



Victorian Paediatric Oncology Situational Analysis & Workforce Requirements 2012-2026

SUMMARY REPORT

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Executive summary

Children's cancer represents a major success story over the past 35 years with a 40% decline in mortality between 1975 and 1995.¹ More recent Victorian data indicates that the five year survival rate for children diagnosed with cancer under the age of 15 years is now 82%.²

While the vast majority of today's children / adolescents diagnosed with cancer are now cured, almost 20% of children / adolescents still die of their disease. In addition, there is increasing evidence that cancer treatment has long term adverse physical, psychosocial, cognitive, developmental and social impacts on a significant proportion of survivors. This complex management of children / adolescents with cancer is resource intensive requiring extensive medical, nursing and allied health resources as well as making substantial demands on support services such as pathology and medical imaging.

Recognising these demands and the expected growth in the Victorian paediatric population, the Paediatric Integrated Cancer Service (PICS) commissioned the development of a Victorian Paediatric Oncology Situational Analysis and Workforce Plan.

The Situational Analysis and Workforce Requirements report:

- is underpinned by documentation of the **care pathway** for all children and adolescents newly diagnosed with cancer and **a model of care based on risk stratification**
- estimates future service and workforce demands, drawing on a wide range of **population, service and workforce data, key evidence** where available, as well as **consultation with key stakeholders** across the PICS partner health services
- estimates **future workforce requirements** using:
 - a risk adaptive approach for the identification of **key clinical tasks and the time required** for different levels of patient need for medical, nursing and allied health professional groups
 - **industrial awards, specific guidelines**, previous PICS **model of care work** and / or other key documents.

This summary report provides a framework to address Victorian paediatric oncology service demand and workforce requirements to 2026 through the PICS three main partners:

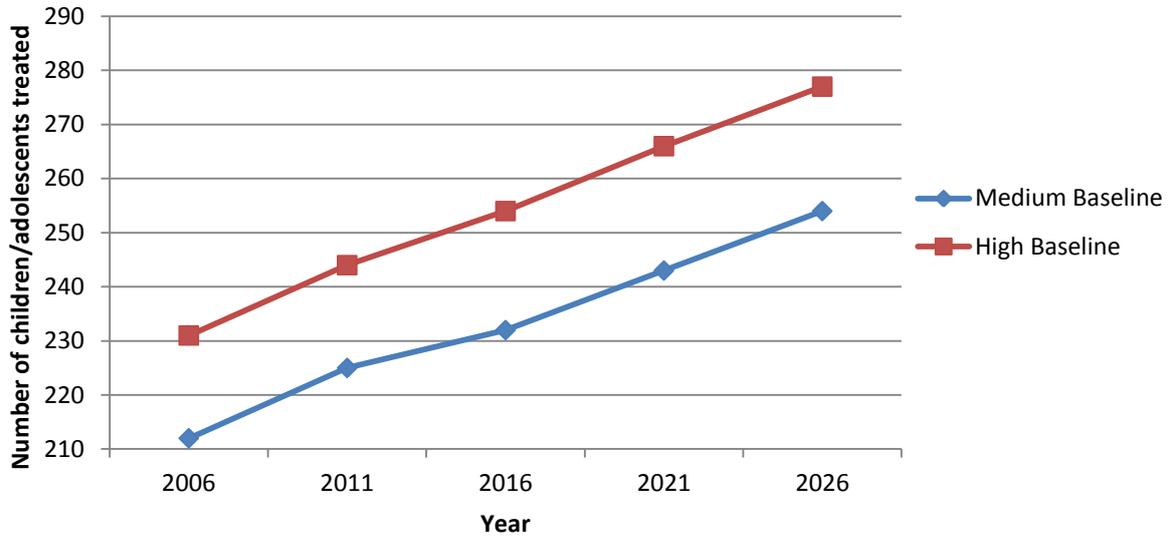
- The Royal Children's Hospital (RCH)
- Monash Children's (MC) at Monash Health (MH)
- Peter MacCallum Cancer Centre (Peter Mac).

Based on documented estimated increases in the population and the quantified current levels of service activity for each newly diagnosed child, future service demand has been estimated. Compared with baseline figures, these estimates indicate that by 2026, there will be an **additional 42-46 new cases** of paediatric cancer diagnosed and treated per annum in Victoria.

¹ Ries LAG, Smith MA, Gurney JG, et al. 1999. **Cancer incidence and survival among children and adolescents: United States SEER Program 1975-1995**. National Cancer Institute, SEER Program. NIH Pub.No. 99-4649. Bethesda. MD.

² Thursfield, V, Farrugia H, Karahalios E, Giles G. 2012. **Cancer Survival Victoria 2012. Estimates of survival for 2006-2010 (and comparisons with earlier periods)**. Cancer Council of Victoria. Melbourne.

Estimated number of all children/adolescents treated for cancer in Victorian aged 0-17 years (2011 to 2026)



Note: including interstate children and adolescents treated in Victoria

Section 4 of this document summarises the estimated workforce resources required to meet the increasing service demand for nineteen identified medical, nursing and allied health workforce disciplines across the three PICS partner health services. The predicted staffing requirements are based on the estimated medium and high baselines for the number of children / adolescents diagnosed at each five year time point (2011 – 2026). For each professional discipline, the ratio of newly diagnosed children / adolescents per 1 EFT has been calculated to guide health services in planning local workforce requirements.

Recommended ratio of 1EFT to total number of newly diagnosed children/adolescents by professional discipline

Professional Discipline	EFT	Newly Diagnosed Children/Adolescents
Paediatric Oncologist	1EFT	to 18 children/adolescents
Paediatric Medical Fellow	1EFT	to 43 children/adolescents
Radiation Oncologist	1EFT	to 82 children/adolescents
RCH Day Oncology Nurses	1EFT	to 30 children/adolescents
MC Day Oncology Nurses	1EFT	to 16 children/adolescents
RCH & MC Nurse Coordinators	1EFT	to 35 children/adolescents
Peter Mac Nurse Coordinators	1EFT	to 76 children/adolescents
RCH & MC Art, Music and Play Therapists	1EFT	to 59 children/adolescents
Peter Mac Music Therapist	<0.7EFT	to 102 children/adolescents
Clinical Research Manager/Associate	1EFT	to 30 children/adolescents
Comfort First Education Play Therapist	1EFT	to 46 children/adolescents

Dietitian	1EFT	to 71 children/adolescents
Mental Health Clinician	1EFT	to 67 children/adolescents
Neuro-psychologist	1EFT	to 83 children/adolescents
Occupational Therapist	1EFT	to 137 children/adolescents
Pharmacist	1EFT	to 32 children/adolescents
Physiotherapist	1EFT	to 79 children/adolescents
Social Worker	1EFT	to 36 children/adolescents
Radiation Therapist	1EFT	to 48 children/adolescents

This Summary Report and the earlier detailed *Situational Analysis and Workforce Plan 2012-2026* (September 2012) may provide guidance for estimating future service and workforce requirements for these services.

1. Introduction

The Paediatric Integrated Cancer Service (PICS) was established in 2004 as part of the improving Victorian paediatric health services (Children First Policy) and the Victorian Cancer Reform agendas. PICS primarily partners with the following three major services:

- The Royal Children's Hospital (RCH) Children's Cancer Centre
- Monash Children's (MC) Cancer Centre
- Peter MacCallum Cancer Centre (radiotherapy services – Peter Mac).

Five year survival from paediatric cancer has increased substantially over the past 35 years³ with recent Victorian data indicating an 82% five year survival rate for children diagnosed with cancer under the age of 15 years.⁴ However, almost 20% of children / adolescents newly diagnosed with cancer today will still die of their disease. There is also increasing evidence that even though it may be successful in curing childhood cancer, cancer treatment has long term adverse physical, psychosocial, cognitive, developmental and social impacts on a significant proportion of survivors.

As a result, paediatric cancer care is continuing to evolve and requires increasingly complex management to:

- improve treatments to increase the chance of cure and minimise potential long-term harm
- improve the length and enhance the quality of life for those who will not survive cancer
- provide optimal supportive, psychosocial and developmental care that benefits children / adolescents and their families in the short and longer-term
- develop appropriate long-term survivorship programs to:
 - reduce the risk and consequences of long-term effects
 - implement appropriate early intervention approaches
 - build networks to facilitate the transition of older adolescents into the adult and community-based care service sectors.

This increasingly complex management is resource intensive, requiring extensive medical, nursing and allied health resources as well as making substantial demands on support services such as pathology and medical imaging.

Victoria's expected growth in the population aged 0-17 years over each five year period from 2006 – 2026 will add increasing demand for these highly complex, low volume cancer services.

Recognising these future demands, PICS commissioned the development of a *Victorian Paediatric Oncology Situational Analysis and Workforce Plan 2012-2026*. This Plan provides a framework to initially guide Victorian paediatric oncology service and workforce development to 2026.

In 2011, a detailed situational analysis of current and future service requirements was undertaken which included specific analysis of service demand and resources at each of the three major PICS service sites.⁵ In 2012, an overview of the situational analysis and a detailed workforce plan were completed.

³ Ries LAG, Smith MA, Gurney JG et al. 1999. op cit

⁴ Thursfield V, Farrugia H, Karahalios E, Giles G. 2012. op cit.

⁵ Paediatric Integrated Cancer Service. 2011. **Victorian Paediatric Oncology Service Plan. Situational analysis: current and future service demand.** Unpublished report.

This *Summary Report*:

- provides a state-wide summary of estimated current and future service demand at a statewide level
- estimates the workforce requirements needed to meet these demands.

Note:

The **workforce estimates** provided are based on the **minimum requirements** needed to provide **optimal clinical care** within the two services currently delivering diagnostic treatment to all Victorian paediatric oncology patients and at Peter Mac (providing radiotherapy).

These estimates do **not** consider:

- significant research resource requirements needed to ensure that optimal clinical care is informed by research-led excellence
- any changes in the number of diagnostic paediatric cancer services or in their scope of practice or model(s) of care.

2. Project method

The following provides an overview of the methods used to estimate current and future service demand and workforce requirements.

2.1 Estimating current and future service demand

The following data was accessed to estimate current and future service demand.⁶

Paediatric cancer data: paediatric cancer incidence, survival and / or mortality data was accessed through the Australian Paediatric Cancer Registry^{7 8} and the Victorian Cancer Registry.⁹

Population data: Victorian data was accessed to identify the current and projected growth in the numbers of children in five year cohorts (0-19 years) from 2006-2026.¹⁰

Health service data: this included access to the Victorian Admitted Episodes Dataset (VAED) for all separations for children / adolescents aged 0-17 years at the key PICS services by diagnostic codes for neoplasms. This data was collapsed into the three diagnostic groups used to define paediatric cancers (ie 'liquid' tumours [eg leukaemias and lymphomas], neurological / brain tumours and solid tumours [eg bone, soft tissue and renal tumours]).

Further **VAED** extractions included same day and multi-day inpatient separations for chemotherapy or other reasons, outpatient consultations and average length of stay (ALOS) for the varying separations. This enabled an estimation of the number and type of separations per newly diagnosed child per annum.

Other service data was accessed via internal data systems within each PICS site and through previous PICS model of care work.

2.2 Estimating future workforce requirements

In total, estimates for 19 workforce groups are included in this report. In summary, a risk stratified approach was used for most disciplines based on:

- whether all or only some children accessed a specific workforce discipline
- three levels of care or intervention (standard, moderate and high care / intervention).

For some disciplines, workforce requirements have been informed by industrial awards, specific guidelines, other key documents and previous model of care work undertaken through PICS.

For professions where such information was not available, each professional discipline identified the key tasks required for each newly diagnosed child at key pathway points (and / or related to specific

⁶ More detail is available through the PICS 2011 *Situational Analysis* report

⁷ Australian Paediatric Cancer Registry 2010. **Childhood cancer incidence in Australia 1983 – 2006.** Vialter Centre for Research in Cancer Control. Cancer Council Queensland. Brisbane, Queensland

⁸ Youlden D, Beade P, Ward L, Valery P, et al. 2010. **Childhood cancer survival in Australia 1995-2004.** Vialter Centre for Research in Cancer Control, Cancer Council Queensland and the Australian Paediatric Cancer Registry. Brisbane, Queensland

⁹ Victorian Cancer Registry. 2011. Range of unpublished reports provided based on Victorian cancer incidence and deaths over different time periods.

¹⁰ Victoria in the Future. **Estimated population growth 2006-2026.** Victorian Dept of Planning and Community Development.

VAED separation activities). The tasks and time allocated to each task was identified for each level of care.

This enabled a calculation of the required hours for all newly diagnosed children. Additional time was allocated for non-clinical duties, management / team leadership, and professional development and leave requirements. Where appropriate this was standardised across relevant professional disciplines.

The total resource requirements for each discipline were calculated over time (2011 – 2026) based on the medium and high baselines for the estimated number of children diagnosed in each time period. For most disciplines the ratio of newly diagnosed children per 1 EFT was also calculated.

3. Estimating current and future service demand

The current predicted demand on services has been calculated by estimating the number of children / adolescents diagnosed with cancer each year and linked to the specific levels of service activity per newly diagnosed child / adolescent.

3.1 Annual cancer incidence

Because of the small numbers of children / adolescents diagnosed with cancer each year there is significant variance in the annual incidence as reported through the Victorian Cancer Registry (VCR). There is also a time-lag in the reporting of the annual incidence data. Data was accessed for the four years 2004/05 –2007/08.

In addition, because of the low volume of cases per annum, the Australian Paediatric Cancer Registry has reported the average incidence (for children aged 0-14 years) per year over a twenty year period (1987-2006).¹¹

Two estimates were calculated as baseline levels to predict the range of numbers of children / adolescents diagnosed with cancer per annum (see Box 1).

Box 1: Estimating current incidence of childhood cancer and number of new patients requiring treatment

In addition to the estimated number of Victorian children and adolescents diagnosed with cancer each year:

- an average of 14 interstate children / adolescents are treated per annum in a Victorian service
- 9-10 children with other conditions receive a Bone Marrow Transplant (BMT) per annum (based on two years' service data 2009 -2010).

The medium baseline

Based on the most robust data available, we estimate that **an average of 198 Victorian children / adolescents** are diagnosed with paediatric cancer each year. This 'medium baseline figure' is based on:

- an average of 150 new cases per annum aged 0-14 years based on over 20 years' data (1983-2006 Australian Paediatric Cancer Registry 2008) PLUS
- an average of 48 new cases aged 15-17 years per annum based on four years of VCR data (2004/05 – 2007/08)

The high baseline

In 2006-07, **217 Victorian children / adolescents** were diagnosed with cancer (based on VCR data). This reflects a 'peak figure' and has been selected as the 'high baseline figure' for the purposes of this work.

¹¹ Australian Paediatric Cancer Registry. 2010. Op cit.

3.2 Future paediatric population growth

The increasing birth rate will influence the numbers of children / adolescents diagnosed with cancer each year and consequently on future service demand.

Table 1 provides the estimated % changes in the population of children and adolescents aged 0-19 years as a whole and by five year age cohorts over 20 years (2006-2026).

Table 1: Overall expected cumulative % change in the population 2006-2026 aged 0-19 years within five year age cohorts

Year	Age group				Cumulative % change 0-19 years
	0-4 yrs	5-9 yrs	10-14 yrs	15-19 yrs	
2006	Baseline				
2011	111.54%	102.43%	99.29%	103.16%	104%
2016	116.70%	112.81%	100.98%	101.87%	108%
2021	121.18%	117.86%	110.73%	103.46%	113%
2026	124.16%	122.23%	115.55%	112.81%	119%

Source: Victoria in the Future 2008

The overall population growth is 4-5% in each five year period. This has implications for children's cancer services:

- in 2011 the largest increased service demand would have potentially occurred in the 0-4 year olds in which nearly 40% of all children's cancers occur
- almost half of these children will have a 'liquid tumour', many of whom may require treatment over two to three years
- as the first (2011) 0-4 year old age cohort moves into adolescence, there would be an expected growth in the number of adolescents with cancer.

3.3 Future paediatric cancer demand

Based on the expected population growth, the increase in the overall number of children and adolescents treated in Victoria with cancer over the next 20 years has been estimated using the previously estimated medium and high baselines (see Box 1).

Table 2 identifies the estimated number of **all** children / adolescents aged 0 to 17 years who would be expected to be diagnosed or treated with cancer based on the medium and high baselines. The % increase per five year period has been calculated based on the increases in the numbers of Victorian children by five year age group as outlined in Table 1. The estimated number of interstate children treated in Victoria and children requiring BMT for other conditions has been added to this modelling.

Table 2: Estimated number of all children / adolescents treated in Victoria 2011 to 2026 (0-17 years)

Baseline		2006	2011	2016	2021	2026
Medium	Estimates based on average Victorian incidence for 2006	198	209	216	226	236
	Estimated number of interstate children	14	16	16	17	18
	Est: total of all children with cancer based on average Victorian incidence (medium forecast)	212	225	232	243	254
	Estimated non-cancer BMT (based on 2009/10 figure)	9	9	10	10	10
	Est: total of ALL children treated in Victoria (cancer and non-cancer)	221	234	242	253	264
High	Estimates based on actual 2006-07 incidence	217	228	238	249	259
	Estimated number of interstate children	14	16	16	17	18
	Est: total of all children with cancer based on 2006/07 peak (high forecast)	231	244	254	266	277
	Estimated non-cancer BMT (based on 2009/10 figure)	9	9	10	10	10
	Est: total of ALL children treated in Victoria (cancer and non-cancer)	240	253	264	276	287

Sources: Australian Paediatric Cancer Registry 2010 and Victorian Cancer Registry 2011
RCH Children's Cancer Centre data: Victoria in the Future 2008

Based on known estimated increases in the population and the estimated current levels of service activity for each newly diagnosed child, future service demand has been identified.

Compared with baseline figures, these estimates indicate that for Victoria by 2026, there will be an **additional 42-46 new cases** of paediatric cancer diagnosed and treated per annum in Victoria.

In 2012 there are two paediatric oncology primary treatment centres in Victoria. Based on continuation of this structure, this will result in an additional:

- **323 multi-day separations** per annum
- **2455 bed days** required per annum, based on the current average length of stay of 7.6 days for multi-day separations
- over **1000 same-day separations** or **chemotherapy appointments** per annum
- approximately **2000 medical outpatient appointments** per annum.

In addition, by 2026 and based on approximately 50% of newly diagnosed children / adolescents requiring radiotherapy, it is estimated that paediatric radiation services at Peter Mac will need to support an additional:

- **36-46 children / adolescents** requiring radiotherapy per annum
- **493-667 radiotherapy occasions of service** per annum, based on the estimated 14.5 occasions of service per child / adolescent.

The above estimates are based on the estimated increase in the number of new diagnoses and assume that the **average** number of separations or occasions of service per child will remain relatively unchanged (based on 2009/10 service data). This is unlikely given a range of factors known to increase individual patient treatment activity including:

- increasing complexity of treatment
- changes in the participation and complexity of clinical trials
- a move towards personalised cancer care with the identification of genetic sub-groups within specific cancer diagnoses that will influence management of the individual child / adolescent.

4. Estimating workforce requirements

Table 3 summarises the estimated workforce resources needed to meet the estimated increased service demand for 19 identified workforce disciplines required across the three PICS partner service sites.

These requirements are based on the estimated medium and high baselines for the number of children / adolescents diagnosed at each five year time point (2011 – 2026). For each discipline, the ratio of newly diagnosed children / adolescents per 1 EFT has been calculated and may guide health services in planning their local workforce requirements.

In establishing the workforce estimates, the following key points are emphasised:

- while it is strongly endorsed that **optimal clinical care** must be informed by research-led excellence,¹² the workforce estimates are based on the **minimum workforce requirements** needed to provide **clinical care** within the primary treating centres and at Peter Mac. These estimates do **not** consider research resource requirements.
- the workforce estimates:
 - recognise there are some efficiency gains in larger volume services as well as the need for a **minimum workforce** in smaller services required to respond to patient needs and build service capacity
 - are based on the current service model and recognised scope of practice of key service providers
- the estimates are based on **diagnostic services** only being available at the current two primary treatment services (ie RCH and MC). These estimates do not consider the resource implications of any new primary treating centres being established in the future.

¹² Victorian Comprehensive Cancer Centre. 2012. Research-led excellence. Website information accessed via <http://www.vcccproject.vic.gov.au/>

Table 3: A summary of current and estimated future workforce required to support estimated diagnoses <17 years (2011-2026)

Baseline levels	Actual EFT 2012			2011 Estimates		2016 Estimates		2021 Estimates		2026 Estimates		Recommended ratio of 1 EFT to total number of newly diagnosed children / adolescents
	Total	Health service operational funded EFT ¹	Funded by philanthropy / 'other'	Med	High	Med	High	Med	High	Med	High	
Estimated new cases (cancer + non-cancer BMT)				234	253	242	264	253	276	264	285	
Estimated new cancer cases only per annum				225	244	232	254	243	266	254	277	
Medical workforce												
Paediatric oncologists	9.1	7.53	1.57	13.1	14.1	13.5	14.6	14.1	15.3	14.6	15.7	1 EFT : 18 children
Paediatric medical fellow	5	3	2	5.4	5.8	5.5	6	5.8	6.3	6	6.5	1 EFT : 43 children
Radiation oncologists	1.1	1.1	0	1.25	1.3	1.27	1.33	1.3	1.36	1.33	1.39	1 EFT : 82 children ²
Nursing												
RCH Day Oncology (based on providing standard day oncology services to 75% of all children newly diagnosed children) ³	4.6	4.6	0	5.9	6.4	6.1	6.7	6.4	7	6.7	7.2	1 EFT : 30 children
MC day oncology (based on providing standard day oncology services plus a range of other ambulatory services to 25% of all newly diagnosed children) ³	2.8	2.8	0	3.8	4	4	4.2	4.1	4.3	4.3	4.5	1 EFT : 16 children ³
Nurse coordinator (Children's Cancer Centres)	5.8	2.1	3.7	6.7	7.2	6.9	7.5	7.2	7.8	7.5	8.1	1 EFT : 35 children
Nurse coordinator / consultant (Peter Mac)	1.2	0.6	0.6	1.34	1.43	1.37	1.48	1.43	1.54	1.48	1.59	1 EFT : 76 children ²
Allied health												
Art, music, play therapy (Children's Cancer Centres) ⁴	3.18	0.18	3	4	4.1	4.1	4.2	4.1	4.2	4.2	4.3	1 EFT : 59 children
Music therapy (Peter Mac) ⁴	0.4	0	0.4	0.66	0.67	0.66	0.68	0.67	0.69	0.68	0.7	< 0.7 EFT : 102 children
Clinical research managers and associates	4.5	0	4.5	7.8	8.4	8	8.8	8.4	9.2	8.8	9.5	1 EFT : 30 children
Comfort First educational play therapy	3.3	0	3.3	4.4	4.7	4.6	4.9	4.7	5.1	4.9	5.3	1 EFT : 46 children
Dietitian	1.3	0.8	0.5	3.3	3.6	3.45	3.8	3.6	4	3.8	4.1	1 EFT : 71 children
Mental health clinician	3	0	3	3.5	3.7	3.6	3.8	3.7	3.9	3.8	4	1 EFT : 67 children
Neuro-psychology	1.32	0	1.32	2.8	3	2.9	3	3	3.2	3.1	3.3	1 EFT : 83 children
Occupational therapy	0.3	0.3	0	1.7	1.9	1.8	2	1.9	2	2	2.1	1 EFT : 137 children
Pharmacist	5.8	5.3	0.5	7.3	7.9	7.6	8.3	7.9	8.6	8.3	8.6	1 EFT : 32 children
Physiotherapy	1.65	1.65	0	3	3.2	3	3.5	3.2	3.5	3.4	3.6	1 EFT : 79 children
Radiation therapists	2	2	0	2.1	2.3	2.2	2.4	2.3	2.5	2.4	2.6	1 EFT : 48 children ²
Social work	5.8	3.3	2.5	6.5	7	6.7	7.3	7	7.6	7.3	7.8	1 EFT : 36 children

Notes:

¹ A varying proportion of the current EFT are not funded by hospital operational funding but may be funded through PICS or by philanthropic support

² For Peter Mac disciplines, the ratio of children to 1 EFT is based on 50% of all newly diagnosed children being referred for radiotherapy

³ Given the variation in service context, the estimates for each day oncology service have been calculated individually with the above estimates being based on method 2 (see attachment 2.3). MC Day Oncology Service includes a wide range of ambulatory care services (eg outpatient clinics, GA procedures and managing emergency presentation) not provided at RCH Day Oncology Service. MC haematology services provided in the CCC are not included in these workforce estimates. MC nurse unit manager EFT (currently 0.5 EFT) is additional.

⁴ Art, music and play therapy estimates include hours for group sessions within different settings; the hours required are dependent on the number of children and so there is not a significant increase in resource requirements over time.

5. Factors influencing future workforce demand

- Any **new diagnostic and /or treatment services** developed in the future may have significant benefit for children / adolescents and families; however such services may result in increased or altered Victorian service and workforce requirements as regardless of patient numbers, such services will need a **minimum level of workforce resources and skills**.
- The current workforce numbers include those funded through health services' operational funding and those funded through philanthropic support. Future funding policies need to consider the gap between current requirements and operational funding for core positions, to transition those funded by philanthropy to health services.
- For at least some disciplines, **significant shortfalls in the current workforce** are identified compared to the estimated resources required to meet current demand (regardless of funding source). These shortfalls occurred even with adjustments being made to ensure realistic estimates.

A range of mechanisms or factors may be considered to relieve workforce demand while maintaining quality of care including:

- changes in the future service model or review of scope of practice of Victorian health services delivering paediatric oncology care
- new role developments and role re-design eg nurse practitioner roles
- streamlining of processes and systems including better access to electronic information
- improved access to regional, community or home based health and support services
- increasing cure rates with first line therapy.

The increasing service demand on children's cancer services will have a **flow-on effect** for other **internal and external support services** eg pathology and medical imaging.

This Summary Report and the earlier detailed *Victorian Paediatric Oncology Situational Analysis and Workforce Plan 2012-2026* provides guidance for estimating future service and workforce requirements for these services.

Finally it is essential that service demand and the resulting workforce requirements **are regularly reviewed and adjusted** in line with emerging evidence and other relevant information.