End of life cancer care

30 day mortality rates for Queenslanders receiving *Palliative* Radiation Therapy

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

2008 - 2017

Acknowledgements

Suggested citation:
Queensland Government. End of life cancer care: 30 day mortality rates for Queenslanders receiving Palliative Radiation Therapy 2008-2017. Queensland Health, Brisbane 2021.

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Message from the chair

Palliative radiation therapy (PRT) is provided to cancer patients with advanced or metastatic disease with the aim of improving symptom control and quality of life while ensuring limited treatment burden and side effects.[1] However, the benefit from radiation therapy may take up to 4 weeks to achieve and therefore patients dying a short time following their treatment may not receive benefit.[2]

To establish a benchmark to guide best practice, a world-wide meta-analysis conducted by Queensland clinicians Justin Kutzko, Tanya Holt and Brigid Hickey in partnership with the Cancer Control Safety and Quality Partnership, Radiation Oncology sub-committee, provides a proposed benchmark for 30 day mortality for cancer patients receiving PRT.

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 'End of life cancer care: 30 day mortality rate for Queenslanders receiving palliative radiation therapy' report. This report, for the first time in Queensland, describes the patterns of palliative radiation therapy (PRT) for patients with cancer, and measures the 30 day mortality rate for Queenslanders receiving PRT. This report provides radiation therapy services, both public and private, a baseline to compare their service outcomes with the proposed target of 15% for the 30 day mortality rate for Queenslanders receiving PRT for cancer care.

There are many factors that influence the clinician and patient's choice of PRT. By providing information on the patterns of 30 day mortality and fractionation schedules this report should help guide these treatment decisions. This report reveals differences between treating facilities which may not be obvious in daily clinical practice but become clear with this type of analysis.

Preparing this report is an important first step in raising awareness amongst individual radiation therapy services in Qld and offers recommendations to guide future practice. I encourage you to consider how this report will inform the treatment of cancer patients in your service. The Partnership will continue to monitor this information, with a focus on ensuring the best possible outcomes for Queenslanders.

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 and input into the development of 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 future radiation therapy delivery in Queensland.

Professor Bryan Burmeister
Chair, Radiation Oncology Sub-committee
Queensland Cancer Control Safety and Quality Partnership
01/10/2021

Introduction

The 'End of life cancer care: 30 day mortality rate for Queenslanders receiving palliative radiation therapy' report is the first population-based study of its kind in Queensland and includes data from 22 public and private radiation therapy services, who provide cancer care for a population of over 5 million people.

Palliative radiation therapy (PRT) is provided to patients with advanced or metastatic disease with the aim of improving symptom control and quality of life while ensuring limited treatment burden and side effects.[1] However, the benefit from radiation therapy may take up to 4 weeks to achieve and therefore patients dying a short time following their treatment may not receive benefit.[2]

Many factors may influence the decision to offer PRT. These may include performance status of the patient, site of disease, primary diagnosis, comorbidity, age, access to specialist treatment, travelling time to the treatment facility, estimated life expectancy and clinician experience or preference.[5]

This report examines cancer patients who have died between 2008 – 2017 and received PRT, and investigates the characteristics of the patients, radiation therapy treatment patterns, the 30 day mortality rate and the number of treatments delivered per course. The overall 30 day mortality rate for PRT in Queensland was 22%, with variation in practice observed between treating facilities. A number of factors are known to impact on 30 day mortality, these include patients' primary histology, patients' performance status, casemix of inpatient vs outpatient, the type of technology used and number of fractions delivered.[1,3,4] The heterogeneity of 30 day mortality between centres may be explained by some of these factors.

Results from a systematic review and meta-analysis conducted by Queensland clinicians Justin Kutzko, Tanya Holt and Brigid Hickey in partnership with the Cancer Control Safety and Quality Partnership, Radiation Oncology sub-committee, provides a proposed benchmark for 30 day mortality for patients receiving PRT. This world-wide meta-analysis, the largest to date in the literature, reviewed the individual patient data of 58,005 patients with advanced or metastatic cancer who received PRT from 39 studies (published and unpublished). The summary effect for 30 day mortality rate for PRT was 15% (95%CI 13.5-17).[1]

There is strong evidence to suggest that patients with poor predicted prognosis can be managed with single fractions and hypofractionation. It is reasonable to expect that among patients dying within 30 days of PRT that the majority should have received less than 5 fractions. This report also demonstrates heterogeneity between Queensland centres in the prescribed fractionation schedules for patients who died within 30 days of treatment.

Looking to the future

The 'End of life cancer care: 30 day mortality rate for Queenslanders receiving palliative radiation therapy' report introduces the target metric of 15% for 30 day mortality rate for PRT for cancer care. The Partnership will provide ongoing monitoring of this indicator and will work with treating facilities to introduce this metric into clinical practice, considering factors that may contribute to variation between services and continuing to introduce new data as it becomes available to provide more detailed analysis. The Partnership will also provide ongoing monitoring of fractionation schedules utilised in palliative patients who die within 30 days of treatment encouraging centres to follow Choosing Wisely[6] recommendations of utilising short treatment schedules where possible.

The Partnership will continue to seek feedback from cancer services, Queensland Health, and the community on radiation therapy indicators. They will lead the development and reporting of quality indicators for other aspects of cancer management and outcomes which will be included in future reports.

Where does the data come from?

Since 2004 QCCAT have compiled and analysed a vast amount of information about cancer incidence, mortality, treatment, and survival. Key to QCCAT'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 QCCAT. This centralised repository compiles and collates data from a range of source systems including the Queensland Cancer Register, private and public hospital admissions data, death data,

treatment systems including public and private radiation therapy services, public and private pathology, hospital clinical data systems and QOOL. QOR contains approximately 50 million records between 1982–2017. Our matching and linking processes provide the 730,000+ matched and linked records of cancer patients between 1982–2017 which provide the data for this report.

Cohort definition

```
┌─────────────────────────────┐
│      All decedents          │
│  2008-2017 total N = 121,199│
└─────────────────────────────┘
```

Decedents
All Queenslanders with cancer who have died between 2008 – 2017 from all causes (cancer and non cancer deaths)

```
┌───────────────────────────┐   ┌──────────────────────────┐
│ Did not receive palliative│   │  Received palliative     │
│   radiation therapy       │   │   radiation therapy      │
│   N = 98,698 (81%)        │   │   N = 22,501 (19%)       │
└───────────────────────────┘   └──────────────────────────┘
```

Palliative radiation therapy intent
Identified from treatment source data where the treatment intent closest to date of death is palliative

```
┌──────────────────────────┐   ┌──────────────────────────┐
│ Received Palliative RT   │   │ Receive Palliative RT    │
│   ≤ 30 days of death     │   │   > 30 days of death     │
│   N = 4,997 (22%)        │   │   N = 17,504 (78%)       │
└──────────────────────────┘   └──────────────────────────┘
```

30 day mortality for palliative RT
Days from last palliative treatment (course end date) to date of death.

```
┌──────────────────────────────┐
│      Dose received           │
│  1 fraction – 1,171 (23%)    │
│  2-5 fractions – 2,503 (50%) │
│  6-10 fractions – 1,040 (21%)│
│  >10 fractions – 283 (6%)    │
└──────────────────────────────┘
```

Fractions received
Number of fractions received in last palliative radiation therapy course closest to date of death

Exclusions
Non-melanoma skin cancer

Summary: 30 day mortality following PRT

	Decedents 2008-2017	Received Palliative RT (PRT)	Received PRT within 30 days of death			
			All	**Single fractions**	**2-5 fractions**	**>5 fractions**
Queensland	121,199	22,501	4,997 (22%)	1,171 (23%)	2,503 (50%)	1,323 (26%)
Public providers	-	13,001	2,681 (21%)	810 (30%)	1,443 (54%)	428 (16%)
Private providers	-	9,500	2,316 (24%)	361 (16%)	1,060 (46%)	895 (39%)

Key findings

22,501 palliative radiation therapy (PRT) treatment courses were examined, of which 4,997 (22%) courses were delivered within 30 days of death. When compared with international literature the Queensland 30 day mortality rate following PRT is high, however the majority of studies reviewed were from single sites, where cohorts were smaller and there was a high degree of heterogeneity of the study methodologies.[1]

Characteristics of decedents receiving PRT within 30 days of death include:
- Median age - 69 years.
- Similar across age groups - 32% for younger persons aged <18 years compared with 30% for those aged 75+ years.
- Higher for males than females, however there was little difference for socio-economic status and Indigenous status.
- Decedents living in metropolitan areas were more likely to receive PRT within 30 days of death compared with remote and very remote areas (23% vs 20%).
- Primary cancers with the highest 30 day mortality rate following PRT include lung cancer (28%), bone and soft tissue (27%), endocrine (29%), other invasive cancers (28%), mesothelioma (24%), upper gastrointestinal and urological cancers (23%).
- Primary cancers with the lowest 30 day mortality rate following PRT include breast cancer (15%), brain cancer (14%) and prostate cancer (16%).
- Decedents with one or more comorbidities were more likely to have a higher 30 day mortality rate following PRT (24%) compared with those with no comorbidities recorded (20%).
- 30 day mortality rate following PRT was highest for decedents where disease duration was ≤3 months.
- Yearly trends from 2008 – 2017 indicate a decrease in the 30 day mortality rate following PRT from 25% to 20%.

Radiation therapy fractionated schedules for PRT
For most Queensland radiation therapy treatment facilities, the 30 day mortality rate following PRT was greater than the 15% proposed target (17% - 29%), however 73% of fractionated schedules delivered were ≤5 fractions (single fractions 23%, 2–5 fractions 50%).

Trends for low fractionated schedules (≤5 fractions) have increased over the 10 year period from 73% - 78%, with >5 fractionated schedules decreasing to 21%

Cancers most likely to be treated with high fractionated schedules (>5 fractions) include CNS and brain cancer, endocrine, and bone and soft tissue cancer.

Characteristics of decedents receiving high fractionated schedules (>5 fractions) include: 63% male, 30% aged 75+ years, 27% with a disadvantaged socioeconomic status, 66% from a metropolitan area and more likely to be treated at a private treating facility.

1.1 | Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland decedents who received palliative radiation therapy (PRT) within 30 days of death?

	Number of decedents*		Received PRT		PRT ≤30 days of death	
	N	%	Count	Row%	Count	Row%
Queensland	**121,199**	**100%**	**22,501**	**19%**	**4,997**	**22%**
Sex						
Male	70,086	58%	13,518	19%	3,172	23%
Female	51,113	42%	8,983	18%	1,825	20%
Age at death						
<18	251	<1%	66	26%	21	32%
18 - 44	2,616	2%	914	35%	232	25%
45 - 54	5,932	5%	2,151	36%	535	25%
55 - 64	14,853	12%	4,716	32%	1,162	25%
65 - 74	26,933	22%	6,939	26%	1,568	23%
75 - 84	36,221	30%	5,442	15%	1,137	21%
85 +	34,393	28%	2,273	7%	342	15%
Indigenous status						
Indigenous	2,215	2%	514	23%	113	22%
Other than Indigenous	118,984	98%	21,987	18%	4,884	22%
Socioeconomic status*						
Affluent	12,451	10%	2,272	18%	524	23%
Middle	74,511	61%	14,264	19%	3,143	22%
Disadvantaged	34,227	28%	5,962	17%	1,329	22%
Remoteness						
Metropolitan	76,452	63%	14,573	19%	3,320	23%
Inner regional	28,945	24%	4,901	17%	1,009	21%
Outer regional	13,160	11%	2,510	19%	564	22%
Remote & very Remote	2,642	2%	517	20%	104	20%
Comorbidity						
0	40,715	34%	10,141	25%	2,400	24%
1	31,024	26%	6,274	20%	1,410	22%
≥ 2	49,460	41%	6,086	12%	1,187	20%
Facility type						
Private	-	-	9,500	42%	2,316	24%
Public	-	-	13,001	58%	2,681	21%
Cause of death						
Cancer death	83,538	69%	21,506	26%	4,869	23%
Non cancer death**	37,661	31%	995	3%	128	13%
Disease duration						
< 1 month	9,067	7%	321	4%	319	99%
1-3mths	10,912	9%	1,772	16%	1,047	59%
3-6mths	9,936	8%	2,247	23%	555	25%
6-12mths	14,326	12%	3,748	26%	834	22%
1-2 years	15,935	13%	4,339	27%	794	18%
2-5 years	21,632	18%	5,279	24%	823	16%
≥ 5 years	39,391	33%	4,795	12%	625	13%

*All cause deaths (cancer & non cancer)
**Non cancer death details – Appendix B
***Socioeconomic status: 10 cases of unknown status are excluded

1.2 | 30 day mortality following PRT by primary cancer site

Death years 2008-2017

What is the 30 day mortality rate by cancer site for Queenslanders receiving PRT?

	Number of decedents		Received PRT		PRT ≤30 days of death	
	N	%	Count	Row%	Count	Row%
Queensland	**121,199**	**100%**	**22,501**	**19%**	**4,997**	**22%**
Bone and soft tissue	916	<1%	300	33%	80	27%
Breast	4,952	4%	2,172	44%	336	15%
CNS and Brain	2,580	2%	318	12%	44	14%
Colorectal	9,967	8%	1,575	16%	316	20%
Endocrine	336	<1%	133	40%	38	29%
Gynaecological	3,294	3%	717	22%	134	19%
Haematological	8,296	7%	897	11%	184	21%
Head and neck	2,459	2%	601	24%	134	22%
Hepatobiliary	7,742	6%	504	7%	134	27%
Lung	16,742	14%	6,661	40%	1,860	28%
Melanoma	3,392	3%	1,432	42%	328	23%
Mesothelioma	1,346	1%	292	22%	69	24%
Ophthalmic	168	<1%	33	20%	6	18%
Prostate	6,014	5%	2,515	42%	401	16%
Upper GI	4,742	4%	1,184	25%	267	23%
Urological	4,179	3%	1,374	33%	317	23%
Other invasive cancers	6,413	5%	798	12%	221	28%
Non cancer deaths*	37,661	31%	995	3%	128	13%

*Non cancer death details – Appendix B

1.3 | All PRT fractionation schedules

Death years 2008-2017

What are the fractionation schedules by cancer site for Queenslanders receiving PRT?

	Received PRT		Single fraction		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**22,501**	**19%**	**3,591**	**16%**	**9,591**	**43%**	**6,161**	**27%**	**3,157**	**14%**
Bone and soft tissue	300	33%	37	12%	111	37%	97	32%	55	18%
Breast	2,172	44%	362	17%	924	43%	677	31%	209	10%
CNS and Brain	318	12%	15	5%	31	10%	63	20%	208	65%
Colorectal	1,575	16%	190	12%	672	43%	442	28%	271	17%
Endocrine	133	40%	14	11%	55	41%	37	28%	27	20%
Gynaecological	717	22%	78	11%	239	33%	229	32%	171	24%
Haematological	897	11%	140	16%	401	45%	240	27%	116	13%
Head and neck	601	24%	82	14%	258	43%	169	28%	92	15%
Hepatobiliary	504	7%	90	18%	213	42%	124	25%	77	15%
Lung	6,661	40%	1,093	16%	3,133	47%	1,719	26%	716	11%
Melanoma	1,432	42%	156	11%	693	48%	452	32%	131	9%
Mesothelioma	292	22%	30	10%	143	49%	87	30%	32	11%
Ophthalmic	33	20%	3	9%	16	48%	11	33%	3	9%
Prostate	2,515	42%	686	27%	1,067	42%	586	23%	176	7%
Upper GI	1,184	25%	119	10%	385	33%	322	27%	358	30%
Urological	1,374	33%	212	15%	585	43%	390	28%	187	14%
Other invasive cancers	798	12%	146	18%	324	41%	223	28%	105	13%
Non cancer deaths	995	3%	138	14%	341	34%	293	29%	223	22%

[1]Received PRT (row %) = Received PRT/Number of decedents

1.4 | 30 day mortality following PRT fractionation schedules

Death years 2008-2017

What are the fractionation schedules by cancer site for Queenslanders who receive PRT within 30 days of death?

	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**4,997**	**22%**	**1,171**	**23%**	**2,503**	**50%**	**1,040**	**21%**	**283**	**6%**
Bone and soft tissue	80	27%	17	21%	40	50%	16	20%	7	9%
Breast	336	15%	71	21%	161	48%	91	27%	13	4%
CNS and Brain	44	14%	7	16%	9	20%	8	18%	20	45%
Colorectal	316	20%	69	22%	153	48%	74	23%	20	6%
Endocrine	38	29%	6	16%	16	42%	14	37%	2	5%
Gynaecological	134	19%	25	19%	61	46%	36	27%	12	9%
Haematological	184	21%	35	19%	85	46%	44	24%	20	11%
Head and neck	134	22%	28	21%	66	49%	24	18%	16	12%
Hepatobiliary	134	27%	33	25%	74	55%	22	16%	5	4%
Lung	1,860	28%	495	27%	942	51%	353	19%	70	4%
Melanoma	328	23%	61	19%	181	55%	78	24%	8	2%
Mesothelioma	69	24%	12	17%	39	57%	14	20%	4	6%
Ophthalmic	6	18%	1	17%	4	67%	1	17%	0	0%
Prostate	401	16%	121	30%	194	48%	72	18%	14	3%
Upper GI	267	23%	36	13%	146	55%	56	21%	29	11%
Urological	317	23%	72	23%	164	52%	62	20%	19	6%
Other invasive cancers	221	28%	57	26%	107	48%	47	21%	10	5%
Non cancer deaths	128	13%	25	20%	61	48%	28	22%	14	11%

[1]Received PRT (row %) = Received PRT ≤30 days of death/Received PRT

1.5 | 30 day mortality following PRT: fractionation schedules

Death years 2008-2017

What are the fractionation schedules by cancer site for Queenslanders who receive PRT within 30 days of death?
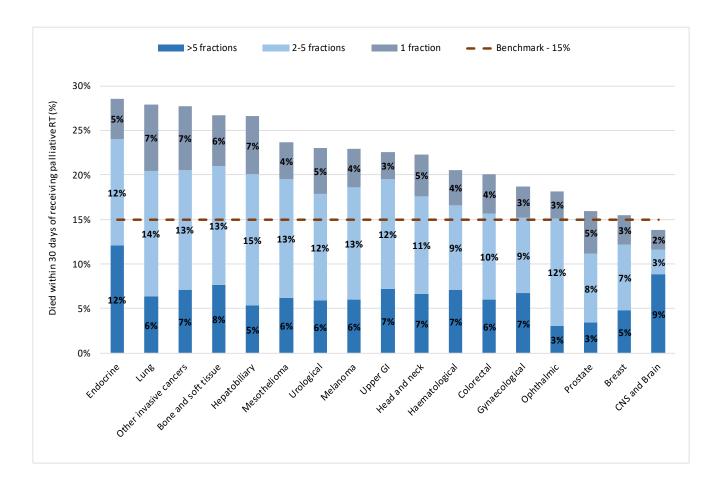
1.6 | Patient characteristics for all PRT by primary cancer site

Death years 2008-2017

What are the characteristics by cancer site of Queenslanders who receive PRT?

	Received PRT		Male		Age 75+		Disadvantaged		Rural		≥1 Comorbidity		Private	
	Count	Row%[1]	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Queensland	**22,501**	**19%**	**13,518**	**60%**	**7,715**	**34%**	**5,962**	**26%**	**7,928**	**35%**	**12,360**	**55%**	**9,500**	**42%**
Bone and soft tissue	300	33%	169	56%	68	23%	69	23%	91	30%	122	41%	124	41%
Breast	2,172	44%	26	1%	437	20%	494	23%	725	33%	1,001	46%	972	45%
CNS and Brain	318	12%	202	64%	71	22%	81	25%	109	34%	220	69%	99	31%
Colorectal	1,575	16%	946	60%	507	32%	411	26%	571	36%	811	51%	689	44%
Endocrine	133	40%	65	49%	46	35%	43	32%	57	43%	74	56%	40	30%
Gynaecological	717	22%	0	0%	183	26%	202	28%	233	32%	335	47%	282	39%
Haematological	897	11%	518	58%	401	45%	219	24%	301	34%	638	71%	383	43%
Head and neck	601	24%	461	77%	155	26%	193	32%	265	44%	287	48%	170	28%
Hepatobiliary	504	7%	309	61%	106	21%	116	23%	128	25%	313	62%	234	46%
Lung	6,661	40%	4,062	61%	1,785	27%	1,995	30%	2,404	36%	3,672	55%	2,722	41%
Melanoma	1,432	42%	1,001	70%	433	30%	361	25%	520	36%	666	47%	539	38%
Mesothelioma	292	22%	234	80%	109	37%	56	19%	79	27%	113	39%	160	55%
Ophthalmic	33	20%	16	48%	6	18%	8	24%	8	24%	17	52%	13	39%
Prostate	2,515	42%	2,515	100%	1,394	55%	554	22%	873	35%	1,427	57%	1,218	48%
Upper GI	1,184	25%	868	73%	429	36%	330	28%	434	37%	598	51%	486	41%
Urological	1,374	33%	992	72%	577	42%	344	25%	492	36%	770	56%	590	43%
Other invasive cancers	798	12%	491	62%	362	45%	214	27%	300	38%	472	59%	356	45%
Non cancer deaths	995	3%	643	65%	646	65%	272	27%	338	34%	824	83%	423	43%

[1]Received PRT (row %) = Received PRT/Number of decedents

1.7 | Patient characteristics for 30 day mortality following PRT

Death years 2008-2017

What are the characteristics by cancer site of Queenslanders who receive PRT within 30 days of death?

	Received PRT ≤30 days of death		Male		Age 75+		Disadvantaged		Rural		≥1 Comorbidity		Private	
	Count	Row%[1]	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Queensland	**4,997**	**22%**	**3,172**	**63%**	**1,479**	**30%**	**1,329**	**27%**	**1,677**	**34%**	**2,597**	**52%**	**2,316**	**46%**
Bone and soft tissue	80	27%	44	55%	19	24%	15	19%	22	28%	35	44%	40	50%
Breast	336	15%	1	<1%	53	16%	68	20%	97	29%	146	43%	164	49%
CNS and Brain	44	14%	28	64%	12	27%	14	32%	14	32%	27	61%	21	48%
Colorectal	316	20%	201	64%	82	26%	84	27%	113	36%	160	51%	161	51%
Endocrine	38	29%	20	53%	12	32%	8	21%	10	26%	19	50%	9	24%
Gynaecological	134	19%	0	0%	30	22%	46	34%	56	42%	53	40%	58	43%
Haematological	184	21%	114	62%	74	40%	45	24%	65	35%	125	68%	85	46%
Head and neck	134	22%	103	77%	30	22%	42	31%	60	45%	64	48%	46	34%
Hepatobiliary	134	27%	80	60%	28	21%	30	22%	33	25%	77	57%	69	51%
Lung	1,860	28%	1,222	66%	458	25%	533	29%	624	34%	1,000	54%	811	44%
Melanoma	328	23%	235	72%	90	27%	75	23%	101	31%	134	41%	147	45%
Mesothelioma	69	24%	55	80%	27	39%	13	19%	22	32%	33	48%	41	59%
Ophthalmic	6	18%	4	67%	1	17%	1	17%	1	17%	2	33%	3	50%
Prostate	401	16%	401	100%	206	51%	83	21%	127	32%	205	51%	221	55%
Upper GI	267	23%	199	75%	70	26%	73	27%	93	35%	115	43%	119	45%
Urological	317	23%	243	77%	128	40%	93	29%	108	34%	177	56%	146	46%
Other invasive cancers	221	28%	144	65%	94	43%	69	31%	84	38%	127	57%	116	52%
Non cancer death	128	13%	78	61%	65	51%	37	29%	47	37%	98	77%	59	46%

[1]Received PRT (row %) = Received PRT ≤30 days of death/Received PRT

1.8 | 30 day mortality following PRT by treating facility volume

Death years 2008-2017

1.9 | 30 day mortality following PRT by treating facility

Death years 2008-2017

What are the 30 day mortality rates for patients receiving PRT by treating facility?

Facility	Received PRT Count	Received PRT Col%	Received PRT ≤30 days of death Count	Received PRT ≤30 days of death Row%
Facility 2136	630	3%	182	29%
Facility 2197	2,214	10%	594	27%
Facility 2116	733	3%	194	26%
Facility 1324	819	4%	210	26%
Facility 2918	259	1%	65	25%
Facility 12	2,271	10%	523	23%
Facility 1298	1,175	5%	261	22%
Facility 2913	163	<1%	36	22%
Facility 2464	774	3%	170	22%
Facility 474	684	3%	149	22%
Facility 4	3,779	17%	813	22%
Facility 1155	1,303	6%	278	21%
Facility 2874	3,584	16%	753	21%
Facility 987	572	3%	119	21%
Facility 2875	3,327	15%	581	17%
Sites with low volumes[1]				
Facility 2960	6	<1%	5	83%
Facility 3018	6	<1%	3	50%
Facility 2905	8	<1%	3	38%
Facility 1825	29	<1%	10	34%
Facility 3133	26	<1%	8	31%
Facility 68	99	<1%	29	29%
Facility 807	40	<1%	11	28%
Queensland	**22,501**	**100%**	**4,997**	**22%**

[1]<150 cases of PRT over 10 years

1.10 | All PRT fractionation schedules by treating facility

Death years 2008-2017

What are the fractionation schedules for Queenslanders receiving PRT by treating facility?

Facility	Received PRT Count	Col%	Single fractions Count	Row%	2-5 fractions Count	Row%	6-10 fractions Count	Row%	>10 fractions Count	Row%
Facility 2136	630	3%	127	20%	343	54%	110	17%	50	8%
Facility 2197	2,214	10%	182	8%	552	25%	1,070	48%	410	19%
Facility 2116	733	3%	35	5%	260	35%	346	47%	92	13%
Facility 1324	819	4%	111	14%	345	42%	238	29%	125	15%
Facility 2918	259	1%	44	17%	94	36%	91	35%	30	12%
Facility 12	2,271	10%	580	26%	1,189	52%	334	15%	168	7%
Facility 1298	1,175	5%	63	5%	457	39%	495	42%	160	14%
Facility 2913	163	<1%	30	18%	67	41%	48	29%	18	11%
Facility 2464	774	3%	43	6%	285	37%	358	46%	88	11%
Facility 474	684	3%	27	4%	151	22%	323	47%	183	27%
Facility 4	3,779	17%	553	15%	1,673	44%	928	25%	625	17%
Facility 1155	1,303	6%	205	16%	559	43%	333	26%	206	16%
Facility 2874	3,584	16%	893	25%	1,742	49%	531	15%	418	12%
Facility 987	572	3%	28	5%	171	30%	307	54%	66	12%
Facility 2875	3,327	15%	633	19%	1,611	48%	584	18%	498	15%
Sites with low volumes[1]										
Facility 2960	6	<1%	1	17%	5	83%	0	0%	0	0%
Facility 3018	6	<1%	1	17%	3	50%	0	0%	2	33%
Facility 2905	8	<1%	0	0%	2	25%	5	63%	1	13%
Facility 1825	29	<1%	4	14%	10	34%	12	41%	3	10%
Facility 3133	26	<1%	4	15%	16	62%	6	23%	0	0%
Facility 68	99	<1%	14	14%	38	38%	37	37%	10	10%
Facility 807	40	<1%	13	33%	18	45%	5	13%	4	10%
Queensland	**22,501**	**100%**	**3,591**	**16%**	**9,591**	**43%**	**6,161**	**27%**	**3,157**	**14%**

1.11 | 30 day mortality following PRT fractionation schedules

Death years 2008-2017

What are the fractionation schedules for Queenslanders receiving PRT within 30 days of death by treating facility?

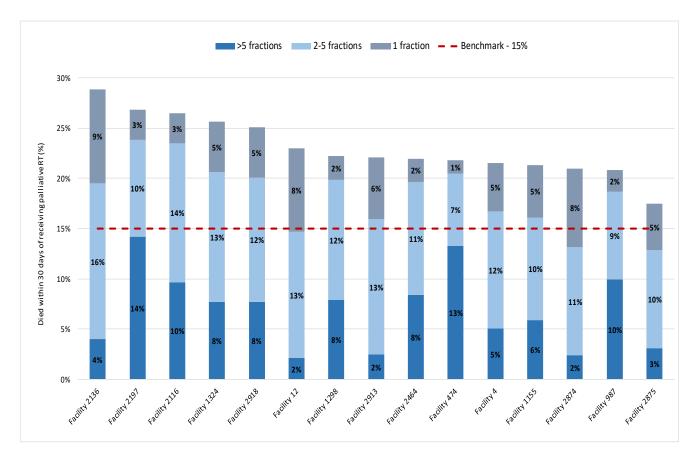| Facility	Received PRT ≤30 days of death Count	Row%[2]	Single fractions Count	Row%	2-5 fractions Count	Row%	6-10 fractions Count	Row%	>10 fractions Count	Row%
Facility 2136	182	29%	59	32%	98	54%	20	11%	5	3%
Facility 2197	594	27%	66	11%	214	36%	265	45%	49	8%
Facility 2116	194	26%	22	11%	101	52%	65	34%	6	3%
Facility 1324	210	26%	41	20%	106	50%	50	24%	13	6%
Facility 2918	65	25%	13	20%	32	49%	17	26%	3	5%
Facility 12	523	23%	190	36%	285	54%	34	7%	14	3%
Facility 1298	261	22%	28	11%	140	54%	81	31%	12	5%
Facility 2913	36	22%	10	28%	22	61%	4	11%	0	0%
Facility 2464	170	22%	18	11%	87	51%	61	36%	4	2%
Facility 474	149	22%	9	6%	49	33%	66	44%	25	17%
Facility 4	813	22%	180	22%	443	54%	128	16%	62	8%
Facility 1155	278	21%	68	24%	133	48%	54	19%	23	8%
Facility 2874	753	21%	281	37%	387	51%	62	8%	23	3%
Facility 987	119	21%	12	10%	50	42%	50	42%	7	6%
Facility 2875	581	17%	153	26%	324	56%	70	12%	34	6%
Sites with low volumes[1]										
Facility 2960	5	83%	1	20%	4	80%	0	0%	0	0%
Facility 3018	3	50%	1	33%	1	33%	0	0%	1	33%
Facility 2905	3	38%	0	0%	1	33%	1	33%	1	33%
Facility 1825	10	34%	3	30%	5	50%	2	20%	0	0%
Facility 3133	8	31%	1	13%	6	75%	1	13%	0	0%
Facility 68	29	29%	9	31%	11	38%	8	28%	1	3%
Facility 807	11	28%	6	55%	4	36%	1	9%	0	0%
Queensland	**4,997**	**22%**	**1,171**	**23%**	**2,503**	**50%**	**1,040**	**21%**	**283**	**6%**

[1] <150 cases of PRT over 10 years
[2] Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

1.12 | 30 day mortality following PRT fractionation schedules

Death years 2008-2017

What are the fractionation schedules for Queenslanders receiving PRT within 30 days of death by treating facility?

1.13 | Patients characteristics for all PRT by treating facility

Death years 2008-2017

What are the characteristics of Queenslanders who receive PRT by treating facility?

Facility	Received PRT Count	Received PRT Col%	Male Count	Male %	Age 75+ Count	Age 75+ %	Disadvantaged Count	Disadvantaged %	Rural Count	Rural %	≥1 Comorbidity Count	≥1 Comorbidity %
Facility 2136	630	3%	364	58%	226	36%	43	7%	21	3%	336	53%
Facility 2197	2,214	10%	1,260	57%	774	35%	452	20%	631	29%	1,243	56%
Facility 2116	733	3%	435	59%	343	47%	18	2%	26	4%	353	48%
Facility 1324	819	4%	529	65%	244	30%	248	30%	810	99%	417	51%
Facility 2918	259	1%	158	61%	94	36%	211	81%	251	97%	155	60%
Facility 12	2,271	10%	1,446	64%	634	28%	837	37%	1,371	60%	1,194	53%
Facility 1298	1,175	5%	741	63%	489	42%	155	13%	333	28%	635	54%
Facility 2913	163	<1%	99	61%	62	38%	132	81%	160	98%	98	60%
Facility 2464	774	3%	464	60%	313	40%	149	19%	292	38%	448	58%
Facility 474	684	3%	432	63%	275	40%	113	17%	115	17%	361	53%
Facility 4	3,779	17%	2,200	58%	1,173	31%	1,269	34%	1,338	35%	2,213	59%
Facility 1155	1,303	6%	823	63%	496	38%	464	36%	1,264	97%	753	58%
Facility 2874	3,584	16%	2,266	63%	1,055	29%	1,003	28%	575	16%	1,907	53%
Facility 987	572	3%	340	59%	251	44%	29	5%	19	3%	277	48%
Facility 2875	3,327	15%	1,818	55%	1,210	36%	776	23%	599	18%	1,848	56%
Sites with low volumes[1]												
Facility 2960	6	<1%	4	67%	4	67%	1	17%	0	0%	3	50%
Facility 3018	6	<1%	5	83%	3	50%	0	0%	0	0%	4	67%
Facility 2905	8	<1%	7	88%	7	88%	4	50%	0	0%	4	50%
Facility 1825	29	<1%	21	72%	13	45%	12	41%	6	21%	20	69%
Facility 3133	26	<1%	17	65%	13	50%	4	15%	5	19%	12	46%
Facility 68	99	<1%	60	61%	23	23%	34	34%	98	99%	55	56%
Facility 807	40	<1%	29	73%	13	33%	8	20%	14	35%	24	60%
Queensland	**22,501**	**100%**	**13,518**	**60%**	**7,715**	**34%**	**5,962**	**26%**	**7,928**	**35%**	**12,360**	**55%**

1.14 | Patient characteristics for 30 day mortality following PRT

Death years 2008-2017

What are the characteristics of Queenslanders who receive PRT within 30 days of death by treating facility?

Facility	Received PRT ≤30 days of death Count	Received PRT ≤30 days of death Row%[2]	Male Count	Male %	Age 75+ Count	Age 75+ %	Disadvantaged Count	Disadvantaged %	Rural Count	Rural %	≥1 Comorbidity Count	≥1 Comorbidity %
Facility 2136	182	29%	106	58%	59	32%	12	7%	7	4%	84	46%
Facility 2197	594	27%	376	63%	189	32%	110	19%	139	23%	324	55%
Facility 2116	194	26%	124	64%	82	42%	7	4%	8	4%	87	45%
Facility 1324	210	26%	138	66%	47	22%	71	34%	206	98%	97	46%
Facility 2918	65	25%	39	60%	21	32%	53	82%	64	98%	39	60%
Facility 12	523	23%	362	69%	125	24%	193	37%	282	54%	263	50%
Facility 1298	261	22%	160	61%	99	38%	35	13%	66	25%	128	49%
Facility 2913	36	22%	22	61%	14	39%	24	67%	35	97%	18	50%
Facility 2464	170	22%	111	65%	67	39%	32	19%	67	39%	95	56%
Facility 474	149	22%	99	66%	51	34%	18	12%	19	13%	77	52%
Facility 4	813	22%	498	61%	231	28%	276	34%	266	33%	479	59%
Facility 1155	278	21%	182	65%	84	30%	99	36%	274	99%	157	56%
Facility 2874	753	21%	504	67%	190	25%	231	31%	112	15%	371	49%
Facility 987	119	21%	85	71%	47	39%	4	3%	4	3%	51	43%
Facility 2875	581	17%	320	55%	157	27%	146	25%	94	16%	290	50%
Sites with low volumes[1]												
Facility 2960	5	83%	3	60%	3	60%	0	0%	0	0%	2	40%
Facility 3018	3	50%	3	100%	1	33%	0	0%	0	0%	2	67%
Facility 2905	3	38%	3	100%	2	67%	0	0%	0	0%	2	67%
Facility 1825	10	34%	7	70%	3	30%	4	40%	0	0%	5	50%
Facility 3133	8	31%	4	50%	1	13%	1	13%	2	25%	4	50%
Facility 68	29	29%	17	59%	5	17%	11	38%	29	100%	15	52%
Facility 807	11	28%	9	82%	1	9%	2	18%	3	27%	7	64%
Queensland	**4,997**	**22%**	**3,172**	**63%**	**1,479**	**30%**	**1,329**	**27%**	**1,677**	**34%**	**2,597**	**52%**

[1]<150 cases of PRT over 10 years
[2]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

1.15 | Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	N	%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**121,199**	**100%**	**22,501**	**19%**	**3,591**	**16%**	**9,591**	**43%**	**6,161**	**27%**	**3,157**	**14%**
2008	10,722	9%	1,959	18%	366	19%	857	44%	460	23%	276	14%
2009	10,978	9%	2,037	19%	317	16%	957	47%	491	24%	272	13%
2010	11,270	9%	2,117	19%	337	16%	949	45%	544	26%	287	14%
2011	11,487	9%	2,135	19%	324	15%	926	43%	553	26%	331	16%
2012	11,879	10%	2,218	19%	334	15%	924	42%	631	28%	329	15%
2013	12,218	10%	2,128	17%	285	13%	895	42%	606	28%	342	16%
2014	12,543	10%	2,245	18%	331	15%	882	39%	687	31%	345	15%
2015	12,985	11%	2,447	19%	393	16%	970	40%	739	30%	345	14%
2016	13,272	11%	2,576	19%	429	17%	1,111	43%	738	29%	298	12%
2017	13,845	11%	2,639	19%	475	18%	1,120	42%	712	27%	332	13%

[1]Received PRT (row %) = Received PRT/Number of decedents

1.16 | Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for patients who died within 30 days of PRT?

	Received PRT ≤30days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**4,997**	**22%**	**1,171**	**23%**	**2,503**	**50%**	**1,040**	**21%**	**283**	**6%**
2008	498	25%	117	23%	261	52%	87	17%	33	7%
2009	452	22%	97	21%	238	53%	88	19%	29	6%
2010	469	22%	108	23%	246	52%	91	19%	24	5%
2011	449	21%	105	23%	224	50%	93	21%	27	6%
2012	483	22%	108	22%	239	49%	110	23%	26	5%
2013	426	20%	84	20%	219	51%	89	21%	34	8%
2014	504	22%	117	23%	231	46%	125	25%	31	6%
2015	570	23%	128	22%	280	49%	126	22%	36	6%
2016	609	24%	165	27%	284	47%	138	23%	22	4%
2017	537	20%	142	26%	281	52%	93	17%	21	4%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

1.17 | Trends for 30 day mortality following PRT

Death years 2008-2017

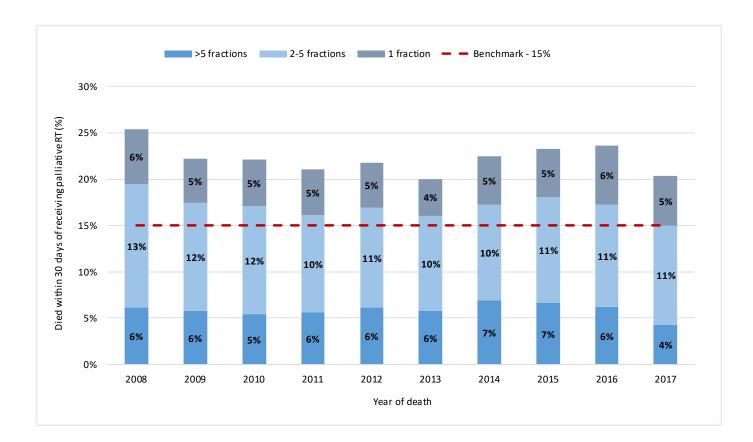Has the trend in fractionated schedules changed for patients who died within 30 days of PRT?

Spotlight on common cancers

Breast, Colorectal, Lung, Prostate and Melanoma

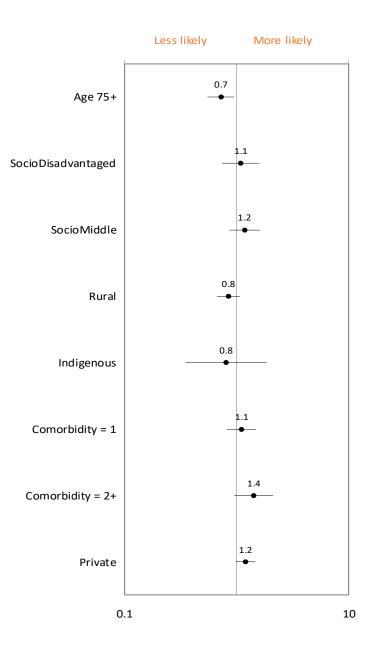# 2.1 | Breast cancer - Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland breast cancer decedents who received palliative radiation therapy (PRT) within 30 days of death?

	Number of decedents		Received PRT		Received PRT ≤30 days of death	
	N	%	Count	Row%	Counts	Row%
Queensland	**4,952**	**100%**	**2,172**	**44%**	**336**	**15%**
Sex						
Male	45	<1%	26	58%	1	4%
Female	4,907	99%	2,146	44%	335	16%
Age at death						
<18	0	0%	0	-	0	-
18 - 44	305	6%	197	65%	36	18%
45 - 54	694	14%	406	59%	63	16%
55 - 64	1,089	22%	584	54%	108	18%
65 - 74	1,146	23%	548	48%	76	14%
75 - 84	953	19%	311	33%	39	13%
85 +	765	15%	126	16%	14	11%
Indigenous status						
Indigenous	105	2%	40	38%	5	13%
Other than Indigenous	4,847	98%	2,132	44%	331	16%
Socioeconomic status*						
Affluent	551	11%	266	48%	39	15%
Middle	3,191	64%	1,411	44%	228	16%
Disadvantaged	1,209	24%	494	41%	68	14%
Remoteness						
Metropolitan	3,186	64%	1,447	45%	239	17%
Inner regional	1,125	23%	471	42%	60	13%
Outer regional	541	11%	206	38%	31	15%
Remote & very Remote	100	2%	48	48%	6	13%
Comorbidity						
0	2,606	53%	1,171	45%	190	16%
1	1,236	25%	573	46%	92	16%
≥ 2	1,110	22%	428	39%	54	13%
Facility						
Private	-	-	972	45%	164	17%
Public	-	-	1,200	55%	172	14%
Disease duration						
< 1 month	120	2%	1	<1%	1	100%
1-3mths	120	2%	27	23%	18	67%
3-6mths	141	3%	42	30%	13	31%
6-12mths	310	6%	93	30%	24	26%
1-2 years	579	12%	239	41%	54	23%
2-5 years	1,488	30%	752	51%	123	16%
≥ 5 years	2,194	44%	1,018	46%	103	10%

*Socioeconomic status: 1 case of unknown status excluded

2.2 | Breast cancer - Factors associated with 30 day mortality following PRT

Death years 2008-2017

The above graph (forest plot) is a graphical display of the hazard ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant. Hazard ratios for those from Middle and Disadvantaged socioeconomic areas are obtained by comparing to those from Affluent areas. Patients with comorbidities are compared to those with no comorbidities. Patient treated in a private facility compared to patients treated in a public facility. Male patients are compared to female patients. Indigenous are compared to non-Indigenous. Age 75 and over are compared with age less than 75.

2.3 | Breast cancer - Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for breast cancer patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fracitons	
	N	%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**4,952**	**100%**	**2,172**	**44%**	**362**	**17%**	**924**	**43%**	**677**	**31%**	**209**	**10%**
2008	469	9%	209	45%	32	15%	98	47%	57	27%	22	11%
2009	433	9%	180	42%	28	16%	83	46%	49	27%	20	11%
2010	464	9%	199	43%	24	12%	94	47%	63	32%	18	9%
2011	486	10%	201	41%	34	17%	84	42%	62	31%	21	10%
2012	494	10%	236	48%	36	15%	93	39%	80	34%	27	11%
2013	539	11%	215	40%	38	18%	94	44%	61	28%	22	10%
2014	459	9%	189	41%	39	21%	69	37%	65	34%	16	8%
2015	541	11%	261	48%	45	17%	113	43%	82	31%	21	8%
2016	530	11%	240	45%	46	19%	98	41%	70	29%	26	11%
2017	537	11%	242	45%	40	17%	98	40%	88	36%	16	7%

[1]Received PRT (row %) = Received PRT/Number of decedents

2.4 | Breast cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

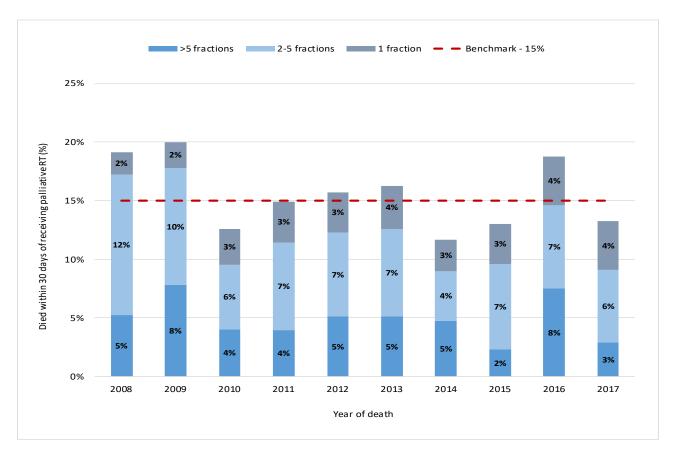Has the trend in fractionated schedules changed for breast cancer patients who died within 30 days of PRT?

	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**336**	**15%**	**71**	**21%**	**161**	**48%**	**91**	**27%**	**13**	**4%**
2008	40	19%	4	10%	25	63%	10	25%	1	3%
2009	36	20%	4	11%	18	50%	11	31%	3	8%
2010	25	13%	6	24%	11	44%	7	28%	1	4%
2011	30	15%	7	23%	15	50%	7	23%	1	3%
2012	37	16%	8	22%	17	46%	12	32%	0	0%
2013	35	16%	8	23%	16	46%	9	26%	2	6%
2014	22	12%	5	23%	8	36%	8	36%	1	5%
2015	34	13%	9	26%	19	56%	6	18%	0	0%
2016	45	19%	10	22%	17	38%	14	31%	4	9%
2017	32	13%	10	31%	15	47%	7	22%	0	0%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

2.5 | Breast cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for breast cancer patients who died within 30 days of PRT?

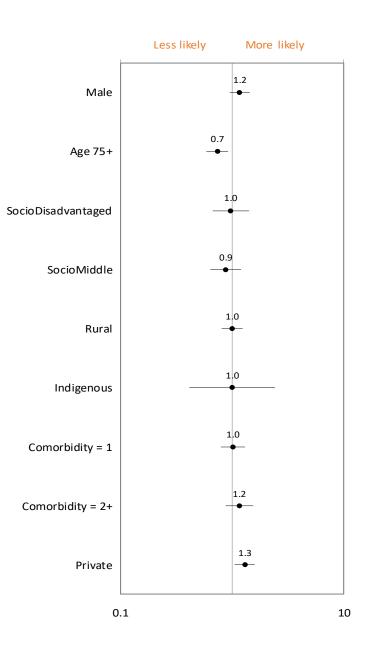# 3.1 | Colorectal cancer - Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland colorectal cancer decedents who received palliative radiation therapy (PRT) within 30 days of death?

| | Number of decedents | | Received PRT | | Received PRT ≤30 days of death | |
	N	%	Count	Row%	Count	Row%
Queensland	**9,967**	**100%**	**1,575**	**16%**	**316**	**20%**
Sex						
Male	5,479	55%	946	17%	201	21%
Female	4,488	45%	629	14%	115	18%
Age at death						
<18	1	<1%	0	0%	0	-
18 - 44	321	3%	81	25%	20	25%
45 - 54	633	6%	167	26%	43	26%
55 - 64	1,407	14%	358	25%	74	21%
65 - 74	2,427	24%	462	19%	97	21%
75 - 84	3,100	31%	371	12%	70	19%
85 +	2,078	21%	136	7%	12	9%
Indigenous status						
Indigenous	134	1%	21	16%	4	19%
Other than Indigenous	9,833	99%	1,554	16%	312	20%
Socioeconomic status*						
Affluent	973	10%	157	16%	35	22%
Middle	6,193	62%	1,007	16%	197	20%
Disadvantaged	2,800	28%	411	15%	84	20%
Remoteness						
Metropolitan	6,125	61%	1,004	16%	203	20%
Inner regional	2,500	25%	356	14%	70	20%
Outer regional	1,135	11%	181	16%	35	19%
Remote & very Remote	207	2%	34	16%	8	24%
Comorbidity						
0	4,496	45%	764	17%	156	20%
1	2,637	26%	406	15%	83	20%
≥ 2	2,834	28%	405	14%	77	19%
Facility						
Private	-	-	689	44%	161	23%
Public	-	-	886	56%	155	17%
Disease duration						
< 1 month	773	8%	6	<1%	6	100%
1-3mths	951	10%	53	6%	32	60%
3-6mths	855	9%	73	9%	18	25%
6-12mths	1,326	13%	166	13%	39	23%
1-2 years	1,945	20%	343	18%	62	18%
2-5 years	2,507	25%	559	22%	98	18%
≥ 5 years	1,610	16%	375	23%	61	16%

*Socioeconomic status: 1 case of unknown status excluded

3.2 | Colorectal cancer - Factors associated with 30 day mortality following PRT

Death years 2008-2017

The above graph (forest plot) is a graphical display of the hazard ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant. Hazard ratios for those from Middle and Disadvantaged socioeconomic areas are obtained by comparing to those from Affluent areas. Patients with comorbidities are compared to those with no comorbidities. Patient treated in a private facility compared to patients treated in a public facility. Male patients are compared to female patients. Indigenous are compared to non-Indigenous. Age 75 and over are compared with age less than 75.

3.3 | Colorectal cancer - Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for colorectal cancer patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	N	Col%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**9,967**	**100%**	**1,575**	**16%**	**190**	**12%**	**672**	**43%**	**442**	**28%**	**271**	**17%**
2008	899	9%	135	15%	22	16%	58	43%	31	23%	24	18%
2009	973	10%	169	17%	19	11%	78	46%	42	25%	30	18%
2010	978	10%	154	16%	25	16%	69	45%	36	23%	24	16%
2011	946	9%	153	16%	13	8%	63	41%	41	27%	36	24%
2012	964	10%	152	16%	14	9%	62	41%	52	34%	24	16%
2013	1,003	10%	137	14%	16	12%	56	41%	41	30%	24	18%
2014	997	10%	142	14%	11	8%	63	44%	41	29%	27	19%
2015	1,059	11%	177	17%	15	8%	67	38%	60	34%	35	20%
2016	1,049	11%	166	16%	24	14%	72	43%	49	30%	21	13%
2017	1,099	11%	190	17%	31	16%	84	44%	49	26%	26	14%

[1]Received PRT (row %) = Received PRT/Number of decedents

3.4 | Colorectal cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

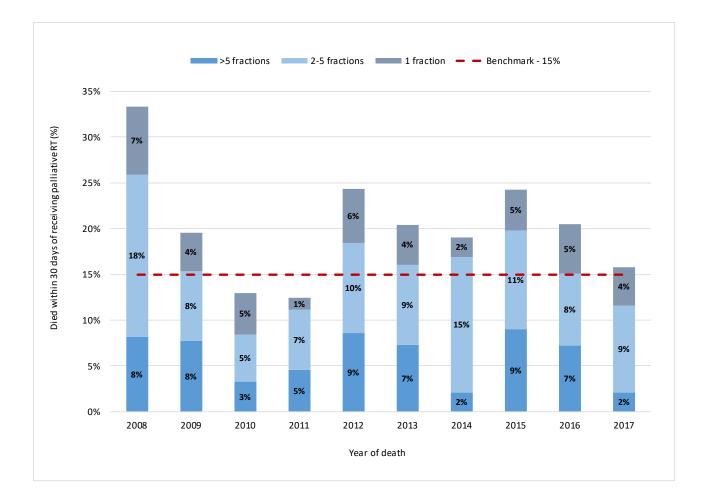Has the trend in fractionated schedules changed for colorectal cancer patients who died within 30 days of PRT?

	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**316**	**20%**	**69**	**22%**	**153**	**48%**	**74**	**23%**	**20**	**6%**
2008	45	33%	10	22%	24	53%	8	18%	3	7%
2009	33	20%	7	21%	13	39%	9	27%	4	12%
2010	20	13%	7	35%	8	40%	4	20%	1	5%
2011	19	12%	2	11%	10	53%	6	32%	1	5%
2012	37	24%	9	24%	15	41%	10	27%	3	8%
2013	28	20%	6	21%	12	43%	9	32%	1	4%
2014	27	19%	3	11%	21	78%	3	11%	0	0%
2015	43	24%	8	19%	19	44%	12	28%	4	9%
2016	34	20%	9	26%	13	38%	10	29%	2	6%
2017	30	16%	8	27%	18	60%	3	10%	1	3%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

3.5 | Colorectal cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for colorectal cancer patients who died within 30 days of PRT?
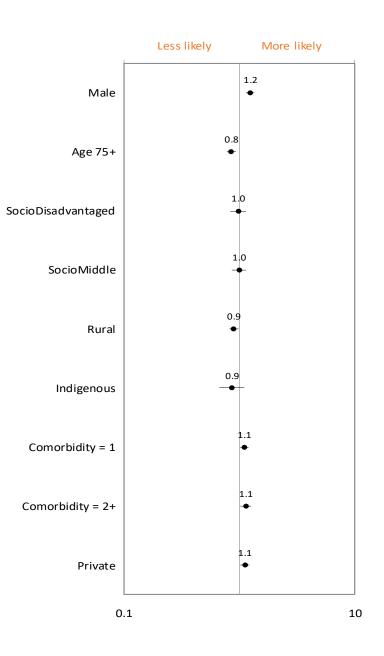
4.1 | Lung cancer - Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland lung cancer decedents who received palliative radiation therapy (PRT) within 30 days of death?

	Number of decedents		Received PRT		Received PRT ≤30 days of death (n)	
	N	%	Count	Row%	Count	Row%
Queensland	**16,742**	**100%**	**6,661**	**40%**	**1,860**	**28%**
Sex						
Male	10,424	62%	4,062	39%	1,222	30%
Female	6,318	38%	2,599	41%	638	25%
Age at death						
<18	1	<1%	1	100%	0	0%
18 - 44	187	1%	120	64%	35	29%
45 - 54	1,020	6%	630	62%	197	31%
55 - 64	3,193	19%	1,673	52%	485	29%
65 - 74	5,634	34%	2,452	44%	685	28%
75 - 84	4,780	29%	1,443	30%	389	27%
85 +	1,927	12%	342	18%	69	20%
Indigenous status						
Indigenous	513	3%	209	41%	49	23%
Other than Indigenous	16,229	97%	6,452	40%	1,811	28%
Socioeconomic status						
Affluent	1,340	8%	567	42%	165	29%
Middle	10,072	60%	4,099	41%	1,162	28%
Disadvantaged	5,330	32%	1,995	37%	533	27%
Remoteness						
Metropolitan	10,239	61%	4,257	42%	1,236	29%
Inner regional	4,034	24%	1,450	36%	375	26%
Outer regional	1,989	12%	791	40%	217	27%
Remote & very Remote	480	3%	163	34%	32	20%
Comorbidity						
0	6,563	39%	2,989	46%	860	29%
1	5,219	31%	2,041	39%	574	28%
≥ 2	4,960	30%	1,631	33%	426	26%
Facility						
Private	-	-	2,722	41%	811	30%
Public	-	-	3,939	59%	1,049	27%
Disease duration						
< 1 month	2,251	13%	212	9%	210	99%
1-3mths	2,961	18%	977	33%	568	58%
3-6mths	2,616	16%	1,166	45%	310	27%
6-12mths	3,379	20%	1,694	50%	381	22%
1-2 years	2,751	16%	1,432	52%	229	16%
2-5 years	1,913	11%	927	48%	130	14%
≥ 5 years	871	5%	253	29%	32	13%

4.2 | Lung cancer - Factors associated with 30 day mortality following PRT

Death years 2008-2017

The above graph (forest plot) is a graphical display of the hazard ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant. Hazard ratios for those from Middle and Disadvantaged socioeconomic areas are obtained by comparing to those from Affluent areas. Patients with comorbidities are compared to those with no comorbidities. Patient treated in a private facility compared to patients treated in a public facility. Male patients are compared to female patients. Indigenous are compared to non-Indigenous. Age 75 and over are compared with age less than 75.

4.3 | Lung cancer - Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for lung cancer patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	N	Col%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**16,742**	**100%**	**6,661**	**40%**	**1,093**	**16%**	**3,133**	**47%**	**1,719**	**26%**	**716**	**11%**
2008	1,525	9%	614	40%	114	19%	294	48%	133	22%	73	12%
2009	1,572	9%	623	40%	99	16%	332	53%	136	22%	56	9%
2010	1,603	10%	631	39%	101	16%	328	52%	143	23%	59	9%
2011	1,594	10%	626	39%	97	15%	310	50%	153	24%	66	11%
2012	1,655	10%	652	39%	94	14%	312	48%	161	25%	85	13%
2013	1,731	10%	593	34%	87	15%	253	43%	167	28%	86	15%
2014	1,774	11%	681	38%	112	16%	294	43%	205	30%	70	10%
2015	1,744	10%	739	42%	124	17%	322	44%	212	29%	81	11%
2016	1,754	10%	781	45%	146	19%	350	45%	217	28%	68	9%
2017	1,790	11%	721	40%	119	17%	338	47%	192	27%	72	10%

[1]Received PRT (row %) = Received PRT/Number of decedents

4.4 | Lung cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for lung cancer patients who died within 30 days of PRT?
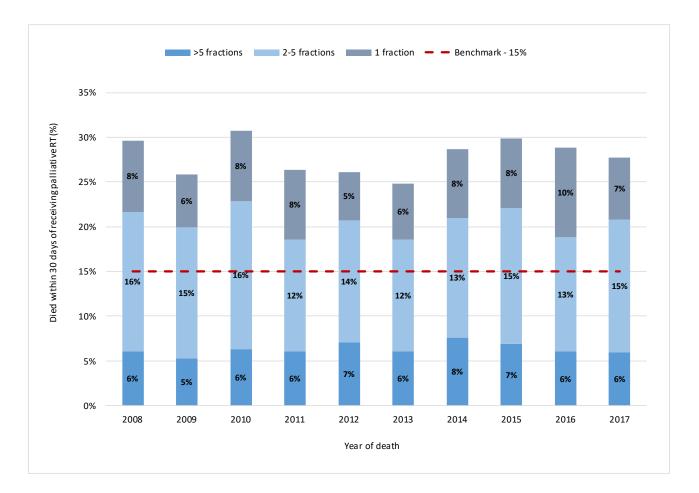
	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**1,860**	**28%**	**495**	**27%**	**942**	**51%**	**353**	**19%**	**70**	**4%**
2008	182	30%	49	27%	96	53%	25	14%	12	7%
2009	161	26%	37	23%	91	57%	25	16%	8	5%
2010	194	31%	50	26%	104	54%	33	17%	7	4%
2011	165	26%	49	30%	78	47%	31	19%	7	4%
2012	170	26%	35	21%	89	52%	39	23%	7	4%
2013	147	25%	37	25%	74	50%	31	21%	5	3%
2014	195	29%	52	27%	91	47%	45	23%	7	4%
2015	221	30%	58	26%	112	51%	43	19%	8	4%
2016	225	29%	78	35%	100	44%	44	20%	3	1%
2017	200	28%	50	25%	107	54%	37	19%	6	3%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

4.5 | Lung cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for lung cancer patients who died within 30 days of PRT?

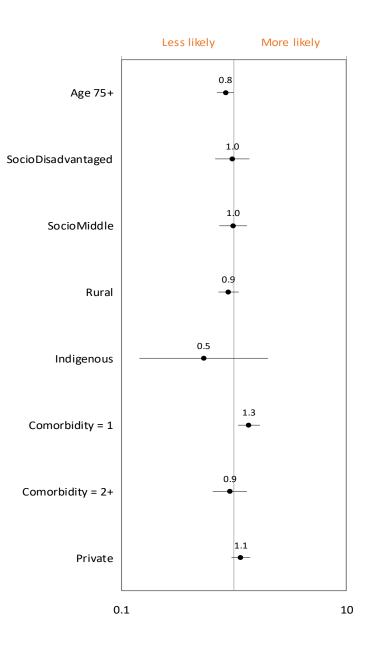# 5.1 | Prostate cancer - Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland prostate cancer decedents who received palliative radiation therapy (PRT) within 30 days of death?

| | Number of decedents | | Received PRT | | Received PRT ≤30 days of death | |
	N	%	Count	Row%	Count	Row%
Queensland	**6,014**	**100%**	**2,515**	**42%**	**401**	**16%**
Age at death						
<18	0	0%	0	-	0	-
18 - 44	3	<1%	3	100%	1	33%
45 - 54	44	<1%	36	82%	9	25%
55 - 64	384	6%	269	70%	47	17%
65 - 74	1,354	23%	813	60%	138	17%
75 - 84	2,381	40%	957	40%	133	14%
85 +	1,848	31%	437	24%	73	17%
Indigenous status						
Indigenous	67	1%	23	34%	2	9%
Other than Indigenous	5,947	99%	2,492	42%	399	16%
Socioeconomic status*						
Affluent	620	10%	282	45%	48	17%
Middle	3,800	63%	1,679	44%	270	16%
Disadvantaged	1,593	26%	554	35%	83	15%
Remoteness						
Metropolitan	3,684	61%	1,642	45%	274	17%
Inner regional	1,484	25%	544	37%	80	15%
Outer regional	695	12%	274	39%	41	15%
Remote & very Remote	151	3%	55	36%	6	11%
Comorbidity						
0	2,315	38%	1,088	47%	196	18%
1	1,560	26%	666	43%	109	16%
≥ 2	2,139	36%	761	36%	96	13%
Facility						
Private	-	-	1,218	48%	221	18%
Public	-	-	1,297	52%	180	14%
Disease duration						
< 1 month	109	2%	9	8%	9	100%
1-3mths	148	2%	30	20%	15	50%
3-6mths	173	3%	43	25%	8	19%
6-12mths	414	7%	154	37%	45	29%
1-2 years	724	12%	362	50%	62	17%
2-5 years	1,450	24%	708	49%	105	15%
≥ 5 years	2,996	50%	1,209	40%	157	13%

*Socioeconomic status: 1 case of unknown status excluded

5.2 | Prostate cancer - Factors associated with 30 day mortality following PRT

Death years 2008-2017

The above graph (forest plot) is a graphical display of the hazard ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant. Hazard ratios for those from Middle and Disadvantaged socioeconomic areas are obtained by comparing to those from Affluent areas. Patients with comorbidities are compared to those with no comorbidities. Patient treated in a private facility compared to patients treated in a public facility. Indigenous are compared to non-Indigenous. Age 75 and over are compared with age less than 75.

5.3 | Prostate cancer - Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for prostate cancer patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	N	Col%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**6,014**	**100%**	**2,515**	**42%**	**686**	**27%**	**1,067**	**42%**	**586**	**23%**	**176**	**7%**
2008	571	9%	213	37%	73	34%	87	41%	45	21%	8	4%
2009	544	9%	219	40%	64	29%	105	48%	43	20%	7	3%
2010	628	10%	260	41%	70	27%	115	44%	60	23%	15	6%
2011	616	10%	259	42%	67	26%	101	39%	73	28%	18	7%
2012	633	11%	252	40%	63	25%	114	45%	58	23%	17	7%
2013	604	10%	225	37%	57	25%	96	43%	50	22%	22	10%
2014	577	10%	232	40%	52	22%	100	43%	61	26%	19	8%
2015	625	10%	278	44%	81	29%	97	35%	72	26%	28	10%
2016	612	10%	270	44%	60	22%	136	50%	54	20%	20	7%
2017	604	10%	307	51%	99	32%	116	38%	70	23%	22	7%

[1]Received PRT (row %) = Received PRT/Number of decedents

5.4 | Prostate cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

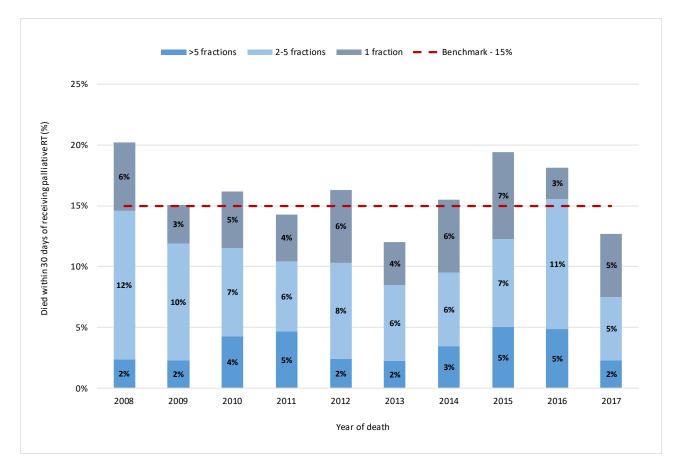Has the trend in fractionated schedules changed for prostate cancer patients who died within 30 days of PRT?

	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**401**	**16%**	**121**	**30%**	**194**	**48%**	**72**	**18%**	**14**	**3%**
2008	43	20%	12	28%	26	60%	5	12%	0	0%
2009	33	15%	7	21%	21	64%	5	15%	0	0%
2010	42	16%	12	29%	19	45%	9	21%	2	5%
2011	37	14%	10	27%	15	41%	9	24%	3	8%
2012	41	16%	15	37%	20	49%	5	12%	1	2%
2013	27	12%	8	30%	14	52%	4	15%	1	4%
2014	36	16%	14	39%	14	39%	7	19%	1	3%
2015	54	19%	20	37%	20	37%	10	19%	4	7%
2016	49	18%	7	14%	29	59%	12	24%	1	2%
2017	39	13%	16	41%	16	41%	6	15%	1	3%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death/Received PRT

5.5 | Prostate cancer - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for prostate cancer patients who died within 30 days of PRT?

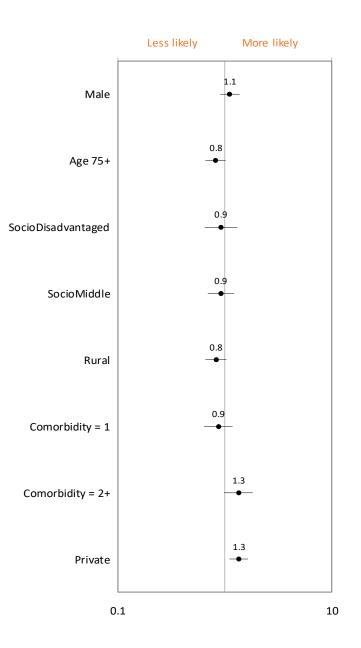# 6.1 | Melanoma - Characteristics of decedents

Death years 2008-2017

What are the characteristics of Queensland melanoma decedents who received palliative radiation therapy (PRT) within 30 days of death?

	Number of decedents		Received PRT		Received PRT ≤30 days of death	
	N	%	Counts	Row%	Counts	Row%
Queensland	**3,392**	**100%**	**1,432**	**42%**	**328**	**23%**
Sex						
Male	2,381	70%	1,001	42%	235	23%
Female	1,011	30%	431	43%	93	22%
Age at death						
<18	2	<1%	2	100%	0	0%
18 - 44	243	7%	151	62%	47	31%
45 - 54	350	10%	198	57%	38	19%
55 - 64	556	16%	303	54%	80	26%
65 - 74	765	23%	345	45%	73	21%
75 - 84	885	26%	312	35%	68	22%
85 +	591	17%	121	20%	22	18%
Indigenous status						
Indigenous	16	<1%	4	25%	1	25%
Other than Indigenous	3,376	100%	1,428	42%	327	23%
Socioeconomic status*						
Affluent	359	11%	156	43%	43	28%
Middle	2,115	62%	915	43%	210	23%
Disadvantaged	917	27%	361	39%	75	21%
Remoteness						
Metropolitan	2,098	62%	912	43%	227	25%
Inner regional	854	25%	324	38%	63	19%
Outer regional	387	11%	171	44%	34	20%
Remote & very Remote	53	2%	25	47%	4	16%
Comorbidity						
0	1,664	49%	766	46%	194	25%
1	822	24%	356	43%	65	18%
≥ 2	906	27%	310	34%	69	22%
Facility						
Private	-	-	539	38%	147	27%
Public	-	-	893	62%	181	20%
Disease duration						
< 1 month	82	2%	2	2%	2	100%
1-3mths	156	5%	56	36%	26	46%
3-6mths	192	6%	87	45%	17	20%
6-12mths	389	11%	168	43%	39	23%
1-2 years	587	17%	249	42%	65	26%
2-5 years	950	28%	443	47%	95	21%
≥ 5 years	1,036	31%	427	41%	84	20%

*Socioeconomic status: 1 case of unknown status excluded

6.2 | Melanoma - Factors associated with 30 day mortality following PRT

Death years 2008-2017

Less likely   More likely

Male	1.1
Age 75+	0.8
SocioDisadvantaged	0.9
SocioMiddle	0.9
Rural	0.8
Comorbidity = 1	0.9
Comorbidity = 2+	1.3
Private	1.3

0.1   10

The above graph (forest plot) is a graphical display of the hazard ratios for each covariate in the analysis. The dot represents the estimate of the hazard ratio with the confidence interval of the estimate represented by a horizontal line. The central vertical line represents no effect, if the confidence intervals for an estimate cross this central vertical line then the effect is considered not to be statistically significant. Hazard ratios for those from Middle and Disadvantaged socioeconomic areas are obtained by comparing to those from Affluent areas. Patients with comorbidities are compared to those with no comorbidities. Patient treated in a private facility compared to patients treated in a public facility. Male patients are compared to female patients. Age 75 and over are compared with age less than 75.

6.3 | Melanoma - Trends for all PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for melanoma patients receiving PRT?

	Number of decedents		Received PRT		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	N	Col%	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**3,392**	**100%**	**1,432**	**42%**	**156**	**11%**	**693**	**48%**	**452**	**32%**	**131**	**9%**
2008	308	9%	120	39%	17	14%	60	50%	31	26%	12	10%
2009	287	8%	140	49%	12	9%	61	44%	47	34%	20	14%
2010	348	10%	158	45%	17	11%	78	49%	47	30%	16	10%
2011	350	10%	155	44%	20	13%	80	52%	43	28%	12	8%
2012	340	10%	136	40%	11	8%	66	49%	47	35%	12	9%
2013	426	13%	173	41%	13	8%	93	54%	49	28%	18	10%
2014	352	10%	162	46%	11	7%	74	46%	60	37%	17	10%
2015	324	10%	126	39%	13	10%	53	42%	49	39%	11	9%
2016	306	9%	134	44%	18	13%	63	47%	45	34%	8	6%
2017	351	10%	128	36%	24	19%	65	51%	34	27%	5	4%

[1]Received PRT (row %) = Received PRT/Number of decedents

6.4 | Melanoma - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for melanoma patients who died within 30 days of PRT?

	Received PRT ≤30 days of death		Single fractions		2-5 fractions		6-10 fractions		>10 fractions	
	Count	Row%[1]	Count	Row%	Count	Row%	Count	Row%	Count	Row%
Queensland	**328**	**23%**	**61**	**19%**	**181**	**55%**	**78**	**24%**	**8**	**2%**
2008	31	26%	7	23%	16	52%	7	23%	1	3%
2009	26	19%	5	19%	14	54%	6	23%	1	4%
2010	40	25%	2	5%	26	65%	10	25%	2	5%
2011	33	21%	10	30%	17	52%	5	15%	1	3%
2012	36	26%	3	8%	24	67%	9	25%	0	0%
2013	34	20%	4	12%	25	74%	4	12%	1	3%
2014	29	18%	8	28%	9	31%	11	38%	1	3%
2015	32	25%	3	9%	15	47%	14	44%	0	0%
2016	33	25%	9	27%	18	55%	6	18%	0	0%
2017	34	27%	10	29%	17	50%	6	18%	1	3%

[1]Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death / Received PRT

6.5 | Melanoma - Trends for 30 day mortality following PRT

Death years 2008-2017

Has the trend in fractionated schedules changed for melanoma patients who died within 30 days of PRT?

Practice Guidelines

30 day mortality following PRT benchmark

Queensland radiation therapy services should aim to not exceed the recommended benchmark of 15% for the 30 day mortality rate for patients receiving palliative radiation therapy, based on the results of the meta-analysis discussed in this report.[1]

Appropriate patient selection for palliative radiation therapy should be based on performance status and life expectancy. Incorporation of validated short-term mortality prediction score/prognostic tools for assessment of palliative patients may assist in appropriate selection of patients and dose/fractionation schedules.

Fractionation schedule

Fractionation schedules for palliative patients with limited life expectancy i.e. less than 3 months should not exceed 5 fractions. Single fractions should be considered for all uncomplicated bone metastases in this setting.

Audit

Individual radiation therapy services should consider incorporating departmental audits documenting 30 day mortality rates for patients receiving palliative radiation therapy into routine service management. These indicators can be routinely reported to department or executive meetings.

Examples of audits may include:
- Review of all cases of patients who die within 30 days of receiving PRT in departmental morbidity and mortality meetings to review quality of care, the number of fractions prescribed and number of fractions received and identify opportunities for improvement
- When 30 day mortality rate exceeds recommended benchmark of 15%, an audit of cases to review case mix looking for patient characteristics that are known to be associated with higher 30 day mortality.[1]
- Retrospective review of PRT treatments during the last 6 months for patients prescribed >10 fractions, to examine clinical reasoning for extended fractionation schedules
- Pre-treatment peer review for Radiation Oncologists to review all palliative schedules prescribed >10 fractions

Education

All Radiation Oncologists should be aware of this new best practice metric and the meta-analysis that supports it. Radiation Oncologists should also be familiar with published validated prognostic tools that allow for better prediction of 30 day and 90 day mortality that can aid in decision making regarding optimal fractionation schedule and help ensure all patients referred for palliative radiation can receive maximum symptom control with minimal treatment burden.[7,8,9,10,11,12,13]

Appendix A | Method

Inclusions

All Queenslanders diagnosed with cancer who died between 2008 – 2017, from all cause death (cancer or non cancer deaths).

Exclusions

Patients who received PRT for non-melanoma skin cancer (squamous cell carcinoma/basal cell carcinoma) because non-melanoma skin cancer is not notifiable to the Queensland Cancer Register.

Assigning a PRT record to a diagnosis

To assign a PRT record to a diagnosis or death record, the PRT record closest to death is linked to the Qld Oncology Repository (QOR) diagnosis or death record using the following method:

1. If patient is diagnosed with a single cancer assign the last PRT to the diagnosis.
2. If patient diagnosed with more than one cancer assign the last PRT to the diagnosis where:
      a.   last PRT ICD10AM cancer site code is similar to the QOR ICD10AM primary site code; or
      b.   last PRT cancer site stream is similar to the QOR primary site stream; or
      c.   cause of death code is similar to QOR ICD10AM primary site code; or
      d.   last diagnosis before death

Last palliative treatment is counted from last treatment end date to date of death.

Appendix B | Non cancer deaths receiving PRT

	Non cancer deaths		Received PRT		Received PRT ≤30 days of death	
	N	%	Count	Row%[1]	Count	Row%[2]
	37,661	*100%*	*995*	*100%*	*128*	*13%*
Bone and soft tissue	224	1%	14	6%	1	7%
Breast	4,562	12%	105	2%	13	12%
CNS and Brain	96	0%	10	10%	2	20%
Colorectal	6,191	16%	63	1%	2	3%
Endocrine	302	1%	4	1%	0	0%
Gynaecological	1,489	4%	19	1%	3	16%
Haematological	4,231	11%	137	3%	12	9%
Head and neck	1,754	5%	37	2%	7	19%
Hepatobiliary	516	1%	12	2%	5	42%
Lung	1,721	5%	176	10%	43	24%
Melanoma	5,812	15%	45	1%	3	7%
Mesothelioma	38	0%	4	11%	2	50%
Ophthalmic	122	0%	0	0%	0	-
Prostate	6,518	17%	202	3%	17	8%
Upper GI	803	2%	38	5%	6	16%
Urological	2,528	7%	92	4%	8	9%
Other invasive cancers	754	2%	37	5%	4	11%

[1] Received PRT (row %) = Received PRT/Number of decedents
[2] Received PRT ≤30 days of death (row %) = Received PRT ≤30 days of death / Received PRT

Cancer and non cancer deaths are coded in the Queensland Cancer Register (QCR) by expert clinical coders. The QCR is one of the largest population-based cancer registries in Australia bringing together a comprehensive set of cancer data (incidence, mortality and survival) to provide an accurate picture of cancer in Queensland.

The rules for coding cause of death are consistent with Cancer Registries both nationally and internationally to allow comparison across jurisdictions.

Rules
1. Cause of death: the disease or condition directly leading to death
Antecedent causes: morbid conditions (if any) giving rise to the above cause
2. Other significant conditions contributing to the death, but not related to the disease or condition causing it.

Example
1(A) Acute pulmonary oedema (B) Myocardial injury (C) Diabetes, 2 Lymphoma

The non cancer deaths in this report are a result of this coding practice and results in 3% of Queenslanders with cancer coded as non cancer deaths while receiving treatment.

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Glossary

30 day mortality
The percentage of patients that die within 30 days following the end date of last palliative radiation therapy

Age at death
Date of death - date of birth

Cancer site (primary)
In this report the primary cancer is the tumour that the patient died from, or if a non cancer death, the primary cancer with which the patient was diagnosed. If the patient had more than one primary cancer see appendix A for the methodology for linking the radiation therapy treatment to the primary cancer.

Comorbidity (count over course of disease)
A clinical condition that has the potential to significantly affect a cancer patient's prognosis or clinical consideration of treatment options. 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 from 12 months before diagnosis to date of death.

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		

Decedent year
This report is structured around year of death as recorded in Queensland Cancer Register. Queenslanders who have died between 2008 and 2017, both cancer and non-cancer deaths, and regardless of date of diagnosis of cancer are included in this report.
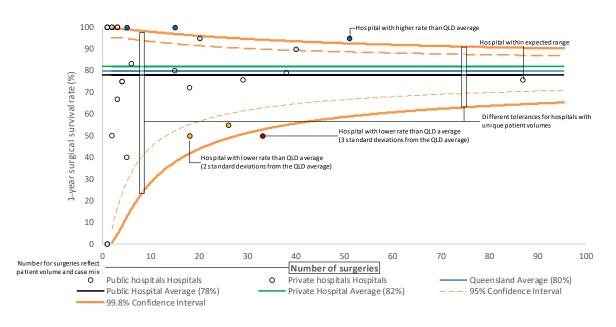
Disease duration
Date of death – date of diagnosis

Fractionated schedules
Dose of palliative radiation therapy fractions received grouped by single, 2-5, 6-10 and >10 fractions

Funnel plot

Funnel plots have been created by plotting the observed result for each hospital result against the surgery volume of the hospital. Confidence limit intervals of 95% (~2 standard deviations) and 99% (~3 standard deviations) have been superimposed around the overall Queensland result.

The funnel plot provides a graphical representation of individual hospital rates and where they sit in relation to the Queensland average. A facility rate outside either of the "funnel" curves of the confidence interval lines is deemed to be statistically significant from the Queensland average.

Example funnel plot:

Indigenous status
A measure of whether a person identifies as being of Aboriginal and/or Torres Strait Islander origin.

Palliative Treatment intent
Treatment to relieve symptoms such as pain and improve quality of life.

Palliative radiation therapy
Radiation therapy doses that have been identified as palliative by the treating clinician and recorded in treatment source systems such as MOSAIQ or ARIA with a palliative intent. If intent has not been recorded it has been imputed based on radiation therapy dose. Intent breakdown: source data 87%, imputed 10% and unknown 3%.

Radiation therapy services
Private facility - Radiation therapy services that are private, or that are participating in public/private partnerships
Public facility - Radiation therapy services that are operated by Queensland Health

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	
Remote	Rural and 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.

Rural

Includes ASGC classifications of: Inner regional, Outer regional, Remote and Very remote (see remoteness)

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%

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