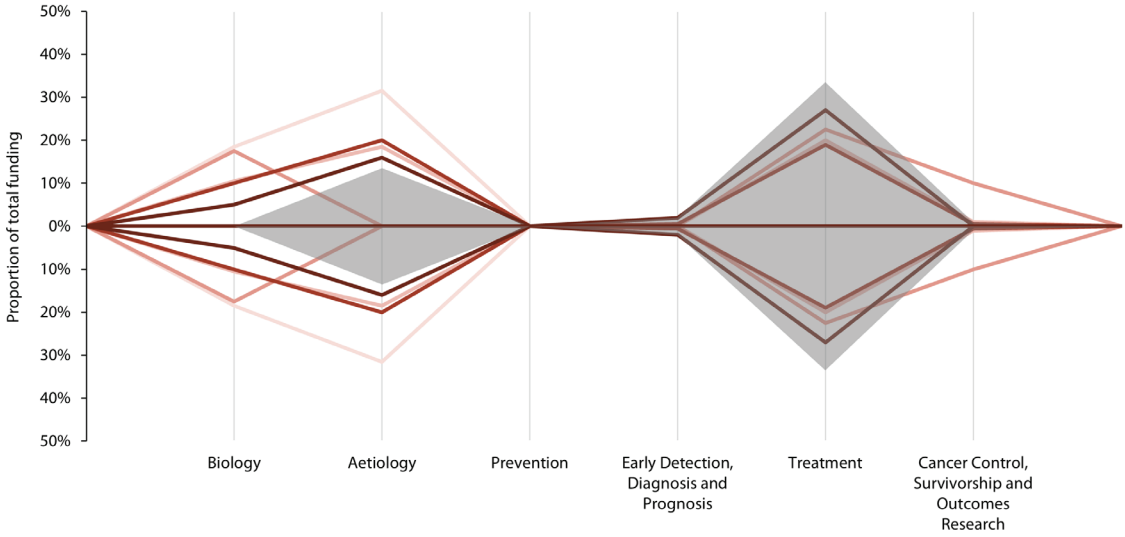
Direct funding to Endometrial cancer research projects and programs increased from $0.8M in 2003–2005 to $4.4M in 2015–2017, decreasing to $3.0M in 2018–2020. Due to the level of funding for this tumour type, only a small number of research projects and programs were funded in each CSO category. This makes it more difficult to assess and interpret patterns of proportional funding over time. The most notable patterns of proportional funding by CSO category across triennia are outlined below:

» **Biology** and **Aetiology**: accounted for all of the direct funding to Endometrial cancer research projects and programs in 2003–2005; fluctuations were seen in both categories in subsequent triennia with the proportion of direct funding ranging from 0% to 37% for Biology and 0% to 63% for Aetiology

» **Treatment**: increased from 0% in 2003–2005 to 67% in 2018–2020

» **Early Detection, Diagnosis and prognosis**: received lower levels of funding, accounting for 0% to 4% of direct funding in each triennium.

Figure 9.9 Pattern of proportional funding by CSO category for Endometrial cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Endometrial cancer research projects and programs					
	2003–2005	37%	63%	0%	0%	0%	0%
	2006–2008	21%	37%	0%	0%	40%	2%
	2009–2011	35%	0%	0%	0%	45%	20%
	2012–2014	20%	40%	0%	1%	38%	1%
	2015–2017	10%	32%	0%	4%	54%	0%
	2018–2020	0%	27%	0%	4%	67%	2%

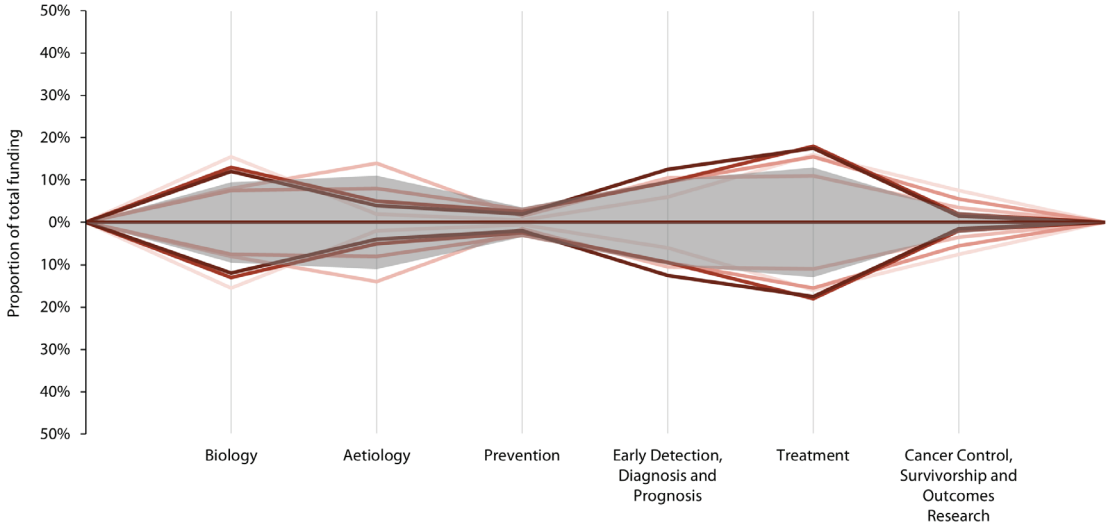
9.7 Colorectal cancer

Figure 9.10 shows the pattern of proportional funding by CSO category for Colorectal cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Colorectal cancer research projects and programs increased from $13.6M in 2003–2005 to $43.6M in 2018–2020 with fluctuations in the intervening triennia. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for **Biology** and **Treatment**:
  - **Biology**: accounted for 31% of direct funding in 2003–2005, decreasing to 19% in 2018–2020
  - **Treatment**: remained reasonably consistent accounting for 32% of direct funding in 2003–2005 and 26% in 2018–20.
- **Early Detection**, **Diagnosis and Prognosis**: fluctuated across triennia ranging from 12% to 25% of direct funding
- **Aetiology**: fluctuated across triennia, ranging from 4% to 22% of direct funding
- **Cancer Control**, **Survivorship and Outcomes Research**: fluctuated across triennia, ranging from 3% to 15% of direct funding
- **Prevention**: received the lowest level of funding, ranging from 1% to 7% of direct funding.

Figure 9.10 Pattern of proportional funding by CSO category for Colorectal cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Colorectal cancer research projects and programs					
	2003–2005	31%	4%	1%	12%	32%	15%
	2006–2008	16%	28%	3%	21%	22%	7%
	2009–2011	15%	16%	6%	19%	31%	11%
	2012–2014	26%	10%	5%	19%	36%	4%
	2015–2017	24%	8%	4%	25%	35%	3%
	2018–2020	19%	22%	7%	20%	26%	5%

9.8 Pancreatic cancer

Figure 9.11 shows the pattern of proportional funding by CSO category for Pancreatic cancer research projects and programs between 2003–2005 and 2018–2020.

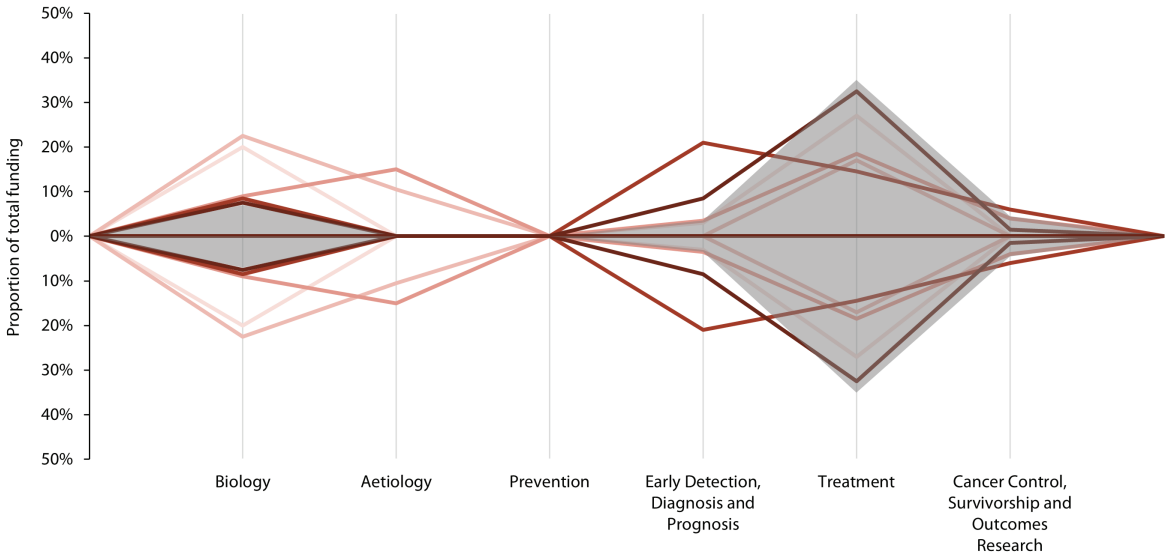
Direct funding to Pancreatic cancer research projects and programs increased from $0.8M in 2003–2005 to $17.0M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

» the highest proportions of direct funding were for **Biology** and **Treatment**:

- **Biology**: decreased over time from 40% of direct funding in 2003–2005 to 14% in 2018–2020
- **Treatment**: fluctuated across triennia from 29% to 70% of direct funding.

- **Early Detection, Diagnosis and Prognosis**: fluctuated markedly from 0% to 42% of direct funding
- **Aetiology**: fluctuated markedly from 0% to 30% of direct funding
- **Cancer Control, Survivorship and Outcomes Research**: accounted for 12% or less of direct funding in each triennium, with no funding in two triennia
- **Prevention**: received no research funding in any triennium.

Figure 9.11 Pattern of proportional funding by CSO category for Pancreatic cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Pancreatic cancer research projects and programs					
	2003–2005	40%	0%	0%	6%	54%	0%
	2006–2008	45%	21%	0%	0%	34%	0%
	2009–2011	18%	30%	0%	7%	37%	8%
	2012–2014	17%	0%	0%	42%	29%	12%
	2015–2017	15%	0%	0%	17%	65%	3%
	2018–2020	14%	0%	0%	7%	70%	9%

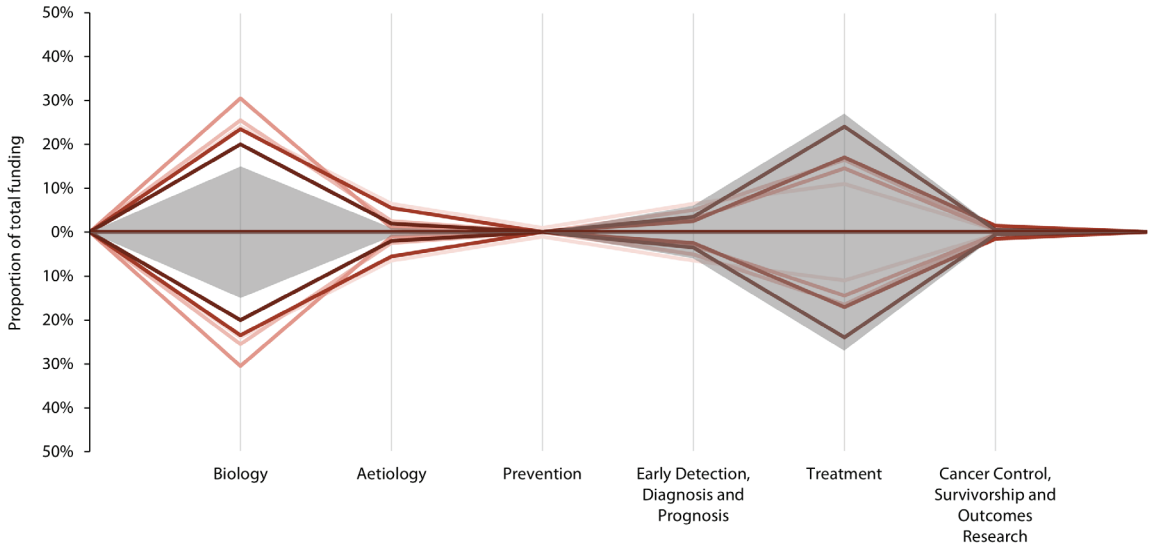
9.9 Haematological cancers

Figure 9.12 shows the pattern of proportional funding by CSO category for Haematological cancer research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Haematological cancer research projects and programs increased markedly over time, from $18.5M in 2003–2005 to $125M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for Biology and Treatment:
  - **Biology**: accounted for 45% to 55% of direct funding in the first three triennia (2003–2005 to 2009–2011), decreasing to 30% in 2018–2020
  - **Treatment**: increased over time, from 21% of direct funding in 2003–2005 to 54% in 2018–2020.
- **Early Detection**, **Diagnosis and Prognosis**: ranged from 5% to 13% of direct funding
- **Aetiology**: ranged from 2% to 13% of direct funding
- **Cancer Control**, **Survivorship and Outcomes Research**: accounted for lower levels of direct funding, ranging from 1% to 3%
- **Prevention**: received the lowest level of funding, accounting for 2% of direct funding in 2003–2005 and no funding in other triennia.

Figure 9.12 Pattern of proportional funding by CSO category for Haematological cancer research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Haematological cancer research projects and programs					
	2003–2005	48%	13%	2%	13%	22%	1%
	2006–2008	51%	5%	0%	10%	33%	1%
	2009–2011	61%	2%	0%	6%	29%	1%
	2012–2014	47%	11%	0%	5%	34%	3%
	2015–2017	40%	4%	0%	7%	48%	1%
	2018–2020	30%	2%	0%	12%	54%	2%

9.9.1 Leukaemia

Figure 9.13 shows the pattern of proportional funding by CSO category for Leukaemia research projects and programs between 2003–2005 and 2018–2020.

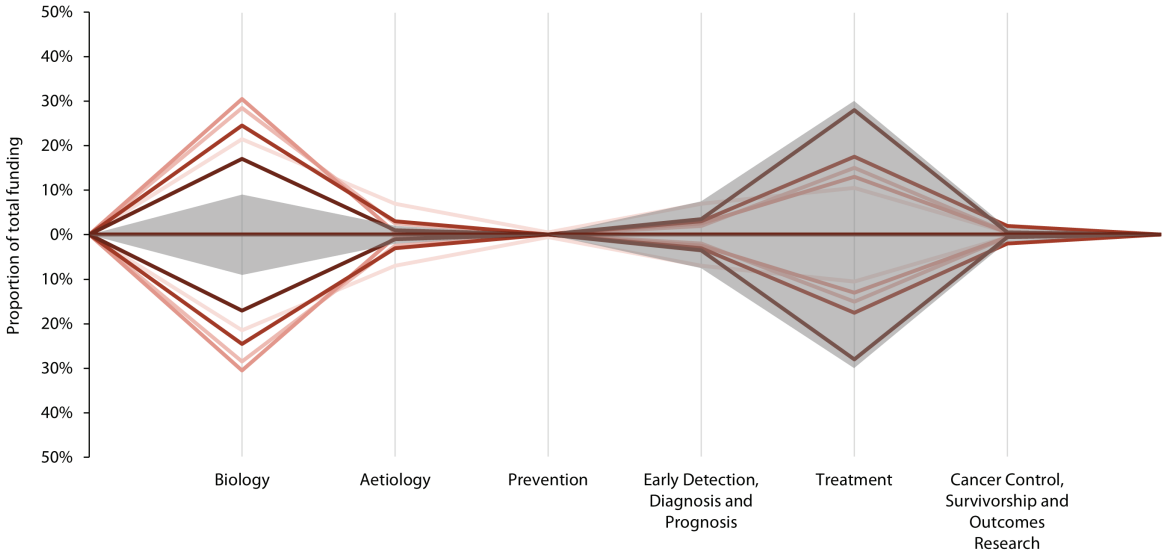
Direct funding to Leukaemia research projects and programs increased from $15.3M in 2003–2005 to $65.9M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

» the highest proportions of direct funding were for **Biology** and **Treatment**:

- **Biology**: increased from 43% of direct funding in 2003–2005 to 61% in 2009–2011, decreasing to 18% in 2018–2020
- **Treatment**: increased from 21% of direct funding in 2003–2005 to 60% in 2018–2020, with fluctuations across triennia

- » **Early Detection, Diagnosis and Prognosis**: ranged from 4% to 15% of direct funding
- » **Aetiology**: decreased from 14% of direct funding in 2003–2005 to 4% in 2018–2020.

Figure 9.13 Pattern of proportional funding by CSO category for Leukaemia research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Leukaemia research projects and programs					
	2003–2005	43%	14%	1%	14%	21%	1%
	2006–2008	57%	5%	0%	4%	30%	1%
	2009–2011	61%	1%	0%	5%	26%	1%
	2012–2014	49%	6%	0%	6%	35%	4%
	2015–2017	34%	2%	0%	7%	56%	1%
	2018–2020	18%	4%	0%	15%	60%	3%

9.9.2 Myeloma

Figure 9.14 shows the pattern of proportional funding by CSO category for Myeloma research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Myeloma research projects and programs increased from $1.3M in 2003–2005 to $14.7M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

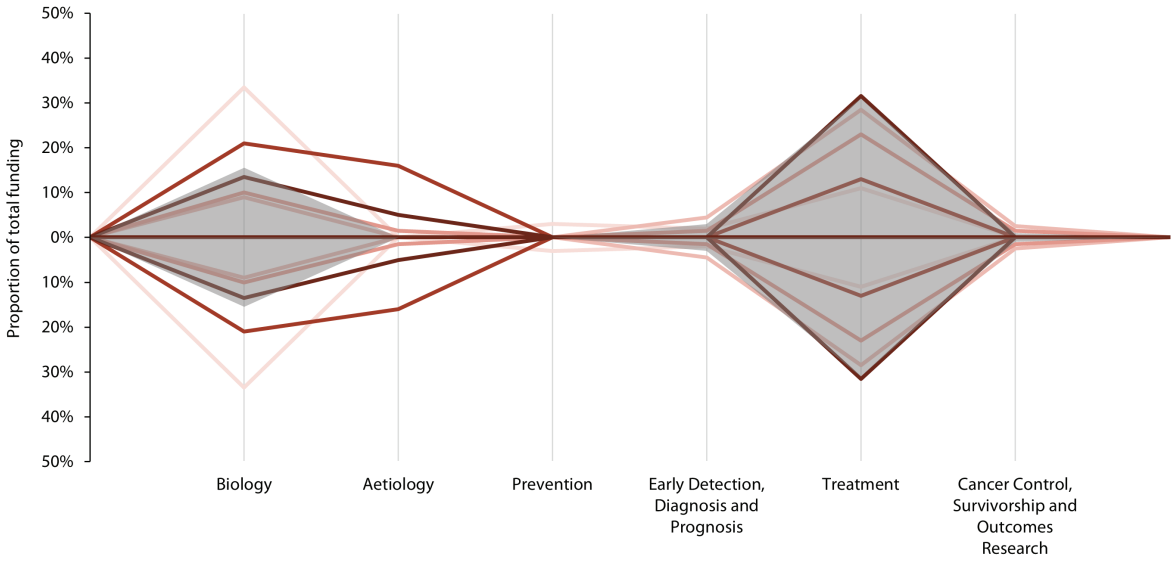
- » the highest proportions of direct funding were for **Biology** and **Treatment**:
  - **Biology**: accounted for the majority of direct funding (67%) in 2003–2005, decreasing in subsequent triennia with a range of 18% to 42%

- **Treatment**: increased over time, from 22% of direct funding in 2003–2005 to 62% in 2018–2020 with fluctuations across triennia

» **Early Detection, Diagnosis and Prognosis**: accounted for less than 10% of direct funding in each triennium, ranging from 0% to 9%

» **Aetiology**: fluctuated by triennium, ranging from 0% to 32% of direct funding.

Figure 9.14 Pattern of proportional funding by CSO category for Myeloma research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Myeloma research projects and programs					
	2003–2005	67%	0%	6%	4%	22%	0%
	2006–2008	18%	0%	0%	9%	57%	5%
	2009–2011	20%	3%	0%	3%	46%	3%
	2012–2014	42%	32%	0%	0%	26%	0%
	2015–2017	27%	10%	0%	0%	63%	0%
	2018–2020	31%	0%	0%	6%	62%	2%

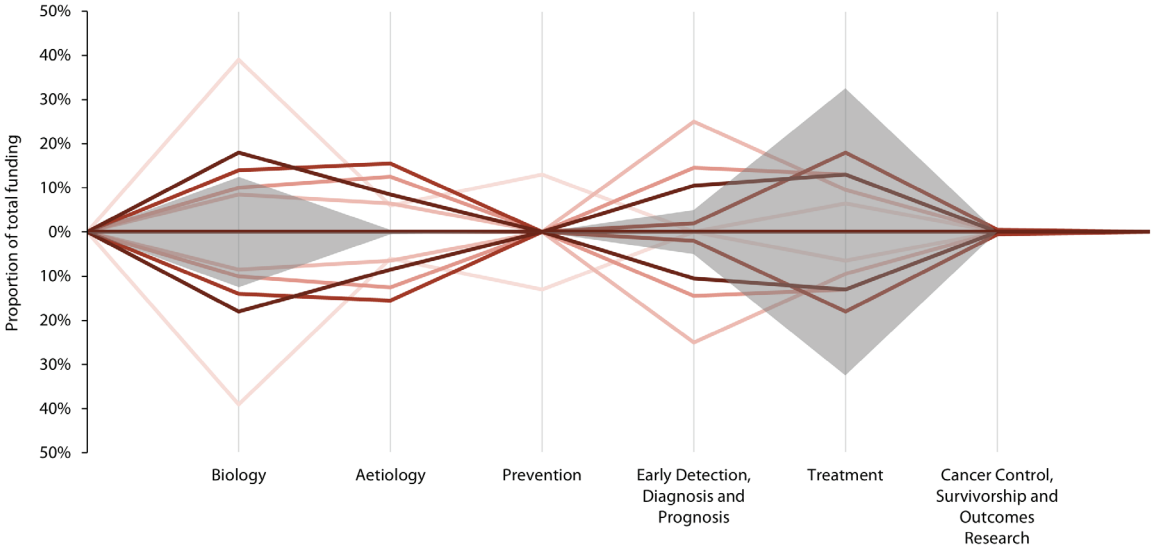
9.9.3 Lymphoma

Figure 9.15 shows the pattern of proportional funding by CSO category for Lymphoma research projects and programs between 2003–2005 and 2018–2020.

Direct funding to Lymphoma research projects and programs (including Hodgkin's, Non-Hodgkin's and other lymphomas) increased from $0.7M in 2003–2005 to $15.2M in 2018–2020. Notable patterns of proportional funding by CSO category across triennia are outlined below:

- the highest proportions of direct funding were for **Biology**, **Early Detection**, **Diagnosis and Prognosis**, and **Treatment**:
  - **Biology**: accounted for 78% of direct funding in 2003–2005, decreasing to 25% in 2018–2020
  - **Early Detection**, **Diagnosis and Prognosis**: fluctuated across triennia, ranging from 0% to 50% of direct funding
  - **Treatment**: increased from 13% of direct funding in 2003–2005 to 65% in 2018–2020.
- **Aetiology**: fluctuated across triennia, ranging from 1% to 31% of direct funding
- **Prevention**: accounted for 26% of direct funding in 2003–2005 but 0% in subsequent triennia.

Figure 9.15 Pattern of proportional funding by CSO category for Lymphoma research projects and programs, 2003–2005 to 2018–2020



	Triennium	Proportional funding for Lymphoma research projects and programs					
	2003–2005	78%	12%	26%	0%	13%	0%
	2006–2008	17%	13%	0%	50%	19%	0%
	2009–2011	20%	25%	0%	29%	26%	0%
	2012–2014	28%	31%	0%	4%	36%	1%
	2015–2017	36%	17%	0%	21%	26%	0%
	2018–2020	25%	1%	0%	10%	65%	0%

10 Funding for cancer clinical trials – tumour type focus and health disciplines

Key findings

» In the period 2012–2020:

- 419 cancer clinical trials were funded through cancer research projects and programs at a cost of $315M
- the majority of direct funding for cancer clinical trials was from:
  - the Australian Government: $147M (47% of funding for clinical trials); 193 trials
  - State and territory governments: $77M (24% of funding for clinical trials); 45 trials
- through the PdCCRS, Cancer Australia and funding partners provided $33M in funding (10% of funding for clinical trials); 85 trials
- the MRFF provided $54.1M in funding (17% of funding for clinical trials); 45 trials
- the ten most common tumour types investigated in clinical trials were:
  - Breast
  - Brain
  - Colorectal
  - Prostate
  - Leukaemia
  - Lung cancer and mesothelioma
  - Ovary
  - Melanoma
  - Myeloma
  - Endometrium.
- The most common health disciplines involved in clinical trials were:
  - Medical oncology
  - Psychosocial
  - Radiation oncology
  - Surgical oncology.

» Between 2003–2005 and 2018–2020:

- funding for cancer clinical trials increased in each triennium from $23.5M in 2003–2005 to $194M in 2018–2020
- proportional funding for cancer clinical trials increased from 7–8% in the first three triennia to 21% in 2018–2020
- the number of clinical trial projects funded increased from 7–8% in the first three triennia to12% in 2018–2020.

10.1 Analysing results for cancer clinical trials

Cancer clinical trials funded by cancer research projects and programs in the period 2012– 2020 were identified and classified by tumour type and health discipline.[v]

10.2 Cancer clinical trials

In the period 2012–2020, 419 clinical trials were funded by cancer research projects and programs (9% of all projects/programs identified). These trials received direct funding of $315M.

The main sources of funding for cancer clinical trials in Australia[w], the funding provided, and the number of cancer clinical trials funded, were:

- **Australian government**: $147.3M (47% of clinical trial funding); 193 clinical trials
  - NHMRC: $55.5M (18% of clinical trial funding); 62 clinical trials
  - Cancer Australia: $31.2M (10% of clinical trial funding); 80 clinical trials
  - MRFF: $54.1M (17% of clinical trial funding); 45 clinical trials
  - other Australian Government sources: $6.5M (2% of clinical trial funding); 6 clinical trials
- **State and territory governments**: $77.0M (24% of clinical trial funding); 45 clinical trials
- **Cancer Councils:** $9.4M (3% of clinical trial funding); 30 clinical trials
- **International funders:** $2.0M (1% of clinical trial funding); 5 clinical trials
- **Medical research institutes, hospitals and foundations**: $57.5M (18% of clinical trial funding); 75 clinical trials
- **Cancer foundations**: $19.7M (6% of clinical trial funding); 54 clinical trials
- **Universities**: $0.9M (<1% of clinical trial funding); 11 clinical trials.

Figure 10.1 compares direct funding and number of cancer clinical trials by triennium for the period 2012–2014 to 2018–2020 with data collected for 2003–2005 to 2009–2011.

Direct funding to cancer clinical trials funded through cancer research projects and programs increased in each triennium from $23.3M in 2003–2005 to $192.5M in 2018–2020. The number of cancer clinical trials funded increased from 99 trials in 2003–2005 to 260 trials in 2018–2020.

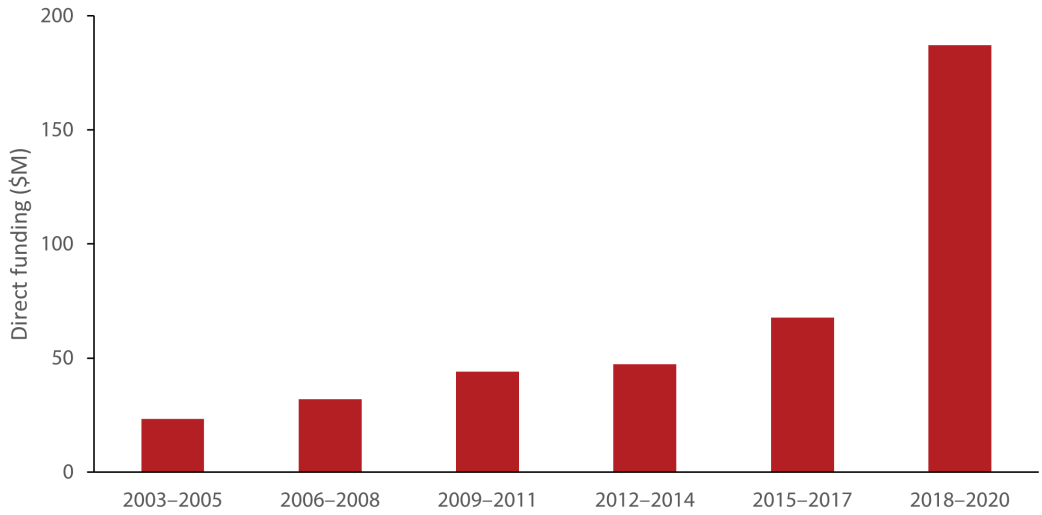
Funding for cancer clinical trials as a proportion of total direct funding to all cancer research projects and programs ranged from 7% to 11% in the first five triennia (2003–2005 to 2015–2017) and then almost doubled to 21% in 2018–2020. The proportion of cancer research projects and programs that were clinical trials increased from 7–8% (2003–2005 to 2012–2014) to 12% (2018–2020).

[v] Health disciplines used were: allied health, epidemiology, medical oncology, nursing, palliative care, primary care, psycho-oncology, radiation oncology and surgery. The definitions for each of these disciplines are provided in Appendix F.

[w] Where a cancer clinical trial was co-funded by two or more organisation, funding has been ascribed to the major funder of the clinical trial.

The increase in cancer clinical trial funding in the last triennium can be largely attributed to the MRFF. The contribution of MRFF to cancer clinical trial funding in the last two triennia was 13% (2015–2017) and 59% (2018–2020).

Figure 10.1 Direct funding to and number of cancer clinical trials, 2003–2005 to 2018–2020



Clinical trials	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Funding	$23.5M	$31.7M	$43.8M	$48.0M	$72.8M	$194M
No. of projects	100	131	157	133	198	261
% funding	8%	8%	7%	9%	11%	21%
% projects	8%	8%	7%	7%	9%	12%

Table 10.1 summarises funding to cancer clinical trials by clinical trial phase (where applicable) for each triennium.

The largest change in clinical trial funding was to Phase 2 cancer clinical trials, which increased from 11% of clinical trial funding ($2.5M) in 2003–2005 to 34% ($66.7M) in 2018–2020. Funding for Phase 1 cancer clinical trials decreased from 39% of clinical trial funding ($9.1M) in 2003–2005 to 5% ($10.0M) in 2018–2020.

Direct funding to cancer clinical trials research was as follows:

- **Phase 1 only**: increased from $9.1M in 2003–2005 to $10.0M in 2018–2020, with fluctuations across triennia
- **Phase 1/2**: not identified in 2003–2005 and then increased from $4.2M in 2006–2008 to $12.1M in 2018–2020, with fluctuations across triennia
- **Phase 2 only**: increased from $2.5M in 2003–2005 to $66.7M in 2018–2020, with fluctuations across triennia
- **Phase 2/3**: not identified in the first four triennia but increased from less than $0.1M in 2015–2017 to $25.4M in 2018–2020
- **Phase 3 only**: increased from $1.9M in 2003–2005 to $17.7M in 2018–2020, with fluctuations across triennia

- **Phase 3/4**: only identified in 2009–2011 ($0.05M)
- **not phase specific**: fluctuated between $0.1M and $4.7M across triennia
- **pilot studies**: not identified in the first three triennia, and then increased from $0.2M in 2012–2014 to $1.8M in 2018–2020
- **phase unclear/undefined**: increased in each triennium from $5.8M in 2003–2005 to $59.6M in 2018–2020.

Table 10.1 Direct funding to and number of cancer clinical trials by phase, 2003–2005 to 2018–2020

Tumour type	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Phase 1						
Funding	$9.1M	$3.2M	$2.4M	$3.5M	$5.3M	$10.0M
No. of projects	11	11	10	7	13	19
Phase 1 /2						
Funding	n.d.	$4.2M	$0.8M	$4.2M	$9.1M	$12.1M
No. of projects		4	1	5	6	11
Phase 2						
Funding	$2.5M	$4.1M	$3.4M	$6.0M	$18.8M	$66.7M
No. of projects	7	11	17	25	50	60
Phase 2/3						
Funding	n.d.	n.d.	n.d.	n.d.	$0.1M	$25.4M
No. of projects					1	2
Phase 3						
Funding	$1.9M	$8.6M	$16.8M	$14.4M	$11.1M	$17.7M
No. of projects	8	37	48	36	33	30
Phase 3 /4						
Funding	n.d.	n.d.	$0.1M	n.d.	n.d.	n.d.
No. of projects			1			
Phase 4						
Funding	n.d.	n.d.	n.d.	$0.3M	$1.0M	n.d.
No. of projects				1	1	
Not phase specific						
Funding	$5.5M	$4.7M	$11.7M	$0.1M	$0.5M	$2.9M
No. of projects	39	28	43	1	3	6
Pilot Studies						
Funding	n.d.	n.d.	n.d.	$0.2M	$0.5M	$1.8M
No. of projects				3	10	7
Unclear or undefined						
Funding	$5.8M	$6.9M	$8.6M	$19.5M	$27.0M	$59.6M
No. of projects	41	40	37	58	91	133

Note: Some projects and programs overlap triennia, thus the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for each triennium form 2003–2005 to 2018–2020. n.d. indicates no funding was detected.

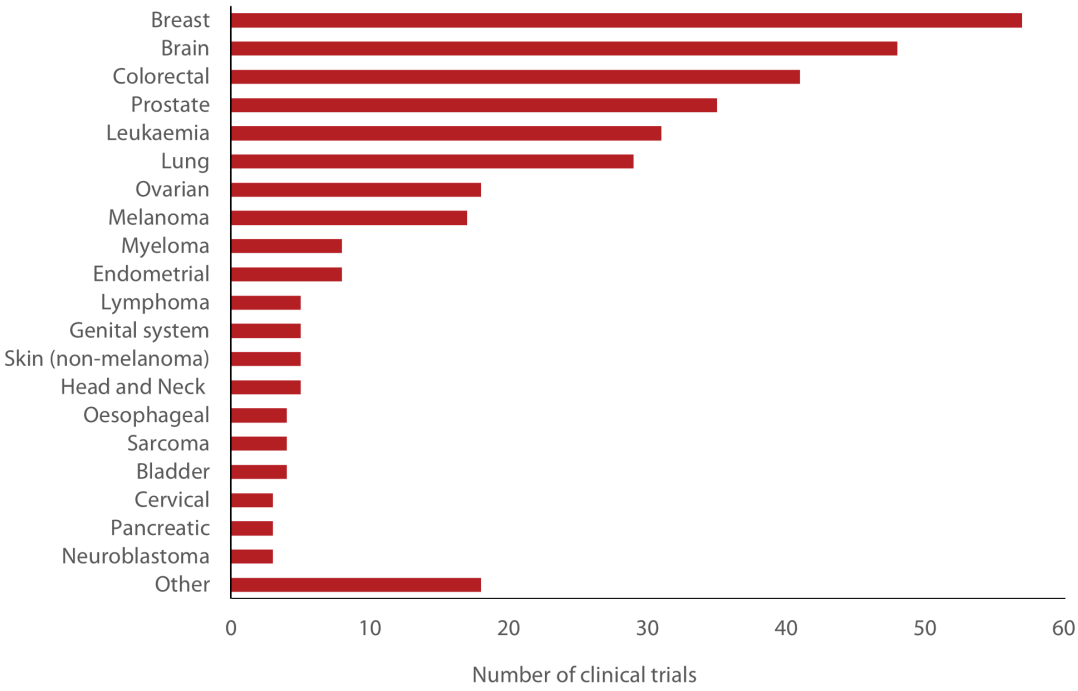
10.3 Tumour focus of clinical trials

In the period 2012–2020, 354 (85%) cancer clinical trials were relevant to one or more tumour type(s). Figure 10.2 shows the number of cancer clinical trials with a tumour-type focus during this period.

In summary, of the 419 clinical trials identified, the number with a specific tumour type focus was as follows: breast cancer (57 clinical trials), brain cancer (48 clinical trials), colorectal cancer (41 clinical trials), prostate cancer (35 clinical trials) and leukaemia (31 clinical trials).

For some tumour types the number of clinical trials receiving grant funding were fewer than might be expected when considering their burden of disease by DALYs in 2018. Lung cancer was the most burdensome tumour type but had the fifth highest number of funded clinical trials reported. Pancreatic and liver cancer also had a lower number of funded clinical trials reported relative to their burden of disease on the community.

Figure 10.2 Number of cancer clinical trials with a specific tumour type focus, 2012–2020



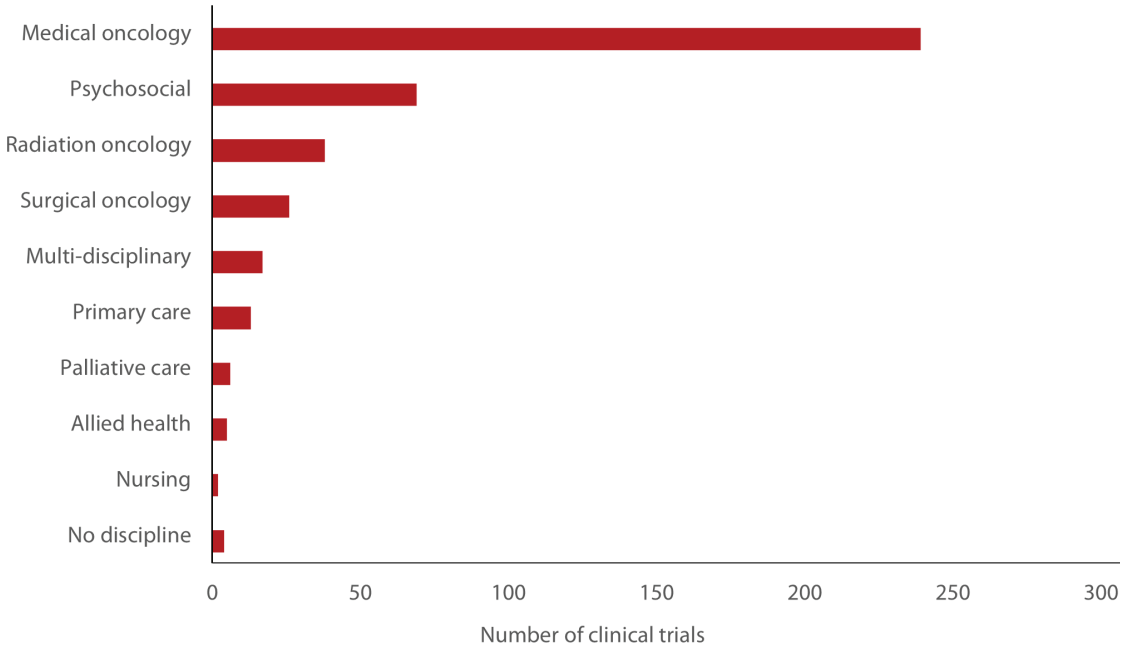
Note: Each clinical trial may have a focus in more than one tumour type. Other cancers with 2 clinical trials or fewer: 18 clinical trials (includes cancers of the Anus, Blood, Gallbladder, Kidney, Liver, Pharynx, Salivary gland, Stomach, Testicle, and Cancers of unknown primary).

10.4 Health discipline focus of cancer clinical trials

Cancer clinical trials identified in the period 2012–2020 were further analysed by area(s) of health discipline focus. Health disciplines were determined from the project summary/abstract and keywords. Figure 10.3 shows the number of cancer clinical trials with a health discipline focus (noting that a single trial may have more than one health discipline focus).

In summary, the number of cancer clinical trials with a focus in each health discipline was as follows: Medical oncology (239 clinical trials), Psycho-oncology (69 clinical trials), Radiation oncology (38 clinical trials), Surgical oncology (26 clinical trials) and Multidisciplinary research (14 clinical trials).

Figure 10.3 Number of cancer clinical trials with a health discipline focus, 2012–2020



11 Research collaborations – Co-investigators

Key findings

- In the period 2012–2020:
  - 60% (2,892) of research projects and programs involved one or more named collaborator(s)
  - 71% of cancer research projects and programs when there were multiple named collaborators received more than $600,000
  - 78% of cancer research projects and programs for which collaborator locations were stated had named collaborators at the same institution
  - most interstate collaborations involved New South Wales, Queensland and/or Victoria
  - 18% (83) of cancer research projects and programs had an international named collaborator (where this information was provided)
  - over one-third (36%) of the 83 international collaborations involved the USA.
- Between 2003–2005 and 2018–2020:
  - the proportion of funding to cancer research projects and programs that named collaborators increased from 58% in 2003–2005 to 68% in 2018–2020, with a peak of 81% in 2015–2017
  - average funding per cancer research project or program for projects and programs with no named collaborators decreased from 2003–2005 to 2015–2017, but increased to $343,000 in 2018–2020
  - average funding per cancer research project or program increased for projects and programs with single or multiple named collaborators
  - the average number of collaborators for cancer research projects or programs with multiple named collaborators increased from 3.2 to 4.4.

11.1 Collaborations

Details of named collaborators on cancer research projects and programs funded in 2012–2020 were requested from funding organisations. It should be noted that:

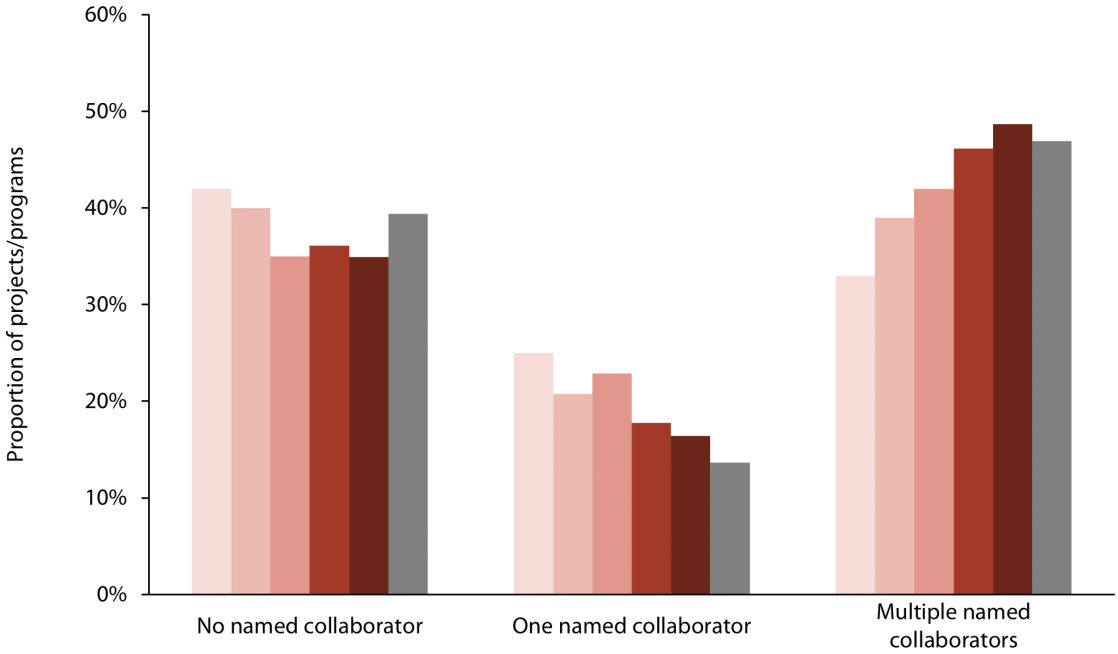
- where funding organisations distinguished between Chief and Associate Investigators, only the details of the Chief Investigators were recorded
- named collaborators provided by funders may or may not have been co-investigators on the original application for research funding
- an absence of a named collaborator did not necessarily equate with a lack of collaboration in the conduct of the research.

Each cancer research project and program funded in 2012–2020 was categorised according to the number of named collaborators:

- no named collaborators
- single named collaborator
- multiple named collaborators.

Figure 11.1 and Table 11.1 show direct funding provided in each collaboration category, and the number and proportion of cancer research projects and programs in each collaboration category between 2003–2005 and 2018–2020.

Figure 11.1 Proportion of cancer research projects and programs by collaboration category, 2003–2005 to 2018–2020



	No named collaborator	One named collaborator	Multiple named collaborators
2003-2005	42%	25%	33%
2006-2008	40%	21%	39%
2009-2011	35%	23%	42%
2012-2014	36%	18%	46%
2015-2017	35%	16%	49%
2018-2020	39%	14%	47%

Table 11.1 Direct funding, number of cancer research projects and programs, and average funding per project/program, in each collaboration category, 2003–2005 to 2018–2020

Collaboration category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
No named collaborators						
Funding	$116M	$130M	$129M	$116M	$125M	$301M
Average funding	$211,000	$205,000	$174,000	$173,000	$167,000	$343,000
No. projects/ programs	556	73	742	675	752	879
Single named collaborator						
Funding	$53.5M	$77.0M	$126M	$76.0M	$104M	$97.3M
Average funding	$163,000	$233,000	$263,000	$229,000	$293,000	$319,000
No. projects/ programs	328	331	480	332	353	305

Collaboration category	2003–2005	2006–2008	2009–2011	2012–2014	2015–2017	2018–2020
Multiple named collaborators						
Funding	$120M	$206M	$340M	$303M	$347M	$453M
Average funding	$268,000	$327,000	$388,000	$352,000	$331,000	$433,000
Average No. collaborators	3.2	3.4	3.6	4.0	4.2	4.4
No. projects/ programs	446	630	876	863	1,047	1,046

Note: Some projects and programs overlap triennia; the total number of projects and programs from 2003 to 2020 does not equal the sum of projects and programs for 2003–2005 to 2018–2020.

11.1.1 Collaboration categories

In the period 2012–2020, of the 4,813 cancer research projects and programs identified, 60% (2,892) involved one or more named collaborators. Between 2003–2005 and 2018–2020, the proportion of cancer research projects and programs that involved named collaborators ranged between 58% and 65%.

Between 2003–2005 and 2018–2020, the proportion of cancer research projects and programs in each collaboration category was as follows:

- no named collaborators: decreased in each triennium from 42% (2003–2005) to 17% (2018–2020)
- single named collaborator: decreased from 25% (2003–2005) to 14% (2018–2020), with fluctuations across triennia
- multiple named collaborators: increased from 33% (2003–2005) to 77% (2018–2020), with fluctuations across triennia.

Figure 11.2 shows the average funding per research project and program in each triennium. Between 2003–2005 and 2018–2020, the pattern of direct funding to each collaboration category, number of cancer research projects and programs and average funding per project and program was as follows:

- no named collaborators:
  - ***funding***: ranged between $116M and $130M in the first five triennia, increasing to $301M in 2018–2020
  - ***number of projects and programs***: increased from 558 in 2003–2005 to 879 (2018–2020), with fluctuations across triennia
  - ***average funding per project and program***: decreased from $211,000 in 2003–2005 to $167,000 in 2015–2017, increasing to $343,000 in 2018–2020.

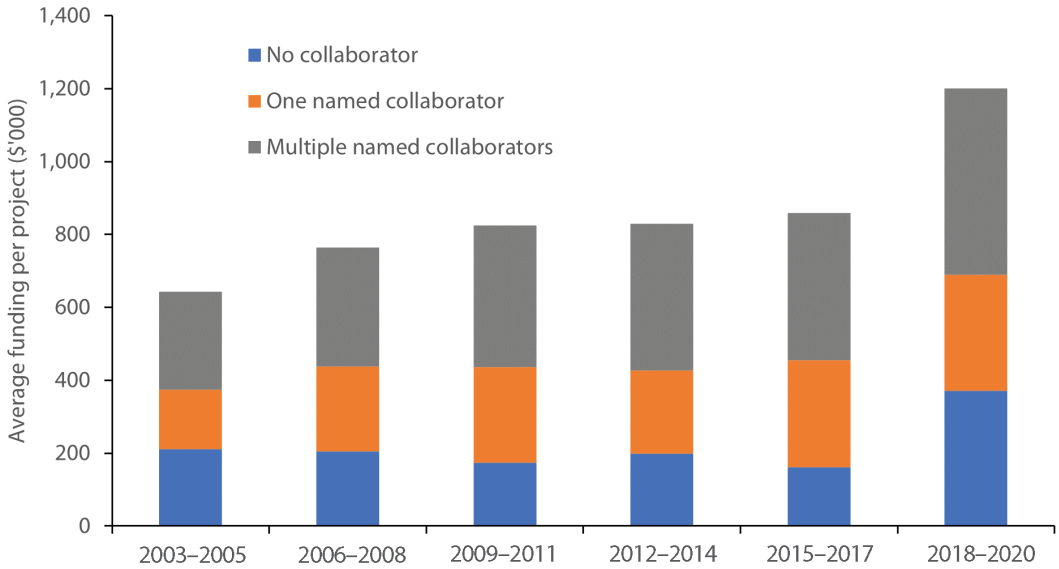
» one named collaborator:

- ***funding:*** increased from $53.5M in 2003–2005 to $104M in 2015–2017, decreasing to $97.3M in 2018–2020
- ***number of projects and programs***: ranged between 305 and 480 across triennia
- ***average funding per project and program***: increased across the triennia from $163,000 in 2003–2005 to $319,000 in 2018–2020.

» multiple named collaborators:

- ***funding***: increased from $120M in 2003–2005 to $453M in 2018–2020, with fluctuations across triennia
- ***number of projects and programs***: increased from 446 to 1,047 across triennia
- ***average funding per project and program***: increased from $268,000 in 2003–2005 to $468,000 in 2018–2020
- a***verage number of collaborators***: increased triennium-on-triennium from 3.2 in 2003–2005 to 4.4 in 2018–2020.

Figure 11.2 Average funding per cancer research project and program by collaboration status, 2003–2005 to 2018–2020



11.1.2 Proportional split of direct funding in each collaboration category

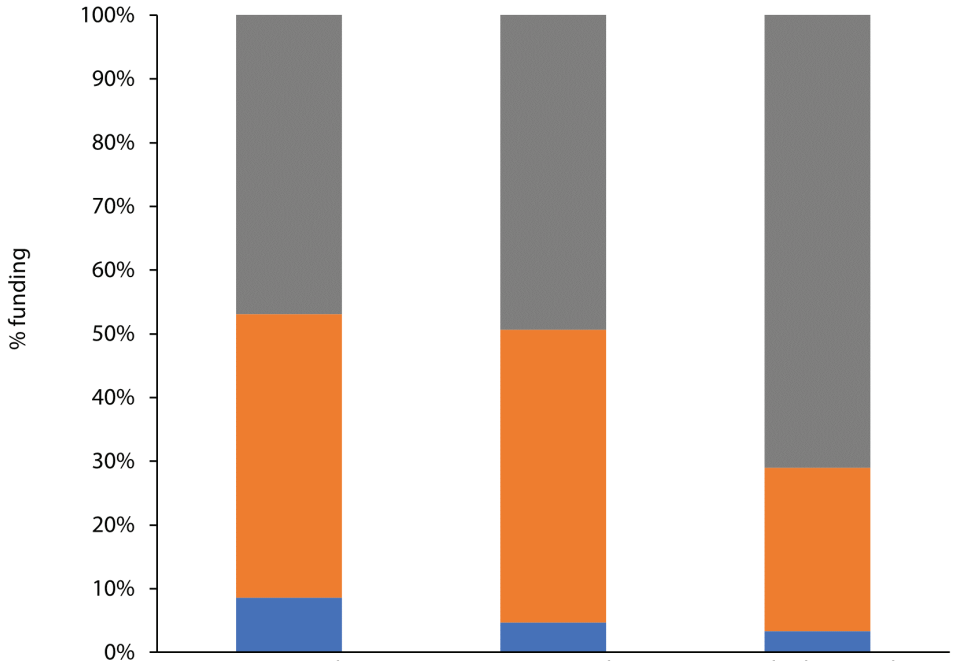
Cancer research projects and programs in the period 2012 to 2020 were categorised by level of direct funding:

- $1 to $150,000
- $151,000 to $600,000
- $600,000.

Figure 11.3 shows the proportion of cancer research projects and programs in each collaboration category by funding level in 2012–2020. The level of funding increased with number of collaborators:

- 9% of projects and programs with no named collaborator received $150,000 or less
- 49% of projects and programs with one named collaborator received more than $600,000
- 71% of projects and programs with multiple named collaborators received more than $600,000.

Figure 11.3 Proportion of funding for cancer research projects and programs in each collaboration category by funding level, 2012–2020



	No named collaborator	One named collaborator	Multiple named collaborators
$600,000 +	47%	49%	71%
$150,001 to $600,000	45%	46%	26%
$1 TO $150,000	9%	5%	3%

11.2 Location of collaborators

In the period 2012–2020, of the 2,892 cancer research projects and programs with named collaborators, 456 included details of geographical location of collaborators. These were further categorised using the categories:

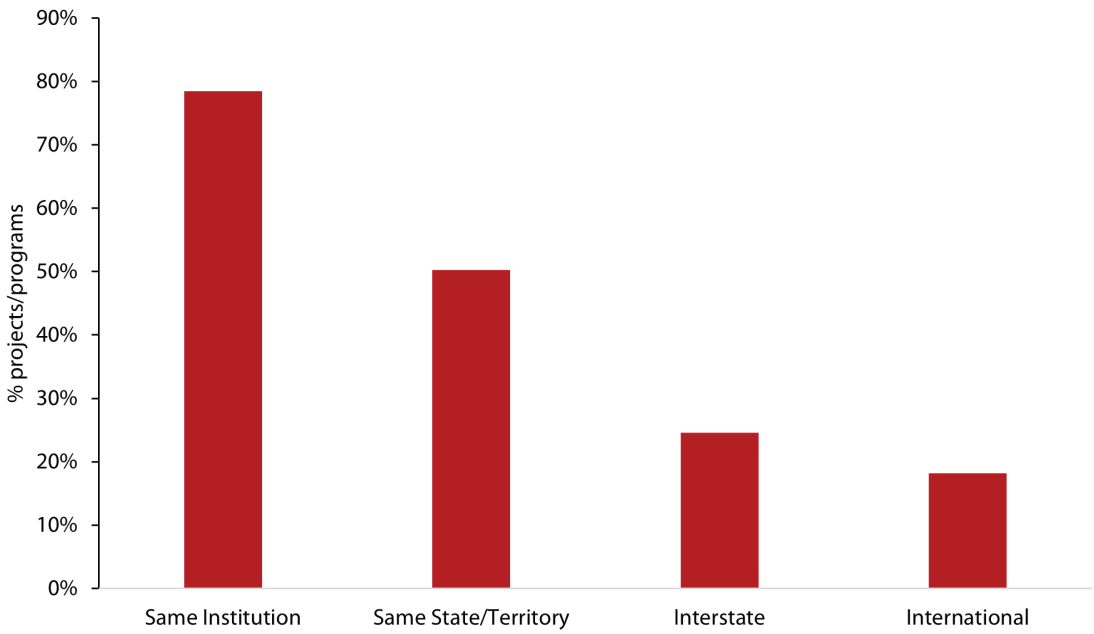
- same institution
- same state/territory
- interstate
- international.

Figure 11.4 shows the percentage of cancer research projects and programs in each location category in the period 2012–2020.

In summary, of the 456 cancer research projects and programs that included location details:[x]

- 79% had a named collaborator at the same institution
- 50% had a named collaborator in the same state/territory
- 25% had an interstate named collaborator
- 18% had an international named collaborator.

Figure 11.4 Proportion of 456 cancer research projects and programs with named collaborators in each collaborator location category, 2012–2020



[x] A cancer research project or program can be allocated to more than one collaboration category.

11.3 Interstate and international collaborators

Table 11.5 shows the state/territory and country of collaborators for the 456 cancer research projects and programs that identified interstate and/or international collaborators. Given the small numbers involved, it is difficult to make meaningful comparisons. However, the most common interstate collaboration locations[y] were NSW, QLD and VIC and the most common international collaboration locations were the US, UK and Europe.

Table 11.5 Location of interstate and international collaborators cancer research projects and programs, 2012–2020

	State/Territory location of host institute							
Location of collaborators	NSW	QLD	SA	TAS	VIC	WA	ACT	NT
NSW		8	3		18	9		
QLD	16		1		10	9	1	
SA	3	1			4	3		
TAS					1			
VIC	33	6	5			12	1	
WA	8	4			7		1	
NT								
International	27	6	6		23	20		
No interstate or international collaborators	395	274	68	8	359	101	18	
Total research projects and programs	1525	753	399	46	1629	379	65	17

» For the 88 cancer research projects and programs which had one or more international collaborators:

- 32 (36%) had one or more collaborators in the US
- 23 (26%) had one or more in the UK
- 16 (18%) had one or more in European Union nations
- 5 (6%) had one or more in New Zealand
- 7 (8%) had one or more in Canada
- 10 (11%) had one or more in other nations.[z]

y Please note that an individual research project or program may have involved collaborations across multiple states and/or territories. As such, the number of collaborative states or territories does not equal the total number of cancer research projects and programs in a host state or territory.

z Other nations identified were Brazil, Singapore, Japan, Korea, Israel, and South Africa.

12 National and international comparisons

Key findings

- In the period 2012 to 2020:
  - The pattern of funding in Australia was broadly similar to the pattern of funding for the UK and Canada.
- From 2003–2005 to 2018–2020:
  - The pattern of funding by CSO category for cancer research projects and programs in New South Wales, Queensland, Victoria, Western Australia, and South Australia were broadly similar to both the overall national pattern and to changes in the national pattern of funding
  - The changes in the pattern of funding by CSO category over time for Australia were similar to international funders of cancer research, with common features being a reduction in proportional funding to Biology and an increase in proportional funding to Treatment
  - Australia, Canada and the UK all have proportionally lower levels of funding to Prevention research.

12.1 Analysis of funding patterns by state/territory

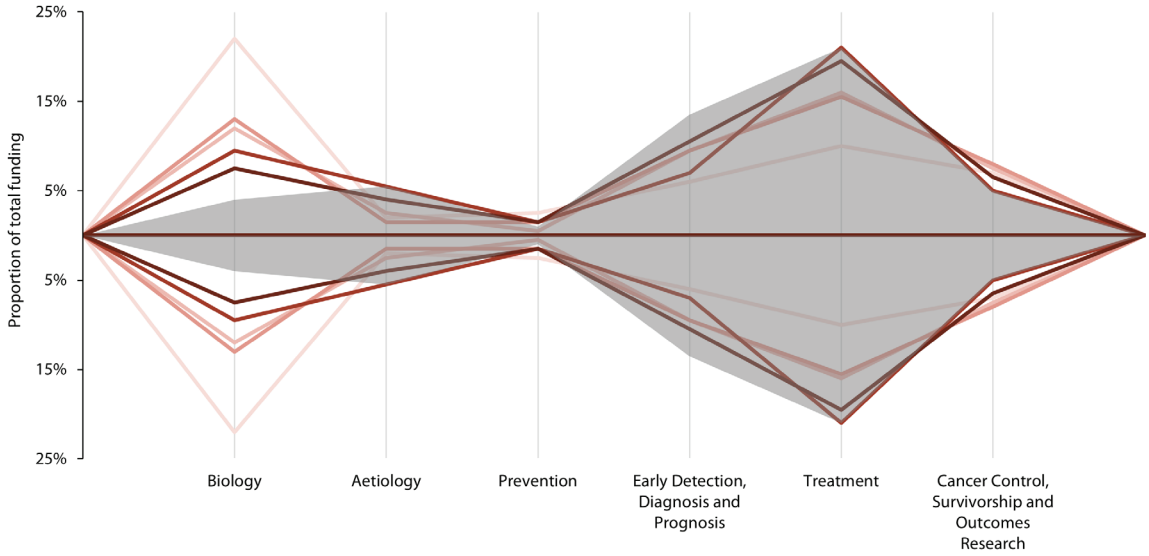
12.1.1 New South Wales

Total direct funding to cancer research projects and programs in New South Wales increased from $72.6M in 2003–2005 to $400M in 2018–2020.

Figure 12.1 shows the pattern of proportional funding by CSO category for cancer research projects and programs in New South Wales between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: decreased from 44% of direct funding in 2003–2005 to 8% in 2018–2020
- **Early Detection, Diagnosis and Prognosis**: increased from 12% of direct funding in 2003–2005 to 27% in 2018–2020, with fluctuations across triennia
- **Treatment**: increased from 20% of direct funding in 2003–2005 to 42% in 2018–2020, with fluctuations across triennia.

Figure 12.1 Pattern of proportional funding by CSO category for cancer research projects and programs in NSW, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in NSW					
	2003–2005	44%	4%	5%	12%	20%	14%
	2006–2008	24%	5%	1%	19%	32%	15%
	2009–2011	26%	3%	3%	19%	31%	16%
	2012–2014	19%	11%	3%	14%	42%	10%
	2015–2017	15%	8%	3%	21%	39%	13%
	2018–2020	8%	11%	2%	27%	42%	10%

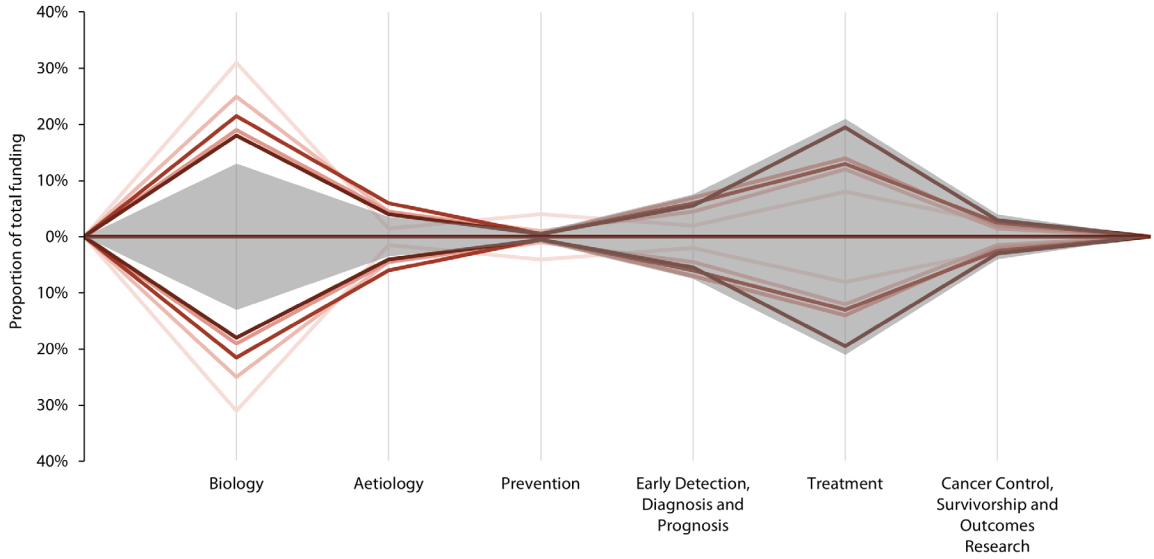
12.1.2 Victoria

Total direct funding to cancer research projects and programs in Victoria increased from $114M in 2003–2005 to $332M in 2018–2020.

Figure 12.2 shows the pattern of proportional funding by CSO category for cancer research projects and programs in Victoria between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: decreased from 62% of direct funding in 2003–2005 to 26% in 2018–2020
- **Early Detection, Diagnosis and Prognosis**: increased from 4% of direct funding in 2003–2005 to 15% in 2018–2020, with fluctuations across triennia
- **Treatment**: increased from 16% of direct funding in 2003–2005 to 42% in 2018–2020, with fluctuations across triennia.

Figure 12.2 Pattern of proportional funding by CSO category for cancer research projects and programs in Victoria, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in Victoria					
	2003–2005	62%	3%	8%	4%	16%	5%
	2006–2008	50%	9%	2%	9%	24%	3%
	2009–2011	38%	9%	1%	14%	28%	4%
	2012–2014	43%	12%	1%	12%	26%	5%
	2015–2017	36%	8%	1%	11%	39%	6%
	2018–2020	26%	7%	2%	15%	42%	8%

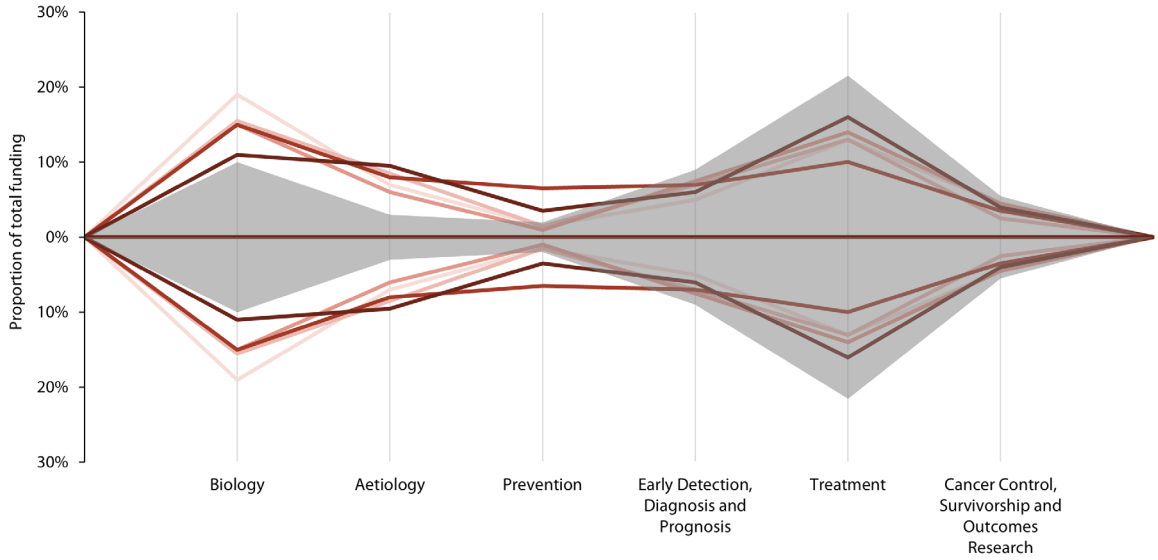
12.1.3 Queensland

Total direct funding to cancer research projects and programs in Queensland increased from $56.8M in 2003–2005 to $102M in 2018–2020.

Figure 12.3 shows the pattern of proportional funding by CSO category for cancer research projects and programs in Queensland between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: decreased from 38% of direct funding in 2003–2005 to 20% in 2018–2020
- **Treatment**: increased from 26% of direct funding in 2003–2005 to 43% in 2018–2020.

Figure 12.3 Pattern of proportional funding by CSO category for cancer research projects and programs in Queensland, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in Queensland					
	2003–2005	38%	14%	3%	10%	26%	9%
	2006–2008	31%	17%	3%	14%	26%	5%
	2009–2011	30%	12%	2%	15%	28%	9%
	2012–2014	30%	16%	13%	14%	20%	7%
	2015–2017	22%	19%	7%	12%	32%	8%
	2018–2020	20%	6%	4%	18%	43%	11%

12.1.4 South Australia

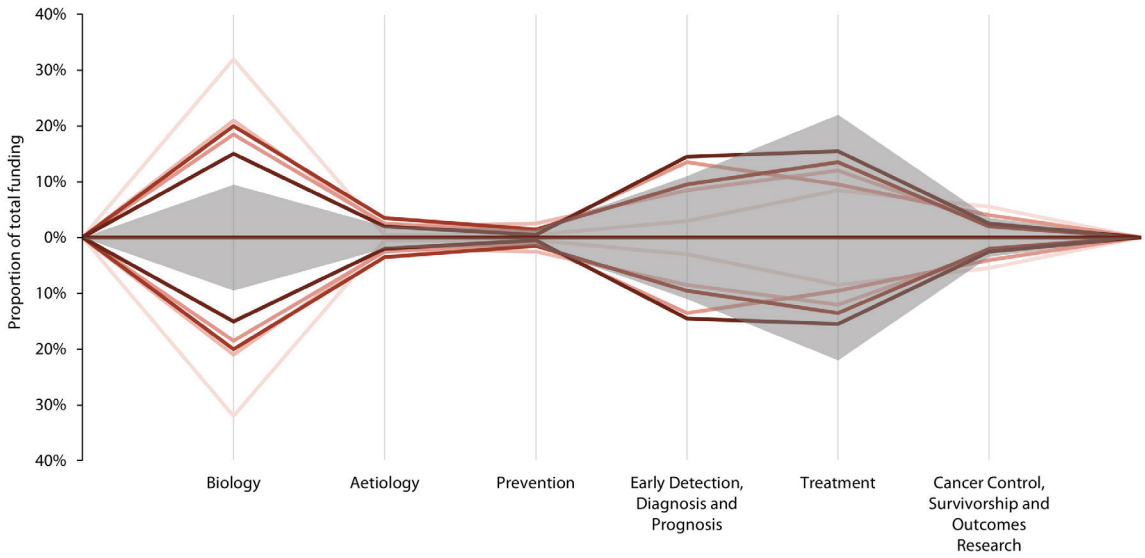
Total direct funding for cancer research projects and programs in South Australia increased from $24.4M in 2003–2005 to $53.1M in 2018–2020.

Figure 12.4 shows the pattern of proportional funding by CSO category for cancer research projects and programs in South Australia between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: decreased from 64% of direct funding in 2003–2005 to 19% in 2018–2020, with fluctuations across triennia
- **Early Detection, Diagnosis and Prognosis**: increased from 6% of direct funding in 2003–2005 to 22% in 2018–2020, with fluctuations across triennia

» **Treatment**: increased from 17% of direct funding in 2003–2005 to 44% in 2018–2020, with fluctuations across triennia.

Figure 12.4 Pattern of proportional funding by CSO category for cancer research projects and programs in South Australia, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in South Australia					
	2003–2005	64%	1%	1%	6%	17%	11%
	2006–2008	42%	4%	5%	17%	24%	5%
	2009–2011	37%	5%	2%	27%	19%	8%
	2012–2014	40%	7%	3%	19%	27%	4%
	2015–2017	30%	4%	1%	29%	31%	5%
	2018–2020	19%	4%	3%	22%	44%	7%

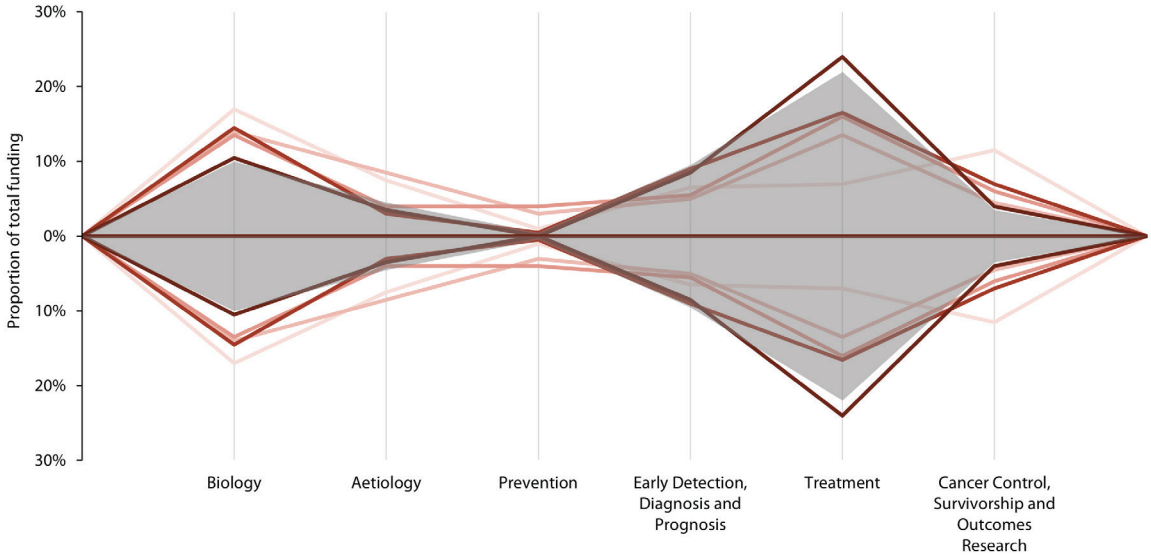
12.1.5 Western Australia

Total direct funding for cancer research projects and programs in Western Australia increased from $16.3M in 2003–2005 to $31.1M in 2018–2020.

Figure 12.5 shows the pattern of proportional funding by CSO category for cancer research projects and programs in Western Australia between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: decreased from 34% of direct funding in 2003–2005 to 20% in 2018–2020
- **Early Detection, Diagnosis and Prognosis**: increased from 13% of direct funding in 2003–2005 to 19% in 2018–2020, with fluctuations across triennia
- **Treatment**: increased from 14% of direct funding in 2003–2005 to 44% in 2018–2020.

Figure 12.5 Pattern of proportional funding by CSO category for cancer research projects and programs in Western Australia, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in Western Australia					
	2003–2005	34%	15%	2%	13%	14%	23%
	2006–2008	28%	17%	6%	10%	27%	9%
	2009–2011	27%	8%	8%	11%	32%	12%
	2012–2014	29%	6%	1%	18%	33%	14%
	2015–2017	21%	7%	0%	17%	48%	8%
	2018–2020	20%	9%	1%	19%	44%	7%

12.1.6 Tasmania, Australian Capital Territory and Northern Territory

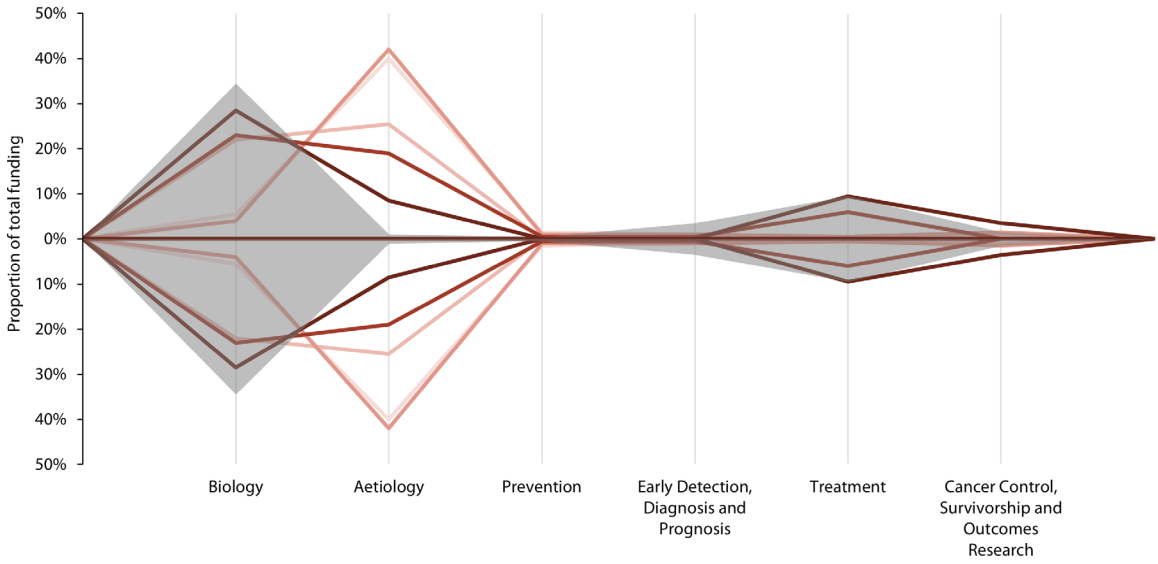
Tasmania

Total direct funding to cancer research projects and programs in Tasmania fluctuated by triennium, ranging from a high of $7.8M in 2009–2011 to a low of $0.3M in 2015–2017.

Figure 12.6 shows the pattern of proportional funding by CSO category for cancer research projects and programs in Tasmania between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: increased from 11% of direct funding in 2003–2005 to 69% in 2018–2020, with fluctuations across triennia
- **Aetiology**: decreased from 80% of direct funding in 2003–2005 to 2% in 2018–2020
- **Treatment:** increased from 1% of direct funding in 2003–2005 to 19% in 2018–2020.

Figure 12.6 Pattern of proportional funding by CSO category for cancer research projects and programs in Tasmania, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in Tasmania					
	2003–2005	11%	80%	3%	2%	1%	3%
	2006–2008	44%	51%	0%	2%	0%	2%
	2009–2011	8%	84%	2%	2%	1%	3%
	2012–2014	46%	38%	1%	1%	12%	0%
	2015–2017	57%	17%	0%	0%	19%	7%
	2018–2020	69%	2%	1%	7%	19%	3%

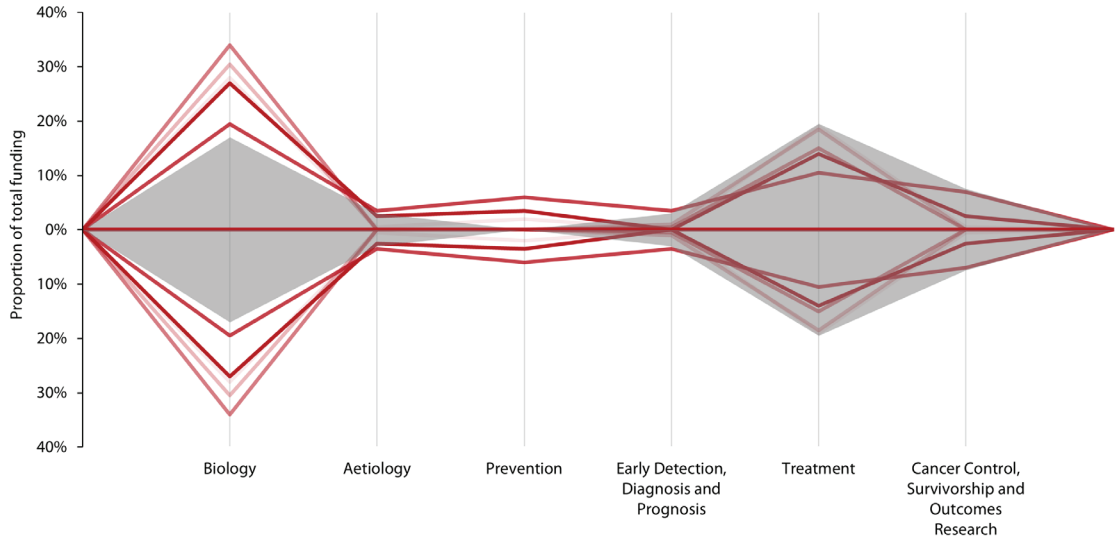
Australian Capital Territory

Total direct funding to cancer research projects and programs in the Australian Capital Territory increased from $3.4M in 2003–2005 to $6.7M in 2018–2020.

Figure 12.7 shows the pattern of proportional funding by CSO category for cancer research projects and programs in the Australian Capital Territory between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- **Biology**: fluctuated by triennium with a high of 68% of direct funding in 2009–2011 and a low of 34% in 2018–2020
- **Treatment**: remained consistent at 38% of direct funding in 2003–2005 and 39% in 2018–2020 but with fluctuations across intervening triennia.

Figure 12.7 Pattern of proportional funding by CSO category for cancer research projects and programs in the Australian Capital Territory, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in the Australian Capital Territory					
	2003–2005	56%	1%	4%	0%	38%	1%
	2006–2008	61%	0%	0%	2%	37%	0%
	2009–2011	68%	0%	0%	1%	30%	0%
	2012–2014	39%	7%	12%	7%	21%	14%
	2015–2017	54%	5%	7%	0%	28%	5%
	2018–2020	34%	6%	0%	6%	39%	15%

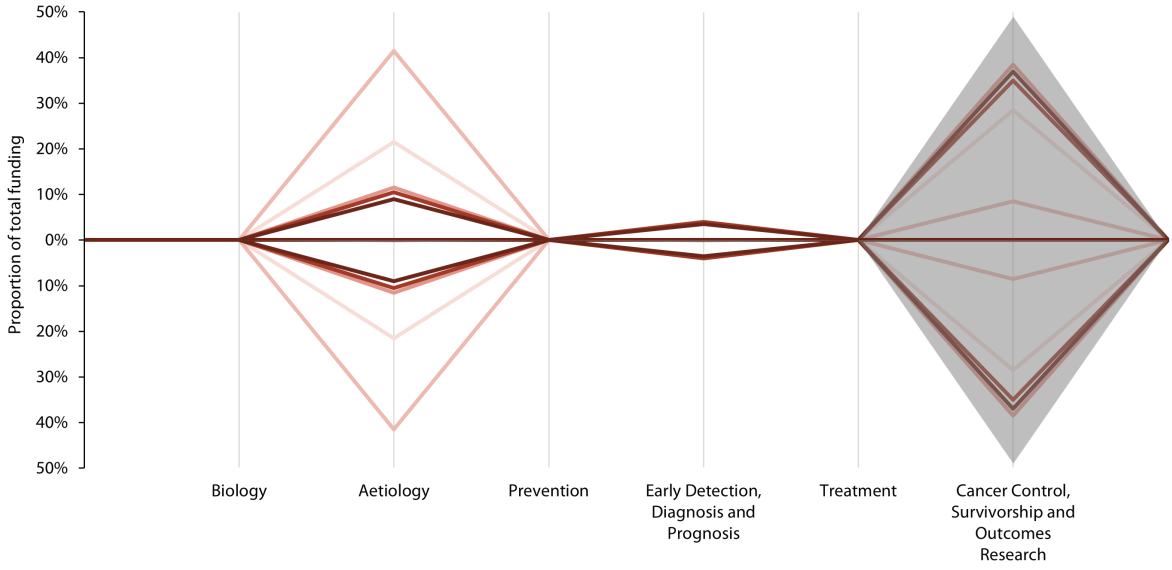
Northern Territory

Total direct funding to cancer research projects and programs in the Northern Territory increased from $0.1M in 2003–2005 to $2.0M in 2018–2020, with a high of $4.2M in 2015–2017.

Figure 12.8 shows the pattern of proportional funding by CSO category for cancer research projects and programs in the Australian Capital Territory between 2003–2005 and 2018–2020. Notable patterns of proportional by CSO category across triennia are outlined below:

- Aetiology: decreased from 43% of direct funding in 2003–2005 to 1% in 2018–2020 , with fluctuations across the triennia
- Cancer Control, Survivorship and Outcomes Research: represented the majority of direct funding, increasing from 57% in 2003–2005 to 98% in 2018–2020.

Figure 12.8 Pattern of proportional funding by CSO category for cancer research projects and programs in the Northern Territory, 2003–2005 to 2018–2020



	Triennium	Proportional funding by CSO category for cancer research projects and programs in the Northern Territory					
	2003–2005	0%	43%	0%	0%	0%	57%
	2006–2008	0%	83%	0%	0%	0%	17%
	2009–2011	0%	23%	0%	0%	0%	77%
	2012–2014	0%	21%	0%	8%	0%	70%
	2015–2017	0%	18%	0%	7%	0%	74%
	2018–2020	0%	1%	0%	1%	0%	98%

12.2 Comparison of Australian and international funding patterns

12.2.1 Analysis of international funding patterns, 2012–2020

This audit has identified direct funding to Australian cancer research projects and programs of AUD$2.12B in the period 2012 to 2020. Recent international surveys by the Canadian Cancer Research Alliance (CCRA) and National Cancer Research Institute (NCRI) have identified the following levels of research funding for Canada and the UK:

- Canada: CAD$3.5B (2012–2018) (40 organisations tracked by the CCRA)
- UK: GBP£5.2B (2012–2020) (22 members of the NCRI).

12.2.2 Analysis of international funding patterns by CSO category

Each survey classified funded research using CSO categories. Some important differences between the reporting for the international surveys and the Australian audit are worth noting:

- the methods of apportioning reported expenditure to CSO codes differed: the CCRA and NCRI surveys apportioned funds to more than one CSO code where relevant, whereas Cancer Australia allocated funds to the major CSO of focus
- the type of funding data represented in each survey may differ: the CCRA and NCRI surveys included funding to people support schemes and infrastructure, whereas Cancer Australia only included funding for cancer research projects and programs
- the CCRA survey apportioned funding based on the percentage by which each project was judged as being dedicated to cancer research, whereas Cancer Australia only included research projects and programs where the main research focus was cancer.

Figure 12.9 compares shows the pattern of proportional funding by CSO category for Canada (2012–2018) and the UK (2012–2020) with the equivalent funding information for Australia in the period 2012 to 2020.

Overall, the patterns of funding for the three countries were broadly similar, with the majority of funding going to the CSO categories of Biology and Treatment.

Comparing Australia and Canada:

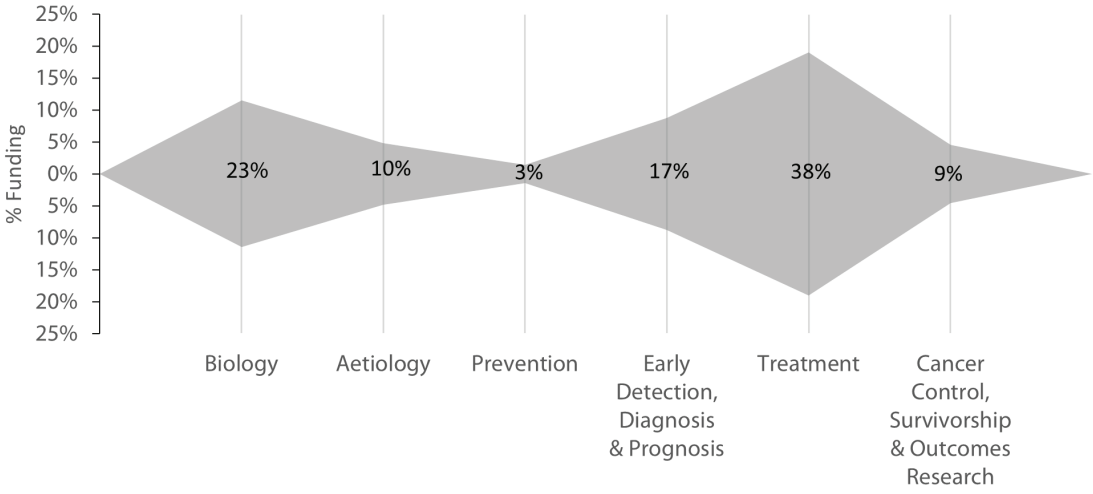
- **Treatment** was the highest funded category (38% and 35%, respectively)
- **Biology** received 23% in both countries
- proportional funding was similar for **Early Detection**, **Diagnosis and Prognosis** (18% each), **Aetiology** (10% and 12%, respectively), **Cancer Control**, **Survivorship and Outcomes Research** (9% each) and **Prevention** (3% each).

Comparing Australia and the UK:

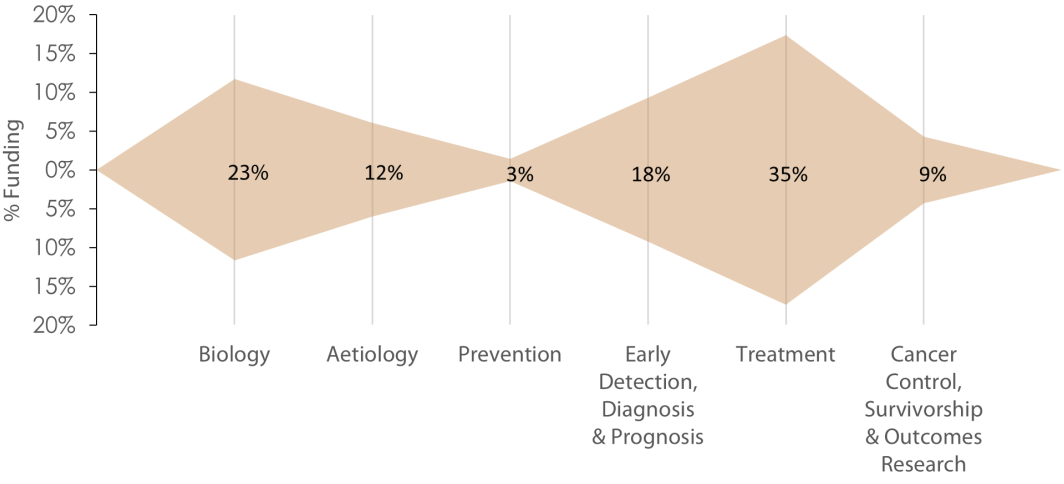
- funding was more evenly distributed across **Treatment** and **Biology** in the UK (34% and 31%, respectively) than in Australia (38% and 23%, respectively)
- proportional funding for **Early Detection**, **Diagnosis and Prognosis** was similar (18% and 17%, respectively)
- **Aetiology**, **Prevention and Cancer Control**, **Survivorship and Outcomes Research** each received 6% of funding in the UK, compared with 10%, 3% and 9%, respectively in Australia.

Figure 12.9 Comparison of research funding by CSO category for Australia (2012–2020), Canada (2012–2018) and the UK (2012–2020)

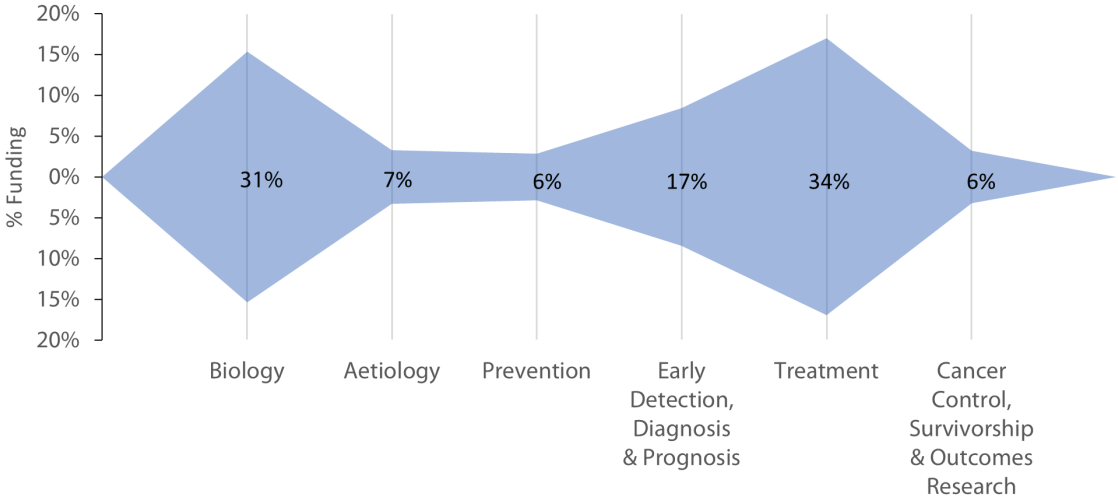
Australia (2012-2020)



Canada (2012-2018)



United Kingdom (2012-2020)



12.2.3 Analysis of international changes in funding patterns over time

Where data were available, annual funding data were aggregated to the triennia 2003–2005, 2006–2008, 2009–2011, 2012–2015, 2015–2017 and 2018–2020.

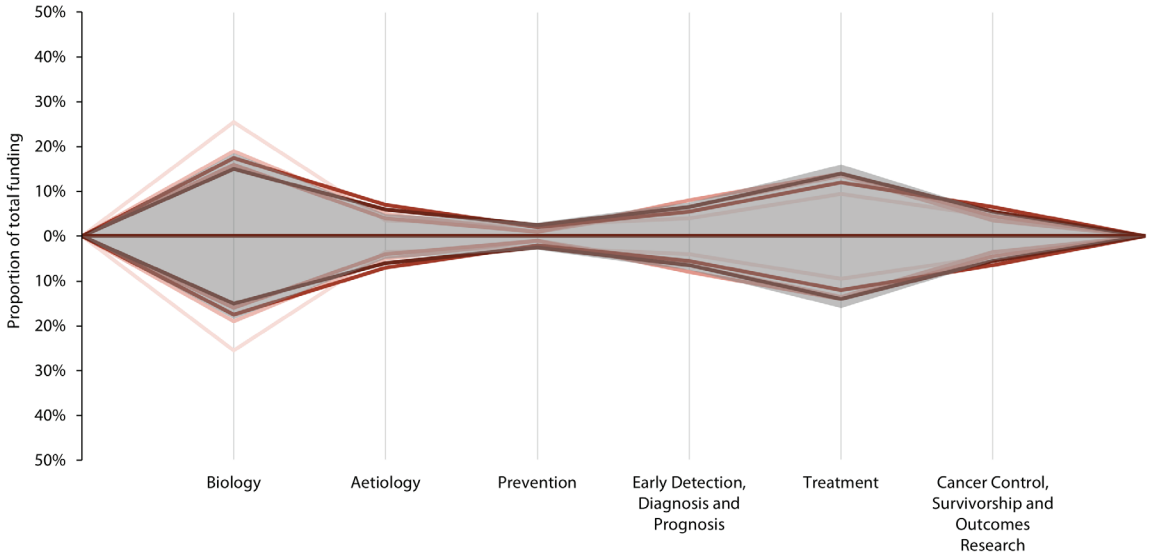
Figure 12.10 compares changes in the pattern of proportional funding for cancer research In Australia, the UK, and Canada.

In summary:

- The total funding to Australian cancer research projects and programs increased from $292M (2003–2005) to $934M (2018–2020). The pattern of proportional funding to CSO categories across the triennia was discussed in detail in Section 5.1. In summary, the largest change in proportional funding was to Biology which decreased from 51% (2003–2005) to 37% (2018–2020) whilst proportional funding to Treatment increased from 19% (2003–2005) to 32% (2018–2020)
- The total funding to cancer research in the United Kingdom increased from £1.0B (2003–2005) to £2.0B (2018–2020)9. Compared to Australia, the changes in the patterns of funding were similar, with the major features being proportional funding to Biology which decreased from 44% in 2003–2005 to 32% in 2018–2020, and funding to Treatment which increased from 22% in 2003–2005 to 39% in 2015–2017 and was 33% in 2018–2020
- The total funding to cancer research in Canada increased from CAD$1.2B in 2006–2008 (first full triennium data available) to CAD$1.4B in 2015–2017 (most recent full triennium).[10] Similar to the patten of funding for Australia and the UK, the major features were the proportional funding to Biology which decreased from 42% in 2006–2008 to 26% in 2015–2017 and funding to Treatment which increased from 24% in 2006–2008 to 32% in 2015–2017.

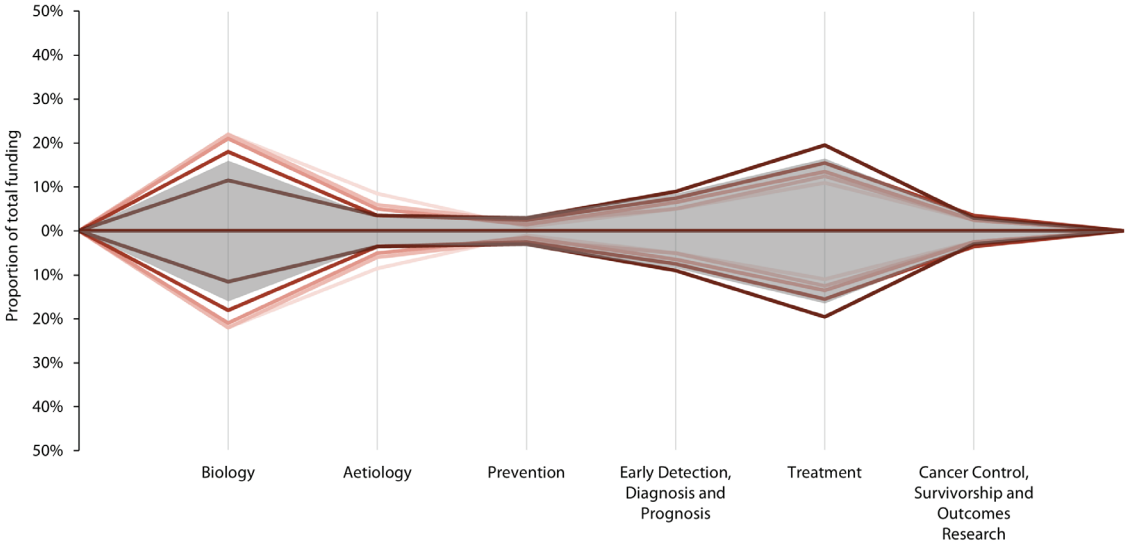
Figure 12.10 International comparisons of the changes in patterns of funding to cancer research

Australia



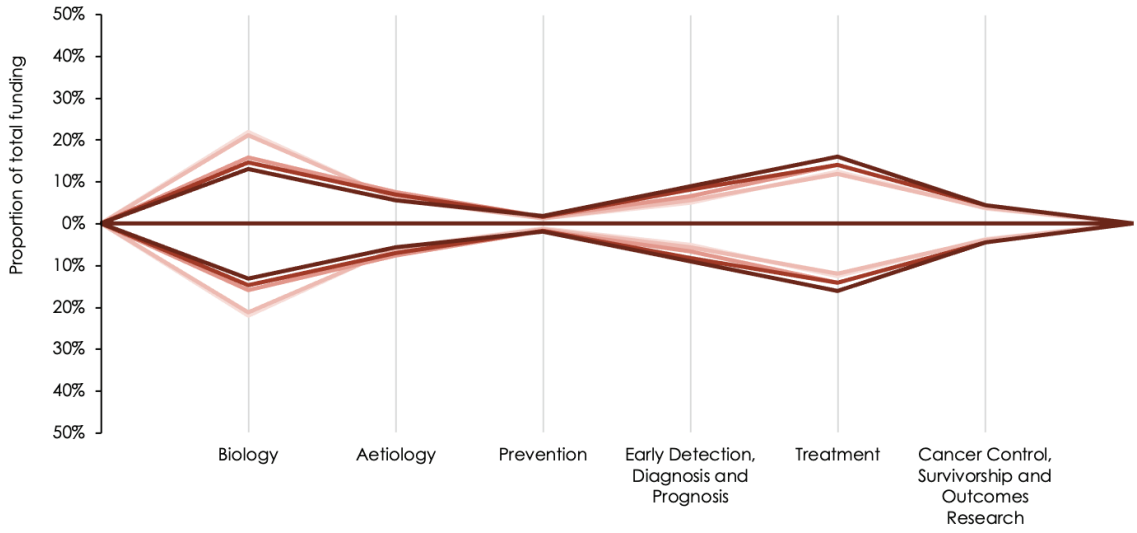
	Triennium	Proportional funding by CSO category for Australian cancer research projects and programs					
	2003–2005	51%	7%	5%	8%	19%	9%
	2006–2008	38%	10%	2%	13%	27%	7%
	2009–2011	32%	8%	2%	16%	28%	9%
	2012–2014	35%	14%	4%	11%	24%	13%
	2015–2017	30%	12%	5%	13%	28%	11%
	2018–2020	37%	10%	6%	15%	32%	11%

United Kingdom



	Triennium	Proportional funding by CSO category for UK cancer research projects and programs					
	2003-2005	44%	17%	2%	10%	22%	5%
	2006-2008	44%	12%	4%	10%	25%	5%
	2009-2011	42%	10%	3%	13%	27%	5%
	2012-2014	36%	7%	5%	15%	31%	7%
	2015-2017	23%	7%	6%	18%	39%	6%
	2018-2020	32%	6%	7%	17%	33%	6%

Canada



	Triennium	Proportional funding by CSO category for Canadian cancer research projects and programs					
	2006-2008	42%	12%	3%	11%	24%	8%
	2009-2011	32%	15%	3%	13%	28%	9%
	2012-2014	29%	14%	3%	16%	28%	9%
	2015-2017	26%	11%	4%	18%	32%	9%
	2018-2020	24%	11%	3%	18%	34%	9%

Appendix A – Organisations invited to provide details of their direct funding to cancer research projects and programs in Australia, 2012–2020

Aboriginal Health and Medical Research Council of New South Wales (AH&MRC)
Aboriginal Health Council of South Australia Limited (AHCSA)
ACT Health Research Office
Adenoid Cystic Carcinoma Research Foundation (ACCRF)
Albury Wodonga Cancer Foundation Inc. (AWCF)
Albury Wodonga Health
Alfred Research Alliance
Alice Springs Hospital
American Association for Cancer Research (AACR)
American Cancer Society
American Institute for Cancer Research - see World Cancer Research Fund International
American Lung Association
AMP Foundation
ANZ Trustees Foundation
ANZAC Research Institute
Arrow Bone Marrow Transplant Foundation
Asbestos Diseases Research Institute (ADRI)
Association for the Cure of the Cancer of the Prostate (CaP CURE)
Association of Australian Medical Research Institutes (AAMRI)
ASX Refinitiv Charity Foundation
Auda Foundation
AusIndustry
Austin Health - Olivia Newton-John Cancer Wellness and Research Centre
Austin Medical Research Foundation (AMRF)
Australasian Gastro-Intestinal Trials Group (AGITG)
Australasian Gynaecological Endoscopy and Surgery Society Ltd. (AGES)
Australasian Leukaemia and Lymphoma Group (ALLG)
Australasian Lung Cancer Trials Group (ALTG)

Australasian Lymphology Association Ltd. (ALA)

Australasian Neuroscience Society (ANS)

Australasian Society for Stem Cell Research Inc. (ASSCR)

Australasian Society of Clinical Immunology and Allergy Ltd. (ASCIA)

Australia And New Zealand Child Neurology Society Limited (ANZCNS)

Australia and New Zealand Children's Haematology / Oncology Group (ANZCHOG)

Australia and New Zealand Gynaecological Oncology Group (ANZGOG)

Australia and New Zealand Sarcoma Association (ANZSA) Formerly known as the Australasian Sarcoma Study Group and the Australian Sarcoma Group

Australia and New Zealand Urogenital and Prostate Cancer Trials Group (ANZUP)

Australian and New Zealand Gastroenterology International Training Association (ANZGITA)

Australian and New Zealand Society for Immunology Inc.

Australian Bone Marrow Donor Registry (ABMDR)

Australian Breast Cancer Research

Australian Cancer Research Foundation (ACRF)

Australian Catholic University (ACU)

Australian Cervical Cancer Foundation (ACCF)

Australian Genomic Cancer Medicine Centre Limited (AGCMC)

Australian Genomics Health Alliance

Australian Melanoma Research Foundation (AMRF)

Australian National University (ANU)

Australian New Zealand Clinical Trials Registry (ANZCTR)

Australian Nuclear Science and Technology Organisation (ANSTO)

Australian Pancreatic Cancer Genome Initiative (APGI)

Australian Prostate Cancer Centre

Australian Research Centre in Complementary and Integrative Medicine (ARCCIM)

Australian Research Council (ARC)

Australian Rotary Health

Australian Skin and Skin Cancer Research Centre (ASSC)

Australian Society of Gynaecologic Oncologists Incorporated (ASGO)

Australian Stem Cell Centre

Australian Synchroton

Ave Fenix Pacific Foundation Ltd.

Avon Foundation for Women

Baker Institute

Barossa Hills Fleurieu Local Health Network (BHFLHN)

Barwon Health - Hospital Geelong
Barwon Health Foundation Ltd.
Basil Hetzel Institute for Translational Health Research (BHI)
Westmead Breast Cancer Institute (BCI)
BEAT Bladder Cancer Australia Inc.
Beth Israel Deaconess Medical Center Inc. (BIDMC)
Beyondblue
Bill Tingate Brain Cancer Foundation Inc.
BIO21 Molecular Science and Biotechnology Institute
Bladder Cancer Awareness Australia (BCA)
Bone Research Foundation Pty Ltd.
Border Medical Oncology Research Unit Pty Ltd.
Border Ovarian Cancer Awareness Group
Bowel Cancer Australia
Bowel Cancer Research Trust
Brain Cancer Collective Ltd.
Brain Foundation
Breast Cancer Research Foundation
Breast Cancer Trials (BCT)
Bright Institute of Stem Cell Research (Australasia)
Buderim Private Hospital
Bufforp Cancer Foundation Ltd.
Burnet Institute for Medical Research and Public Health
Business Victoria - Department of Jobs, Precincts and Regions
Cabrini Cancer Institute
Can Too
Canadian Institute of Health Research (CIHR)
Cancer and Ageing Research Foundation Ltd.
Cancer and Bowel Research Trust
Cancer Australia - PdCCRS
Cancer Council ACT
Cancer Council Australia
Cancer Council NSW
Cancer Council NT
Cancer Council Queensland

Cancer Council SA
Cancer Council Tasmania
Cancer Council Victoria
Cancer Council Western Australia
Cancer Information and Support Society
Cancer Institute NSW
Cancer Research Institute (CRI)
Cancer Research UK
Cancer Surgery Research Foundation
Cancer Symptom Trials (CST)
Cancer Therapeutics CRC
Cancer Trials Australia (CTA)
Cancer Voices NSW
CanTeen
CASS Foundation Ltd.
Centenary Institute of Cancer Medicine and Cell Biology
Central Adelaide Local Health Network (CALHN)
Central Queensland University (CQU)
Centre for Cancer Biology (CCB)
Centre for Health Promotion and Cancer Prevention Research (USA)
Charles Darwin University (CDU)
Charles Sturt University (CSU)
Charlies Foundation for Research
Child Health Research Centre - University of Queensland
Children's Cancer Foundation
Children's Cancer Institute of Australia (CCIA)
Children's Health Queensland Hospital and Health Service
Children's Hospital at Westmead
Children's Hospital Foundation (Qld)
Children's Leukaemia and Cancer Research Foundation Ltd.
Children's Leukemia Research Association
Children's Medical Research Institute (CMRI)
Children's National Hospital (USA)
Chris O'Brien Lifehouse
Clifford Craig Foundation

Clinical Oncology Society of Australia Ltd. (COSA)
Colonial Foundation
Colorectal Surgical Society of Australia and New Zealand Foundation (CSSANZ)
Commonwealth Scientific and Industrial Research Organisation (CSIRO)
Community Cancer Link (CCL)
Concern Foundation (USA)
Conquer Cancer, The ASCO Foundation
Cooperative Research Centres Association
Cooperative Trials Group for Neuro-Oncology (COGNO)
Cure Brain Cancer Foundation
Cure Cancer Australia Foundation
Curtin University of Technology
David Collins Leukaemia Foundation Inc.
Deakin University
Department for Health and Wellbeing (DHW), SA
Department of Health and Aged Care
Department of Health Tas
Department of Industry, Science, Energy and Resources
Department of Veterans' Affairs (DVA)
Department of Defence - Congressionally Directed Medical Research Programs
Diamantia Institute
Eastern Health Foundation
Eastern Health
Edith Cowan University (ECU)
EHE Rare Cancer Foundation Australia
Epworth Research Institute
European Cancer Organisation
European Organisation for Research and Treatment of Cancer (EORTC)
Fight Against Cancer
Fight Cancer Foundation
Fiona Elsey Cancer Research Institute
Flinders Medical Centre (FMC)
Flinders University
Fred Hutchinson Cancer Research Center
Garvan Institute of Medical Research

Gates Foundation
GenesisCare
German Cancer Research Center
Go2 Foundation for Lung Cancer
Griffith University
Gut Cancer Foundation
Hadassah Australia Medical Research and Collaborations Foundation
Hanson Institute - see Royal Adelaide Hospital Research Fund (HAMRC)
Harry Perkins Institute of Medical Research Inc.
Hartwig Medical Foundation
Health Research Foundation
Heart Research Institute
Helen MacPherson Smith Trust
Queensland Health Innovation, Investment and Research Office (HIIRO)
Hokkaido University (Japan)
Howard Florey Institute
Hudson Institute of Medical Research
Human Frontier Science Program (HFSP)
Hunter Medical Research Institute (HMRI)
Ian Potter Foundation
IconCancer Centre Adelaide
Illawarra Health and Medical Research Institute Ltd. (IHMRI)
Ingham Institute for Applied Medical Research
Institute for Molecular Bioscience (IMB) - University of Queensland
Institute of Medical and Veterinary Science
International Agency for Research on Cancer (IARC)
International Association of Cancer Registries (IACR)
International Cancer Genome Consortium (ICGC)
International Centre for Community-driven Research
International Myeloma Foundation (IMF)
James and Diana Ramsay Foundation
James Andrew Sawyer medical research trust
James Cook University (JCU)
James S. McDonnell Foundation (JSMF)
John Curtin School of Medical Research

John Hunter Children's Hospital, Newcastle
Johns Hopkins School of Medicine
Juntendo University
Kidney Health Australia
Kids' Cancer Centre, Sydney Children's Hospital
Kids Cancer Research Trust
Kids with Cancer Foundation
Kolling Institute of Medical Research
La Trobe University
Launceston Hospital
Leukaemia Foundation of Australia
Leukemia and Lymphoma Society (LLS)
Leukemia Research Foundation
Lions Medical Research Foundation
Lowitja Institute
Lowy Cancer Research Centre (UNSW)
Ludwig Institute for Cancer Research
Lung Cancer Foundation of America
Lung Foundation Australia (LFA) - see ALTG
Lustgarten Foundation
Lymphoma Australia Inc.
Lyons Eye Institute
MacMillan Cancer Support
Macquarie Group Foundation
Macquarie University
Maddie Riewoldt's Vision
Mark Grundy Oesophageal Cancer Awareness Group Inc.
Mark Hughes Foundation
Mater Medical Research Institute
Max Bruce Trust
McGrath Foundation
Medical Oncology of Group of Australia (MOGA)
Melanoma and Skin Cancer Advocacy Network Ltd. (MSCAN)
Melanoma and Skin Cancer Trials (MASC)
Melanoma Institute Australia (MIA)

Melanoma Patients Australia (MPA)
Melanoma Research Foundation Ltd.
Menzies Research institute
Menzies School of Health
Mercy Hospital
Metro North - The Prince Charles Hospital
Metro South - Princess Alexandra Hospital
Metro South Health
Monash Children's Hospital
Monash Health
Monash University
Movember Foundation
MPN-Mate Research Foundation
Multiple Myeloma Research Foundation (MMRF)
Murdoch Children's Research Institute (MRCI)
Murdoch University
My Room Inc.
Myeloma Foundation of Australia
Nagoya University
National Breast Cancer Foundation (NBCF)
National Cancer Foundation Ltd.
National Cancer Institute (NCI)
National Centre for Asbestos-Related Diseases (NCARD)
National Health and Medical Research Council (NHMRC)
National Institutes of Health (NIH)
National Stem Cell Foundation of Australia
Neuroblastoma Australia Inc.
NeuroEndocrine Cancer Australia
New South Wales Office for Health and Medical Research
Newcastle Breast Centre Research Association
Newcastle Mater Misericordia Hospital
Northern Health
Northwest cancer centre
NSLHD - Northern Sydney
NT Health

Olivia Newton-John Foundation Ltd.
Oral Health CRC
Ovarian Cancer Australia (OCA)
Ovarian Cancer Research Foundation (OCRF)
Pancare Foundation
Pancreatic Cancer Alliance
Pancreatic Cancer Canada
Pancreatic Cancer Coalition
Pancreatic Cancer Collective
Pancreatic Cancer UK
PanKind Avner Pancreatic Cancer Foundation Ltd.
Perpetual Trustees - Clive and Vera Ramaciotti Foundation
Perth Children's Hospital Foundation (PCHF)
Perth Children's Hospital Foundation, Royal Perth Hospital
Peter MacCallum Cancer Centre
Peter MacCallum Cancer Foundation
Petre Foundation
Primary Care Collaborative Cancer Clinical Trials Group (PC4)
Princess Alexandra Hospital Research Foundation
Prostate Cancer Foundation of Australia (PCFA)
Purple Our World
Pyscho-Oncology Co-operative Trials Group (PoCoG)
QIMR Berghofer Institute of Medical Research
Queensland Clinical Trials Network Inc. (QCTN)
Queensland University of Technology (QUT)
Raine Medical Research Foundation
Rare Cancers Australia (RCA)
Rare Ovarian Cancer Inc. (ROC)
RJH Biosciences Inc.
RMIT University
Robert Connor Dawes Foundation
Royal Adelaide Hospital (RAH)
Royal Adelaide Hospital Research fund
Royal Australian and New Zealand College of Radiologists (RANZCR)
Royal Australian College of Surgeons (RACS)

Royal Brisbane and Women's Hospital Foundation
Royal Children's Hospital Melbourne
Royal Darwin Hospital
Royal Hobart Hospital
Royal Hobart Hospital Foundation
Royal Melbourne Hospital Foundation
Royal North Shore Hospital Foundation
Royal Perth Hospital
Royal Perth Hospital Foundation
Royal Women's Hospital foundation
SAX Institute
Sydney Children's Hospital, Randwick (SCHN)
South Eastern Sydney Local Health District - St George Hospital
South Eastern Sydney Local Health District - The Prince of Wales Hospital
Sir Charles Gairdner Hospital (SCGH)
Sir Edward Dunlop Medical Research Foundation
Skin and Cancer Foundation Australia
SLHD - Concord Repatriation General Hospital
SLHD - Royal Prince Alfred Hospital
SLHD - Sydney Health network
Snow Medical Research Foundation Ltd.
South Australian Health and Medical Research Institute (SAHMRI)
South Eastern Area Laboratory Services (SEALS)
Southern Adelaide Local Health Network (SALHN)
Southern Cross University (SCU)
St Vincent's Centre for Applied Medical Research (AMR)
St Vincent's Clinical School
St Vincent's Institute of Medical Research
St. Vincent's Hospital Melbourne
St. Vincent's Hospital Sydney
Starlight Children's Research Foundation
Susan G. Komen for the Cure
St. Vincent's Hospital Research Office
Swan Research Institute
Swinburne University of Technology

SWSLDH - St. George Cancer Care Centre
SWSLHD - Liverpool Hospital
SWSLHD - South Western Sydney
Sydney Cancer Centre
Sydney Children's Hospital Foundation
Sydney Medical School Foundation - see also Sydney Children's Hospital
Sydney Melanoma Diagnostic Centre
Tasmanian Health Service
Telethon Institute for Child Health Research
Telstra Foundation
Terry Fox Foundation
The Abbie Basson Sarcoma Foundation Ltd.
The Alfred Foundation
The Alfred Hospital
The Brain Cancer Group Ltd.
The Bupa Health Foundation
The Children's Hospital at Westmead incl. Kids Research Institute
The Garnett Passe and Rodney Williams Memorial Foundation
The Head And Neck Cancer Foundation Ltd.
The Hospital Research Foundation
The Inflammatory Breast Cancer Network Foundation Australia Ltd.
The Kids Cancer Project (TKCP)
The Kinghorn Cancer Centre (TKCC)
The Medical Foundation
The Myer Foundation and Sydney Myer Fund
The Princess Margaret Cancer Foundation (PMCF)
The Queen Elizabeth Hospital (TQEH)
The Royal Children's Hospital (RCH) Foundation
The Royal Melbourne Hospital
The Sarah Barlow Bowel Cancer Foundation
The Snowdome Foundation
The St George and Sutherland Medical Research Foundation (SSMRF)
The Walter and Eliza Hall Trust
The Walter and Eliza Hall Institute of Medical Research
Therapeutic Innovation Australia Ltd. (TIA)

Translational Research Institute at Princess Alexandra Hospital
Trans-Tasman Radiation Oncology Group Ltd (TROG)
Union for International Cancer Control (UICC)
University of Adelaide
University of Ballarat
University of Canberra (UC)
University of Melbourne
University of New England (UNE)
University of New South Wales (UNSW)
University of Newcastle (incl. Hunter Medical Research Institute)
University of Notre Dame (UNDA)
University of Queensland (UQ)
University of South Australia (USA)
University of Southern Queensland (USQ)
University of Sydney
University of Tasmania (UTAS)
University of Technology Sydney
University of Western Australia (UWA)
University of Western Sydney (WSU)
University of Wollongong (UoW)
Val Lishman Health Research Foundation
Vanderbilt University Medical Center (VUMC)
Victor Chang Cardiac Research Institute
Victoria University (VU)
Victorian Breast Cancer Research Consortium
Victorian Cancer Agency
Victorian Comprehensive Cancer Centre (VCCC)
Victorian Lions Foundation Inc.
Victorian Prostate Cancer Research Consortium (VPCRC)
W.P. Holman Clinic
Wellcome Centre Human Genetics
Wellcome Trust
Wesley Research Institute (WRI)
Western Australia Department of Health
Western Australia East Metropolitan Health Service

Western Australian Institute for Medical Research (WAIMR)
Western Cancer Centre Foundation Ltd. (WCCF)
Western Health
Western Health Foundation
Westmead Institute for Medical Research
Women's and Children's Hospital Adelaide
World Cancer Research Fund International UK
Worlds Greatest Shave - Leukaemia Foundation
Worldwide Cancer Research
WSLHD - Western Sydney Health Service
WSLHD - Westmead Hospital

Appendix B – Email introduction to the Audit

Dear

The attached letter from Professor Dorothy Keefe, CEO of Cancer Australia, is an invitation for (name of funding organisation) to contribute to a National Audit of funding to cancer research, and requests assistance from your organisation in providing details of cancer research projects and cancer programs directly funded by grants awarded by in the calendar years 2012-2020.

Kind regards,

Elke

Appendix C – Invitation from CEO of Cancer Australia to cancer research funding organisations

Date

Name
Address 1
Address 2
City State Postcode

Dear xxx

2012-2020 Audit of Cancer Research in Australia

Cancer Australia invites your participation in the Audit of cancer Research funding in Australia to inform priorities for future strategic investment in cancer research.

Cancer Australia is the Australian Government's national cancer agency established to benefit all Australians affected by cancer. Our purpose is to minimise the impact of cancer, address disparities, and improve the health outcomes of people affected by cancer in Australia by providing national leadership in cancer control.

Cancer Australia's Priority-driven Collaborative Cancer Research Scheme (PdCCRS) supports research that reduces the impact of cancer on the community and improves outcomes for people affected by cancer. This annual national project grant funding scheme brings together government and other funders to collaboratively fund cancer research in Australia. To inform future research priorities for this funding scheme, Cancer Australia conducts audits of cancer research projects and research programs across Australia.

Since 2008, Cancer Australia has published two national audits of cancer research funding: Cancer research in Australia: An overview of cancer research projects and research programs in Australia 2003-2005 and An overview of funding to cancer research projects and research programs in Australia 2006 to 2011. Both audits have been used by Cancer Australia and other funders of cancer research in Australia to guide strategic research investment.

The 2020 audit aims to build on the data collected to date, to allow a better understanding of trends in funding to cancer research in Australia over six triennia from 2003 to 2020. Understanding the patterns of investment will provide research funders and policy-makers with the evidence-base to inform future cancer research investments to maximise the benefit and impact of cancer research funding through national and international collaborations, and to reduce disparities in cancer outcomes.

For the 2020 audit, we invite you to provide details of all grants awarded directly by your organisation to cancer-related research projects and research programs in any of the calendar years from 2012 through to 2020 (excluding those grants that are co-funded by Cancer Australia awarded through the PdCCRS). We are also interested to learn how consumers are involved in your research grant processes, and how COVID-19 may impact your ability to fund research into the future. The information we are seeking is summarised in Attachment A to this letter and a spreadsheet to assist in providing this information is Attachment B.

We would value your participation in this audit and would appreciate if you could nominate a person within your organisation to be responsible for the compilation of the requested data. Attachments A and B can be forwarded to this nominated person. We would appreciate receiving any project/ program grant information you can provide by C.O.B. 30 November 2020.

If you would like clarification of the above, or would like to discuss any aspect of these audits further, please contact:

Manager Research and Clinical Trials by email.

Cancer Australia looks forward to your organisation's contribution to these Audis and thanks you for your support in helping to inform cancer research efforts which improve outcomes for people affected by cancer.

Yours sincerely,

Professor Dorothy Keefe PSM MD

Chief Executive Officer

Appendix D – Common Scientific Outline (CSO) classification of cancer research

Biology

Research included in this category looks at the biology of how cancer starts and progresses as well as normal biology relevant to these processes

1.1 Normal Functioning

Examples of science that would fit:

- Developmental biology (from conception to adulthood) and the biology of aging
- Normal functioning of genes, including their identification and expression, and the normal function of gene products, such as hormones and growth factors
- Normal formation of the extracellular matrix
- Normal cell-to-cell interactions
- Normal functioning of apoptotic pathways
- Characterisation of pluripotent progenitor cells (e.g., normal stem cells).

1.2 Cancer Initiation: Alterations in Chromosomes

Examples of science that would fit:

- Abnormal chromosome number
- Aberration in chromosomes and genes (e.g., in chronic myelogenous leukemia)
- Damage to chromosomes and mutation in genes
- Failures in DNA repair
- Aberrant gene expression
- Epigenetics
- Genes and proteins involved in aberrant cell cycles.

1.3 Cancer Initiation: Oncogenes and Tumour Suppressor Genes

Examples of science that would fit:

- Genes and signals involved in growth stimulation or repression, including oncogenes (Ras, etc.), and tumor suppressor genes (p53, etc.)
- Effects of hormones and growth factors and their receptors such as estrogens, androgens, TGF-beta, GM-CSF, etc.
- Research into the biology of stem cell tumour initiation.

1.4 Cancer Progression and Metastasis

Examples of science that would fit:

- Latency, promotion, and regression
- Expansion of malignant cells
- Interaction of malignant cells with the immune system or extracellular matrix
- Cell mobility, including detachment, motility, and migration in the circulation
- Invasion
- Malignant cells in the circulation, including penetration of the vascular system and extravasation
- Systemic and cellular effects of malignancy
- Tumor angiogenesis and growth of metastases
- Role of hormone or growth factor dependence/independence in cancer progression
- Research into cancer stem cells supporting or maintaining cancer progression
- Interaction of immune system and microbiome in cancer progression.

1.5 Resources and Infrastructure

Examples of science that would fit:

- Informatics and informatics networks
- Specimen resources
- Epidemiological resources pertaining to biology
- Reagents, chemical standards
- Development and characterization of new model systems for biology, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer-term research-based training, such as Ph.D. or post-doctoral fellowships.

Aetiology

Research included in this category aims to identify the causes or origins of cancer - genetic, environmental, and lifestyle, and the interactions between these factors.

2.1 Exogenous Factors in the Origin and Cause of Cancer

Examples of science that would fit:

- Research into the role of lifestyle factors such as smoking, chewing tobacco, alcohol consumption, parity, diet, sunbathing, and exercise in the origin and cause of cancer or increasing the risk of cancer
- Research into the social determinants of cancer such as crime, housing dilapidation (poor housing), neighbourhood level socioeconomic status and services and their relationship to cancer incidence and mortality etc.
- Studies on the effect(s) of nutrients or nutritional status on cancer incidence
- Development, characterisation, validation, and use of dietary/nutritional assessment instruments in epidemiological studies and to evaluate cancer risk
- Environmental and occupational exposures such as radiation, second-hand smoke/ e-cigarettes, radon, asbestos, organic vapors, pesticides, and other chemical or physical agents
- Infectious agents associated with cancer etiology, including viruses (Human Papilloma Virus-HPV, etc.) and bacteria (helicobacter pylori, etc.)
- Viral oncogenes and viral regulatory genes associated with cancer causation
- Contextual factors contributing to cancer incidence (e.g., race/ethnicity, socioeconomic status, neighborhood factors, community factors, built environment).

2.2 Endogenous Factors in the Origin and Cause of Cancer

Examples of science that would fit:

- Free radicals such as superoxide and hydroxide radicals
- Identification /confirmation of genes suspected of being mechanistically involved in familial cancer syndromes; for example, BRCA1, Ataxia Telangiectasia, and APC
- Identification/confirmation of genes suspected or known to be involved in "sporadic" cancer events; for example, polymorphisms and/or mutations that may affect carcinogen metabolism (e.g., CYP, NAT, glutathione transferase, etc.)
- Investigating a role for stem cells in the etiology of tumours.

2.3 Interactions of Genes and/or Genetic Polymorphisms with Exogenous and/or Endogenous Factors

Examples of science that would fit:

- Gene-environment interactions, including research into the role of the microbiome
- Interactions of genes with lifestyle factors, environmental, and/or occupational exposures such as variations in carcinogen metabolism associated with genetic polymorphisms

- Interactions of genes and endogenous factors such as DNA repair deficiencies and endogenous DNA damaging agents such as oxygen radicals or exogenous radiation exposure.

2.4 Resources and Infrastructure Related to Aetiology

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, etc.)
- Reagents and chemical standards
- Epidemiological resources pertaining to etiology
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development, characterization and validation of new model systems for etiology, distribution of models to the scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

Prevention

Research included in this category looks at identifying individual and population-based primary prevention interventions, which reduce cancer risk by reducing exposure to cancer risks and increasing protective factors.

3.1 Interventions to Prevent Cancer: Personal Behaviors (Non-Dietary) that Affect Cancer Risk

Examples of science that would fit:

- Research on determinants of personal behaviors, such as physical activity, sun exposure, alcohol and tobacco use, known to affect cancer risk and interventions (including educational and behavioral interventions, such as e-cigarettes, directed at individuals as well as population-based interventions including social marketing campaigns, environmental supports, and regulatory, policy and legislative changes) to change determinants or to target health inequalities
- Directed education to specified populations of patients, health care providers, and at-risk groups about cancer risk and prevention and relevant interventions with the intent of promoting increased awareness and behavioural change. This includes communication of lifestyle models that reduce cancer risk, such as communicating smoking and tobacco cessation interventions, genetic counselling, or targeting/addressing health inequalities.

3.2 Dietary Interventions to Reduce Cancer Risk and Nutritional Science in Cancer Prevention

Examples of science that would fit:

- Quantification of nutrients, micronutrients, and purified nutritional compounds in cancer prevention studies
- Development, characterisation, validation, and use of dietary/nutritional assessment instruments to evaluate cancer prevention interventions
- Research on determinants of dietary behavior and interventions to change diet (including educational and behavioral interventions directed at individuals as well as population-based interventions including social marketing campaigns, environmental supports, and regulatory and legislative changes)
- Education of patients, health care providers, at-risk populations, and the general population about cancer risk and diet
- Communicating cancer risk of diet to underserved populations, at-risk populations, and the general public
- Communication of nutritional interventions that reduce cancer risk
- Nutritional manipulation of the microbiome for cancer prevention.

3.3 Chemoprevention and other medical interventions

Examples of science that would fit:

- Chemopreventive agents and their discovery, mechanism of action, development, testing in model systems, and clinical testing
- Other (non-vaccine) preventive measures such as prophylactic surgery (e.g., mastectomy, oophorectomy, prostatectomy etc.), use of antibiotics, immune modulators/stimulators or other biological agents
- Manipulation of the microbiome for cancer prevention (e.g., fecal transplant).

3.4 Vaccines

Examples of science that would fit:

- Vaccines for prevention, their discovery, mechanism of action, development, testing in model systems, and clinical testing (e.g., HPV vaccines).

3.5 Complementary and Alternative Prevention Approaches

Examples of science that would fit:

- Discovery, development, and testing of complementary/alternative medicine (CAM) approaches or other primary prevention interventions that are not widely used in conventional medicine or are being applied in different ways as compared to conventional medical uses
- Mind and body medicine (e.g., meditation, acupuncture, hypnotherapy), manipulative and body-based practices (e.g., spinal manipulation, massage therapy), and other practices (e.g., light therapy, traditional healing) used as a preventive measure.

3.6 Resources and Infrastructure Related to Prevention

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, etc.)
- Epidemiological resources pertaining to prevention
- Clinical trials infrastructure
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development and characterisation of new model systems for prevention, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

Early Detection, Diagnosis, and Prognosis

Research included in this category focuses on identifying and testing cancer markers, imaging and other methods that are helpful in detecting and/or diagnosing cancer as well as predicting the outcome or chance of recurrence or to support treatment decision making in stratified/personalised medicine.

4.1 Technology Development and/or Marker Discovery

Examples of science that would fit:

- Discovery or identification and characterisation of markers (e.g., proteins, genes, epigenetic, microbiomic), and/or technologies (such as fluorescence, nanotechnology, etc.) that are potential candidates for use in cancer detection, staging, diagnosis, theranostic and/or prognosis
- Use of proteomics, genomics, expression assays, or other technologies in the discovery or identification of markers
- Defining molecular signatures of cancer cells, including cancer stem cells (e.g., for the purposes of diagnosis/prognosis/theranostic and to enable treatment decision planning in personalised/stratified/precision medicine).

4.2 Technology and/or Marker Evaluation With Respect to Fundamental Parameters of Method

Examples of science that would fit:

- Development, refinement, and preliminary evaluation (e.g., animal trials, preclinical, and Phase I human trials) of identified markers or technologies such as genetic/protein biomarkers (prospective or retrospective) or imaging methods (optical probes, PET, MRI, etc.)
- Preliminary evaluation with respect to laboratory sensitivity, laboratory specificity, reproducibility, and accuracy
- Research into mechanisms assessing tumor response to therapy at a molecular or cellular level.

4.3 Technology and/or Marker Testing in a Clinical Setting

Examples of science that would fit:

- Evaluation of clinical sensitivity, clinical specificity, and predictive value (Phase II or III clinical trials), including theranostics and prediction of late/adverse events
- Quality assurance and quality control
- Inter- and intra-laboratory reproducibility
- Testing of the method with respect to effects on morbidity and/or mortality
- Study of screening methods, including compliance, acceptability to potential screenees, and receiver-operator characteristics. Includes education, communication (e.g., genetic counselling and advice on screening behavior based on cancer risk factors), behavioral and complementary/alternative approaches to improve compliance, acceptability or to reduce anxiety/discomfort, and evaluation of new methods to improve screening in healthcare settings
- Research into improvements in techniques to assess clinical response to therapy.

4.4 Resources and Infrastructure Related to Detection, Diagnosis, or Prognosis

Examples of science that would fit:

- Informatics and informatics networks; for example, patient databanks
- Specimen resources (serum, tissue, images, etc.)
- Clinical trials infrastructure
- Epidemiological resources pertaining to risk assessment, detection, diagnosis, or prognosis
- Statistical methodology or biostatistical methods
- Centers, consortia, and/or networks
- Development, characterisation and validation of new model systems for detection, diagnosis or prognosis, distribution of models to the scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead

- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

Treatment

Research included in this category focuses on identifying and testing treatments administered locally (such as radiotherapy and surgery) and systemically (treatments like chemotherapy which are administered throughout the body) as well as non-traditional (complementary/alternative) treatments (such as supplements, herbs). Research into the prevention of recurrence and treatment of metastases are also included here.

5.1 Localised Therapies - Discovery and Development

Examples of science that would fit:

- Discovery and development of treatments administered locally that target the organ and/or neighboring tissue directly, including but not limited to surgical interventions, cryotherapy, local/regional hyperthermia, high-intensity, focused ultrasound, radiotherapy, and brachytherapy
- Therapies with a component administered systemically but that act locally (e.g., photodynamic therapy, radioimmunotherapy, radiosensitisers and theranostics)
- Development of methods of localised drug delivery of systemic therapies e.g., Pressurised Intraperitoneal Aerosol Chemotherapy (PIPAC), direct intratumoral polymers/gels/ nanoparticles/microsomes etc.
- Research into the development of localised therapies to prevent recurrence
- Identifying mechanisms of action of existing localised therapies and targets, including cancer stem cells.

5.2 Localised Therapies - Clinical Applications

Examples of science that would fit:

- Clinical testing and application of treatments administered locally that target the organ and/ or neighboring tissue directly, including but not limited to surgical interventions, cryotherapy, local/regional hyperthermia, radiotherapy, and brachytherapy.
- Clinical testing and application of therapies with a component administered systemically but that act locally (e.g., photodynamic therapy, radiosensitisers and theranostics, Pressurised Intraperitoneal Aerosol Chemotherapy (PIPAC), direct intratumoral polymers/gels/ nanoparticles/microsomes etc.
- Phase I, II, or III clinical trials of promising therapies that are administered locally
- Side effects, toxicity, and pharmacodynamics
- Clinical testing of localised therapies to prevent recurrence and prevent and treat metastases.

5.3 Systemic Therapies - Discovery and Development

Examples of science that would fit:

- Discovery and development of treatments administered systemically such as cytotoxic or hormonal agents, novel systemic therapies such as immunologically directed therapies (treatment vaccines, antibodies , antibiotics, theranostics or other biologics), gene therapy, angiogenesis inhibitors, apoptosis inhibitors, whole body hyperthermia, bone marrow/ stem cell transplantation, differentiating agents, adjuvant and neo-adjuvant treatments, systemically-delivered nanoparticles/microsomes, cell-based therapies, manipulation of the microbiome etc.
- Identifying mechanisms of action of existing cancer drugs and novel drug targets, including cancer stem cells for the purposes of treatment/identifying drug targets
- Drug discovery and development, including drug metabolism, pharmacokinetics, pharmacodynamics, combinatorial chemical synthesis, drug screening, development of high-throughput assays, and testing in model systems, including that which may aid treatment planning in stratified/personalised medicine
- Investigating the molecular mechanisms of drug resistance (including the role of cancer stem cells) and pre-clinical evaluation of therapies to circumvent resistance
- Development of methods of drug delivery
- Research into the development of systemic therapies to prevent recurrence.

5.4 Systemic Therapies - Clinical Applications

Examples of science that would fit:

- Clinical testing and application of treatments administered systemically such as cytotoxic or hormonal agents, novel systemic therapies such as immunologically directed therapies (treatment vaccines, antibodies, antibiotics, theranostics or other biologics), gene therapy, angiogenesis inhibitors, apoptosis inhibitors, whole body hyperthermia, bone marrow/ stem cell transplantation, differentiating agents, adjuvant and neo-adjuvant treatments, systemically-delivered nanoparticles/microsomes, cell-based therapies, manipulation of the microbiome etc.
- Phase I, II, or III clinical trials of promising therapies administered systemically
- Side effects, toxicity, and pharmacodynamics
- Clinical testing of systemic therapies to prevent recurrence and prevent and treat metastases.

5.5 Combinations of Localised and Systemic Therapies

Examples of science that would fit:

- Development and testing of combined local and systemic approaches to treatment (e.g., radiotherapy and chemotherapy, or surgery and chemotherapy)
- Clinical application of combined approaches to treatment such as systemic cytotoxic therapy and radiation therapy

- Development and clinical application of combined localised and systemic therapies to prevent recurrence and prevent and treat metastases.

5.6 Complementary and Alternative Treatment Approaches

Examples of science that would fit:

- Discovery, development, and clinical application of complementary/alternative medicine (CAM) treatment approaches such as diet, herbs, supplements, natural substances, or other interventions that are not widely used in conventional medicine or are being applied in different ways as compared to conventional medical uses
- Complementary/alternative or non-pharmaceutical approaches to prevent recurrence and prevent and treat metastases.

5.7 Resources and Infrastructure Related to Treatment and the Prevention of Recurrence

Examples of science that would fit:

- Informatics and informatics networks; for example, clinical trials networks and databanks
- Mathematical and computer simulations
- Specimen resources (serum, tissue, etc.)
- Clinical trial groups
- Clinical treatment trials infrastructure
- Epidemiological resources pertaining to treatment
- Statistical methodology or biostatistical methods
- Drugs and reagents for distribution and drug screening infrastructures
- Centers, consortia, and/or networks
- Development and characterisation of new model systems for treatment, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead
- Reviews/meta-analyses of clinical effectiveness of therapeutics/treatments
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer term research based training, such as Ph.D. or post-doctoral fellowships.

Cancer Control, Survivorship, and Outcomes Research

Research included in this category includes a broad range of areas: patient care and pain management; tracking cancer cases in the population; beliefs and attitudes that affect behavior regarding cancer control; ethics; education and communication approaches for patients, family/caregivers, and health care professionals; supportive and end-of-life care; and health care delivery in terms of quality and cost effectiveness.

6.1 Patient Care and Survivorship Issues

Examples of science that would fit:

- Research into patient centred outcomes
- Quality of life
- Pain management
- Psychological impacts of cancer survivorship
- Rehabilitation, including reconstruction and replacement
- Economic sequelae, including research on employment, return to work, and vocational/educational impacts on survivors and their families/caregivers
- Reproductive issues
- Long-term issues (morbidity, health status, social and psychological pathways)
- Symptom management, including nausea, vomiting, lymphedema, neuropathies, etc.
- Prevention and management of long-term treatment-related toxicities and sequelae, including symptom management (e.g., physical activity or other interventions), prevention of mucosities, prevention of cardiotoxicities, opportunistic infections, cachexia etc.
- Psychological, educational or complementary/alternative (e.g., hypnotherapy, relaxation, transcendental meditation, imagery, spiritual healing, massage, biofeedback, herbs, spinal manipulation, yoga, acupuncture) interventions/approaches to promote behaviors that lessen treatment-related morbidity and promote psychological adjustment to the diagnosis of cancer and to treatment effects
- Burdens of cancer on family members/caregivers and interventions to assist family members/caregivers
- Educational interventions to promote self-care and symptom management
- Research into peer support, self-help, and other support groups
- Behavioral factors in treatment compliance.

6.2 Surveillance

Examples of science that would fit:

- Epidemiology and end results reporting (e.g., SEER)
- Registries that track incidence, morbidity, co-morbidities/symptoms, long-term effects and/or mortality related to cancer

- Surveillance, measurement, evaluation or tracking of established cancer risk factors in populations such as diet, body weight, physical activity, sun exposure, and tobacco use, including method development
- Analysis of variations in established cancer risk factor exposure in populations by demographic, geographic, economic, or other factors
- Trends in use of interventional strategies in populations (e.g., geographic variation).

6.3 Population-based Behavioral Factors

Examples of science that would fit:

- Research into populations' attitudes and belief systems (including cultural beliefs) and their influence on behaviors related to cancer control, outcomes and treatment. For example, how populations' beliefs can affect compliance/interaction with all aspects of the health care/service provision
- Research into the psychological effects of genetic counselling
- Research into behavioral barriers to improving cancer care/survivorship clinical trial enrolment.

6.4 Health Services, Economic and Health Policy Analyses

Examples of science that would fit:

- Development and testing of health service delivery methods
- Interventions to increase the quality of health care delivery
- Impact of organisational, social, and cultural factors on access to care and quality of care, including studies on variations or inequalities in access among racial, ethnic, geographical or socio-economic groups
- Studies of providers such as geographical or care-setting variations in outcomes
- Effect of reimbursement and/or insurance on cancer control, outcomes, and survivorship support
- Health services research, including health policy and practice and development of guidelines/best practice for healthcare delivery across the diagnostic/preventive/treatment spectrum
- Analysis of health service provision, including the interaction of primary and secondary care
- Analyses of the cost effectiveness of methods used in cancer prevention, detection, diagnosis, prognosis, treatment, and survivor care/support
- Ethical, legal or social implications of research/health service delivery (e.g. genetic counselling)
- Research into systemic or operational barriers to trial enrolment.

6.5 Education and Communication Research

Examples of science that would fit:

- Development of generic health provider-patient communication tools and methods (e.g., telemedicine/health)
- Tailoring educational approaches or communication to different populations (e.g., social, racial, geographical, or linguistic groups)
- Research into new educational and communication methods and approaches, including special approaches and considerations for underserved and at-risk populations
- Research on new methods and strategies to disseminate cancer information/innovation to healthcare providers (e.g., web-based information, telemedicine, smartphone apps, etc.) and the effectiveness of these approaches
- Research on new communication processes and/or media and information technologies within the health care system and the effectiveness of these approaches
- Media studies focused on the nature and ways in which information on cancer and cancer research findings are communicated to the general public
- Education, information, and assessment systems for the general public, primary care professionals, or policy makers
- Research into barriers to successful health communication.

6.6 End-of-Life Care

Examples of science that would fit:

- Hospice/end-of-life patient care focused on managing pain and other symptoms (e.g., respiratory distress, delirium, cachexia) and the provision of psychological, social, spiritual and practical support through either conventional or complementary/alternative interventions/approaches throughout the last phase of life and into bereavement
- Quality of life and quality of death for terminally-ill patients
- Provision of psychological, social, spiritual and practical support to families/caregivers through either conventional or complementary/alternative interventions/approaches
- Research into the delivery of hospice care.

6.7 Research on Ethics and Confidentiality

Examples of science that would fit:

- Informed consent modeling/framing and development
- Quality of Institutional Review Boards (IRBs)
- Protecting patient confidentiality and privacy
- Research on publication bias within the cancer research field.

6.8 Resources and Infrastructure Related to Cancer Control, Survivorship, and Outcomes Research

Examples of science that would fit:

- Informatics and informatics networks
- Clinical trial groups related to cancer control, survivorship, and outcomes research
- Epidemiological resources pertaining to cancer control, survivorship, and outcomes research
- Statistical methodology or biostatistical methods pertaining to cancer control, survivorship and outcomes research
- Surveillance infrastructures
- Centers, consortia, and/or networks pertaining to cancer control, survivorship and outcomes research
- Development and characterisation of new model systems for cancer control, outcomes or survivorship, distribution of models to scientific community or research into novel ways of applying model systems, including but not limited to computer-simulation systems, software development, in vitro/cell culture models, organ/tissue models or animal model systems. Note: this should only be used where the focus of the award is creating a model. If it is only a tool or a methodology, code to the research instead
- Psychosocial, economic, political and health services research frameworks and models
- Education and training of investigators at all levels (including clinicians and other health professionals), such as participation in training workshops, conferences, advanced research technique courses, and Master's course attendance. This does not include longer-term research-based training, such as Ph.D. or post-doctoral fellowships.

Appendix E – Tumour streams and tumour types

Tumour streams

- Breast cancer
- Cancer of unknown primary (CUP)
- Brain and nervous system tumours
- Colorectal cancer
- Genitourinary (includes cancers of the prostate, bladder, kidney, and testis)
- Gynaecological cancers
- Head and neck cancers
- Haematological (includes lymphomas, leukaemia, and myeloma)
- Lung cancer
- Musculoskeletal
- Skin cancers including melanoma
- Upper gastro-intestinal cancers (includes cancers of the oesophagus, stomach, pancreas, and hepato-biliary system).

Tumour types

- Specific tumour types used for coding cancer research projects and research programs
- Adrenocortical cancer
- Anal cancer
- Bladder cancer
- Blood cancer (other than Hodgkin's disease, leukaemia, myeloma, non-Hodgkin's lymphoma)
- Bone cancer (including osteosarcoma and malignant fibrous histiocytoma)
- Brain tumour (including chordoma)
- Breast cancer
- Cancer of unknown primary (CUP)
- Cervical cancer
- Colorectal (colon and rectal) cancer
- Ear cancer
- Endometrial cancer
- Eye cancer (not including retinoblastoma)

- Gallbladder cancer
- Gastrointestinal tract cancer (not including colorectal, oesophageal, gallbladder, liver, pancreatic, small intestine and stomach)
- Genital System, Female (not including cervical, endometrial, ovarian, vaginal and vulva)
- Genital System, Male (not including penile, prostate and testicular)
- Head and neck cancer (not including laryngeal, nasal cavity and paranasal sinus, oral cavity and lip, parathyroid, pharyngeal, salivary gland and thyroid)
- Heart cancer
- Hodgkin's disease
- Kaposi's sarcoma
- Kidney cancer (including Wilm's tumour)
- Laryngeal cancer
- Leukaemia including acute lymphoblastic leukaemia, acute myeloid leukaemia, chronic lymphocytic leukaemia, chronic myelogenous leukaemia, hairy cell leukaemia)
- Liver cancer (including bile duct and hepatocellular)
- Lung cancer (including pleural mesothelioma)
- Melanoma
- Myeloma (including multiple myeloma)
- Nasal cavity and paranasal sinus cancer
- Neuroblastoma (included in the Brain and nervous system stream)
- Non-Hodgkin lymphoma
- Oesophageal cancer
- Oral cavity and lip cancer
- Ovarian cancer
- Pancreatic cancer
- Penile cancer
- Pharyngeal cancer
- Pituitary tumour
- Prostate cancer
- Retinoblastoma
- Respiratory system cancer (not including lung, nasal cavity and paranasal sinus)
- Salivary gland cancer
- Sarcoma (including chondrosarcoma, Ewing's sarcoma, fibrosarcoma, osteosarcoma,rhabdomyosracoma, soft tissue sarcoma and uterine sarcoma)
- Skin cancer (not melanoma)
- Small intestine cancer

- Stomach cancer
- Testicular cancer
- Thymoma (malignant)
- Thyroid cancer
- Urinary system (not including bladder, kidney and Wilm's)
- Vaginal cancer
- Vulva cancer.

Appendix F – Definitions of health disciplines

Clinical trials

A 'clinical trial' is the name commonly given to research in which a therapeutic, preventive or diagnostic intervention is tested. According to the World Health Organisation (WHO), a clinical trial is ' Any research project that prospectively assigns human participants or groups to one or more health-related interventions to evaluate the effects on health outcomes.'

Primary care

Primary health care is socially appropriate, universally accessible, scientifically sound first level care provided by health services and systems with a suitably trained workforce comprised of multi-disciplinary teams supported by integrated referral systems in a way that: gives priority to those most in need and addresses health inequalities; maximises community and individual self-reliance, participation and control; and involves collaboration and partnership with other sectors to promote public health. Comprehensive primary health care includes health promotion, illness prevention, treatment and care of the sick, community development, and advocacy and rehabilitation.

Palliative care

Palliative care is an area of healthcare that focuses on relieving and preventing the suffering of patients. Palliative medicine is appropriate for patients in all disease stages, including those undergoing treatment for curable illnesses and those living with chronic diseases, as well as patients who are nearing the end of life. Palliative medicine utilizes a multidisciplinary approach to patient care, relying on input from physicians, pharmacists, nurses, chaplains, social workers, psychologists, and other allied health professionals in formulating a plan of care to relieve suffering in all areas of a patient's life. This multidisciplinary approach allows the palliative care team to address physical, emotional, spiritual, and social concerns that arise with advanced illness.

According to the World Health Organization (WHO), palliative care is defined as the active total care of patients whose disease is not responsive to curative treatment.

Psychosocial Oncology

Psychosocial oncology is a field of interdisciplinary study and practice at the intersection of lifestyle, psychology and oncology. It is concerned with aspects of cancer that go beyond medical treatment and include lifestyle, psychological and social aspects of cancer. Sometimes it is also referred to as or "behavioural oncology" because it deals with psychosocial and behavioural topics. The field is concerned both with the effects of cancer on a person's psychological health as well as the social and behavioural factors that may affect the disease process of cancer and/or the remission of it.

Radiation oncology

Radiation oncology is the medical use of ionizing radiation, generally as part of cancer treatment to control or kill malignant cells. Radiation oncology is distinct from radiology, the use of radiation in medical imaging and diagnosis.

Medical oncology

Medical oncology is treatment primarily with drugs, e.g. chemotherapy.

Surgical oncology

Surgical oncology is surgical treatment of cancer, including biopsy, staging, and surgical resection of tumours.

Nursing

Oncology nursing involves the provision and supervision of the care of patients with cancer. Nursing involves monitoring the patient's condition, administering medication, and developing care plans and developing symptom management protocols.

Allied health

Allied health refers to non-medical health services such as a psychologists, or physiotherapists.

Multi-disciplinary

Involving a number of disciplines and not definable under any single category of care.

Translational

Translational refers to a way of thinking about and conducting scientific research to make the results of research applicable to the population under study. In the field of medicine, for example, it is used to translate the findings in basic research more quickly and efficiently into medical practice and, thus, meaningful health outcomes, whether those are physical, mental, or social outcomes.

Appendix G – Translational Research Methodology

Analysis of ICRP data suggests that awards wholly or partially coded to CSO 3, 4 or 5 can be classed as TR. Patient-oriented TR – research primarily focused on needs in the area of patient care and survivorship (CSO6) - has also been separated out. There is some difficulty in separating out late translation from clinical research, as some CSO codes (e.g., CSO3.3) encompass early and late translational/clinical research. To overcome this a general 'translational' category is also included which encompasses both early and later translation. Research wholly/partly coded to the following CSO sub-codes is categorised as follows:

CSO	Translational Research Category
1.1	-
1.2	-
1.3	-
1.4	-
1.5	-
2.1	-
2.2	-
2.3	-
2.4	-
3.1	Translational
3.2	Translational
3.3	Translational
3.4	Translational
3.5	Translational
3.6	Translational
4.1	Translational (early)
4.2	Translational (early)
4.3	Translational/clinical
4.4	Translational
5.1	Translational (early)
5.2	Translational/clinical
5.3	Translational (early)
5.4	Translational/clinical
5.5	Translational/clinical

5.6 Translational/clinical

5.7 Translational

6.1 Patient-orientated translational

6.2 Translational

6.3 Patient-orientated translational

6.4 Patient-orientated translational

6.5 Patient-orientated translational

6.6 Patient-orientated translational

6.7 Patient-orientated translational

6.8 Patient-orientated translational

6.9 Patient-orientated translational

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