

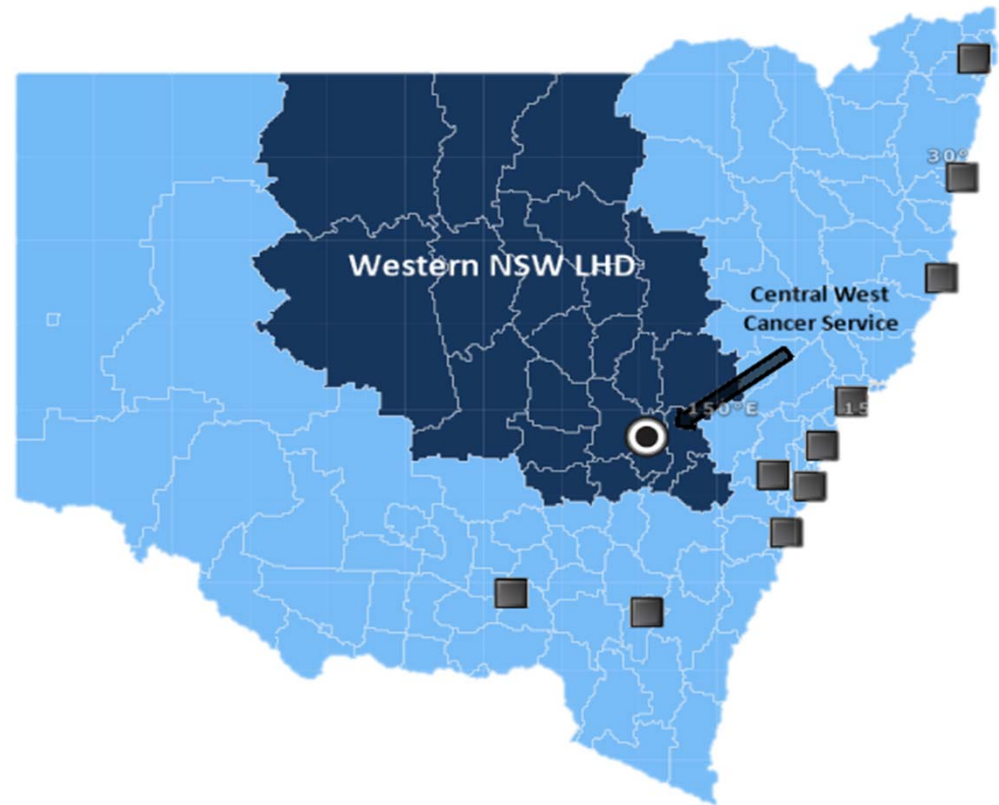
# The change to radiotherapy utilisation in a rural area after the establishment of a local service

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# Background:



# Aim:

To evaluate the impact of a new rural radiotherapy centre in a geographically sparse area of NSW.

## Objectives:

- 1) Age
- 2) Gender
- 3) Treatment Intent
- 4) Cancer Type
- 5) Geographical Region



# Method:

## **Repeat cross sectional study:**

Data was collected on every WNSWLHD patient who had radiotherapy in **2010** (pre service) and **2012** (service at full capacity).

## **Inclusion Criteria:**

- Patients 17 years of age and over
- A residential address within WNSWLHD
- Received radiotherapy in the calendar years of 2010 or 2012
- Treated with a megavoltage course in NSW or ACT
- Diagnosed with a NSW Health notifiable cancer



# Method:

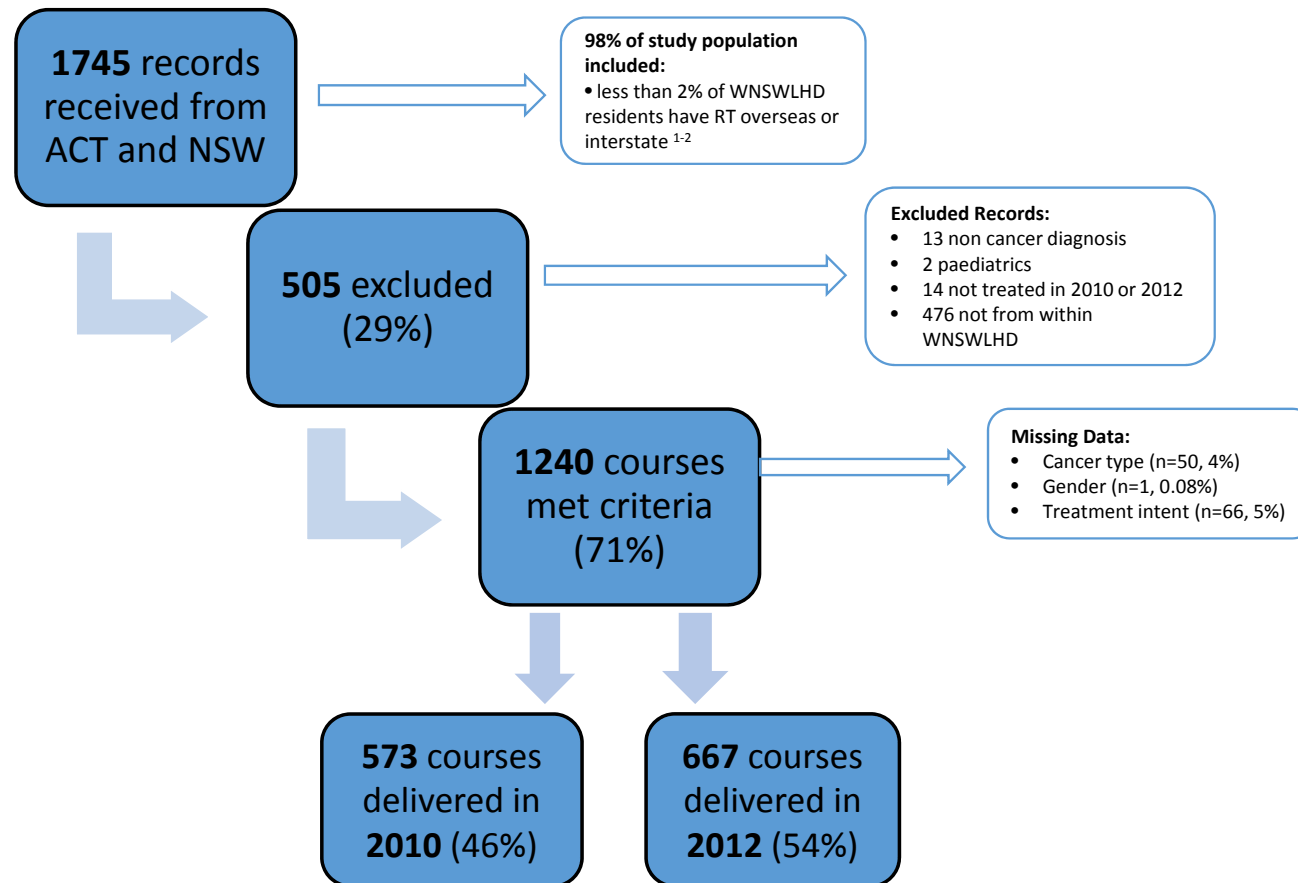
**Data Collection:** Every radiotherapy centre in NSW and ACT was a site of data collection. This equated to **22 in total**, 21 were within **NSW** (15 public + 6 private) and one public centre in the **ACT**.

**Patient information collected:**

- Age
- Gender
- Treatment Intent
- Cancer Diagnosis or ICD code
- Residential town and postcode
- Year of treated with radiotherapy



# Progression of records:



# Results:

**573** courses delivered in **2010 (46%)**

vs

**667** courses delivered in **2012 (54%)**

- **↑ 94 more** treatments in **2012**  
( $\chi^2(1)=6.0$ ,  $p=0.014$ )

## Radiotherapy Utilisation Rate:

Year	RTU
2010	29.3%
2012	33.4%

- $RTU = \frac{\text{The number of new radiotherapy courses}}{\text{The number of new cancer cases}}$
- RTU increased 4.1% in 2012
- RTU results are comparable to findings in similar studies<sup>3</sup>

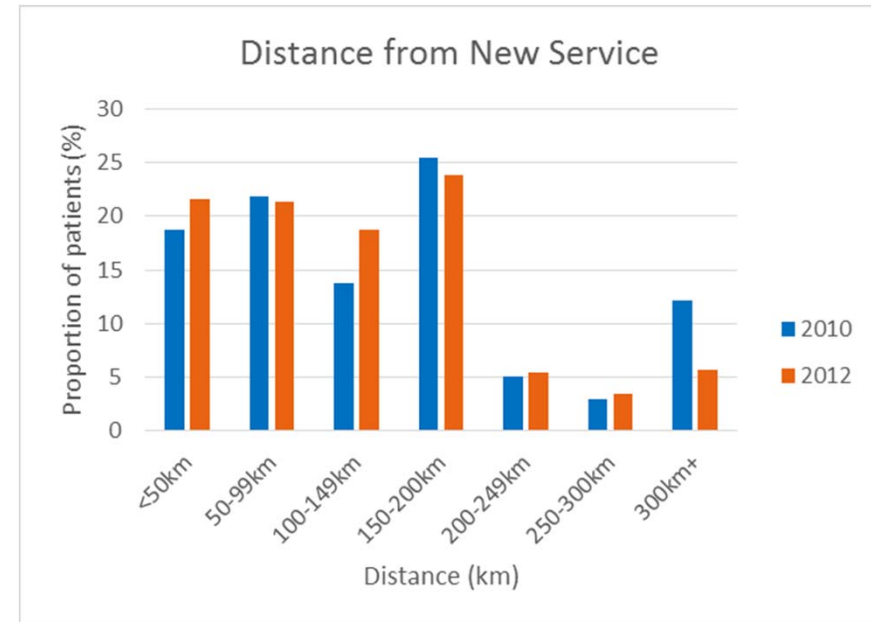
# Geographical Distance

Table 1: Distance Travelled to the Radiotherapy Centre

Year	Mean (km)	p value	Mean difference (95% CI)	Test
2010	338.7	>0.0001	128.5km (111km-145.5km)	Independent Samples T- Test
2012	210.2			

Table 2: Distance from participant's residential location to CWCS, Orange

Year	Mean (km)	p value	Mean difference (95% CI)	Test
2010	143.3	0.002	20km (7km-32km)	Independent Samples T- Test
2012	123.6			

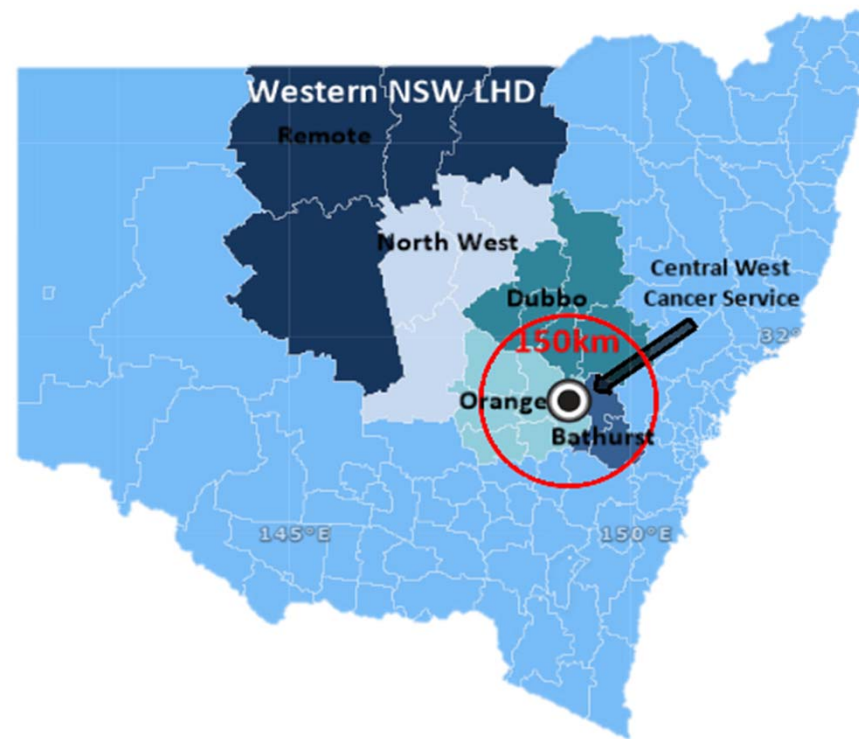




# Geographical Region

Table 3: Radiotherapy Utilisation Rates by Residential Region

Region	2010 RTU	2012 RTU	Change %
Bathurst	32%	37%	+ 5%
Orange	30%	40%	+ 10%
Dubbo	27%	28%	+ 1%
North West	31%	32%	+ 1%
Remote	31%	20%	-9%

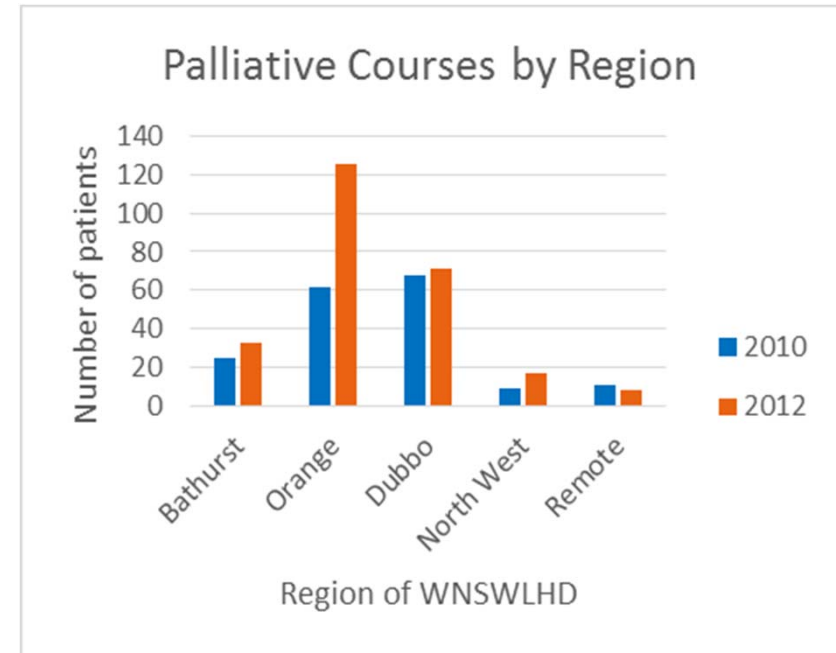


# Treatment Intent

Table 4: Number of palliative courses by Residential Region

Region	2010 n=175 n (%)	2012 n=254 n (%)	p value	OR (95% CI)	Test
Bathurst	25(14%)	33(13%)	0.46	1.3(0.7-2.3)	Univariate logistic Regression. (Wald: 10.6(4) p=0.03)
Orange	62(35%)	125(49%)	0.004	1.9(1.2-3.0)	
North West	9(3%)	11(7%)	0.74	1.2(0.5-3.0)	
Remote	11(6%)	8(3%)	0.47	0.7(0.3-1.8)	
Dubbo	68(39%)	71(28%)	reference		

- **62/79** new palliative treatments in **2012** were from within the **Orange** Region



# Gender

Table 5: Gender changes to radiation treatments using prevalence as the denominator

Gender	2010 n=573 n (%)	2012 n=667 n (%)	p value	OR (95% CI)	Test
Male	292(51%)	373(56%)	0.002	1.3 (1.1-1.5)	Chi-square
Female	280(49%)	294(44%)	0.75	1.0 (0.9-1.2)	

- **81 new male** treatments
- **14 new female** treatments

- It is **not known** why **male** treatments **increased significantly**
- Most likely it is a combination of factors, such as **physician referral, PSA tests prescribed, treatment options** and **improved access**



# Age:

Table 6: Changes to Age between 2010 and 2012

Age (years)	2010 n=573 n (%)	2012 n=667 n (%)	p value	OR (95% CI)	Test
Mean	64.9 yrs.	66.1 yrs.	0.09	mean diff: 1.2 yrs.(- 0.2-2.5)	Independent Samples T- Test
17-49	66(12%)	58(9%)	0.46	0.9(0.6-1.3)	Chi- Square
50-64	205(36%)	224(34%)	0.48	1.1(0.9-1.3)	
65-79	237(41%)	294(44%)	0.08	1.2(1.0-1.4)	
80+	65(11%)	91(14%)	0.07	1.4(1.0-1.9)	

- **Age** and a more accessible radiation service was shown to **not be significantly associated** in this study

# Cancer Type

Table 7: Cancer clinical groupings

Cancer Clinical Group	2010 n=573 n (%)	2012 n=667 n (%)	p value	OR (95% CI)	Test
Breast	136(24%)	146(22%)	0.64	1.1(0.8-1.4)	Chi Square
Urogenital	109(19%)	139(21%)	0.07	1.3(1.0-1.7)	
> (Prostate) <sup>[1]</sup>	92(16%)	123(18%)			
Respiratory	66(12%)	97(15%)	0.003	1.8(1.2-2.7)	
Skin	63(11%)	62(9%)	0.83	1.0(0.7-1.4)	
Colorectal	45(8%)	43(6%)	0.75	0.9(0.6-1.4)	
Head and Neck	28(5%)	37(6%)	0.24	1.4(0.8-2.4)	
Gynaecological	23(4%)	29(4%)	0.43	1.3(0.7-2.3)	
Upper GI	15(3%)	32(5%)	0.008	2.4(1.2-4.7)	
Neurological	14(2%)	16(2%)	0.61	1.3(0.5-3.5)	
Lymphohaematopoietic	13(2%)	29(4%)	0.01	2.3(1.2-4.5)	
Ill-defined and Unknown	12(2%)	17(3%)	0.3	1.6(0.7-3.7)	
Other	9(2%)	10(1%)	0.84	1.1(0.4-2.8)	

<sup>[1]</sup> The significance of prostate treatments was not tested as prevalence was obtained for only cancer clinical groups and not cancer types

- **Respiratory, upper GI and lymphohaematopoietic cancers significantly increased from 2010 to 2012**
- **The respiratory cancers treated increased by 19% (31 new courses) in 2012. Of the 31 new courses, 27 (87%) were palliative.**



# What does it all mean???

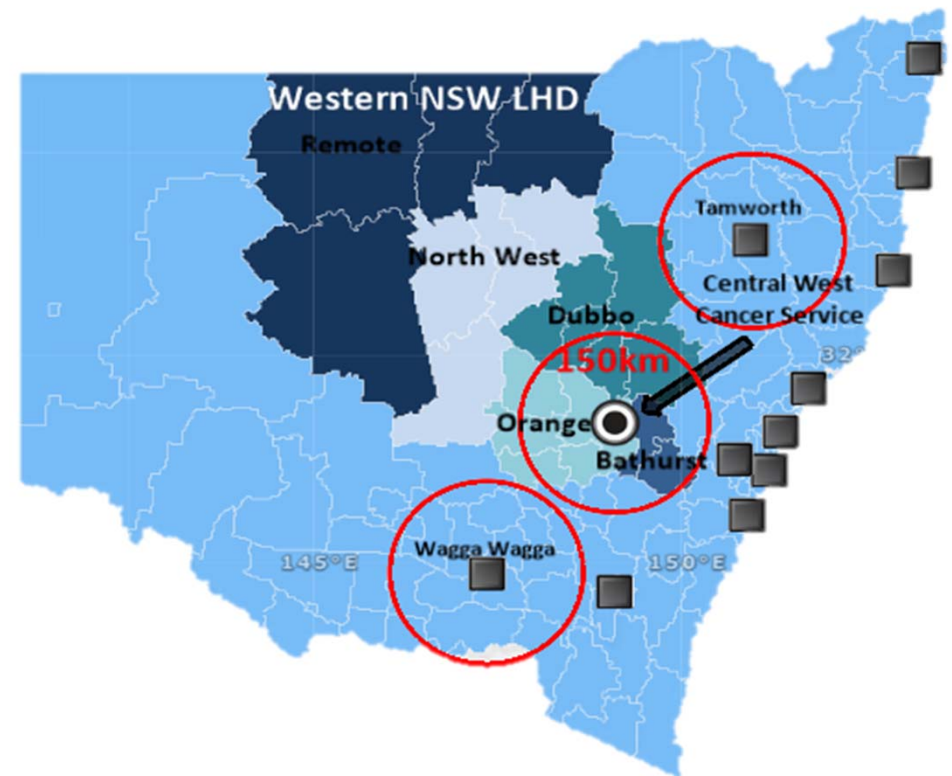
- **RTU** rates have **improved** since the CWCS opened
- **Orange** was the only region that had a **significantly higher** number of patients treated in **2012**
- RT rates **past 300km** of Orange and in the **Remote** region **worsened**
- **Males, palliative patients** from the **Orange region** and patients with a **respiratory cancer** also increased significantly





# Recommendations

- 1) WNSWLHD, NSW Health and Federal Health should continue to support the second linear accelerator, in terms of resources and staffing
- 2) For those living in NSW and greater than 300km from a radiation centre, other strategies to increase the uptake of radiotherapy need to be strengthened
- 3) Evaluation of radiotherapy utilisation in WNSWLHD should be reviewed once the second linear accelerator reaches full capacity



# Thank You

## References:

1. NSW Health. 2010 Radiotherapy Management Information System Report. Sydney: NSW Department of Health, 2011.
2. NSW Health. 2012 Radiotherapy Management Information System Report. Sydney: NSW Department of Health, 2013.
3. Gabriel G, Barton M.B., Delaney G.P. Radiotherapy Utilisation in NSW and ACT 2004-2006: A data linkage and GIS experience. Collaboration for Cancer Outcome, Research and Evaluation (CCORE), Ingham Institute, Liverpool Hospital, Sydney Australia. RANZCR 2013.

