Radiation Oncology in Queensland

Indicators of safe, quality cancer care delivered by public and private services

2009 - 2018

cancer alliance queensland

the Partnership

qccat

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Queensland Government

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Table of Contents

Message from the chair 4
What is the Radiation Oncology in Queensland report? 5
Radiation therapy utilisation rates 5
Why develop the Radiation Oncology in Queensland report? 5
Where has the data come from? 6
Looking to the future 6
Key Findings 7
1| Effective 10
Section 1: Radiation therapy rates 11
1.1 | Patient characteristics 11
1.2 | Radiation therapy rate by cancer site 12
1.3 | Where do people receiving radiation therapy get treated? 14
1.4 | Where do people receiving radiation therapy get treated? 15
1.5 | Radiation therapy rate by Hospital and Health Service (HHS) of residence 16
1.6 | Characteristics of cancer patients receiving radiation therapy by HHS of residence 17
1.7 | Treatment facilities which deliver radiation therapy in Queensland 18
1.8 | Characteristics of cancer patients receiving radiation therapy by facility 19
2| Efficient 21
2.1 | Flows 22
2.2 | Patient flows for radiation therapy by HHS of residence 23
3| Safe 25
3.1 | 30-day mortality for patients receiving curative RT 26
4| Accessible 27
4.1 | Timeliness 28
4.2 | Remoteness 29
5| Equitable 31
5.1 | Over 75 years 32
5.2 | First Nations peoples 33
5.3 | Socioeconomic status 34
6| Spotlight ON – *Service Activity* 36
6.1 | Patterns of radiation therapy retreatment 37
6.2 | Radiation therapy courses per linear accelerator 39
Appendix 40
Appendix A | How are the cohorts identified 41
Appendix B | Linking radiation therapy to a person with cancer 42
Appendix C | LINACs by Radiation therapy services in Queensland 43
Appendix D | Cancer groupings 44
References 46
Glossary 47

Message from the chair

As the Chair of the Radiation Oncology sub-committee of the Queensland Cancer Control Safety and Quality Partnership (The Partnership), I am privileged to introduce the **Radiation Oncology in Queensland, Indicators of safe, quality cancer care delivered by public and private services, 2009-2018 report**. This report provides a population-wide profile for Queenslanders receiving external beam radiation therapy treatment for cancer and provides an important step in understanding radiation therapy utilisation in Queensland.

This report describes the radiation therapy utilisation rate by: cancer type; where patients live; where patients receive their treatment; and public, private and public private partnership (PPP) treatment services. The characteristics of patients who receive radiation therapy treatment are examined to paint the picture of who is receiving radiation therapy as part of their cancer treatment.

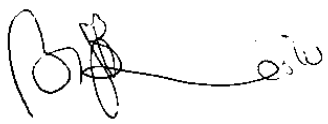
The Queensland radiation therapy utilisation rates have been compared broadly with those proposed in the Review of Optimal Radiotherapy Utilisation Rates by the Collaboration for Cancer Outcomes, Research and Evaluation (CCORE); Ingham Institute, Liverpool Hospital Sydney, Australia in 2013.[4] The CCORE optimal radiotherapy utilisation rate for all cancers is 48%, compared with this report where the Queensland 'real world' radiotherapy utilisation rate is 31% (for persons with cancer diagnosed between 2009 and 2018).

Many factors may contribute to this variation of radiation therapy rates including changes to clinical practice over time, patient suitability, patient preference, access to services and referral by service providers. Further analysis is required to determine if these factors impact on the radiation therapy utilisation rates in Queensland and if patient outcomes such as overall survival are affected.

For the first time, waiting times for selected cancers (where radiation therapy is most likely to be the first treatment), are examined to assess equity of access. Patterns of re-treatment rates and RT courses per linear accelerator have also been introduced to assist with monitoring and evaluation for service planning and delivery.[10]

I encourage you to consider how this information will inform the treatment of cancer patients with radiation therapy in your facility in Queensland. Radiation therapy for cancer patients in Queensland will continue to be monitored with a focus on ensuring the best possible outcomes for our patients.

I wish to acknowledge the commitment of the members of the Radiation Oncology sub-committee and Cancer Alliance Queensland in providing the information, analysis, statistics, discussion and recommendations for this report. Finally, we invite your feedback on the value and benefits of this report. We hope that this information can make a positive contribution to the future of radiation therapy delivery in Queensland.



Professor Bryan Burmeister
Chair, Radiation Oncology Sub-committee
Queensland Cancer Control Safety and Quality Partnership
18.03.2022

What is the Radiation Oncology in Queensland report?

The Radiation Oncology in Queensland report has been developed for public and private cancer services. It is an initiative of the Radiation Oncology Sub-committee, part of the Cancer Alliance Queensland (CAQ) which brings together the Cancer Control Safety and Quality Partnership (The Partnership), Queensland Cancer Control Analysis Team (QCCAT) and the Queensland Cancer Register (QCR) (https://canceralliancegld.health.qld.gov.au).

The report is a population wide profile of Queenslanders receiving external beam radiation therapy treatment for cancer (excluding non-melanoma skin cancer). Preparing this report is an important step in providing ongoing monitoring of Queensland's radiation therapy patterns of care over ten years. The report includes the following quality dimensions, developed by Cancer Alliance Queensland with clinical leadership.[2]

Quality Dimension	Description
1 | Effective	Achieving the best outcomes for Queenslanders with cancer
2 | Efficient	Optimally using resources to achieve desired outcomes
3 | Safe	Avoiding and preventing adverse outcomes or injuries caused by healthcare management
4 | Accessible	Making health services available in the most suitable setting in a reasonable time
5 | Equitable	Providing care and ensuring health status does not vary in quality because of personal characteristics

The Radiation Oncology in Queensland report has been expanded to include reporting for the five quality dimensions above and introduces new analysis for 30 day mortality following **curative** radiation therapy and examines the equity of access and timeliness of radiation therapy (RT) services for Queenslanders, with a focus on patients over 75 years of age, First Nations peoples and socio-economically disadvantaged patients.

New to this report is the introduction of the patterns of retreatment for patients who receive multiple courses of RT and the examination of RT courses per linear accelerator (LINAC) to assist with establishing a baseline in Queensland for service planning and monitoring.

This report explores 10 years of data from 2009-2018, however there may have been changes more recently that are not captured by the time periods reported. Regardless, the report provides an important tool for monitoring current investments in cancer care and changes in clinical practice and may assist cancer clinicians, healthcare providers, researchers, and policymakers to improve patient care, and in some cases may prompt a change in the delivery and organisation of cancer services to improve health outcomes and performance.

Radiation therapy utilisation rates

It is widely reported that cancer treatment with radiation therapy may be under-utilised when compared with modelled optimal utilisation rates of 44-48%. [4,9] Actual 'real-life' radiation therapy rates vary from 26% in USA (2010-2012), and NSW and ACT (2004-2006), 37% in UK (2007), 38% NSW (2011)[13] and 39% in Ontario, Canada (2015 – 2016).[5-8]

The CCORE optimal utilisation rates comparison with Queensland radiation therapy rates have been included in this report as a baseline guide only.[4] The optimal rates are determined by systematic review of international guidelines based on best evidence, however the level of clinical detail required for comparison, such as stage distribution of disease and patient performance status are not available at a population level in Queensland. Care should be taken when making direct comparison to any optimal utilisation rates as many factors may contribute to variation in radiation therapy rates.

Why develop the Radiation Oncology in Queensland report?

Performance indicators linked to clinical outcomes that align with national and international benchmarking is a key service action in the Cancer Care State-wide Health Service Strategy, 2014.[1] The Radiation Oncology in Queensland report has been developed by the Cancer Alliance Queensland, lead clinicians and relevant persons under the auspices of the Queensland Cancer Control Safety and Quality Partnership (The Partnership). Cancer Alliance Queensland

supports a clinician-led, safety and quality program for cancer across Queensland. The Partnership was gazetted as a quality assurance committee under Part 6, Division 1 of the Hospital and Health Boards Act 2011. A key role of the Partnership is to provide cancer clinicians, Hospital and Health Services (HHS), hospitals, treatment facilities and Queensland Health with cancer information and tools to plan and deliver the best patient care.

Where has the data come from?

Since 2004 CAQ have compiled and analysed a vast amount of information about cancer incidence, mortality, treatment and survival. Key to CAQ's program of work is the ability to match and link population-based cancer information on an individual patient basis. This matched and linked data is housed in the Queensland Oncology Repository (QOR), a resource managed by CAQ. This centralised repository compiles and collates data from a range of source systems including the QCR, hospital admissions data, death data, treatment systems, public and private pathology, hospital clinical data systems and QOOL. QOR contains over 50 million records between 1982 and 2018. Our matching and linking processes provide the 730,000+ matched and linked records of cancer patients between 2009 and 2018, which provide the data for this report.

The Radiation Oncology in Queensland report should be interpreted in the context of the previous publications by The Partnership. To access previous publications, go to https://canceralliancegld.health.qld.gov.au/reports-publications.

Looking to the future

The Radiation Oncology in Queensland report provides baseline measurements for the on-going monitoring of the quality of Radiation Oncology care in Queensland. The suite of quality indicators will be expanded as the Radiation Oncology Sub-committee continues to seek feedback on the report from cancer services, Queensland Health, and the community, and as more data becomes available. Further investigation and analysis could focus on radiation therapy service activity patterns for patients receiving multiple treatments, and treatment of non-melanoma skin cancer, two areas of increasing activity and resource.

Key Findings

The incidence of invasive cancer in Qld has increased by 16% between the two cohorts, 2009-2013 (n=122,792) and 2014-2018 (n=141,861), examined in this report. This is due to people living longer and an increase in the Queensland (Qld) population. By the end of 2018, more than 100,000 people were living with a diagnosis of cancer in the previous five years (nearly 4% of all Queenslanders). In 2031, an estimated 44,000 new cases of invasive cancer will be diagnosed among Queenslanders.[3] This growth in cancer cases and people living with cancer is placing unique challenges on the healthcare system, including radiation therapy (RT) services. As a result, the RT utilisation rate remains static when comparing the two five year periods (32% vs 31%), despite an increase in RT services in Qld from 25 to 48 LINACs over the 10 year reporting period.

Further analysis is required to investigate why RT utilisation rates have not improved. Factors that could influence utilisation rates include: patient preferences and suitability, the introduction of targeted therapies which may change the patterns of care for some cancers, technological advances in the types of RT, staffing and workload, radiation oncology referral pathways and the impact of multi-disciplinary team review on the likelihood of receiving RT.[11,12,13,14] Other influences that may impact utilisation rates include retreatment rates, the number of patients being treated for non-melanoma skin cancer and benign conditions, and the treatment of interstate patients. These patients contribute to day-to-day activity for RT services, but are not included in the reported Qld utilisation rate which is linked to Qld notifiable cancers only.

1. Effective – achieving the best outcomes for Queenslanders with cancer

- The RT utilisation rate for Queenslanders diagnosed with invasive cancer between 2009 and 2018 is 31%. This rate can be compared with world-wide modelled optimal utilisation rates between 44-48%.[4,9]
- There are favourable comparisons for high volume Queensland cancers treated with RT, and CCORE Optimal utilisation rates[4], such as breast, brain, gynaecological, head and neck and urological cancers.
- There is equitable access to RT services across Hospital and Health Service (HHS) of residence, with the RT rate ranging from 27% in Mackay HHS to 33% in Torres and Cape HHS and Sunshine Coast HHS.
- Overall access to RT for people living in regional and remote areas is similar to people living in the metropolitan areas.
- Cancers such as brain, head and neck and lung are more likely to be treated in public RT services whereas more common cancers such as breast and prostate are distributed between public, private and PPP treatment facilities. This may indicate the complexity of care for patients is different between the public and private treatment facilities.
- Cancer patients who are reviewed by a multidisciplinary team (MDT) are twice as likely, (49% compared with 24%) to receive RT as part of their cancer treatment. This is likely to be an underestimate of the difference in RT rates as there is known missing data in areas such as the private sector, Townsville HHS and Wide Bay HHS. MDT data included in this report are from 67 multi-disciplinary teams who use QOOL to support data collection and teams who provide MDT data from other source systems to be included in state-wide reporting.

2. Efficient – optimally using resources to achieve desired outcomes

Opening of new RT services has allowed patients to be treated closer to home, where practicable and clinically appropriate. This change in treatment flow has benefited patients living in the Hospital and Health services of Cairns and Hinterland, Central Queensland, Gold Coast, Mackay, West Moreton and Wide Bay.

	2009-2013 Travelled for treatment	2014-2018 Travelled for treatment
Hospital and Health Service	**n (%)**	**n (%)**
Cairns and Hinterland	927 (44%)	385 (17%)
Central Queensland	1436 (93%)	938 (53%)
Gold Coast	1436 (30%)	324 (6%)
Mackay	1219 (97%)	957 (76%)
West Moreton	1938 (97%)	1588 (73%)
Wide Bay	1972 (82%)	749 (27%)

3. Safe – avoiding and preventing adverse outcomes or injuries caused by healthcare management

30 day mortality following **curative** RT for selected cancers is as expected, very low (2%), and ranged between <1% for breast and prostate cancer, up to 7% for lung cancer. Lung cancer may have a higher 30 day mortality rate due to disease morphology (non-small cell vs small cell lung cancer), disease progression or co-morbidities.

4. Accessible – making health service available in the most suitable setting in a reasonable time

(all accessible findings refer to RT where RT treatment was the first treatment received)

- For selected cancers, RT as the first treatment has increased from 32% to 36% for the two cohorts.
- Almost 60% of patients received RT within 45 days of diagnosis in 2014-2018, compared with 54% in 2009-2013.
- Variation in waiting times exist between treating facility types – for private facilities 67% of patients begin treatment within 45 days, compared with 63% for public/private partnership (PPP) facilities and 55% for public facilities.
- Access to RT is similar between regional, rural and remote residents when compared to metropolitan residents (32%). However, patients living in the regional, rural and remote areas were more likely to wait longer than 45 days for first RT treatment compared with metropolitan patients. 52% of regional, rural and remote patients received RT within 45 days compared with 62% for metropolitan patients.

5. Equitable – providing care and ensuring health status does not vary in quality because of person characteristics

(all equitable findings refer to RT, where RT treatment was the first treatment received)

For selected cancers, senior patients aged ≥75 years are less likely to receive RT as their first treatment when compared with those aged <75 years (35% vs 29%), however for those receiving RT as their first treatment, the waiting time for seniors was the same as those aged <75 years.

For First Nations peoples diagnosed with selected cancers, there was no change in the first RT treatment rate (37%). Waiting times have improved with 46% of patients waiting more than 45 days in 2014-2018, compared with 54% in 2009-2013. Care should be taken with this analysis due to small numbers.

Socially disadvantaged patients were just as likely to receive RT for their first treatment when compared with patients categorised as middle or affluent. However, 47% of socially disadvantaged patients waited more than 45 days for RT treatment compared with those patients classified as SES middle and affluent (40% & 29% respectively).

6. Spotlight *ON*

a. Patterns of radiation therapy retreatment

A total of 83,052 patients were treated with 111,247 courses of RT during the study period, 2009-2018. 79% of patients received a single course of RT, with 21% receiving more than one course of treatment. The average number of treatment courses prescribed was 1.34 per patient.

Of the 83,052 patients, at least 71% of the first RT courses were for curative intent, with 16% of those patients receiving multiple courses of RT treatment. For the 27% of patients whose initial course of RT was for palliative intent, 31% received more than one course of RT. 2% of courses had an unknown intent.

b. Courses of radiation therapy per linear accelerator

Over the last five treating years (2017–2021) the average number of RT courses per LINAC per year were:

- All Qld RT facilities: 311 (range 276 – 336 per year)
- Public facilities: 298 (range 279 – 314 per year)
- Private facilities: 303 (range 245 – 342 per year)
- Public/private partnership facilities: 342 (range 318 - 353 per year).

Location of RT services were examined with the average number of RT courses per LINAC per year:

- Metropolitan facilities: 341 (range 291 – 363 per year)
- Metro Other facilities: 283 (range 236 – 319 per year)
- Regional facilities 355: (range 321 – 347 per year)

These new data help describe the yearly LINAC activity of RT services and may help form the Qld baseline for comparison to guidelines for calculating demand of Radiation Oncology services.[10,14]

1| Effective

Achieving the best outcomes for Queenslanders with cancer

Section 1: Radiation therapy rates

1.1 | Patient characteristics

Diagnosis years 2009-2018

1.1.1 | What are the characteristics of Queenslanders receiving radiation therapy for cancer?[1,2,3]

	2009-2013				2014-2018			
	Diagnosis		Radiation therapy		Diagnosis		Radiation therapy	
	N	(Qld %)	n	(RT %)	N	(Qld %)	n	(RT %)
Queensland	**122,792**	**(100%)**	**39,421**	**(32%)**	**141,861**	**(100%)**	**43,631**	**(31%)**
Gender								
Male	69,457	(57%)	20,981	(30%)	79,098	(56%)	22,200	(28%)
Female	53,335	(43%)	18,440	(35%)	62,763	(44%)	21,431	(34%)
Age Group								
0-14	719	(1%)	197	(27%)	735	(1%)	203	(28%)
15-24	1,121	(1%)	232	(21%)	1,167	(1%)	225	(19%)
25-34	3,094	(3%)	645	(21%)	3,517	(2%)	666	(19%)
35-44	6,823	(6%)	2,213	(32%)	7,503	(5%)	2,286	(30%)
45-54	15,927	(13%)	5,954	(37%)	16,708	(12%)	5,934	(36%)
55-64	28,812	(23%)	10,718	(37%)	31,108	(22%)	10,788	(35%)
65-74	33,650	(27%)	12,352	(37%)	42,519	(30%)	14,435	(34%)
75-84	23,393	(19%)	5,947	(25%)	27,589	(19%)	7,495	(27%)
85+	9,253	(8%)	1,163	(13%)	11,015	(8%)	1,599	(15%)
First Nations status								
First Nations peoples	2,039	(2%)	740	(36%)	3,014	(2%)	1,038	(34%)
Other than First Nation peoples	120,753	(98%)	38,681	(32%)	138,847	(98%)	42,593	(31%)
Socioeconomic status								
Affluent	13,914	(11%)	4,437	(32%)	15,851	(11%)	4,660	(29%)
Middle	77,492	(63%)	25,077	(32%)	90,694	(64%)	28,079	(31%)
Disadvantaged	31,378	(26%)	9,904	(32%)	35,304	(25%)	10,891	(31%)
Remoteness								
Metropolitan	78,457	(64%)	25,575	(33%)	90,739	(64%)	28,333	(31%)
Inner regional	28,667	(23%)	8,867	(31%)	32,883	(23%)	9,995	(30%)
Outer regional	13,173	(11%)	4,239	(32%)	15,550	(11%)	4,518	(29%)
Remote & very Remote	2,495	(2%)	740	(30%)	2,689	(2%)	785	(29%)
MDT								
MDT review	25,882	(21%)	13,695	(53%)	38,713	(27%)	19,132	(49%)
No MDT review	96,910	(79%)	25,726	(27%)	103,148	(73%)	24,499	(24%)
Comorbidities								
0-1 Comorbidities	108,162	(88%)	35,664	(33%)	123,245	(87%)	38,156	(31%)
2+ Comorbidities	14,630	(12%)	3,757	(26%)	18,616	(13%)	5,475	(29%)
Facility type								
Private			14,958	(38%)			15,269	(35%)
Public			22,089	(56%)			19,881	(46%)
PPP			2,374	(6%)			8,481	(19%)

[1] Radiation therapy refers to external beam radiation therapy only

[2] MDT rate is limited to hospitals that use QOOL or provide MDT data to CAQ – see glossary

[3] PPP – Public private partnership

1.2 | Radiation therapy rate by cancer site

Diagnosis years 2009-2018

1.2.1 | What are the radiation therapy rates by cancer?[1,2,3,4]

Cancer group	Cancer	2009-2013				2014-2018				CCORE Optimal Rate (%)
		Diagnosis		Radiation therapy		Diagnosis		Radiation therapy		
		N	(Qld %)	n	(RT %)	N	(Qld %)	n	(RT %)	
Breast	Breast	15,013	(12.2%)	9,981	(66%)	17,357	(12.2%)	11,749	(68%)	(87%)
CNS and Brain	CNS and Brain	1,577	(1.3%)	991	(63%)	1,819	(1.3%)	1,155	(63%)	(80%)
Colorectal	Colon	9,747	(7.9%)	920	(9%)	10,672	(7.5%)	820	(8%)	(4%)
	Rectal	4,560	(3.7%)	1,962	(43%)	4,895	(3.5%)	1,961	(40%)	(60%)
Endocrine	Thyroid Gland	2,472	(2.0%)	220	(9%)	3,104	(2.2%)	224	(7%)	(4%)
Gynaecological	Cervix	903	(0.7%)	441	(49%)	999	(0.7%)	495	(50%)	(71%)
	Ovary	1,269	(1.0%)	129	(10%)	1,320	(0.9%)	129	(10%)	(4%)
	Uterus	2,270	(1.8%)	665	(29%)	2,567	(1.8%)	734	(29%)	(38%)
	Vagina	61	(0.0%)	45	(74%)	97	(0.1%)	80	(82%)	(94%)
	Vulva	300	(0.2%)	105	(35%)	370	(0.3%)	152	(41%)	(39%)
Haematological	Hodgkin Lymphoma	557	(0.5%)	239	(43%)	685	(0.5%)	264	(39%)	(85%)
	Leukaemia	3,833	(3.1%)	431	(11%)	4,477	(3.2%)	386	(9%)	(4%)
	Non-Hodgkin Lymphoma	4,439	(3.6%)	1,092	(25%)	5,362	(3.8%)	1,152	(21%)	(45%)
	Plasma cell tumours	1,502	(1.2%)	478	(32%)	2,373	(1.7%)	563	(24%)	(71%)
Head and neck	Hypopharynx	200	(0.2%)	155	(78%)	254	(0.2%)	203	(80%)	(100%)
	Larynx	577	(0.5%)	411	(71%)	604	(0.4%)	455	(75%)	(93%)
	Lip	1,095	(0.9%)	124	(11%)	707	(0.5%)	56	(8%)	(41%)
	Nasal Cavity and Paranasal Sinuses	135	(0.1%)	85	(63%)	199	(0.1%)	137	(69%)	(100%)
	Nasopharynx	91	(0.1%)	74	(81%)	120	(0.1%)	105	(88%)	(100%)
	Oral Cavity	926	(0.8%)	466	(50%)	1,090	(0.8%)	510	(47%)	(69%)
	Oropharynx	1,029	(0.8%)	830	(81%)	1,493	(1.1%)	1,299	(87%)	(81%)
	Pharynx	81	(0.1%)	53	(65%)	39	(0.0%)	30	(77%)	(100%)
	Salivary Glands	216	(0.2%)	138	(64%)	248	(0.2%)	151	(61%)	(100%)
Hepatobiliary	Biliary Tract	32	(0.0%)	3	(9%)	90	(0.1%)	6	(7%)	(0%)
	Gallbladder	287	(0.2%)	21	(7%)	322	(0.2%)	28	(9%)	(17%)
	Liver	1,330	(1.1%)	127	(10%)	1,833	(1.3%)	286	(16%)	(0%)
	Pancreas	2,418	(2.0%)	237	(10%)	3,197	(2.3%)	333	(10%)	(49%)
Lung	NSCLC	8,575	(7.0%)	4,411	(51%)	10,018	(7.1%)	5,287	(53%)	(80%)
	SCLC	1,086	(0.9%)	599	(55%)	1,359	(1.0%)	822	(60%)	(59%)
Male genital organs	Prostate	20,120	(16.4%)	7,328	(36%)	20,891	(14.7%)	7,215	(35%)	(58%)
	Testis	739	(0.6%)	39	(5%)	886	(0.6%)	24	(3%)	(7%)
Melanoma	Melanoma	16,609	(13.5%)	1,950	(12%)	19,757	(13.9%)	1,543	(8%)	(21%)
Mesothelioma	Mesothelioma	732	(0.6%)	203	(28%)	762	(0.5%)	206	(27%)	(0%)
Upper GI	Oesophagus	1,317	(1.1%)	754	(57%)	1,487	(1.0%)	866	(58%)	(71%)
	Small Intestine	675	(0.5%)	66	(10%)	782	(0.6%)	65	(8%)	(0%)
	Stomach	1,959	(1.6%)	440	(22%)	2,319	(1.6%)	578	(25%)	(27%)
Urological	Bladder	2,313	(1.9%)	739	(32%)	2,700	(1.9%)	829	(31%)	(47%)
	Kidney	3,004	(2.4%)	571	(19%)	3,652	(2.6%)	553	(15%)	(15%)
Unknown Primary	Unknown Primary	2,259	(1.8%)	586	(26%)	2,525	(1.8%)	572	(23%)	(61%)
Other	Other invasive cancers	6,484	(5.3%)	1,312	(20%)	8,430	(5.9%)	1,608	(19%)	
All cancers		**122,792**	**(100%)**	**39,421**	**(32%)**	**141,861**	**(100%)**	**43,631**	**(31%)**	**(48%)**

[1] Radiation therapy refers to external beam radiation therapy only

[2] See appendix for cancer descriptions

[3] Barton M, Jacob S, Shafiq J, et al. Review of Optimal Radiotherapy Utilisation Rates. Collaboration for Cancer Outcomes, Research and Evaluation (CCORE); Ingham Institute, Liverpool Hospital Sydney, Australia, 2013.

[4] According to clinical guidelines the role of radiotherapy for the treatment of biliary tract, liver and mesothelioma cancers is not well established, therefore there are no indications for radiotherapy in the optimal CCORE model

1.2.2 | What cancers are included in the 'Other' group?[1,2]

Diagnosis years 2009-2018

Cancer group	Cancer	2009-2013				2014-2018			
		Diagnosis		Radiation therapy		Diagnosis		Radiation therapy	
		N	(Qld %)	n	(RT %)	N	(Qld %)	n	(RT %)
Other	Adrenal gland	56	(0.9%)	17	(30%)	92	(1.1%)	28	(30%)
	Ampulla of vater	142	(2.2%)	15	(11%)	191	(2.3%)	27	(14%)
	Anus, Anal Canal	251	(3.9%)	203	(81%)	367	(4.4%)	299	(81%)
	Bones and articular cartilage	92	(1.4%)	57	(62%)	113	(1.3%)	47	(42%)
	Bones upper and lower limbs	108	(1.7%)	20	(19%)	104	(1.2%)	31	(30%)
	Chronic eosinophilic leukaemia (hypereosinophilic syndrome)	15	(0.2%)	0	(0%)	17	(0.2%)	0	(0%)
	Chronic myeloproliferative disease	240	(3.7%)	10	(4%)	244	(2.9%)	8	(3%)
	Connective tissue	539	(8.3%)	297	(55%)	605	(7.2%)	312	(52%)
	Essential (haemorrhagic) thrombocythaemia	409	(6.3%)	23	(6%)	547	(6.5%)	19	(3%)
	Extrahepatic bile duct	252	(3.9%)	34	(13%)	392	(4.7%)	54	(14%)
	Eye	300	(4.6%)	43	(14%)	420	(5.0%)	47	(11%)
	Kaposi sarcoma	33	(0.5%)	4	(12%)	37	(0.4%)	6	(16%)
	Lymphoid, haematopoietic and related tissue	113	(1.7%)	15	(13%)	134	(1.6%)	19	(14%)
	Malignant immunoproliferative disease	4	(0.1%)	0	(0%)	2	(0.0%)	0	(0%)
	Mediastinum, pleura, heart	49	(0.8%)	14	(29%)	61	(0.7%)	29	(48%)
	Osteomyelofibrosis	157	(2.4%)	17	(11%)	242	(2.9%)	11	(5%)
	Other Haematological	1,264	(19.5%)	72	(6%)	1,514	(18.0%)	84	(6%)
	Other lung	774	(11.9%)	95	(12%)	1,217	(14.4%)	138	(11%)
	Other specified female genital organs	120	(1.9%)	20	(17%)	253	(3.0%)	39	(15%)
	Other specified male genital organs	18	(0.3%)	7	(39%)	38	(0.5%)	7	(18%)
	Parathyroid gland, endocrine gland	74	(1.1%)	25	(34%)	101	(1.2%)	31	(31%)
	Pelvis, thorax	65	(1.0%)	14	(22%)	30	(0.4%)	6	(20%)
	Penis	101	(1.6%)	24	(24%)	113	(1.3%)	27	(24%)
	Peripheral nerves	32	(0.5%)	14	(44%)	49	(0.6%)	23	(47%)
	Peritoneum, retroperitoneum	220	(3.4%)	53	(24%)	221	(2.6%)	41	(19%)
	Placenta	13	(0.2%)	1	(8%)	5	(0.1%)	2	(40%)
	Polycythaemia vera	302	(4.7%)	25	(8%)	491	(5.8%)	18	(4%)
	Renal pelvis	275	(4.2%)	73	(27%)	303	(3.6%)	82	(27%)
	Spleen, Unspecified, ill-defined digestive tract	142	(2.2%)	10	(7%)	134	(1.6%)	9	(7%)
	Thymus	119	(1.8%)	48	(40%)	161	(1.9%)	77	(48%)
	Trachea	0	(0.0%)	0	-	1	(0.0%)	1	(100%)
	Unspecified respiratory tract	2	(0.0%)	0	(0%)	2	(0.0%)	1	(50%)
	Ureter	139	(2.1%)	44	(32%)	168	(2.0%)	64	(38%)
	Urethra	64	(1.0%)	18	(28%)	61	(0.7%)	21	(34%)
Total		**6,484**	**(100%)**	**1,312**	**(20%)**	**8,430**	**(100%)**	**1,608**	**(19%)**

[1] Radiation therapy refers to external beam radiation therapy only

[2] See appendix for cancer descriptions

1.3 | Where do people receiving radiation therapy get treated?

Diagnosis years 2009-2013

1.3.1 | What percentage of Queenslanders with cancer receive radiation therapy in public, private or PPP facilities?[1,2,3]

Cancer group	Cancer	2009-2013									
		Diagnosis		Radiation therapy							
				All		Public facility		Private facility		PPP facility	
		N	(Qld %)	n	(%)	n	(%)	n	(%)	n	(%)
Breast	Breast	15,013	(12.2%)	9,981	(66%)	5,131	(51%)	4,314	(43%)	536	(5%)
CNS and Brain	CNS and Brain	1,577	(1.3%)	991	(63%)	633	(64%)	334	(34%)	24	(2%)
Colorectal	Colon	9,747	(7.9%)	920	(9%)	451	(49%)	370	(40%)	99	(11%)
	Rectal	4,560	(3.7%)	1,962	(43%)	1,099	(56%)	740	(38%)	123	(6%)
Endocrine	Thyroid Gland	2,472	(2.0%)	220	(9%)	122	(55%)	76	(35%)	22	(10%)
Gynaecological	Cervix	903	(0.7%)	441	(49%)	329	(75%)	95	(22%)	17	(4%)
	Ovary	1,269	(1.0%)	129	(10%)	67	(52%)	55	(43%)	7	(5%)
	Uterus	2,270	(1.8%)	665	(29%)	397	(60%)	217	(33%)	51	(8%)
	Vagina	61	(0.0%)	45	(74%)	32	(71%)	12	(27%)	1	(2%)
	Vulva	300	(0.2%)	105	(35%)	76	(72%)	22	(21%)	7	(7%)
Haematological	Hodgkin Lymphoma	557	(0.5%)	239	(43%)	156	(65%)	74	(31%)	9	(4%)
	Leukaemia	3,833	(3.1%)	431	(11%)	271	(63%)	126	(29%)	34	(8%)
	Non-Hodgkin Lymphoma	4,439	(3.6%)	1,092	(25%)	605	(55%)	415	(38%)	72	(7%)
	Plasma cell tumours	1,502	(1.2%)	478	(32%)	256	(54%)	199	(42%)	23	(5%)
Head and neck	Hypopharynx	200	(0.2%)	155	(78%)	140	(90%)	15	(10%)	0	(0%)
	Larynx	577	(0.5%)	411	(71%)	342	(83%)	63	(15%)	6	(1%)
	Lip	1,095	(0.9%)	124	(11%)	72	(58%)	39	(31%)	13	(10%)
	Nasal Cavity and Paranasal Sinuses	135	(0.1%)	85	(63%)	73	(86%)	11	(13%)	1	(1%)
	Nasopharynx	91	(0.1%)	74	(81%)	69	(93%)	5	(7%)	0	(0%)
	Oral Cavity	926	(0.8%)	466	(50%)	381	(82%)	69	(15%)	16	(3%)
	Oropharynx	1,029	(0.8%)	830	(81%)	733	(88%)	89	(11%)	8	(1%)
	Pharynx	81	(0.1%)	53	(65%)	48	(91%)	5	(9%)	0	(0%)
	Salivary Glands	216	(0.2%)	138	(64%)	108	(78%)	28	(20%)	2	(1%)
Hepatobiliary	Biliary Tract	32	(0.0%)	3	(9%)	1	(33%)	2	(67%)	0	(0%)
	Gallbladder	287	(0.2%)	21	(7%)	12	(57%)	8	(38%)	1	(5%)
	Liver	1,330	(1.1%)	127	(10%)	88	(69%)	32	(25%)	7	(6%)
	Pancreas	2,418	(2.0%)	237	(10%)	122	(51%)	103	(43%)	12	(5%)
Lung	NSCLC	8,575	(7.0%)	4,411	(51%)	2,699	(61%)	1,524	(35%)	188	(4%)
	SCLC	1,086	(0.9%)	599	(55%)	404	(67%)	174	(29%)	21	(4%)
Male genital organs	Prostate	20,120	(16.4%)	7,328	(36%)	3,453	(47%)	3,272	(45%)	603	(8%)
	Testis	739	(0.6%)	39	(5%)	17	(44%)	19	(49%)	3	(8%)
Melanoma	Melanoma	16,609	(13.5%)	1,950	(12%)	1,023	(52%)	730	(37%)	197	(10%)
Mesothelioma	Mesothelioma	732	(0.6%)	203	(28%)	90	(44%)	104	(51%)	9	(4%)
Upper GI	Oesophagus	1,317	(1.1%)	754	(57%)	447	(59%)	282	(37%)	25	(3%)
	Small Intestine	675	(0.5%)	66	(10%)	36	(55%)	25	(38%)	5	(8%)
	Stomach	1,959	(1.6%)	440	(22%)	238	(54%)	176	(40%)	26	(6%)
Urological	Bladder	2,313	(1.9%)	739	(32%)	434	(59%)	269	(36%)	36	(5%)
	Kidney	3,004	(2.4%)	571	(19%)	305	(53%)	205	(36%)	61	(11%)
Unknown Primary	Unknown Primary	2,259	(1.8%)	586	(26%)	361	(62%)	198	(34%)	27	(5%)
Other	Other invasive cancers	6,484	(5.3%)	1,312	(20%)	768	(59%)	462	(35%)	82	(6%)
All cancers		**122,792**	**(100%)**	**39,421**	**(32%)**	**22,089**	**(56%)**	**14,958**	**(38%)**	**2,374**	**(6%)**

[1] Radiation therapy refers to external beam radiation therapy only
[2] See appendix for public, private and PPP radiation therapy facilities
[3] PPP – Public private partnership

1.4 | Where do people receiving radiation therapy get treated?

Diagnosis years 2014-2018

1.4.1 | What percentage of Queenslanders with cancer receive radiation therapy in public, private or PPP facilities?[1,2,3]

Cancer group	Cancer	2014-2018									
		Diagnosis		Radiation therapy							
				All		Public facility		Private facility		PPP facility	
		N	(Qld %)	n	(%)	n	(%)	n	(%)	n	(%)
Breast	Breast	17,357	(12.2%)	11,749	(68%)	4,615	(39%)	4,836	(41%)	2,298	(20%)
CNS and Brain	CNS and Brain	1,819	(1.3%)	1,155	(63%)	702	(61%)	268	(23%)	185	(16%)
Colorectal	Colon	10,672	(7.5%)	820	(8%)	335	(41%)	304	(37%)	181	(22%)
	Rectal	4,895	(3.5%)	1,961	(40%)	892	(45%)	731	(37%)	338	(17%)
Endocrine	Thyroid Gland	3,104	(2.2%)	224	(7%)	121	(54%)	68	(30%)	35	(16%)
Gynaecological	Cervix	999	(0.7%)	495	(50%)	288	(58%)	98	(20%)	109	(22%)
	Ovary	1,320	(0.9%)	129	(10%)	63	(49%)	48	(37%)	18	(14%)
	Uterus	2,567	(1.8%)	734	(29%)	406	(55%)	193	(26%)	135	(18%)
	Vagina	97	(0.1%)	80	(82%)	32	(40%)	32	(40%)	16	(20%)
	Vulva	370	(0.3%)	152	(41%)	93	(61%)	39	(26%)	20	(13%)
Haematological	Hodgkin Lymphoma	685	(0.5%)	264	(39%)	140	(53%)	82	(31%)	42	(16%)
	Leukaemia	4,477	(3.2%)	386	(9%)	238	(62%)	102	(26%)	46	(12%)
	Non-Hodgkin Lymphoma	5,362	(3.8%)	1,152	(21%)	524	(45%)	446	(39%)	182	(16%)
	Plasma cell tumours	2,373	(1.7%)	563	(24%)	237	(42%)	249	(44%)	77	(14%)
Head and neck	Hypopharynx	254	(0.2%)	203	(80%)	168	(83%)	11	(5%)	24	(12%)
	Larynx	604	(0.4%)	455	(75%)	297	(65%)	74	(16%)	84	(18%)
	Lip	707	(0.5%)	56	(8%)	26	(46%)	15	(27%)	15	(27%)
	Nasal Cavity and Paranasal Sinuses	199	(0.1%)	137	(69%)	95	(69%)	15	(11%)	27	(20%)
	Nasopharynx	120	(0.1%)	105	(88%)	89	(85%)	5	(5%)	11	(10%)
	Oral Cavity	1,090	(0.8%)	510	(47%)	347	(68%)	60	(12%)	103	(20%)
	Oropharynx	1,493	(1.1%)	1,299	(87%)	1,017	(78%)	94	(7%)	188	(14%)
	Pharynx	39	(0.0%)	30	(77%)	20	(67%)	4	(13%)	6	(20%)
	Salivary Glands	248	(0.2%)	151	(61%)	85	(56%)	33	(22%)	33	(22%)
Hepatobiliary	Biliary Tract	90	(0.1%)	6	(7%)	2	(33%)	1	(17%)	3	(50%)
	Gallbladder	322	(0.2%)	28	(9%)	9	(32%)	13	(46%)	6	(21%)
	Liver	1,833	(1.3%)	286	(16%)	197	(69%)	52	(18%)	37	(13%)
	Pancreas	3,197	(2.3%)	333	(10%)	101	(30%)	157	(47%)	75	(23%)
Lung	NSCLC	10,018	(7.1%)	5,287	(53%)	2,669	(50%)	1,535	(29%)	1,083	(20%)
	SCLC	1,359	(1.0%)	822	(60%)	421	(51%)	201	(24%)	200	(24%)
Male genital organs	Prostate	20,891	(14.7%)	7,215	(35%)	2,469	(34%)	3,110	(43%)	1,636	(23%)
	Testis	886	(0.6%)	24	(3%)	10	(42%)	12	(50%)	2	(8%)
Melanoma	Melanoma	19,757	(13.9%)	1,543	(8%)	678	(44%)	554	(36%)	311	(20%)
Mesothelioma	Mesothelioma	762	(0.5%)	206	(27%)	78	(38%)	96	(47%)	32	(16%)
Upper GI	Oesophagus	1,487	(1.0%)	866	(58%)	433	(50%)	264	(30%)	169	(20%)
	Small Intestine	782	(0.6%)	65	(8%)	27	(42%)	23	(35%)	15	(23%)
	Stomach	2,319	(1.6%)	578	(25%)	238	(41%)	226	(39%)	114	(20%)
Urological	Bladder	2,700	(1.9%)	829	(31%)	337	(41%)	326	(39%)	166	(20%)
	Kidney	3,652	(2.6%)	553	(15%)	286	(52%)	170	(31%)	97	(18%)
Unknown Primary	Unknown Primary	2,525	(1.8%)	572	(23%)	305	(53%)	167	(29%)	100	(17%)
Other	Other invasive cancers	8,430	(5.9%)	1,608	(19%)	791	(49%)	555	(35%)	262	(16%)
All cancers		**141,861**	(100%)	**43,631**	**(31%)**	**19,881**	**(46%)**	**15,269**	**(35%)**	**8,481**	**(19%)**

[1] Radiation therapy refers to external beam radiation therapy only
[2] See appendix for public, private and PPP radiation therapy facilities
[3] PPP – Public private partnership

1.5 | Radiation therapy rate by Hospital and Health Service (HHS) of residence

Diagnosis years 2009-2018

1.5.1 | Where do Queenslanders with cancer access radiation therapy services?[1,2,3]

HHS of residence	2009-2013									
	Diagnosis		Radiation therapy							
			All		Public facility		Private facility		PPP facility	
	N	(Qld %)	n	(%)	n	(%)	n	(%)	n	(%)
Cairns and Hinterland	6,313	(5%)	2,084	(33%)	735	(35%)	186	(9%)	1,163	(56%)
Central Queensland	5,251	(4%)	1,545	(29%)	1,057	(68%)	353	(23%)	135	(9%)
Central West	320	(<1%)	92	(29%)	51	(55%)	38	(41%)	3	(3%)
Darling Downs	8,114	(7%)	2,502	(31%)	392	(16%)	2,105	(84%)	5	(0%)
Gold Coast	15,246	(12%)	4,845	(32%)	1,335	(28%)	3,016	(62%)	494	(10%)
Mackay	4,100	(3%)	1,256	(31%)	1,068	(85%)	171	(14%)	17	(1%)
Metro North	23,976	(20%)	7,625	(32%)	4,597	(60%)	3,009	(39%)	19	(0%)
Metro South	25,368	(21%)	8,562	(34%)	7,241	(85%)	1,291	(15%)	30	(0%)
North West	501	(<1%)	152	(30%)	134	(88%)	13	(9%)	5	(3%)
South West	687	(<1%)	187	(27%)	51	(27%)	136	(73%)	0	(0%)
Sunshine Coast	12,491	(10%)	4,153	(33%)	770	(19%)	3,368	(81%)	15	(0%)
Torres and Cape	370	(<1%)	109	(29%)	54	(50%)	8	(7%)	47	(43%)
Townsville	5,988	(5%)	1,908	(32%)	1,875	(98%)	24	(1%)	9	(0%)
West Moreton	6,053	(5%)	2,003	(33%)	1,293	(65%)	709	(35%)	1	(0%)
Wide Bay	8,014	(7%)	2,398	(30%)	1,436	(60%)	531	(22%)	431	(18%)
Queensland	**122,792**	**(100%)**	**39,421**	**(32%)**	**22,089**	**(56%)**	**14,958**	**(38%)**	**2,374**	**(6%)**

HHS of residence	2014-2018									
	Diagnosis		Radiation therapy							
			All		Public facility		Private facility		PPP facility	
	N	(Qld %)	n	(%)	n	(%)	n	(%)	n	(%)
Cairns and Hinterland	7,927	(6%)	2,311	(29%)	327	(14%)	47	(2%)	1,937	(84%)
Central Queensland	5,933	(4%)	1,759	(30%)	689	(39%)	218	(12%)	852	(48%)
Central West	382	(<1%)	117	(31%)	63	(54%)	40	(34%)	14	(12%)
Darling Downs	8,989	(6%)	2,704	(30%)	370	(14%)	2,305	(85%)	29	(1%)
Gold Coast	18,172	(13%)	5,815	(32%)	244	(4%)	2,361	(41%)	3,210	(55%)
Mackay	4,582	(3%)	1,251	(27%)	838	(67%)	380	(30%)	33	(3%)
Metro North	27,582	(19%)	8,219	(30%)	4,756	(58%)	3,425	(42%)	38	(0%)
Metro South	28,384	(20%)	9,034	(32%)	7,173	(79%)	1,766	(20%)	95	(1%)
North West	493	(<1%)	145	(29%)	123	(85%)	12	(8%)	10	(7%)
South West	746	(<1%)	213	(29%)	57	(27%)	152	(71%)	4	(2%)
Sunshine Coast	14,885	(10%)	4,915	(33%)	1,563	(32%)	3,302	(67%)	50	(1%)
Torres and Cape	435	(<1%)	144	(33%)	33	(23%)	1	(1%)	110	(76%)
Townsville	6,930	(5%)	2,020	(29%)	1,997	(99%)	15	(1%)	8	(0%)
West Moreton	7,189	(5%)	2,167	(30%)	1,102	(51%)	1,051	(49%)	14	(1%)
Wide Bay	9,232	(7%)	2,817	(31%)	546	(19%)	194	(7%)	2,077	(74%)
Queensland	**141,861**	**(100%)**	**43,631**	**(31%)**	**19,881**	**(46%)**	**15,269**	**(35%)**	**8,481**	**(19%)**

[1] Radiation therapy refers to external beam radiation therapy only
[2] See appendix for public, private and PPP radiation therapy facilities
[3] PPP – Public private partnership

1.6 | Characteristics of cancer patients receiving radiation therapy by HHS of residence[1,2]

Diagnosis years 2009-2013 and 2014-2018

2009-2013

HHS of residence	RT patients		Male		Age 75+		Disadvantaged		Rural		First Nations peoples		1+ Comorbidities		Had MDT Review		Median age at diagnosis
	N	(RT %)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Cairns and Hinterland	2,084	(5%)	1,156	(55%)	292	(14%)	579	(28%)	2,084	(100%)	118	(6%)	508	(24%)	878	(42%)	63yrs
Central Queensland	1,545	(4%)	934	(60%)	240	(16%)	505	(33%)	1,545	(100%)	43	(3%)	458	(30%)	461	(30%)	63yrs
Central West	92	(0%)	54	(59%)	18	(20%)	0	(0%)	92	(100%)	4	(4%)	34	(37%)	19	(21%)	65yrs
Darling Downs	2,502	(6%)	1,406	(56%)	483	(19%)	949	(38%)	2,502	(100%)	51	(2%)	708	(28%)	792	(32%)	65yrs
Gold Coast	4,845	(12%)	2,528	(52%)	877	(18%)	183	(4%)	46	(<1%)	28	(<1%)	1,145	(24%)	1,554	(32%)	65yrs
Mackay	1,256	(3%)	692	(55%)	161	(13%)	362	(29%)	1,256	(100%)	43	(3%)	314	(25%)	139	(11%)	62yrs
Metro North	7,625	(19%)	3,899	(51%)	1,518	(20%)	1,273	(17%)	556	(7%)	72	(<1%)	2,200	(29%)	2,835	(37%)	65yrs
Metro South	8,562	(22%)	4,244	(50%)	1,507	(18%)	1,536	(18%)	423	(5%)	110	(1%)	2,267	(26%)	3,290	(38%)	64yrs
North West	152	(0%)	86	(57%)	10	(7%)	21	(14%)	152	(100%)	30	(20%)	45	(30%)	14	(9%)	59yrs
South West	187	(0%)	95	(51%)	24	(13%)	20	(11%)	187	(100%)	16	(9%)	70	(37%)	57	(30%)	64yrs
Sunshine Coast	4,153	(11%)	2,190	(53%)	918	(22%)	536	(13%)	1,232	(30%)	23	(<1%)	1,100	(26%)	1,916	(46%)	66yrs
Torres and Cape	109	(0%)	58	(53%)	8	(7%)	75	(69%)	109	(100%)	51	(47%)	41	(38%)	48	(44%)	60yrs
Townsville	1,908	(5%)	1,138	(60%)	340	(18%)	783	(41%)	501	(26%)	84	(4%)	536	(28%)	125	(7%)	64yrs
West Moreton	2,003	(5%)	1,089	(54%)	282	(14%)	1,059	(53%)	763	(38%)	33	(2%)	593	(30%)	691	(34%)	63yrs
Wide Bay	2,398	(6%)	1,412	(59%)	432	(18%)	2,023	(84%)	2,398	(100%)	34	(1%)	762	(32%)	876	(37%)	66yrs
Queensland	**39,421**	**(100%)**	**20,981**	**(53%)**	**7,110**	**(18%)**	**9,904**	**(25%)**	**13,846**	**(35%)**	**740**	**(2%)**	**10,781**	**(27%)**	**13,695**	**(35%)**	**64yrs**

2014-2018

HHS of residence	RT patients		Male		Age 75+		Disadvantaged		Rural		First Nations peoples		1+ Comorbidities		Had MDT Review		Median age at diagnosis
	N	(RT %)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Cairns and Hinterland	2,311	(5%)	1,319	(57%)	394	(17%)	664	(29%)	2,311	(100%)	156	(7%)	730	(32%)	1,553	(67%)	65yrs
Central Queensland	1,759	(4%)	941	(53%)	312	(18%)	529	(30%)	1,759	(100%)	54	(3%)	633	(36%)	535	(30%)	64yrs
Central West	117	(0%)	67	(57%)	18	(15%)	0	(0%)	117	(100%)	8	(7%)	36	(31%)	42	(36%)	63yrs
Darling Downs	2,704	(6%)	1,448	(54%)	591	(22%)	1,062	(39%)	2,704	(100%)	81	(3%)	1,046	(39%)	1,145	(42%)	67yrs
Gold Coast	5,815	(13%)	2,971	(51%)	1,346	(23%)	208	(4%)	45	(<1%)	65	(1%)	1,711	(29%)	2,646	(46%)	66yrs
Mackay	1,251	(3%)	672	(54%)	185	(15%)	307	(25%)	1,251	(100%)	40	(3%)	403	(32%)	238	(19%)	63yrs
Metro North	8,219	(19%)	3,842	(47%)	1,775	(22%)	1,506	(18%)	558	(7%)	119	(1%)	2,559	(31%)	3,619	(44%)	66yrs
Metro South	9,034	(21%)	4,343	(48%)	1,745	(19%)	1,672	(19%)	489	(5%)	130	(1%)	2,833	(31%)	3,937	(44%)	65yrs
North West	145	(0%)	90	(62%)	15	(10%)	25	(17%)	145	(100%)	38	(26%)	62	(43%)	48	(33%)	61yrs
South West	213	(0%)	108	(51%)	34	(16%)	28	(13%)	213	(100%)	15	(7%)	84	(39%)	96	(45%)	64yrs
Sunshine Coast	4,915	(11%)	2,536	(52%)	1,221	(25%)	546	(11%)	1,521	(31%)	57	(1%)	1,456	(30%)	2,633	(54%)	67yrs
Torres and Cape	144	(0%)	85	(59%)	17	(12%)	107	(74%)	144	(100%)	76	(53%)	58	(40%)	95	(66%)	61yrs
Townsville	2,020	(5%)	1,121	(55%)	382	(19%)	779	(39%)	448	(22%)	101	(5%)	689	(34%)	457	(23%)	65yrs
West Moreton	2,167	(5%)	1,137	(52%)	365	(17%)	1,125	(52%)	776	(36%)	43	(2%)	732	(34%)	1,063	(49%)	65yrs
Wide Bay	2,817	(6%)	1,520	(54%)	694	(25%)	2,333	(83%)	2,817	(100%)	55	(2%)	1,052	(37%)	1,025	(36%)	68yrs
Queensland	**43,631**	**(100%)**	**22,200**	**(51%)**	**9,094**	**(21%)**	**10,891**	**(25%)**	**15,298**	**(35%)**	**1,038**	**(2%)**	**14,084**	**(32%)**	**19,132**	**(44%)**	**66yrs**

[1] Rural includes inner regional, outer regional, remote and very remote

[2] MDT rate is limited to hospitals that use QOOL or provide MDT data to CAQ – see glossary

1.7 | Treatment facilities which deliver radiation therapy in Queensland

Diagnosis years 2009-2018

1.7.1 | Where do Queenslanders with cancer access radiation therapy services?[1,2,3,4,5]

Facility	Radiation therapy			
	2009-2013		2014-2018	
	n	(Qld%)	n	(Qld%)
Public	22,089	(56%)	19,881	(46%)
RBWH	7,331	(19%)	6,196	(14%)
ROPAIR	5,405	(14%)	5,634	(13%)
ROPART	5,657	(14%)	3,998	(9%)
Townsville University Hospital	3,558	(9%)	2,936	(7%)
Sunshine Coast University Hospital	138	(<1%)	1,117	(3%)
Private	14,958	(38%)	15,269	(35%)
Icon Cancer Centre Toowoomba	2,483	(6%)	2,564	(6%)
GenesisCare - Wesley	3,244	(8%)	2,455	(6%)
Icon Cancer Centre Maroochydore	2,201	(6%)	2,278	(5%)
GenesisCare - Chermside	2,058	(5%)	1,950	(4%)
GenesisCare - Southport	1,997	(5%)	1,336	(3%)
GenesisCare - Nambour	1,473	(4%)	962	(2%)
Icon Cancer Centre Springfield	86	(<1%)	729	(2%)
Icon Cancer Centre Greenslopes	157	(<1%)	719	(2%)
GenesisCare - Tugun	1,023	(3%)	678	(2%)
Icon Cancer Centre North Lakes	53	(<1%)	442	(1%)
Icon Cancer Centre Gold Coast Private Hospital	70	(<1%)	395	(<1%)
Icon Cancer Centre Redland	42	(<1%)	325	(<1%)
Icon Cancer Centre Mackay	40	(<1%)	302	(<1%)
GenesisCare - Buderim	31	(<1%)	134	(<1%)
PPP	2,374	(6%)	8,481	(19%)
Icon Cancer Centre Gold Coast University Hospital	535	(1%)	3,364	(8%)
Icon Cancer Centre Cairns (Liz Plummer)	1,237	(3%)	2,070	(5%)
GenesisCare - Rockhampton	120	(<1%)	868	(2%)
Icon Cancer Centre Bundaberg *(closed)*	252	(<1%)	740	(2%)
Icon Cancer Centre Fraser Coast *(closed)*	82	(<1%)	597	(1%)
GenesisCare - Fraser Coast	66	(<1%)	438	(1%)
GenesisCare - Bundaberg	82	(<1%)	404	(<1%)
Queensland	**39,421**	**(100%)**	**43,631**	**(100%)**

[1]Radiation therapy refers to external beam radiation therapy only
[2] Radiation Oncology Princess Alexandra Ipswich Road (ROPAIR)
[3] Radiation Oncology Princess Alexandra Raymond Terrace (ROPART)
[4] Royal Brisbane and Women's Hospital (RBWH)
[5] PPP – Public private partnership

1.8 | Characteristics of cancer patients receiving radiation therapy by facility[1,2,3,4,5,6]

Diagnosis years 2009-2013

Facility	2009-2013																
	Radiation therapy patients		Male		Age 75+		Disadvantaged		Rural		First Nation peoples		1+ Comorbidities		Had MDT Review		Median age at diagnosis
	N	(RT %)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Public	**22,089**	**(56%)**	**11,827**	**(54%)**	**3,680**	**(17%)**	**6,490**	**(29%)**	**6,868**	**(31%)**	**529**	**(2%)**	**6,570**	**(30%)**	**9,819**	**(44%)**	**63 yrs**
RBWH	7,331	(19%)	3,939	(54%)	1,314	(18%)	2,536	(35%)	2,812	(38%)	152	(2%)	2,525	(34%)	4,160	(57%)	64 yrs
ROPAIR	5,405	(14%)	3,368	(62%)	877	(16%)	1,412	(26%)	920	(17%)	86	(2%)	1,692	(31%)	3,403	(63%)	63 yrs
ROPART	5,657	(14%)	2,337	(41%)	880	(16%)	1,197	(21%)	892	(16%)	75	(1%)	1,342	(24%)	1,805	(32%)	63 yrs
Townsville University Hospital	3,558	(9%)	2,086	(59%)	589	(17%)	1,323	(37%)	2,203	(62%)	214	(6%)	979	(28%)	393	(11%)	63 yrs
Sunshine Coast University Hospital	138	(<1%)	97	(70%)	20	(14%)	22	(16%)	41	(30%)	2	(1%)	32	(23%)	58	(42%)	65 yrs
Private	**14,958**	**(38%)**	**7,786**	**(52%)**	**3,084**	**(21%)**	**2,637**	**(18%)**	**5,148**	**(34%)**	**112**	**(<1%)**	**3,663**	**(24%)**	**2,878**	**(19%)**	**66 yrs**
Icon Cancer Centre Toowoomba	2,483	(6%)	1,406	(57%)	511	(21%)	899	(36%)	2,433	(98%)	60	(2%)	696	(28%)	675	(27%)	66 yrs
GenesisCare - Wesley	3,244	(8%)	1,670	(51%)	659	(20%)	576	(18%)	926	(29%)	11	(<1%)	878	(27%)	111	(3%)	65 yrs
Icon Cancer Centre Maroochydore	2,201	(6%)	1,161	(53%)	504	(23%)	311	(14%)	592	(27%)	13	(<1%)	561	(25%)	1,125	(51%)	66 yrs
GenesisCare - Chermside	2,058	(5%)	1,070	(52%)	361	(18%)	296	(14%)	325	(16%)	9	(<1%)	448	(22%)	90	(4%)	65 yrs
GenesisCare - Southport	1,997	(5%)	949	(48%)	352	(18%)	104	(5%)	80	(4%)	7	(<1%)	415	(21%)	322	(16%)	65 yrs
GenesisCare - Nambour	1,473	(4%)	700	(48%)	349	(24%)	325	(22%)	639	(43%)	8	(<1%)	353	(24%)	348	(24%)	66 yrs
Icon Cancer Centre Springfield	86	(<1%)	62	(72%)	14	(16%)	40	(47%)	27	(31%)	0	(0%)	18	(21%)	18	(21%)	64 yrs
Icon Cancer Centre Greenslopes	157	(<1%)	104	(66%)	21	(13%)	26	(17%)	26	(17%)	0	(0%)	27	(17%)	18	(11%)	64 yrs
GenesisCare - Tugun	1,023	(3%)	504	(49%)	268	(26%)	24	(2%)	45	(4%)	2	(<1%)	224	(22%)	149	(15%)	66 yrs
Icon Cancer Centre North Lakes	53	(<1%)	35	(66%)	14	(26%)	16	(30%)	7	(13%)	0	(0%)	11	(21%)	7	(13%)	67 yrs
Icon Cancer Centre Gold Coast Private Hospital	70	(<1%)	43	(61%)	12	(17%)	2	(3%)	2	(3%)	0	(0%)	12	(17%)	3	(4%)	66 yrs
Icon Cancer Centre Redland	42	(<1%)	32	(76%)	9	(21%)	1	(2%)	0	(0%)	0	(0%)	9	(21%)	3	(7%)	66 yrs
Icon Cancer Centre Mackay	40	(<1%)	29	(73%)	6	(15%)	10	(25%)	38	(95%)	2	(5%)	6	(15%)	5	(13%)	65 yrs
GenesisCare - Buderim	31	(<1%)	21	(68%)	4	(13%)	7	(23%)	8	(26%)	0	(0%)	5	(16%)	4	(13%)	66 yrs
PPP	**2,374**	**(6%)**	**1,368**	**(58%)**	**346**	**(15%)**	**777**	**(33%)**	**1,830**	**(77%)**	**99**	**(4%)**	**548**	**(23%)**	**998**	**(42%)**	**64 yrs**
Icon Cancer Centre Gold Coast University	535	(1%)	304	(57%)	82	(15%)	43	(8%)	21	(4%)	5	(<1%)	101	(19%)	249	(47%)	65 yrs
Icon Cancer Centre Cairns (Liz Plummer)	1,237	(3%)	659	(53%)	175	(14%)	327	(26%)	1,223	(99%)	87	(7%)	298	(24%)	619	(50%)	63 yrs
GenesisCare - Rockhampton	120	(<1%)	78	(65%)	10	(8%)	38	(32%)	120	(100%)	1	(<1%)	29	(24%)	19	(16%)	62 yrs
Icon Cancer Centre Bundaberg *(closed)*	252	(<1%)	168	(67%)	56	(22%)	196	(78%)	250	(99%)	4	(2%)	73	(29%)	67	(27%)	68 yrs
Icon Cancer Centre Fraser Coast *(closed)*	82	(<1%)	61	(74%)	6	(7%)	62	(76%)	77	(94%)	2	(2%)	14	(17%)	16	(20%)	68 yrs
GenesisCare - Fraser Coast	66	(<1%)	44	(67%)	9	(14%)	46	(70%)	59	(89%)	0	(0%)	15	(23%)	12	(18%)	66 yrs
GenesisCare - Bundaberg	82	(<1%)	54	(66%)	8	(10%)	65	(79%)	80	(98%)	0	(0%)	18	(22%)	16	(20%)	64 yrs
Queensland	**39,421**	**(100%)**	**20,981**	**(53%)**	**7,110**	**(18%)**	**9,904**	**(25%)**	**13,846**	**(35%)**	**740**	**(2%)**	**10,781**	**(27%)**	**13,695**	**(35%)**	**64 yrs**

[1] Radiation therapy refers to external beam radiation therapy only
[2] Radiation Oncology Princess Alexandra Ipswich Road (ROPAIR)
[3] Radiation Oncology Princess Alexandra Raymond Terrace (ROPART)
[4] Royal Brisbane and Women's Hospital (RBWH)
[5] Rural includes inner regional, outer regional, remote and very remote
[6] MDT rate is limited to hospitals that use QOOL or provide MDT data to CAQ

Diagnosis years 2014-2018

Facility	2014-2018																
	Radiation therapy patients		Male		Age 75+		Disadvantaged		Rural		First Nation peoples		1+ Comorbidities		Had MDT Review		Median age at diagnosis
	N	(RT %)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	
Public	**19,881**	**(46%)**	**10,331**	**(52%)**	**3,510**	**(18%)**	**5,342**	**(27%)**	**5,015**	**(25%)**	**539**	**(3%)**	**6,940**	**(35%)**	**10,952**	**(55%)**	**64 yrs**
RBWH	6,196	(14%)	3,198	(52%)	1,119	(18%)	1,715	(28%)	1,659	(27%)	159	(3%)	2,359	(38%)	4,304	(69%)	64 yrs
ROPAIR	5,634	(13%)	3,364	(60%)	969	(17%)	1,542	(27%)	993	(18%)	109	(2%)	2,134	(38%)	3,661	(65%)	64 yrs
ROPART	3,998	(9%)	1,496	(37%)	670	(17%)	847	(21%)	546	(14%)	73	(2%)	1,091	(27%)	1,503	(38%)	63 yrs
Townsville University Hospital	2,936	(7%)	1,639	(56%)	509	(17%)	1,071	(36%)	1,433	(49%)	185	(6%)	993	(34%)	658	(22%)	64 yrs
Sunshine Coast University Hospital	1,117	(3%)	634	(57%)	243	(22%)	167	(15%)	384	(34%)	13	(1%)	363	(32%)	826	(74%)	66 yrs
Private	**15,269**	**(35%)**	**7,456**	**(49%)**	**3,781**	**(25%)**	**2,657**	**(17%)**	**5,112**	**(33%)**	**185**	**(1%)**	**4,409**	**(29%)**	**3,493**	**(23%)**	**67 yrs**
Icon Cancer Centre Toowoomba	2,564	(6%)	1,387	(54%)	583	(23%)	932	(36%)	2,537	(99%)	81	(3%)	970	(38%)	1,045	(41%)	67 yrs
GenesisCare - Wesley	2,455	(6%)	1,139	(46%)	576	(23%)	334	(14%)	576	(23%)	18	(<1%)	749	(31%)	96	(4%)	66 yrs
Icon Cancer Centre Maroochydore	2,278	(5%)	1,071	(47%)	622	(27%)	234	(10%)	583	(26%)	22	(<1%)	666	(29%)	1,191	(52%)	68 yrs
GenesisCare - Chermside	1,950	(4%)	848	(43%)	504	(26%)	266	(14%)	221	(11%)	11	(<1%)	484	(25%)	90	(5%)	67 yrs
GenesisCare - Southport	1,336	(3%)	672	(50%)	349	(26%)	61	(5%)	49	(4%)	9	(<1%)	318	(24%)	46	(3%)	69 yrs
GenesisCare - Nambour	962	(2%)	429	(45%)	263	(27%)	140	(15%)	410	(43%)	5	(<1%)	234	(24%)	256	(27%)	69 yrs
Icon Cancer Centre Springfield	729	(2%)	330	(45%)	112	(15%)	329	(45%)	198	(27%)	13	(2%)	185	(25%)	290	(40%)	65 yrs
Icon Cancer Centre Greenslopes	719	(2%)	442	(61%)	199	(28%)	82	(11%)	87	(12%)	4	(<1%)	215	(30%)	81	(11%)	69 yrs
GenesisCare - Tugun	678	(2%)	325	(48%)	198	(29%)	11	(2%)	23	(3%)	5	(<1%)	191	(28%)	57	(8%)	67 yrs
Icon Cancer Centre North Lakes	442	(1%)	141	(32%)	90	(20%)	176	(40%)	68	(15%)	6	(1%)	98	(22%)	185	(42%)	67 yrs
Icon Cancer Centre Gold Coast Private Hospital	395	(<1%)	236	(60%)	125	(32%)	16	(4%)	11	(3%)	1	(<1%)	120	(30%)	52	(13%)	69 yrs
Icon Cancer Centre Redland	325	(<1%)	164	(50%)	71	(22%)	23	(7%)	22	(7%)	2	(<1%)	63	(19%)	41	(13%)	68 yrs
Icon Cancer Centre Mackay	302	(<1%)	169	(56%)	60	(20%)	46	(15%)	299	(99%)	8	(3%)	92	(30%)	42	(14%)	64 yrs
GenesisCare - Buderim	134	(<1%)	103	(77%)	29	(22%)	7	(5%)	28	(21%)	0	(0%)	24	(18%)	21	(16%)	68 yrs
PPP	**8,481**	**(19%)**	**4,413**	**(52%)**	**1,803**	**(21%)**	**2,892**	**(34%)**	**5,171**	**(61%)**	**314**	**(4%)**	**2,735**	**(32%)**	**4,687**	**(55%)**	**66 yrs**
Icon Cancer Centre Gold Coast University Hospital	3,364	(8%)	1,706	(51%)	674	(20%)	228	(7%)	105	(3%)	51	(2%)	1,048	(31%)	2,475	(74%)	65 yrs
Icon Cancer Centre Cairns (Liz Plummer)	2,070	(5%)	1,116	(54%)	376	(18%)	629	(30%)	2,054	(99%)	196	(9%)	665	(32%)	1,411	(68%)	65 yrs
GenesisCare - Rockhampton	868	(2%)	457	(53%)	174	(20%)	298	(34%)	863	(99%)	26	(3%)	286	(33%)	168	(19%)	65 yrs
Icon Cancer Centre Bundaberg *(closed)*	740	(2%)	345	(47%)	192	(26%)	583	(79%)	733	(99%)	15	(2%)	270	(36%)	258	(35%)	68 yrs
Icon Cancer Centre Fraser Coast *(closed)*	597	(1%)	313	(52%)	157	(26%)	511	(86%)	595	(100%)	9	(2%)	195	(33%)	179	(30%)	68 yrs
GenesisCare - Fraser Coast	438	(1%)	250	(57%)	109	(25%)	363	(83%)	427	(97%)	10	(2%)	136	(31%)	101	(23%)	69 yrs
GenesisCare - Bundaberg	404	(<1%)	226	(56%)	121	(30%)	280	(69%)	394	(98%)	7	(2%)	135	(33%)	95	(24%)	69 yrs
Queensland	**43,631**	**(100%)**	**22,200**	**(51%)**	**9,094**	**(21%)**	**10,891**	**(25%)**	**15,298**	**(35%)**	**1,038**	**(2%)**	**14,084**	**(32%)**	**19,132**	**(44%)**	**66 yrs**

[1] Radiation therapy refers to external beam radiation therapy only
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[3] Radiation Oncology Princess Alexandra Raymond Terrace (ROPART)
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[5] Rural includes inner regional, outer regional, remote and very remote
[6] MDT rate is limited to hospitals that use QOOL or provide MDT data to CAQ

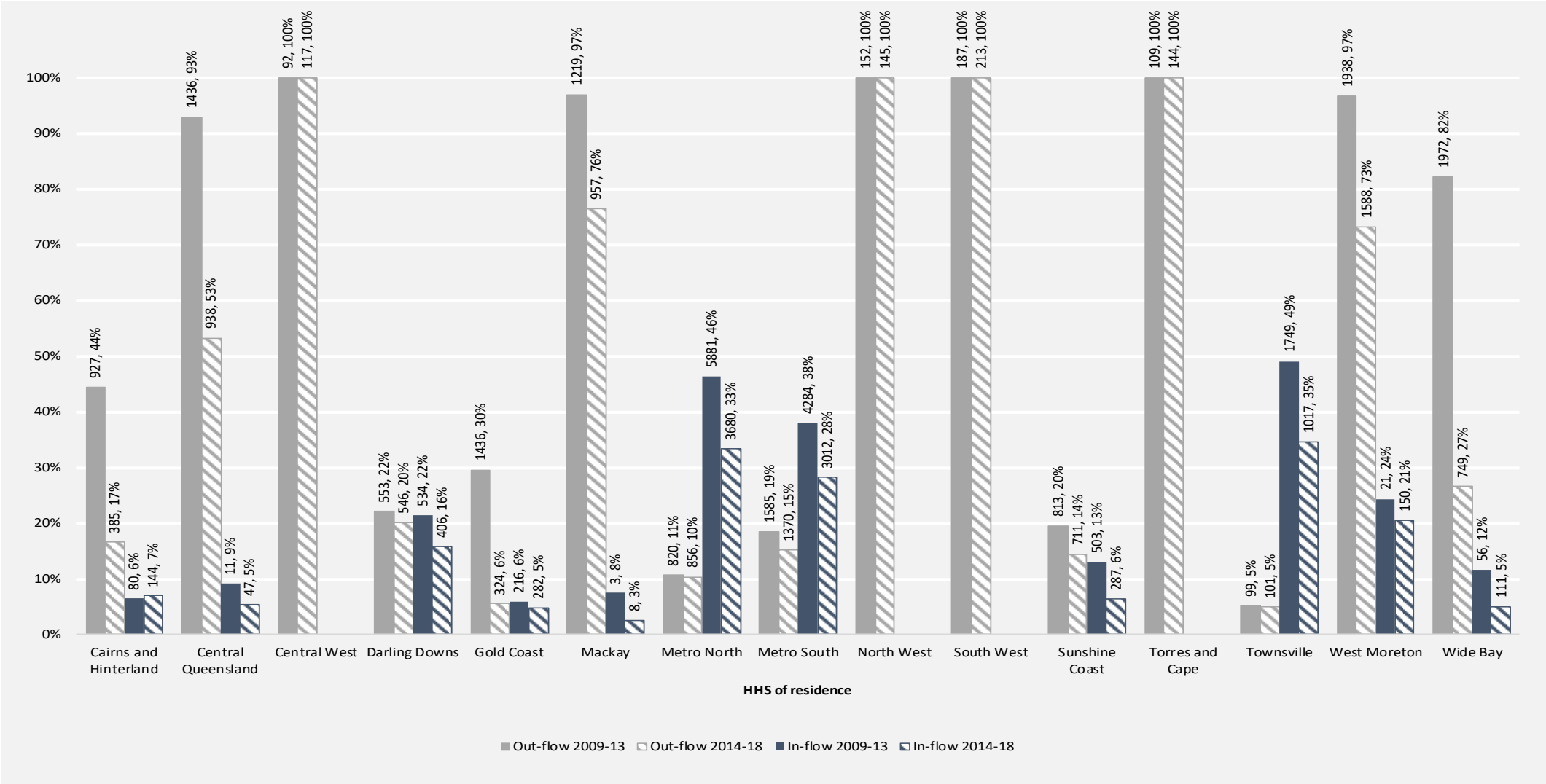
2| Efficient

Optimally using resources to achieve desired outcomes

2.1 | Flows

Diagnosis years 2009-2018

2.1.1 | Summary of patient flows by HHS of residence for 2009-2013 and 2014-2018



2.2 | Patient flows for radiation therapy by HHS of residence

Diagnosis years 2009-2013

	Radiation therapy facility																											
HHS of residence	ICON - Cairns (Liz Plummer)	GC - Rockhampton	ICON - Toowoomba	GC - Southport	GC - Tugun	ICON - Gold Coast Private Hospital	ICON - Gold Coast University Hospital	ICON - Mackay	GC - Chermside	GC - Wesley	ICON - North Lakes	RBWH	ROPAIR	ROPART	ICON - Greenslopes	ICON - Redland	GC - Nambour	ICON - Maroochydore	Sunshine Coast University Hospital	GC - Buderim	Townsville University Hospital	ICON - Springfield	GC - Bundaberg	GC - Fraser Coast	ICON - Bundaberg	ICON - Fraser Coast	**Queensland**
Cairns and Hinterland	1,157 (56%,94%)		4 (<1%,<1%)	6 (<1%,<1%)	9 (<1%,<1%)		1 (<1%,<1%)	1 (<1%,3%)	16 (<1%,<1%)	138 (7%,4%)		47 (2%,<1%)	57 (3%,1%)	35 (2%,<1%)	2 (<1%,1%)		5 (<1%,<1%)	5 (<1%,<1%)			596 (29%,17%)		1 (<1%,1%)		3 (<1%,1%)	1 (<1%,1%)	**2,084 (5%)**
Central Queensland	4 (<1%,<1%)	109 (7%,91%)	32 (2%,1%)	8 (<1%,<1%)	5 (<1%,<1%)		2 (<1%,<1%)		50 (3%,2%)	206 (13%,6%)	1 (<1%,2%)	740 (48%,10%)	91 (6%,2%)	179 (12%,3%)	3 (<1%,2%)		34 (2%,2%)	14 (<1%,<1%)			47 (3%,1%)		1 (<1%,1%)	3 (<1%,5%)	15 (<1%,6%)	1 (<1%,1%)	**1,545 (4%)**
Central West		2 (2%,2%)	21 (23%,<1%)	1 (1%,<1%)	1 (1%,<1%)				3 (3%,<1%)	9 (10%,<1%)		18 (20%,<1%)	5 (5%,<1%)	4 (4%,<1%)			2 (2%,<1%)	1 (1%,<1%)			24 (26%,<1%)				1 (1%,<1%)		**92 (<1%)**
Darling Downs		1 (<1%,<1%)	1,949 (78%,78%)	5 (<1%,<1%)	8 (<1%,<1%)		1 (<1%,<1%)		19 (<1%,<1%)	86 (3%,3%)		128 (5%,2%)	144 (6%,3%)	116 (5%,2%)	7 (<1%,4%)		10 (<1%,<1%)	19 (<1%,<1%)	1 (<1%,<1%)		3 (<1%,<1%)	2 (<1%,2%)		2 (<1%,3%)		1 (<1%,1%)	**2,502 (6%)**
Gold Coast	3 (<1%,<1%)		4 (<1%,<1%)	1,898 (39%,95%)	957 (20%,94%)	65 (1%,93%)	489 (10%,91%)		8 (<1%,<1%)	53 (1%,2%)	2 (<1%,4%)	108 (2%,1%)	570 (12%,11%)	655 (14%,12%)	7 (<1%,4%)		12 (<1%,<1%)	9 (<1%,<1%)	2 (<1%,1%)			1 (<1%,1%)		1 (<1%,2%)		1 (<1%,1%)	**4,845 (12%)**
Mackay	6 (<1%,<1%)	3 (<1%,3%)	7 (<1%,<1%)	5 (<1%,<1%)	5 (<1%,<1%)		2 (<1%,<1%)	37 (3%,93%)	21 (2%,1%)	82 (7%,3%)		97 (8%,1%)	47 (4%,<1%)	39 (3%,<1%)			7 (<1%,<1%)	6 (<1%,<1%)	1 (<1%,<1%)		884 (70%,25%)	1 (<1%,1%)	2 (<1%,2%)	1 (<1%,2%)	2 (<1%,<1%)	1 (<1%,1%)	**1,256 (3%)**
Metro North	8 (<1%,<1%)		11 (<1%,<1%)	5 (<1%,<1%)	6 (<1%,<1%)	1 (<1%,1%)	6 (<1%,1%)		1,779 (23%,86%)	1,024 (13%,32%)	47 (<1%,89%)	3,955 (52%,54%)	302 (4%,6%)	329 (4%,6%)	16 (<1%,10%)	1 (<1%,2%)	62 (<1%,4%)	52 (<1%,2%)	5 (<1%,4%)	4 (<1%,13%)	6 (<1%,<1%)	1 (<1%,1%)	2 (<1%,2%)		1 (<1%,<1%)	2 (<1%,2%)	**7,625 (19%)**
Metro South	1 (<1%,<1%)		8 (<1%,<1%)	49 (<1%,2%)	19 (<1%,2%)	4 (<1%,6%)	26 (<1%,5%)		40 (<1%,2%)	999 (12%,31%)	1 (<1%,2%)	397 (5%,5%)	3,449 (40%,64%)	3,387 (40%,60%)	100 (1%,64%)	41 (<1%,98%)	8 (<1%,<1%)	6 (<1%,<1%)	3 (<1%,2%)		5 (<1%,<1%)	16 (<1%,19%)		1 (<1%,2%)		2 (<1%,2%)	**8,562 (22%)**
North West	4 (3%,<1%)		2 (1%,<1%)				1 (<1%,<1%)		2 (1%,<1%)	8 (5%,<1%)		15 (10%,<1%)	5 (3%,<1%)				1 (<1%,<1%)				114 (75%,3%)						**152 (<1%)**
South West			113 (60%,5%)						2 (1%,<1%)	13 (7%,<1%)		9 (5%,<1%)	25 (13%,<1%)	16 (9%,<1%)	2 (1%,1%)			6 (3%,<1%)			1 (<1%,<1%)						**187 (<1%)**
Sunshine Coast	4 (<1%,<1%)	2 (<1%,2%)	14 (<1%,<1%)	10 (<1%,<1%)	5 (<1%,<1%)		3 (<1%,<1%)	2 (<1%,5%)	45 (1%,2%)	65 (2%,2%)	2 (<1%,4%)	484 (12%,7%)	114 (3%,2%)	44 (1%,<1%)	7 (<1%,4%)		1,166 (28%,79%)	2,026 (49%,92%)	122 (3%,88%)	26 (<1%,84%)	6 (<1%,<1%)			3 (<1%,5%)	1 (<1%,<1%)	2 (<1%,2%)	**4,153 (11%)**
Torres and Cape	45 (41%,4%)	1 (<1%,<1%)	1 (<1%,<1%)							6 (6%,<1%)		3 (3%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)			1 (<1%,<1%)				49 (45%,1%)					1 (<1%,1%)	**109 (<1%)**
Townsville	4 (<1%,<1%)			1 (<1%,<1%)			2 (<1%,<1%)		5 (<1%,<1%)	10 (<1%,<1%)		35 (2%,<1%)	18 (<1%,<1%)	11 (<1%,<1%)	1 (<1%,<1%)		3 (<1%,<1%)	4 (<1%,<1%)	2 (<1%,1%)		1,809 (95%,51%)			2 (<1%,3%)		1 (<1%,1%)	**1,908 (5%)**
West Moreton			269 (13%,11%)	3 (<1%,<1%)	1 (<1%,<1%)				9 (<1%,<1%)	344 (17%,11%)		104 (5%,1%)	436 (22%,8%)	750 (37%,13%)	9 (<1%,6%)		4 (<1%,<1%)	5 (<1%,<1%)	1 (<1%,<1%)		2 (<1%,<1%)	65 (3%,76%)			1 (<1%,<1%)		**2,003 (5%)**
Wide Bay	1 (<1%,<1%)	2 (<1%,2%)	48 (2%,2%)	6 (<1%,<1%)	7 (<1%,<1%)		2 (<1%,<1%)		59 (2%,3%)	201 (8%,6%)		1,191 (50%,16%)	141 (6%,3%)	91 (4%,2%)	3 (<1%,2%)		158 (7%,11%)	48 (2%,2%)	1 (<1%,<1%)	1 (<1%,3%)	12 (<1%,<1%)		76 (3%,93%)	53 (2%,80%)	228 (10%,90%)	69 (3%,84%)	**2,398 (6%)**
Queensland	**1,237** (3%)	**120** (<1%)	**2,483** (6%)	**1,997** (5%)	**1,023** (3%)	**70** (<1%)	**535** (1%)	**40** (<1%)	**2,058** (5%)	**3,244** (8%)	**53** (<1%)	**7,331** (19%)	**5,405** (14%)	**5,657** (14%)	**157** (<1%)	**42** (<1%)	**1,473** (4%)	**2,201** (6%)	**138** (<1%)	**31** (<1%)	**3,558** (9%)	**86** (<1%)	**82** (<1%)	**66** (<1%)	**252** (<1%)	**82** (<1%)	**39,421** (100%)

Row% is used to show the proportion of patients residing in a given HHS who also receive their RT treatment in the same HHS, and what proportion had their RT treatment in another HHS. For example: of the 2,084 patients who reside in Cairns and Hinterland HHS, 1,157 (56%) also had their RT treatment in Cairns and Hinterland HHS. The remaining 927 patients (44%) had RT treatment in other treatment facilities.

Col% is used to show the distribution of residence for the total group of patients who received RT by a single RT facility. For example: of the 1,237 patients who had RT treatment performed at ICON Cairns (Liz Plummer) 1,157 (94%) of patients were also residents of Cairns and Hinterland HHS. The remaining 80 (6%) who received treatment at ICON Cairns (Liz Plummer) reside in 14 other HHS.

Diagnosis years 2014-2018

HHS of residence	Radiation therapy facility																										
	ICON - Cairns (Liz Plummer)	GC - Rockhampton	ICON - Toowoomba	GC - Southport	GC - Tugun	ICON - Gold Coast Private Hospital	ICON - Gold Coast University Hospital	ICON - Mackay	GC - Chermside	GC - Wesley	ICON - North Lakes	RBWH	ROPAIR	ROPART	ICON - Greenslopes	ICON - Redland	GC - Nambour	ICON - Maroochydore	Sunshine Coast University Hospital	GC - Buderim	Townsville University Hospital	ICON - Springfield	GC - Bundaberg	GC - Fraser Coast	ICON - Bundaberg	ICON - Fraser Coast	**Queensland**
Cairns and Hinterland	1,926 (83%,93%)	3 (<1%,<1%)	2 (<1%,<1%)	3 (<1%,<1%)	3 (<1%,<1%)		7 (<1%,<1%)	1 (<1%,<1%)	2 (<1%,<1%)	28 (1%,1%)		52 (2%,<1%)	106 (5%,2%)	18 (<1%,<1%)	2 (<1%,<1%)		2 (<1%,<1%)	4 (<1%,<1%)	4 (<1%,<1%)		147 (6%,5%)				1 (<1%,<1%)		**2,311 (5%)**
Central Queensland	2 (<1%,<1%)	821 (47%,95%)	12 (<1%,<1%)	6 (<1%,<1%)	4 (<1%,<1%)		4 (<1%,<1%)		32 (2%,2%)	142 (8%,6%)	2 (<1%,<1%)	498 (28%,8%)	67 (4%,1%)	97 (6%,2%)	7 (<1%,<1%)		6 (<1%,<1%)	7 (<1%,<1%)	3 (<1%,<1%)		24 (1%,<1%)		6 (<1%,1%)	1 (<1%,<1%)	16 (<1%,2%)	2 (<1%,<1%)	**1,759 (4%)**
Central West		13 (11%,1%)	21 (18%,<1%)	1 (<1%,<1%)				2 (2%,<1%)	1 (<1%,<1%)	11 (9%,<1%)		26 (22%,<1%)	8 (7%,<1%)	4 (3%,<1%)	2 (2%,<1%)			2 (2%,<1%)			25 (21%,<1%)			1 (<1%,<1%)			**117 (<1%)**
Darling Downs	1 (<1%,<1%)	1 (<1%,<1%)	2,158 (80%,84%)	2 (<1%,<1%)	4 (<1%,<1%)	1 (<1%,<1%)	10 (<1%,<1%)		12 (<1%,<1%)	81 (3%,3%)	1 (<1%,<1%)	99 (4%,2%)	174 (6%,3%)	86 (3%,2%)	19 (<1%,3%)		6 (<1%,<1%)	15 (<1%,<1%)	11 (<1%,<1%)			6 (<1%,<1%)	5 (<1%,1%)	3 (<1%,<1%)	5 (<1%,<1%)	4 (<1%,<1%)	**2,704 (6%)**
Gold Coast	2 (<1%,<1%)		7 (<1%,<1%)	1,270 (22%,95%)	642 (11%,95%)	376 (6%,95%)	3,203 (55%,95%)	1 (<1%,<1%)	5 (<1%,<1%)	34 (<1%,1%)	2 (<1%,<1%)	68 (1%,1%)	104 (2%,2%)	64 (1%,2%)	16 (<1%,2%)	3 (<1%,<1%)	1 (<1%,<1%)	2 (<1%,<1%)	4 (<1%,<1%)	1 (<1%,<1%)	4 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	4 (<1%,<1%)			**5,815 (13%)**
Mackay	4 (<1%,<1%)	15 (1%,2%)	5 (<1%,<1%)	1 (<1%,<1%)	5 (<1%,<1%)	1 (<1%,<1%)	10 (<1%,<1%)	294 (24%,97%)	8 (<1%,<1%)	44 (4%,2%)		76 (6%,1%)	57 (5%,1%)	22 (2%,<1%)	8 (<1%,1%)		4 (<1%,<1%)	6 (<1%,<1%)	8 (<1%,<1%)	1 (<1%,<1%)	675 (54%,23%)	3 (<1%,<1%)		2 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	**1,251 (3%)**
Metro North	5 (<1%,<1%)	5 (<1%,<1%)	12 (<1%,<1%)	5 (<1%,<1%)	4 (<1%,<1%)	2 (<1%,<1%)	15 (<1%,<1%)	1 (<1%,<1%)	1,800 (22%,92%)	1,018 (12%,41%)	428 (5%,97%)	4,117 (50%,66%)	322 (4%,6%)	286 (3%,7%)	55 (<1%,8%)	1 (<1%,<1%)	44 (<1%,5%)	40 (<1%,2%)	25 (<1%,2%)	9 (<1%,7%)	6 (<1%,<1%)	6 (<1%,<1%)	4 (<1%,<1%)	4 (<1%,<1%)	4 (<1%,<1%)	1 (<1%,<1%)	**8,219 (19%)**
Metro South	1 (<1%,<1%)		7 (<1%,<1%)	32 (<1%,2%)	11 (<1%,2%)	12 (<1%,3%)	91 (1%,3%)		22 (<1%,1%)	671 (7%,27%)	2 (<1%,<1%)	361 (4%,6%)	4,005 (44%,71%)	2,793 (31%,70%)	546 (6%,76%)	320 (4%,98%)	2 (<1%,<1%)	8 (<1%,<1%)	8 (<1%,<1%)	1 (<1%,<1%)	6 (<1%,<1%)	132 (1%,18%)		2 (<1%,<1%)	1 (<1%,<1%)		**9,034 (21%)**
North West	8 (6%,<1%)		1 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	5 (3%,<1%)		5 (3%,<1%)	5 (3%,<1%)	3 (2%,<1%)			1 (<1%,<1%)		1 (<1%,<1%)		109 (75%,4%)				1 (<1%,<1%)		**145 (<1%)**
South West	1 (<1%,<1%)	1 (<1%,<1%)	130 (61%,5%)	3 (1%,<1%)					2 (<1%,<1%)	13 (6%,<1%)		12 (6%,<1%)	28 (13%,<1%)	14 (7%,<1%)	1 (<1%,<1%)			2 (<1%,<1%)	1 (<1%,<1%)		2 (<1%,<1%)	1 (<1%,<1%)		1 (<1%,<1%)	1 (<1%,<1%)		**213 (<1%)**
Sunshine Coast	3 (<1%,<1%)	3 (<1%,<1%)	7 (<1%,<1%)	5 (<1%,<1%)	2 (<1%,<1%)		10 (<1%,<1%)		46 (<1%,2%)	57 (1%,2%)	3 (<1%,<1%)	355 (7%,6%)	127 (3%,2%)	40 (<1%,1%)	16 (<1%,2%)		872 (18%,91%)	2,173 (44%,95%)	1,039 (21%,93%)	120 (2%,90%)	2 (<1%,<1%)	1 (<1%,<1%)	8 (<1%,2%)	9 (<1%,2%)	6 (<1%,<1%)	11 (<1%,2%)	**4,915 (11%)**
Torres and Cape	109 (76%,5%)									1 (<1%,<1%)		7 (5%,<1%)	8 (6%,<1%)	4 (3%,<1%)					1 (<1%,<1%)		13 (9%,<1%)					1 (<1%,<1%)	**144 (<1%)**
Townsville	6 (<1%,<1%)			1 (<1%,<1%)		1 (<1%,<1%)	2 (<1%,<1%)	1 (<1%,<1%)	2 (<1%,<1%)	6 (<1%,<1%)		24 (1%,<1%)	37 (2%,<1%)	16 (<1%,<1%)	1 (<1%,<1%)		2 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)		1,919 (95%,65%)						**2,020 (5%)**
West Moreton	1 (<1%,<1%)		194 (9%,8%)	3 (<1%,<1%)	1 (<1%,<1%)		9 (<1%,<1%)		1 (<1%,<1%)	228 (11%,9%)	2 (<1%,<1%)	86 (4%,1%)	496 (23%,9%)	518 (24%,13%)	37 (2%,5%)	1 (<1%,<1%)	2 (<1%,<1%)	3 (<1%,<1%)	1 (<1%,<1%)		1 (<1%,<1%)	579 (27%,79%)		1 (<1%,<1%)	3 (<1%,<1%)		**2,167 (5%)**
Wide Bay	1 (<1%,<1%)	6 (<1%,<1%)	8 (<1%,<1%)	3 (<1%,<1%)	1 (<1%,<1%)	1 (<1%,<1%)	2 (<1%,<1%)	1 (<1%,<1%)	16 (<1%,<1%)	116 (4%,5%)	2 (<1%,<1%)	410 (15%,7%)	90 (3%,2%)	33 (1%,<1%)	9 (<1%,1%)		20 (<1%,2%)	15 (<1%,<1%)	10 (<1%,<1%)	2 (<1%,1%)	3 (<1%,<1%)		380 (13%,94%)	410 (15%,94%)	701 (25%,95%)	577 (20%,97%)	**2,817 (6%)**
Queensland	**2,070 (5%)**	**868 (2%)**	**2,564 (6%)**	**1,336 (3%)**	**678 (2%)**	**395 (<1%)**	**3,364 (8%)**	**302 (<1%)**	**1,950 (4%)**	**2,455 (6%)**	**442 (1%)**	**6,196 (14%)**	**5,634 (13%)**	**3,998 (9%)**	**719 (2%)**	**325 (<1%)**	**962 (2%)**	**2,278 (5%)**	**1,117 (3%)**	**134 (<1%)**	**2,936 (7%)**	**729 (2%)**	**404 (<1%)**	**438 (1%)**	**740 (2%)**	**597 (1%)**	**43,631 (100%)**

Row% is used to show the proportion of patients residing in a Row% is used to show the proportion of patients residing in a given HHS who also receive their RT treatment in the same HHS, and what proportion had their RT treatment in another HHS. For example: of the 2,311 patients who reside in Cairns and Hinterland HHS, 1,926 (83%) also had their RT treatment in Cairns and Hinterland HHS. The remaining 385 patients (17%) had RT treatment in other treatment facilities.

Col% is used to show the distribution of residence for the total group of patients who received RT by a single RT facility. For example: of the 2,074 patients who had RT treatment performed at ICON Cairns (Liz Plummer) 1,926 (93%) of patients were also residents of Cairns and Hinterland HHS. The remaining 144 (7%) who received treatment at ICON Cairns (Liz Plummer) reside in 14 other HHS.

3| Safe

Avoiding and preventing adverse outcomes or injuries caused by healthcare management

3.1 | 30-day mortality for patients receiving curative RT

Diagnosis years 2009-2018

3.1.1 | What percentage of Queenslanders with selected cancers die within 30 days of ***curative*** intent radiation therapy?[1,2]

Cancer group	2009-2013			2014-2018		
	Curative RT	30 day mortality		Curative RT	30 day mortality	
	N	n	%	N	n	%
Breast	9,138	121	(1%)	10,976	80	(<1%)
CNS and Brain	894	41	(5%)	976	33	(3%)
Colorectal	1,849	68	(4%)	1,879	53	(3%)
Gynaecological	1,044	44	(4%)	1,238	30	(2%)
Haematological	1,213	47	(4%)	1,348	34	(3%)
Head and neck	2,083	95	(5%)	2,669	73	(3%)
Lung	1,725	181	(10%)	2,441	179	(7%)
Male genital organs (including Prostate cancer)	5,982	114	(2%)	5,859	39	(<1%)
Melanoma	986	31	(3%)	744	27	(4%)
Upper GI	624	43	(7%)	741	41	(6%)
Urological	551	37	(7%)	607	26	(4%)
Reported cancers	**26,089**	**822**	**(3%)**	**29,478**	**615**	**(2%)**

[1] Curative intent - see glossary

[2] Proportion of patients who have died within 30 days following curative RT

4| Accessible

Making health services available in the most suitable setting in a reasonable time

4.1 | Timeliness

Diagnosis years 2009-2013

4.1.1 | How long are Queenslanders waiting for treatment, where radiation therapy is the first treatment for selected cancers?[1,2,3]

Cancer	First RT treatment by diagnosis		Time to first RT within 45 days of diagnosis							
			All		Public facility		Private facility		PPP facility	
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
CNS and Brain	278/1577	(18%)	197/278	(71%)	113/174	(65%)	79/98	(81%)	5/6	(83%)
Cervix	343/903	(38%)	124/343	(36%)	87/261	(33%)	36/71	(51%)	1/11	(9%)
Lung	3266/9661	(34%)	1968/3266	(60%)	1200/2143	(56%)	727/1012	(72%)	41/111	(37%)
Oesophagus	580/1317	(44%)	320/580	(55%)	162/352	(46%)	152/207	(73%)	6/21	(29%)
Oropharynx	554/1029	(54%)	177/554	(32%)	157/511	(31%)	18/40	(45%)	2/3	(67%)
Rectal	1099/4560	(24%)	537/1099	(49%)	226/642	(35%)	292/397	(74%)	19/60	(32%)
Reported cancers	**6120/19047**	**(32%)**	**3323/6120**	**(54%)**	**1945/4083**	**(48%)**	**1304/1825**	**(71%)**	**74/212**	**(35%)**

[1] Number of cases receiving RT as first treatment/number of diagnoses
[2] Number of cases receiving RT within 45 days of diagnosis/total cases receiving RT as first treatment
[3] PPP – Public private partnership

Diagnosis years 2014-2018

Cancer	First RT treatment by diagnosis		Time to first RT within 45 days of diagnosis							
			All		Public facility		Private facility		PPP facility	
	n/N	%	n/N	%	n/N	%	n/N	%	n/N	%
CNS and Brain	333/1819	(18%)	231/333	(69%)	133/193	(69%)	71/94	(76%)	27/46	(59%)
Cervix	374/999	(37%)	151/374	(40%)	68/217	(31%)	40/76	(53%)	43/81	(53%)
Lung	3884/11377	(34%)	2366/3884	(61%)	1193/2084	(57%)	676/997	(68%)	497/803	(62%)
Oesophagus	706/1487	(47%)	459/706	(65%)	223/372	(60%)	145/201	(72%)	91/133	(68%)
Oropharynx	874/1493	(59%)	446/874	(51%)	331/691	(48%)	21/55	(38%)	94/128	(73%)
Rectal	1134/4895	(23%)	638/1134	(56%)	241/517	(47%)	293/423	(69%)	104/194	(54%)
Reported cancers	**6171/17175**	**(36%)**	**3653/6171**	**(59%)**	**1948/3557**	**(55%)**	**953/1423**	**(67%)**	**752/1191**	**(63%)**

[1] Number of cases receiving RT as first treatment/number of diagnoses
[2] Number of cases receiving RT within 45 days of diagnosis/total cases receiving RT as first treatment
[3] PPP – Public private partnership

4.2 | Remoteness

Diagnosis years 2009-2013

4.2.1 | Is there a difference in access to treatment, where radiation therapy is the first cancer treatment, for Queenslanders living in regional, rural and remote areas?[1,2]

Cancer	2009-2013					
	Rural & remote		Regional		Metropolitan	
	n/N	%	n/N	%	n/N	%
CNS and Brain	46/186	(25%)	55/370	(15%)	177/1021	(17%)
Cervix	49/127	(39%)	75/182	(41%)	219/594	(37%)
Lung	410/1336	(31%)	726/2299	(32%)	2130/6026	(35%)
Oesophagus	86/180	(48%)	141/322	(44%)	353/815	(43%)
Oropharynx	92/168	(55%)	118/246	(48%)	344/615	(56%)
Rectal	202/696	(29%)	289/1083	(27%)	608/2781	(22%)
Reported cancers	**885/2693**	**(33%)**	**1404/4502**	**(31%)**	**3831/11852**	**(32%)**

[1] Number of cases where RT is first treatment/number of diagnoses
[2] PPP – Public private partnership

Diagnosis years 2014-2018

Cancer	2014-2018					
	Rural & remote		Regional		Metropolitan	
	n/N	%	n/N	%	n/N	%
CNS and Brain	46/207	(22%)	61/389	(16%)	226/1223	(18%)
Cervix	63/143	(44%)	86/208	(41%)	225/648	(35%)
Lung	471/1597	(29%)	877/2726	(32%)	2536/7054	(36%)
Oesophagus	83/215	(39%)	162/347	(47%)	461/925	(50%)
Oropharynx	154/250	(62%)	195/344	(57%)	525/899	(58%)
Rectal	165/681	(24%)	259/1194	(22%)	710/3020	(24%)
Reported cancers	**982/3093**	**(32%)**	**1640/5208**	**(31%)**	**4683/13769**	**(34%)**

[1] Number of cases where RT is first treatment/number of diagnoses
[2] PPP – Public private partnership

4.2.2 | Is there a difference in time to treatment, where radiation therapy is the first cancer treatment, for Queenslanders living in regional, rural and remote areas?[1,2]

Diagnosis years 2009-2013

Cancer	Time to first RT within 45 days of diagnosis					
	Rural & remote		Regional		Metropolitan	
	n/N	%	n/N	%	n/N	%
CNS and Brain	36/46	(78%)	45/55	(82%)	116/177	(66%)
Cervix	16/49	(33%)	28/75	(37%)	80/219	(37%)
Lung	248/410	(60%)	469/726	(65%)	1251/2130	(59%)
Oesophagus	43/86	(50%)	79/141	(56%)	198/353	(56%)
Oropharynx	28/92	(30%)	33/118	(28%)	116/344	(34%)
Rectal	88/202	(44%)	139/289	(48%)	310/608	(51%)
Reported cancers	**459/885**	**(52%)**	**793/1404**	**(56%)**	**2071/3831**	**(54%)**

[1] Number of cases receiving radiation therapy within 45 days of diagnosis/total cases receiving RT as first treatment
[2] PPP – Public private partnership

Diagnosis years 2014-2018

Cancer	Time to first RT within 45 days of diagnosis					
	Rural & remote		Regional		Metropolitan	
	n/N	%	n/N	%	n/N	%
CNS and Brain	24/46	(52%)	42/61	(69%)	165/226	(73%)
Cervix	22/63	(35%)	32/86	(37%)	97/225	(43%)
Lung	284/471	(60%)	503/877	(57%)	1579/2536	(62%)
Oesophagus	41/83	(49%)	96/162	(59%)	322/461	(70%)
Oropharynx	56/154	(36%)	74/195	(38%)	316/525	(60%)
Rectal	72/165	(44%)	133/259	(51%)	433/710	(61%)
Reported cancers	**499/982**	**(51%)**	**880/1640**	**(54%)**	**2912/4683**	**(62%)**

[1] Number of cases receiving radiation therapy within 45 days of diagnosis/total cases receiving RT as first treatment
[2] PPP – Public private partnership

5| Equitable

Providing care and ensuring health status does not vary in quality because of personal characteristics

5.1 | Over 75 years

Diagnosis years 2009-2018

5.1.1 | Is there a difference in access to treatment, where radiation therapy is the first cancer treatment for senior Queenslanders?[1]

Cancer	2009-2013				2014-2018			
	<75		≥75		<75		≥75	
	n/N	%	n/N	%	n/N	%	n/N	%
CNS and Brain	266/1,318	(20%)	12/259	(5%)	310/1,479	(21%)	23/340	(7%)
Cervix	300/827	(36%)	43/76	(57%)	339/933	(36%)	35/66	(53%)
Lung	2,324/6,441	(36%)	942/3,220	(29%)	2,705/7,651	(35%)	1,179/3,726	(32%)
Oesophagus	378/875	(43%)	202/442	(46%)	444/971	(46%)	262/516	(51%)
Oropharynx	523/946	(55%)	31/83	(37%)	812/1,347	(60%)	62/146	(42%)
Rectal	922/3,338	(28%)	177/1,222	(14%)	946/3,585	(26%)	188/1,310	(14%)
Reported cancers	**4,713/13,745**	**(34%)**	**1,407/5,302**	**(27%)**	**5,556/15,966**	**(35%)**	**1,749/6,104**	**(29%)**

[1] Number of cases where RT is first treatment/number of diagnoses

5.1.2 | Is there a difference in time to treatment, where radiation therapy is the first cancer treatment, for senior Queenslanders?[1]

Cancer	2009-2013 Time to first RT within 45 days of diagnosis				2014-2018 Time to first RT within 45 days of diagnosis			
	<75		≥75		<75		≥75	
	n/N	%	n/N	%	n/N	%	n/N	%
CNS and Brain	188/266	(71%)	9/12	(75%)	217/310	(70%)	14/23	(61%)
Cervix	103/300	(34%)	21/43	(49%)	136/339	(40%)	15/35	(43%)
Lung	1,413/2,324	(61%)	555/942	(59%)	1,678/2,705	(62%)	688/1,179	(58%)
Oesophagus	197/378	(52%)	123/202	(61%)	282/444	(64%)	177/262	(68%)
Oropharynx	160/523	(31%)	17/31	(55%)	413/812	(51%)	33/62	(53%)
Rectal	468/922	(51%)	69/177	(39%)	537/946	(57%)	101/188	(54%)
Reported cancers	**2,529/4,713**	**(54%)**	**794/1,407**	**(56%)**	**3,263/5,556**	**(59%)**	**1,028/1,749**	**(59%)**

[1] Number of cases receiving RT within 45 days of diagnosis/ total cases receiving RT as first treatment

5.2 | First Nations peoples

Diagnosis years 2009-2018

5.2.1 | Is there a difference in access to treatment, where radiation therapy is the first cancer treatment for First Nations peoples? [1,2,3]

Cancer	2009-2013		2014-2018	
	First Nations peoples	Non First Nations peoples	First Nations peoples	Non First Nations peoples
CNS and Brain	(22%)	(18%)	(25%)	(18%)
Cervix	(49%)	(37%)	(44%)	(37%)
Lung	(35%)	(34%)	(35%)	(34%)
Oesophagus	(54%)	(44%)	(51%)	(47%)
Oropharynx	(56%)	(54%)	(52%)	(59%)
Rectal	(27%)	(24%)	(28%)	(23%)
Reported cancers	**(37%)**	**(32%)**	**(37%)**	**(33%)**

[1] Number of cases where RT is first treatment/number of diagnoses

[2] First Nations peoples – see glossary

[3] Care should be taken when interpreting these results. Patient counts have been suppressed due to small numbers to protect confidentiality

5.2.2 | Is there a difference in time to treatment, where radiation therapy is the first cancer treatment, for First Nations peoples?[1,2,3]

Cancer	2009-2013 Time to first RT within 45 days of diagnosis		2014-2018 Time to first RT within 45 days of diagnosis	
	First Nations peoples	Non First Nations peoples	First Nations peoples	Non First Nations peoples
CNS and Brain	(67%)	(71%)	(56%)	(70%)
Cervix	(33%)	(36%)	(48%)	(40%)
Lung	(48%)	(61%)	(60%)	(61%)
Oesophagus	(62%)	(55%)	(53%)	(66%)
Oropharynx	(47%)	(31%)	(39%)	(51%)
Rectal	(24%)	(49%)	(48%)	(56%)
Reported cancers	**(46%)**	**(55%)**	**(54%)**	**(59%)**

[1] Number of cases receiving RT within 45 days of diagnosis/ total cases receiving RT as first treatment

[2] First Nations peoples – see glossary

[3] Care should be taken when interpreting these results. Patient counts have been suppressed due to small numbers to protect confidentiality

5.3 | Socioeconomic status

Diagnosis years 2009-2013

5.3.1 | Is there a difference in access to treatment, where radiation therapy is the first cancer treatment, by socioeconomic status?[1]

Cancer	2009-2013					
	Disadvantaged		Middle		Affluent	
	n/N	%	n/N	%	n/N	%
CNS and Brain	51/352	(14%)	185/1,036	(18%)	42/189	(22%)
Cervix	101/254	(40%)	215/552	(39%)	27/97	(28%)
Lung	1,020/2,995	(34%)	1,954/5,866	(33%)	292/800	(37%)
Oesophagus	167/384	(43%)	351/803	(44%)	62/130	(48%)
Oropharynx	152/307	(50%)	342/630	(54%)	60/92	(65%)
Rectal	328/1,196	(27%)	691/2,902	(24%)	80/462	(17%)
Reported cancers	**1,819/5,488**	**(33%)**	**3,738/11,789**	**(32%)**	**563/1,770**	**(32%)**

[1] Number of cases where RT is first treatment/number of diagnoses

Diagnosis years 2014-2018

Cancer	2014-2018					
	Disadvantaged		Middle		Affluent	
	n/N	%	n/N	%	n/N	%
CNS and Brain	64/426	(15%)	208/1,161	(18%)	61/232	(26%)
Cervix	126/264	(48%)	229/639	(36%)	19/96	(20%)
Lung	1,193/3,473	(34%)	2,393/7,006	(34%)	298/898	(33%)
Oesophagus	200/425	(47%)	437/908	(48%)	69/154	(45%)
Oropharynx	201/352	(57%)	597/1,001	(60%)	76/140	(54%)
Rectal	277/1,279	(22%)	749/3,127	(24%)	108/487	(22%)
Reported cancers	**2,061/6,219**	**(33%)**	**4,613/13,842**	**(33%)**	**631/2,007**	**(31%)**

[1] Number of cases where RT is first treatment/number of diagnoses

5.3.2 | Is there a difference in time to treatment, where radiation therapy is the first cancer treatment, by socioeconomic status?[1]

Diagnosis years 2009-2013

Cancer	Time to first RT within 45 days of diagnosis					
	Disadvantaged		Middle		Affluent	
	n/N	%	n/N	%	n/N	%
CNS and Brain	37/51	(73%)	132/185	(71%)	28/42	(67%)
Cervix	37/101	(37%)	73/215	(34%)	14/27	(52%)
Lung	591/1,020	(58%)	1,172/1,954	(60%)	205/292	(70%)
Oesophagus	86/167	(51%)	197/351	(56%)	37/62	(60%)
Oropharynx	50/152	(33%)	108/342	(32%)	19/60	(32%)
Rectal	130/328	(40%)	354/691	(51%)	53/80	(66%)
Reported cancers	**931/1,819**	**(51%)**	**2,036/3,738**	**(54%)**	**356/563**	**(63%)**

[1] Number of cases receiving RT within 45 days of diagnosis/ total cases receiving RT as first treatment

Diagnosis years 2014-2018

Cancer	Time to first RT within 45 days of diagnosis					
	Disadvantaged		Middle		Affluent	
	n/N	%	n/N	%	n/N	%
CNS and Brain	39/64	(61%)	140/208	(67%)	52/61	(85%)
Cervix	45/126	(36%)	99/229	(43%)	7/19	(37%)
Lung	689/1,193	(58%)	1,466/2,393	(61%)	211/298	(71%)
Oesophagus	117/200	(59%)	288/437	(66%)	54/69	(78%)
Oropharynx	79/201	(39%)	315/597	(53%)	52/76	(68%)
Rectal	121/277	(44%)	444/749	(59%)	73/108	(68%)
Reported cancers	**1,090/2,061**	**(53%)**	**2,752/4,613**	**(60%)**	**449/631**	**(71%)**

[1] Number of cases receiving RT within 45 days of diagnosis/ total cases receiving RT as first treatment

6| Spotlight ON – *Service Activity*

Patterns of RT Retreatment
Courses of RT per LINAC

6.1 | Patterns of radiation therapy retreatment

Diagnosis years 2009-2018

6.1.1 | Number of radiation therapy retreatment courses per treatment facility type[1,2,3]

Treatment facility types	Diagnoses received single course of RT	Diagnoses received multiple courses of RT	Total diagnoses received RT	Number of courses	Average number of retreatment courses	Diagnoses received multiple courses of RT (%)
Public	33,704	8,266	41,970	55,229	1.32	20%
Private	23,534	6,693	30,227	41,532	1.37	22%
PPP	8,443	2,412	10,855	14,486	1.33	22%
Total	**65,681**	**17,371**	**83,052**	**111,247**	**1.34**	**21%**

[1] Average number of retreatment courses = Total diagnoses who received RT/ Number of courses
[2] Diagnoses who received multiple courses of RT (%) = diagnoses received multiple courses of RT/ total diagnoses who received RT
[3] PPP – Public private partnership

6.1.2 | Number of radiation therapy retreatment courses per treatment intent[1,2,3]

Diagnosis years 2009-2018

First treatment intent	Diagnoses received single course of RT	Diagnoses received multiple courses of RT	Total diagnoses received RT	Number of courses	Average number of retreatment courses	Diagnoses received multiple courses of RT (%)
Curative	49,253	9,361	58,614	72,733	1.24	16%
Palliative	15,754	7,226	22,980	35,559	1.55	31%
Other	674	784	1,458	2,955	2.03	54%
Total	**65,681**	**17,371**	**83,052**	**111,247**	**1.34**	**21%**

[1] Average number of retreatment courses = total diagnoses who received RT/number of courses
[2] Diagnoses who received multiple courses of RT (%) = diagnoses received multiple courses of RT/ total diagnoses who received RT
[3] Treatment intent group = intent (curative, palliative, other) of the first RT treatment record, with subsequent RT records remaining in the same intent group

Notes:
This cohort of patients includes Queenslanders diagnosed with a notifiable cancer between 2009 – 2018 and excludes non-melanoma skin cancer.

In this report retreatment rates are related to the patient. For treatment facility type the retreatment rate is linked to the first RT treating facility. If a patient in treated at multiple RT facilities then all courses of treatment are associated with the first treating facility. For treatment intent the retreatment rate is linked to the first treatment intent and all courses of treatment are associated with the first treatment intent.

6.1.3 | Number of radiation therapy retreatment courses per cancer type[1,2]

Diagnosis years 2009-2018

Cancer group	Cancer	Diagnoses received single course of RT	Diagnoses received multiple courses of RT	Total diagnoses who received RT	Number of courses	Average number of retreatment courses	Diagnoses received multiple courses of RT (%)
Breast	Breast	18,639	3,091	21,730	27,002	1.24	14%
CNS and Brain	CNS and Brain	1,918	228	2,146	2,425	1.13	11%
Colorectal	Colon	1,357	383	1,740	2,307	1.33	22%
	Rectal	3,153	770	3,923	5,082	1.30	20%
Endocrine	Thyroid Gland	346	98	444	623	1.40	22%
Gynaecological	Cervix	679	257	936	1,315	1.40	27%
	Ovary	202	56	258	349	1.35	22%
	Uterus	1,009	390	1,399	1,926	1.38	28%
	Vagina	81	44	125	184	1.47	35%
	Vulva	191	66	257	352	1.37	26%
Haematological	Hodgkin Lymphoma	456	47	503	563	1.12	9%
	Leukaemia	668	149	817	1,061	1.30	18%
	Non-Hodgkin Lymphoma	1,859	385	2,244	2,852	1.27	17%
	Plasma cell tumours	674	367	1,041	1,716	1.65	35%
Head and neck	Hypopharynx	292	66	358	444	1.24	18%
	Larynx	720	146	866	1,071	1.24	17%
	Lip	140	40	180	239	1.33	22%
	Nasal Cavity and Paranasal Sinuses	175	47	222	304	1.37	21%
	Nasopharynx	143	36	179	247	1.38	20%
	Oral Cavity	792	184	976	1,240	1.27	19%
	Oropharynx	1,837	292	2,129	2,565	1.20	14%
	Pharynx	73	10	83	102	1.23	12%
	Salivary Glands	231	58	289	400	1.38	20%
Hepatobiliary	Biliary Tract	8	1	9	10	1.11	11%
	Gallbladder	41	8	49	59	1.20	16%
	Liver	314	99	413	594	1.44	24%
	Pancreas	484	86	570	706	1.24	15%
Lung	NSCLC	6,492	3,206	9,698	14,888	1.54	33%
	SCLC	723	698	1,421	2,423	1.71	49%
Male genital organs	Prostate	11,918	2,625	14,543	18,995	1.31	18%
	Testis	49	14	63	83	1.32	22%
Melanoma	Melanoma	2,558	935	3,493	5,081	1.45	27%
Mesothelioma	Mesothelioma	296	113	409	579	1.42	28%
Upper GI	Oesophagus	1,258	362	1,620	2,137	1.32	22%
	Small Intestine	103	28	131	179	1.37	21%
	Stomach	798	220	1,018	1,317	1.29	22%
Urological	Bladder	1,246	322	1,568	2,084	1.33	21%
	Kidney	693	431	1,124	1,972	1.75	38%
Unknown Primary	Unknown Primary	883	275	1,158	1,601	1.38	24%
Other	Other invasive cancers	2,182	738	2,920	4,170	1.43	25%
All cancers		**65,681**	**17,371**	**83,052**	**111,247**	**1.34**	**21%**

[1] Average number of retreatment courses = total diagnoses who received RT/number of courses

[2] Diagnoses who received multiple courses of RT (%) = diagnoses received multiple courses of RT/ total diagnoses who received RT

6.2 | Radiation therapy courses per linear accelerator

Treatment years 2017-2021

This is a new data cohort and includes courses of treatment from all RT services in Qld between 2017 to 2021. The data includes patients that have been treated for cancer, but also other patients treated at RT services such as non-melanoma skin cancer, benign conditions and those who travel from interstate, which are typically excluded from Qld population reporting. These inclusions help describe the yearly LINAC activity of RT services and may help form the Qld baseline for comparison to guidelines for calculating demand of Radiation Oncology services.[10,14]

6.2.1 | Average number of radiation therapy courses per LINAC by treatment facility type[1,2,3]

Treatment facility type	2017	2018	2019	2020	2021	Average
Public	279	293	297	314	310	298
Private	245	284	309	326	342	303
PPP	347	349	353	318	344	342
Queensland	**276**	**300**	**316**	**322**	**336**	**311**

[1] PPP – Public private partnership
[2]LINAC numbers and RT facility type – see Appendix C
[3]Gamma Knife courses from PAH are excluded from Public group

6.2.2 | Average number of radiation therapy courses per LINAC by RT facility area[1,2]

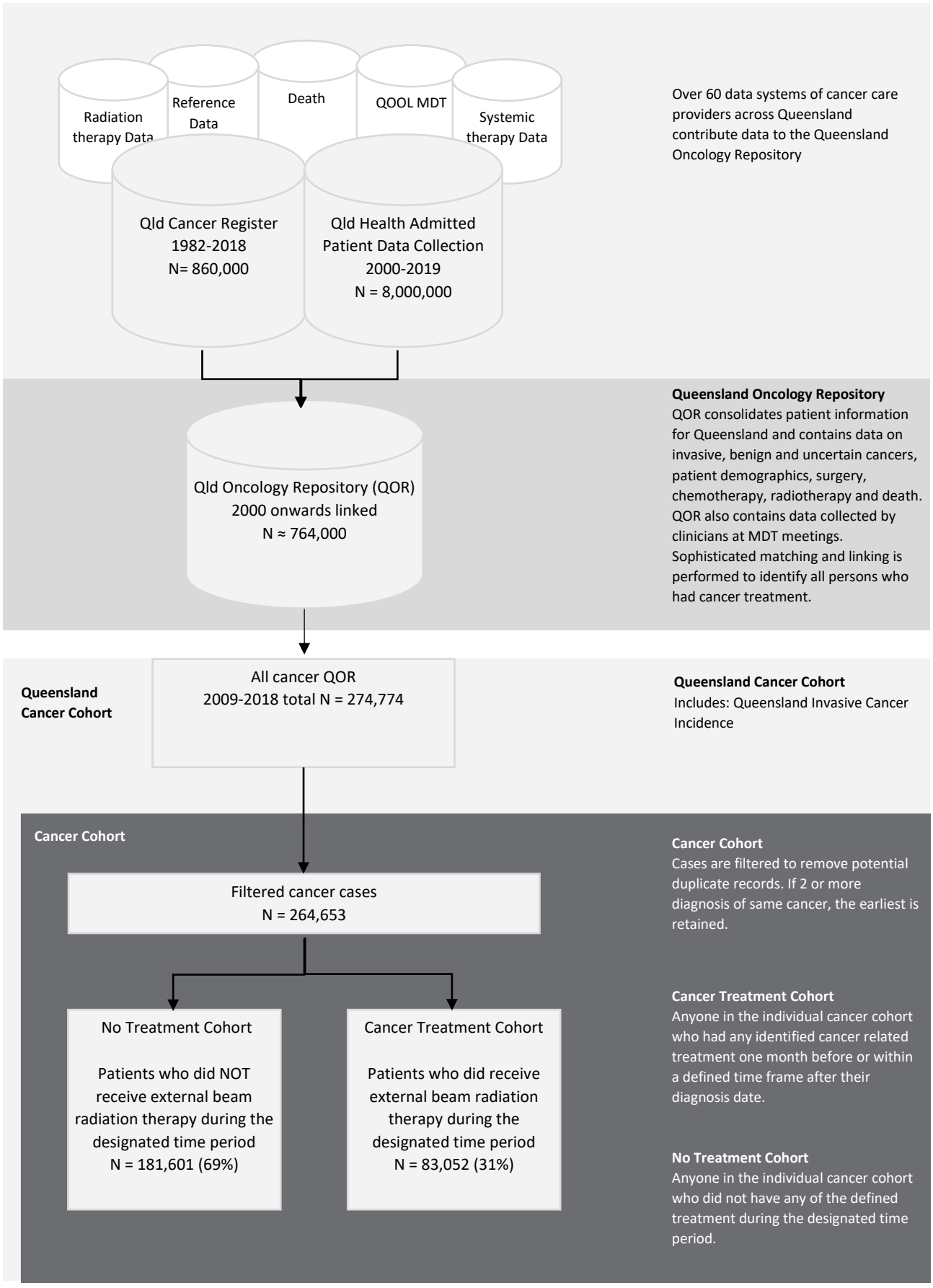
RT facility area	2017	2018	2019	2020	2021	Average
Metro	291	346	363	346	358	341
Metro Other	236	262	281	310	319	283
Regional	347	326	340	321	346	335
Queensland	**276**	**300**	**316**	**322**	**336**	**311**

[1] LINAC numbers and RT facility areas – see Appendix C
[2] Gamma Knife courses from PAH are excluded from Metro group

Note:
If a patient is treated at multiple facilities the courses are attributed to each treating facility in each treating year. For example: a patient receives 11 courses of treatment - 5 courses at Facility 'A' and 6 courses at Facility 'B', the courses are counted in each facility.

Appendix

Appendix A | How are the cohorts identified



Appendix B | Linking radiation therapy to a person with cancer

Each invasive cancer diagnosed in a calendar year was matched and linked to the earliest radiation therapy record created from radiation therapy treatment systems. The radiation therapy record is linked to the diagnosis record if the radiation therapy record start date is 30 days prior to diagnosis or any time after diagnosis. This radiation therapy flag determines the radiation therapy rate (utilisation rate) and includes treatment anytime (curative and palliative) during the course of the disease. Of the 264,653 Qld Cancer Register invasive diagnosis records for diagnosis year 2009 – 2018, 31% (83,052) were matched with a radiation therapy record.

There were 5,855 (2%) radiation therapy records that were not matched to a diagnosis record because the treatment date was more than 30 days prior to the diagnosis date. These records were excluded from the report. Other diagnosis records excluded from this report include non-melanoma skin cancer.

Appendix C | LINACs by Radiation therapy services in Queensland

Radiation therapy services*	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	RT facility areas
Public														
Townsville	2	2	3	3	3	3	3	3	3	4	4	4	5	Metro Other
PAH - ROPART	4	4	4	4	4	4	4	4	4	4	4	4	4	Metro
PAH - ROPAIR	3	4	4	4	6	6	6	5	5	5	5	5	5	Metro
Royal Brisbane and Women's Hospital	5	5	5	5	5	5	5	5	5	5	5	5	5	Metro
Sunshine Coast University Hospital									2	2	2	2	2	Metro Other
Public Private Partnership														
GenesisCare-Bundaberg						1	1	1	1	1	1	2	2	Regional
GenesisCare-Fraser Coast							1	1	1	1	2	2	2	Regional
GenesisCare-Rockhampton								2	2	2	2	2	2	Regional
ICON-Cairns (Liz Plummer)				2	2	2	2	2	2	2	2	2	2	Regional
ICON-Gold Coast University Hospital						2	2	2	3	3	3	3	3	Metro Other
Private														
GenesisCare-Wesley	3	3	3	3	3	3	3	3	3	2	2	2	2	Metro
GenesisCare-Chermside	2	2	2	2	2	2	2	2	2	2	2	2	2	Metro
GenesisCare-Tugun	2	2	2	2	2	2	2	2	2	2	2	2	2	Metro Other
GenesisCare-Southport	2	2	2	2	2	2	2	2	2	2	2	2	2	Metro Other
GenesisCare-Nambour	1	1	1	1	1	1	1	1	1	1	1	1	1	Metro Other
GenesisCare-Buderim											1	1	1	Metro Other
ICON-Toowoomba	1	2	2	2	2	2	2	2	2	2	2	2	2	Regional
ICON-Maroochydore		2	2	2	2	2	2	2	2	2	2	1	1	Metro Other
ICON-Springfield							1	1	1	1	1	1	1	Metro Other
ICON-Gold Coast Private									1	1	1	1	1	Metro Other
ICON-Greenslopes									1	1	1	2	2	Metro
ICON-North Lakes									1	1	1	1	1	Metro Other
ICON-Redland									1	1	1	1	1	Metro Other
ICON-Mackay										1	1	1	1	Regional
Total LINACS	**25**	**29**	**30**	**32**	**34**	**37**	**39**	**40**	**47**	**48**	**50**	**51**	**52**	

*Service names represent current management, changes in management over the years, from previous companies such as Oceania, ROC, ROQ are not identified in this table

Appendix D | Cancer groupings

Cancer Group	Cancer	ICD-10 AM code
Breast	Breast	C50
CNS and Brain	CNS and Brain	C70-C72
Colorectal	Colon	C18
	Rectal	C19-C20,C218
Endocrine	Thyroid Gland	C73
Gynaecological	Cervix	C53
	Ovary	C56
	Uterus	C54-C55
	Vagina	C52
	Vulva	C51
Haematological	Hodgkin Lymphoma	M965-M966
	Leukaemia	M980-M994
	Myeloma	M973
	Non-Hodgkin Lymphoma	M967-M972
Head and neck	Hypopharynx	C13
	Larynx	C32
	Lip	C00
	Nasal Cavity and Paranasal Sinuses	C30-C31
	Nasopharynx	C11
	Oral Cavity	C02-C06
	Oropharynx	C01, C09-C10, C12
	Pharynx Other	C14
	Salivary Glands	C07-C08
Hepatobiliary	Biliary Tract (not incl Bile Ducts and Vater)	C24
	Gallbladder	C23
	Liver	C22
	Pancreas	C25
Lung	NSCLC/SCLC	C33-C34
Male genital organs	Prostate/Testis	C61-C62
Melanoma	Melanoma	C43
Mesothelioma	Mesothelioma	C45
Upper GI	Oesophagus	C15
	Small Intestine	C17
	Stomach	C16
Urological	Bladder	C67
	Kidney	C64

Cancer groupings (cont.)

Unknown Primary	Unknown Primary	C80
Other invasive cancers	Anus, Anal Canal	C21
	Spleen, Unspecified, ill-defined digestive tract	C26
	Other lung	C34
	Thymus	C37
	Mediastinum, pleura, heart	C38
	Unspecified respiratory tract	C39
	Bones upper and lower limbs	C40
	Bones and articular cartilage	C41
	Kaposi sarcoma	C46
	Peripheral nerves	C47
	Peritoneum, retroperitoneum	C48
	Connective tissue	C49
	Other specified female genital organs	C57
	Placenta	C58
	Penis	C60
	Other specified male genital organs	C63
	Renal pelvis	C65
	Ureter	C66
	Urethra	C68
	Eye	C69
	Adrenal gland	C74
	Parathyroid gland, endocrine gland	C75
	Pelvis, thorax	C76
	Secondary and unspecified lymph nodes	C77
	Secondary respiratory and digestive organs	C78
	Secondary other and unspecified sites	C79
	Other non-follicular lymphoma	C83
	Malignant immunoproliferative disease	C88
	Lymphoid, haematopoietic and related tissue	C96

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Glossary

Comorbidity

A clinical condition that has the potential to significantly affect a cancer patient's prognosis.
Comorbidity is derived from hospital admissions data following the Quan algorithm for classifying ICD-10 coded conditions, modified to exclude metastasis, which is represented by a separate and distinct metastasis dimension.
Comorbidity is limited to conditions coded in any admission episode between 12 months before and 12 months after the date of cancer diagnosis.
For any given cancer diagnosis, comorbidity is restricted to conditions other than the primary cancer. E.g. A rectum cancer can be a comorbidity to a colon cancer diagnosis and vice versa, if they are diagnosed within 12 months of each other.
Benign tumours are not considered comorbidities.

Co-morbidity list:		
AIDS	Acute myocardial infarction	Cancer
Cerebrovascular disease	Congestive heart failure	Chronic obstructive pulmonary disease
Dementia	Diabetes	Diabetes + complications
Hemiplegia or Paraplegia	Mild liver disease	Moderate/severe liver disease
Peptic ulcer	Peripheral vascular disease	Renal disease
Rheumatoid disease		

Curative radiation therapy

Radiation therapy courses that have been recorded in radiation therapy treatment systems such as MOSAIQ or ARIA with a curative intent (see also Treatment intent).

Diagnosis year

This report is structure around diagnosis years as recorded in Queensland Cancer Register. Only patients diagnosed between 2009 and 2018 will be included in this report. Patients who received radiation therapy in 2009 but were diagnosed in an earlier year are excluded.

First Nations peoples

The terminology First Nations peoples refers to the Aboriginal peoples and Torres Strait Islander peoples, their nations, societies, and language groups that have occupied these lands since time immemorial.

Flows

In-flows - show the distribution of residence for the total group of patients who receive radiation therapy at a HHS
Out-flows – show the proportion of residence in a given HHS who travel to another HHS for radiation therapy

MDT Review

Cancer patients are discussed by a Multidisciplinary Team (MDT) to ensure all available treatment options are considered. In this report the MDT rate is limited to hospitals that use QOOL to capture MDT review data or provide MDT data to CAQ.

Mortality

30 day mortality following curative RT - Percentage of patients who received curative radiation therapy and died ≤30 days following radiation therapy.

Non First Nations peoples

A measure where a person does not identify as Aboriginal peoples and/or Torres Strait Islander peoples (First Nations peoples).

Over 75 years

The age that divides this population into over 75 years and under 75 years, it describes Queensland's ageing population.

Facility type (see Appendix C)
Private facility - Radiation therapy services that are privately operated
Public facility - Radiation therapy services that are operated by Queensland Health
Public/private partnership - Cooperative arrangement between public and private services in the form of a contract

Linear Accelerator (LINAC)
A linear accelerator is a machine that is used to deliver external beam radiation therapy treatments to cancer tumours with pinpoint accuracy, sparing nearby healthy tissue.

QOOL
QOOL supports cancer multidisciplinary teams by assisting meeting preparation, communication and documentation of essential clinical information such as diagnosis, cancer stage and recommended treatment plans. QOOL provides continuity of care and state-wide multidisciplinary team linkage and provides access to clinical outcomes and system performance data for quality improvement. The system provides a central view of patient data for multiple users, accessible at multiple locations.

Radiation therapy
Includes Queensland residents of all ages diagnosed with invasive cancer who received external beam radiotherapy anytime during the course of their disease. For further information on radiation therapy https://www.targetingcancer.com.au

Radiation therapy utilisation rate
Number of cases who ever received radiation therapy for invasive cancer diagnosis during the course of their disease divided by the number of cases of invasive cancer diagnosed in the specified timeframe.

Retreatment patterns
Radiation therapy retreatment is defined as any radiation therapy course delivered to any body site, after an initial episode of radiation therapy for the same patient.

Remoteness
The relative remoteness of residence at time of diagnosis, derived from the Australian Standard Geographical Classification (ASGC). In this report, remoteness is classified into three groups based on the original ASGC grouping.

ASGC classifications	Modified ASGC classification
Major City	Metropolitan
Inner Regional	Regional
Outer Regional	Rural and Remote
Remote	
Very Remote	

An exception to this grouping is the metropolitan area of Townsville (originally classified as Rural). Townsville has been classified as Metropolitan because of the availability of tertiary level cancer services.

Sex
Refers to the biological and physiological characteristics that define men and women.

Socioeconomic status
Socioeconomic status is based on the Socio-Economic Indexes for Areas (SEIFA), a census-based measure of social and economic well-being developed by the Australian Bureau of Statistics (ABS) and aggregated at the level of Statistical Local Areas (SLA).

The ABS use SEIFA scores to rank regions into ten groups or deciles numbered one to ten, with one being the most disadvantaged and ten being the most affluent group. This ranking is useful at the national level, but the number of

people in each decile often becomes too small for meaningful comparisons when applied to a subset of the population. For this reason, this document further aggregates SEIFA deciles into 3 socioeconomic groups.

SEIFA Group	Decile	Percentage of population (approximate)
Disadvantaged	1-2	20%
Middle	3-8	60%
Affluent	9-10	20%

Time to first treatment where radiation therapy is the first treatment
First radiation therapy is counted when the patient receives radiation therapy as the first treatment closest to the date of diagnosis.

Treatment within 45 days of diagnosis
Number of days from date of diagnosis to the start date of first radiation therapy treatment (where radiation therapy treatment is the first treatment) is ≤45 days.

Treatment Intent
Curative – treatment is given to control the disease
Palliative – when cure is unlikely to be achieved and treatment is given primarily for pain control
Treatment intent data was defined using a combination of intent specified by clinicians and recorded in radiation therapy treatment systems and fractionation schedules.

FOR MORE INFORMATION
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