



SOUTHERN CANCER NETWORK SOUTH ISLAND PET SCAN AUDIT: 1 JULY 2010 - 30 JUNE 2011

Authors:

Dr Iain Ward, Radiation Oncologist & Clinical Director Radiation Oncology, Canterbury Regional Cancer and Blood Service

Dr Shaun Costello, Radiation Oncologist, Southern Blood and Cancer Service, Clinical Director Medicine and Emergency Service Southern DHB and Clinical Director Southern Cancer Network

Ruth Robson, Project Manager, Southern Cancer Network

Rebecca McDowell, Report Analysis, Central Region's Technical Advisory Services Ltd (TAS)

October 2011.

EXECUTIVE SUMMARY

In December 2009, the Minister of Health agreed to \$1million sustainable funding per annum nationally to boost funding for PET scans based on nationally agreed clinical indications (Appendix one). This funding was intended to supplement existing DHB spending on PET scans and both increase the number of PET scans undertaken and address the variable and inequitable access to PET.

This report reflects the results of the audit of the 315 scans requested in the South Island between 1 July 2010 and 30 June 2011.

Details of the volume increases that occurred during that period and information regarding compliance with the national clinical indications for PET and whether the scans changed management for patients are provided.

The audit found that across all South Island DHBs in 2010/11 the volumes for 2008/09 were exceeded, by between 35% and 600%, with an average for the South Island of 160%. The total of PET scans for the South Island in 2010/11 was only 24 short of the 339¹ projected by the Ministry of Health.

In 86% of cases audited, the requested PET scans were deemed compliant with the national clinical indications and in 50% of cases, patients had their clinical management changed as a result of PET scan findings.

The auditors found there was some confusion with the wording and interpretation of the nationally approved indications for PET resulting in 12.5% of cases where the request was not compliant with the national clinical indications and a further 5.9% of cases where the referring clinician had inadvertently requested the scan using the wrong indication on the request form. A further 2.1% of cases were requested using one of the nationally approved indications when the scan should have gone before the Variance Committee.

As a result of this audit and in concordance with the Radiation Oncology Working Group and the Cancer Treatment Advisory Group, the audit team recommend:

1. A new indication for ovarian cancer is added to the list of nationally approved clinical indications, in line with the class action approved by the South Island Variance Committee during the year i.e. *staging of locally advanced recurrent ovarian cancer being considered for local treatment*.
2. That the wording in three of the national indications be amended to improve the clarity of intent of the indication, specifically:
 - Indication 2.
 - Indication 11.
 - Indication 10.

¹ December 2009 Ministry of Health letter to the South Island CEOs providing the 2008/09 volumes and modelling of volumes for 2010/11

3. Clinicians are asked to take greater care to make their request using the correct indication.
4. Clinicians are asked to take greater care to make their request using the correct indication appropriately.
5. On receipt of a PET request, the PET scan provider is asked to take a greater role in checking compliance with the indication based on the clinical information supplied by the requesting clinician.
6. On receipt of a PET request, the PET scan provider is asked to take a greater role in checking the correct indication has been requested on the request form.

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1. INTRODUCTION

The Southern Cancer Network (SCN) is one of four Regional Cancer Networks (RCNs) established in NZ, by the Ministry of Health. The role of the RCNs is to provide a framework that supports linkages between District Health Board (DHB) planners, DHB specialist service providers, Non Government Organisations (NGOs), Primary Health Care (PHOs) and Public Health Care Organisations and consumers, in the coordination and implementation of the Cancer Control Strategy Action Plan 2005-2010 and national programme of cancer 2011 across DHB regional areas.

SCN works with five DHBs – Nelson Marlborough; Canterbury; West Coast; South Canterbury and Southern.

Positron Emission Tomography (PET) is an imaging tool to support clinical decision-making on the appropriate treatment for some patients with cancer and can be used to more accurately plan treatment for patients.

Further to the expectation given by the minister in 2009, the aim nationally was to double the number of PET scans purchased in 2008-09. In 2008-09 the South Island purchased 121 PET scans and the aim of the boost funding was to increase these volumes in 2010-2011.

Commencing 1 July 2010, the Southern Cancer Network (SCN) in collaboration with the Canterbury DHB as lead DHB, worked with the other SI DHBs to agree on a South Island wide approach to PET scan funding and to ensure that the increased funding translated into increased availability of PET scan services in the South Island.

It was also agreed that the SCN would establish the South Island Regional Variance Committee and provide the secretariat for this group for the first 12 months. Further, SCN took responsibility for the audit of PET scan services after the first financial year.

Under the Crown Funding Agreement, Canterbury DHB assumed the responsibility for funding and reporting processes on behalf of South Island DHBs and for the establishment and maintenance of the South Island Registry (South Island PET scan database).

Christchurch Radiology Group (CRG) was the sole provider of PET scans in the South Island for the patients represented in this report.

All PET scans from all five South Island DHBs were included in the audit (n=315). NHI, patient demographics, referral, and receipt of referral scan dates were populated from the PET scan registry. Data was analysed in Excel 2007.

Additional data points were populated manually from the DHB patient information systems and diagnostic records and through access to the data base held at CRG.

It is noted that due to small numbers in some South Island DHBs, some percentages are over representative of the actual finding.

The audit team consisted of Dr Shaun Costello, Radiation Oncologist Southern DHB and SCN Clinical Director; Dr Iain Ward, Radiation Oncologist Canterbury DHB and Ruth Robson, Project Manager Southern Cancer Network.

To ensure impartiality and mitigate conflict of interest, Dr Costello audited PET cases in Canterbury DHB and Nelson Marlborough DHB and Dr Iain Ward audited cases in Southern DHB, South Canterbury DHB and West Coast DHB.

The audit team determined if the scan request was compliant with the national clinical indications by reviewing the clinical information and checking if the information correlated correctly to the clinical indication that the request was made under.

The questions as to whether the PET scan made a difference i.e. changed management or avoided costly treatments, were answered by comparing the scan result against the post scan patient treatment plan.

2. CONCLUSIONS

- Across all South Island DHBs in 2010/11 the volumes for 2008/09 were exceeded, by between 35% and 600%, with an average for the South Island of 160%.
- On average for the South Island, 26 scans were requested each month.
- Of the 315 scans requested for the South Island in 2010/11, 27 (8.6%) were approved by the Variance Committee.
- Clinical indication 3 (staging of non-small cell lung cancer (NSLC) prior to surgery or radiotherapy with curative intent) was the most commonly requested clinical indication across the South Island.
- Overall for the South Island, 86% of the requested PET scans that were not submitted to the Regional Variance Committee were deemed to be compliant with the national clinical indications when audited. By DHB this ranged from 63% (Nelson Marlborough) to 100% (West Coast)
- There were also 36 instances (12.5%) whereby an approved clinical indication was used inappropriately. In some cases, the audit team deemed this was the result of insufficient clarity within the wording of the national clinical indication i.e. the need for recurrent masses post surgery for colorectal cancer to be symptomatic. Other reasons why the request was deemed non compliant with the national clinical indication include:
 - Indication 2. Requests made when the patient was not symptomatic i.e. rising CEA level.
 - Indication 5. Requests made for restaging of Hodgkins lymphoma not non-Hodgkins lymphoma.
 - Indication 11. Requests made post treatment rather than pre treatment.
 - Indication 9: Requires an unknown primary. Requests were made where there was a known primary.
 - Across all indications, requests were made when there was no curative intent
- In a further 17 instances (5.9%) clinicians had inadvertently requested the wrong indication on the request form, but the patient still met the criteria for another approved clinical indication. In all but one instance, these cases were deemed compliant with the national clinical indications by the auditors.
- In the 2010/11 financial year, PET scans for six (2.1%) South Island patients were requested under an approved clinical indication when they should have been put before the Variance Committee i.e. Indication 2. requests made for anal cancer.
- The two indications that have been approved most frequently by variance committees nationally are staging of locally advanced cervical cancer and staging of locally advanced ovarian cancer². This differed in the South Island where there was only one scan requested for cervical cancer compared to six for melanoma. PET scans requested for ovarian cancer seems to be more in line with national trends.

² August 2011 PET scan memo from the Ministry of Health Cancer Team to the Cancer Treatment Advisory Group (CTAG)

- Based on an audit of records, 50% of South Island patients had their clinical management changed as a result of PET scan findings. By DHB this ranged from 32% (South Canterbury) to 86% (Nelson Marlborough)
 - Clinical management changed for 95% (21/22) of patients who came under clinical indication 5 (restaging of residual mass for Non Hodgkin's Lymphoma following definitive treatment).
- The wait time for all scans from the date the PET scan was **requested** to the date the PET scan was performed showed a median wait of 11 days and an average wait of 15 days.
- The median wait time was only slightly longer for scans that went through the Variance Committee compared to scans that did not (13 days vs. 11 days respectively). The average wait time was similar (14 days for variant scans, 15 days for non variant scans).
- The wait time for all scans from the date the PET scan was **performed** to the report date of the PET scan showed a median wait of 1 day and an average wait of 2 days.

3. RECOMMENDATIONS

As a result of this audit and in concordance with the Radiation Oncology Working Group and the Cancer Treatment Advisory Group, the audit team recommend:

1. A new indication for ovarian cancer is added to the list of nationally approved clinical indications, in line with the class action approved by the South Island Variance Committee during the year i.e. *staging of locally advanced recurrent ovarian cancer being considered for local treatment*.
2. That the wording in three of the national indications be amended to improve the clarity of intent of the indication, specifically:
 - Indication 2.
 - Indication 11.
 - Indication 10.
3. Clinicians are asked to take greater care to make their request using the correct indication.
4. Clinicians are asked to take greater care to make their request using the correct indication appropriately.
5. On receipt of a PET request, the PET scan provider is asked to take a greater role in checking compliance with the indication based on the clinical information supplied by the requesting clinician.
6. On receipt of a PET request, the PET scan provider is asked to take a greater role in checking the correct indication has been requested on the request form.

4. DISCUSSION

The analysis focuses on the 315 PET scans that were requested in the 2010/11 financial year for patients domiciled in the five South Island DHBs (Nelson Marlborough, West Coast, Canterbury, South Canterbury and Southern).

The total includes 282 scans that fall within the approved clinical indications suite, 27 variant scans approved by the variance committee, and six further scans categorised as “Incorrect indications”. These are cases that should have gone to the Variance Committee, but were requested incorrectly under an approved clinical indication. A further breakdown of these cases is presented later in this report as is a more detailed breakdown of scans that were requested inappropriately (e.g. post treatment rather than pre treatment).

The total of 315 includes one patient who did not have cancer but for whom a scan was approved by the Variance Committee. There were eight patients who had two scans.

The 315 PET scans excludes 11 patients who were removed from this analysis, reasons being request date outside financial year of interest (1), declined by variance committee (1), scan not performed due to breakdown (1), scan cancelled as patient sought privately funded scan (1), duplicate records (2), scan not performed due to patient condition (3), and scan not performed – no reason given (2). Six of these patients were domiciled in Southern DHB, four in Canterbury and one in Nelson-Marlborough.

Also excluded from the analysis are four PET scans requested by Canterbury DHB for patients domiciled outside of the South Island.

Note that because of these exclusions, the figures in this analysis differ slightly to those figures presented in the August 2011 PET scan memo to the Cancer Treatment Advisory Group (CTAG).

Table 1: South Island PET scan volumes, 2010/11

| DHB of Domicile | Approved indication | Variant | Incorrect indication* | Total |
|--------------------|---------------------|---------|-----------------------|-------|
| Nelson Marlborough | 18 | 4 | 1 | 23 |
| West Coast | 10 | 0 | 0 | 10 |
| Canterbury | 137 | 14 | 5 | 156 |
| South Canterbury | 26 | 2 | 0 | 28 |
| Southern | 91 | 7 | 0 | 98 |
| Total | 282 | 27 | 6 | 315 |

*Cases that should have gone to the Variance Committee but were categorised as an approved clinical indication.

West Coast was the only South Island DHB to have no requests outside the approved clinical indications (Please note that very small numbers are represented here).

DHBs are currently funded for PET scans through Crown Funding Agreements (CFAs). In the South Island, there is one CFA with Canterbury DHB on behalf of all the South Island DHBs. For 2010/11 the CFA stated that the DHB will be funded only once it has demonstrated that it has purchased on behalf of the South Island the same number of scans that the South Island DHBs purchased in the 2008/09 financial year (121). No breakdown of the 121 scans by DHB is given in the CFA but a December 2009 Ministry of Health letter to the South Island CEOs provides the 2008/09 volumes and these are reflected in the table below. Across all South Island DHBs in 2010/11 the volumes for 2008/09 were exceeded, by between 35% and 600%, with an average for the South Island of 160%.

Table 2: South Island PET scan volumes 2010/11 compared with 2008/09

| DHB of Domicile | 2010/11 | 2008/09 | Difference | % increase |
|--------------------|---------|---------|------------|------------|
| Nelson Marlborough | 23 | 17 | 6 | 35% |
| West Coast | 10 | 2 | 8 | 400% |
| Canterbury | 156 | 77 | 79 | 103% |
| South Canterbury | 28 | 4 | 24 | 600% |
| Southern | 98 | 21 | 77 | 367% |
| Total | 315 | 121 | 194 | 160% |

At a national level, the aim has been to double the volume of scans purchased in 2009/08. The 2009 letter gives an indication of anticipated volumes going forward based on each DHBs share of the anticipated funding (based on PBFF share). These volumes are notably higher than that for 2008/09 and are summarised in the table below. The total for the South Island in 2010/11 was only 24 short of the anticipated 339 (7%). South Canterbury exceeded anticipated volumes (by 7 scans, 33%), while Southern DHB matched the anticipated target for their district. While West Coast and Canterbury were only a few scans short (3 and 4 respectively), Nelson Marlborough had the largest gap between actual scans completed and anticipated volumes (24 scans, 51%).

Table 3: South Island PET scan volumes 2010/11 compared with Ministry of Health anticipated volumes as per December 2009 letter to CEOs

| DHB of Domicile | 2010/11 | MoH anticipated | Difference | % change |
|--------------------|---------|-----------------|------------|----------|
| Nelson Marlborough | 23 | 47 | -24 | -51% |
| West Coast | 10 | 13 | -3 | -23% |
| Canterbury | 156 | 160 | -4 | -3% |
| South Canterbury | 28 | 21 | 7 | 33% |
| Southern | 98 | 98 | 0 | 0% |
| Total | 315 | 339 | -24 | -7% |

4.1 DEMOGRAPHICS OF REFERRED PATIENTS

Table 4: Age and gender demographics of patients domiciled in the South Island for whom a PET scan was requested in 2010/11

| DHB of domicile | Total # of scans | Age demographics | | | | Gender demographics | |
|--------------------|------------------|------------------|-----|--------|------|---------------------|--------|
| | | Min | Max | Median | Mean | % female | % male |
| Nelson Marlborough | 23 | 15 | 79 | 58 | 54 | 61% | 39% |
| West Coast | 10 | 29 | 87 | 66 | 64 | 40% | 60% |
| Canterbury | 156 | 3 | 86 | 65 | 62 | 40% | 60% |
| South Canterbury | 28 | 18 | 85 | 68 | 64 | 32% | 68% |
| Southern | 98 | 20 | 86 | 68 | 66 | 43% | 57% |
| Grand Total | 315 | 3 | 87 | 65 | 63 | 42% | 58% |

In the table below the ethnicity group 'Other' includes patients of Asian ethnicity of which there were three.

Table 5: Ethnic breakdown of patients domiciled in the South Island for whom a PET scan was requested in 2010/11

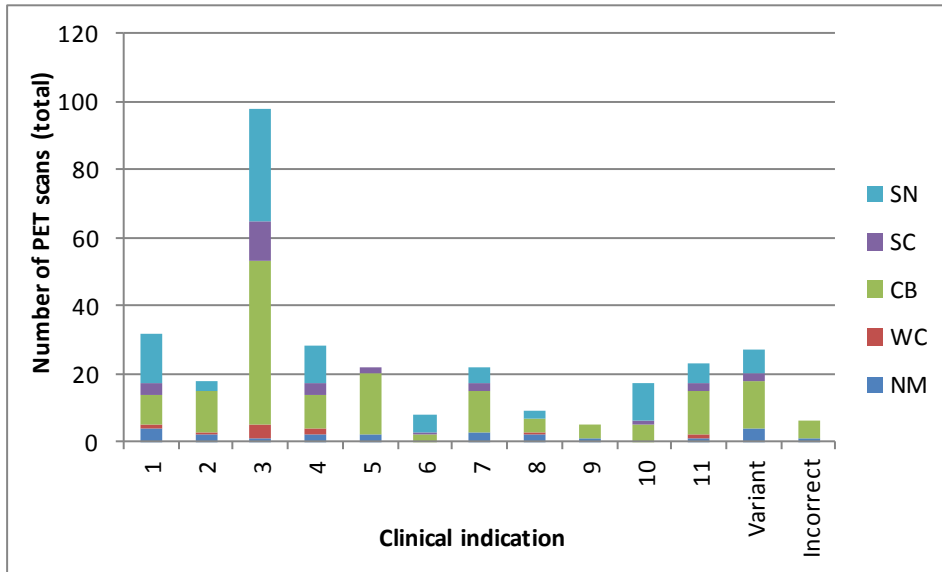
| DHB of Domicile | Other | | Maori | | Pacific Peoples | | Unknown | | Total # |
|--------------------|-------|-----|-------|-----|-----------------|----|---------|----|---------|
| | # | % | # | % | # | % | # | % | |
| Nelson Marlborough | 22 | 96% | 1 | 4% | 0 | 0% | 0 | 0% | 23 |
| West Coast | 9 | 90% | 1 | 10% | 0 | 0% | 0 | 0% | 10 |
| Canterbury | 146 | 94% | 9 | 6% | 1 | 1% | 0 | 0% | 156 |
| South Canterbury | 26 | 93% | 2 | 7% | 0 | 0% | 0 | 0% | 28 |
| Southern | 87 | 89% | 7 | 7% | 1 | 1% | 3 | 3% | 98 |
| Total | 290 | 92% | 20 | 6% | 2 | 1% | 3 | 1% | 315 |

4.2 PET SCANS BY INDICATION

Clinical indication 3 (staging of non-small cell lung cancer (NSLC) prior to surgery or radiotherapy with curative intent) was the most commonly requested clinical indication across the South Island. This is because staging of NSLC is the most mature indication and has the greatest evidence base. There are also functional MDMs in both cancer centres and MDMs optimise the use of complex imaging.

West Coast was the only South Island DHB to have no requests outside the approved clinical indications (Please note that very small numbers are represented here).

Figure 1: 2010/11 PET scans by clinical indication, South Island DHBs



The following table details the cancer type for the 27 variant scans requested for the South Island in 2010/11. Note that the CTAG memo reports that the two indications that have been approved most frequently by variance committees nationally are staging of locally advanced cervical cancer and staging of locally advanced ovarian cancer.

The clinical explanation as to why the South Island trend is different to the North Island with respect to cervical cancer is unclear, however the South Island Variance Committee did approved a class action for ovarian cancer i.e. *Resectable first recurrence of ovarian cancer for whom surgery is deemed optimal therapy by the appropriate MDM*. This appears to be more in line with national trend.

Further, the South Island Variance Committee agreed to an approved variant for Malignant Melanoma i.e. *Melanoma - post operative staging prior to radiotherapy* enabling approval by the Chair without requiring re-presentation to the committee.

Referring clinicians requested these scans for patients who did not have a PET pre-operatively but prior to radiotherapy, it was deemed appropriate to approve a variant PET scan to avoid costly and potentially toxic radiation therapy.

Table 6: 2010/11 variant PET scans cancer type, South Island DHBs

| Cancer type (variant PET scan) | Volume |
|-------------------------------------|--------|
| Melanoma | 7 |
| Ovarian | 3 |
| Colorectal | 2 |
| Gastrointestinal stromal tumour | 2 |
| Anal | 1 |
| Cervical | 1 |
| Endometrial cancer | 1 |
| Gastro oesophageal | 1 |
| Head and neck | 1 |
| Hodgkin's lymphoma | 1 |
| Merkel cell tumour | 1 |
| Not cancer (temporal lobe epilepsy) | 1 |
| Osteosarcoma | 1 |
| Peripheral nerve sheath | 1 |
| Rectal | 1 |
| Rhabdamyosarcoma (foot) | 1 |
| Vulval | 1 |
| Total | 27 |

4.3 PET SCANS BY MONTH AND QUARTER

On average for the South Island, 26 scans were requested each month.

Figure 1: 2010/11 PET scans by month, South Island DHBs

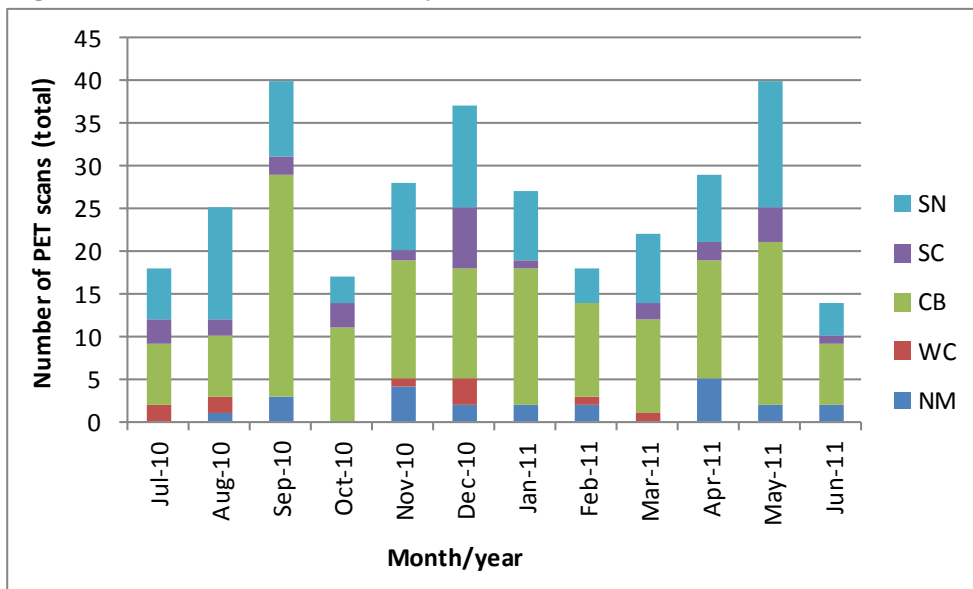
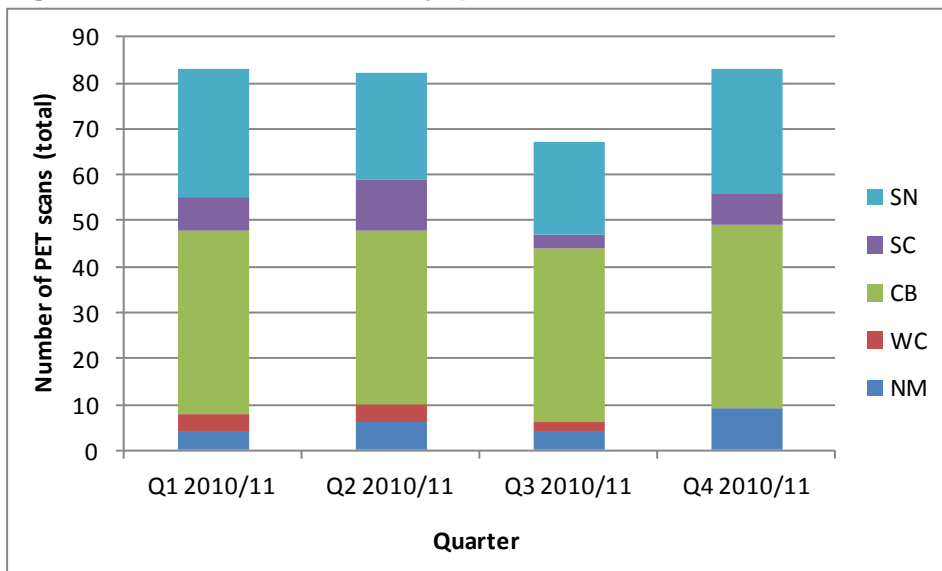


Table 7: 2010/11 PET scans by month, South Island DHBs

| Month/yr | Nelson Marlborough | West Coast | Canterbury | South Canterbury | Southern | South Island Total |
|----------|-----------------------|------------|------------|---------------------|----------|-----------------------|
| Jul-10 | 0 | 2 | 7 | 3 | 6 | 18 |
| Aug-10 | 1 | 2 | 7 | 2 | 13 | 25 |
| Sep-10 | 3 | 0 | 26 | 2 | 9 | 40 |
| Oct-10 | 0 | 0 | 11 | 3 | 3 | 17 |
| Nov-10 | 4 | 1 | 14 | 1 | 8 | 28 |
| Dec-10 | 2 | 3 | 13 | 7 | 12 | 37 |
| Jan-11 | 2 | 0 | 16 | 1 | 8 | 27 |
| Feb-11 | 2 | 1 | 11 | 0 | 4 | 18 |
| Mar-11 | 0 | 1 | 11 | 2 | 8 | 22 |
| Apr-11 | 5 | 0 | 14 | 2 | 8 | 29 |
| May-11 | 2 | 0 | 19 | 4 | 15 | 40 |
| Jun-11 | 2 | 0 | 7 | 1 | 4 | 14 |
| Total | 23 | 10 | 156 | 28 | 98 | 315 |
| Average | 2 | 1 | 13 | 2 | 8 | 26 |

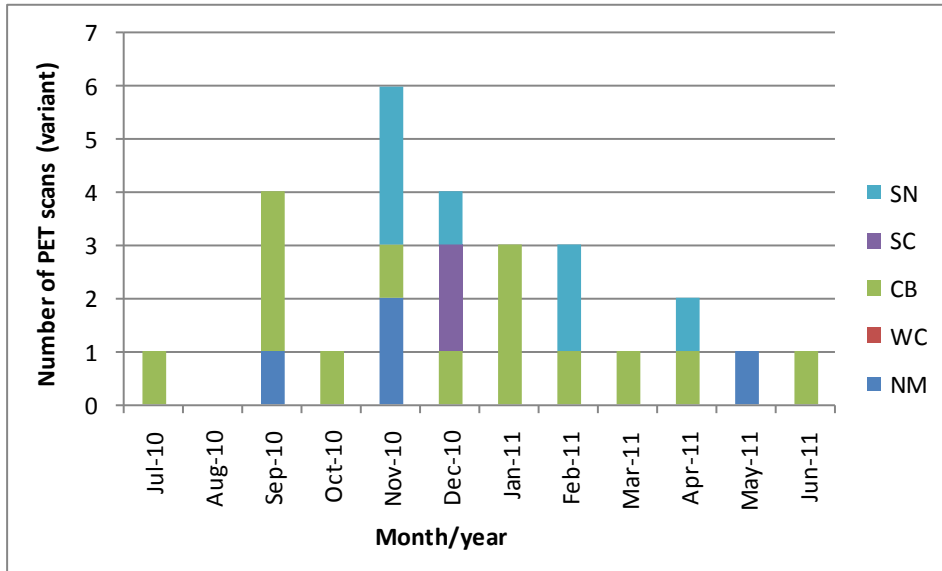
On average, there were 79 scans requested each quarter, although note that only 67 were requested in quarter 3.

Figure 2: 2010/11 PET scans by quarter, South Island DHBs



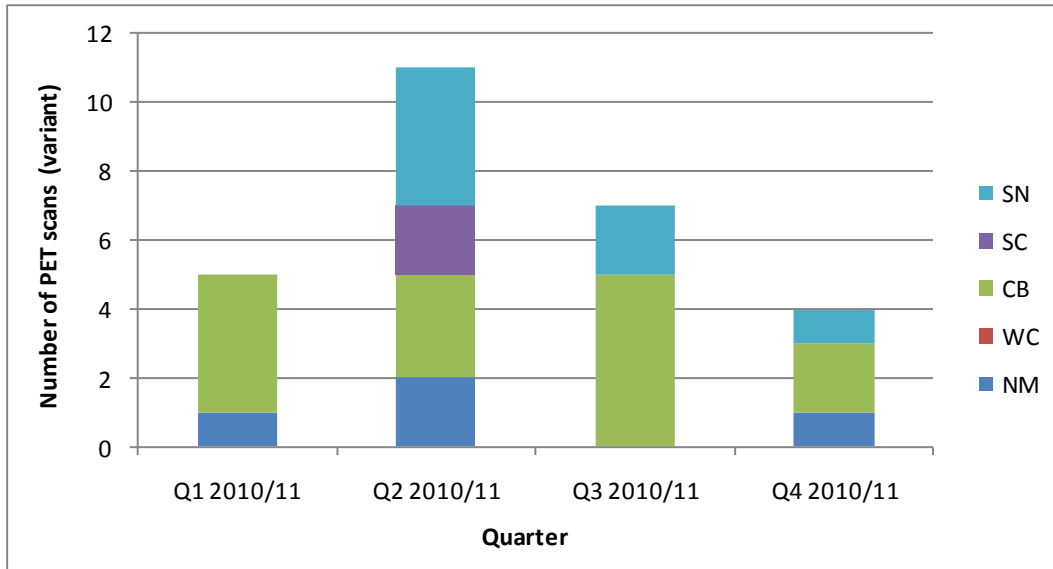
Twenty seven variant scans were requested for the South Island in 2010/11.

Figure 3: 2010/11 variant PET scans by month, South Island DHBs



By quarter, the number of variant scans requested ranged from four to 11, with an average of seven.

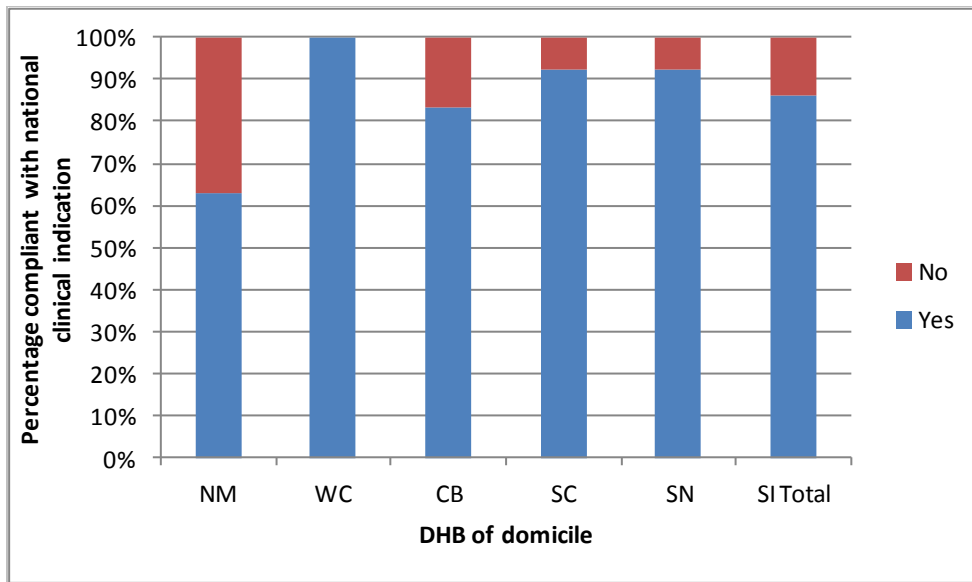
Figure 4: 2010/11 variant PET scans by quarter, South Island DHBs



4.4 PET SCANS COMPLIANT WITH NATIONAL CLINICAL INDICATIONS

Overall for the South Island, 86% of the requested PET scans that were not submitted to the Regional Variance Committee were deemed compliant with a national clinical indication when audited. By DHB this ranged from 63% (Nelson Marlborough) to 100% (West Coast). (Please note that very small numbers are used here).

Figure 5: Percentage of PET scans that were compliant with a national clinical indication, South Island DHBs, 2010/11



In the 2010/11 financial year, there were 36 instances whereby an approved clinical indication was used inappropriately, for example requesting a PET scan via clinical indication 2 (evaluation of residual structural abnormality on diagnostic imaging in patients who are currently symptomatic following definitive treatments for colorectal carcinoma) when the patient was not symptomatic. A summary is presented in the following table. The auditors concluded that in most cases there were minor errors in interpreting the wording of the indication rather than poor judgement of the referring clinician.

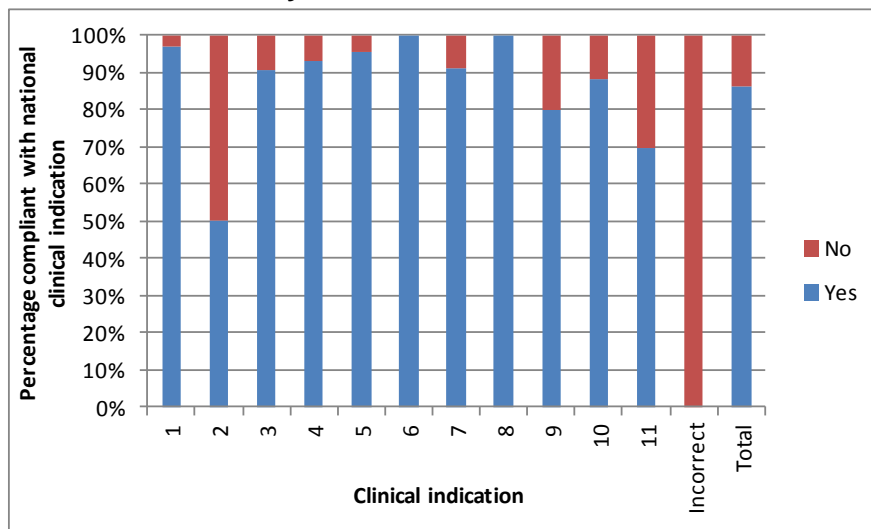
Table 8: Scans deemed non compliant with the national clinical indications, South Island DHBs, 2010/11

| Reason for non compliance | Nelson Marlborough | West Coast | Canterbury | South Canterbury | Southern | South Island Total |
|--|--------------------|------------|------------|------------------|-----------|--------------------|
| Non curative intent | 1 | 0 | 6 | 2 | 4 | 13 |
| Patient not symptomatic | 2 | 0 | 7 | 0 | 0 | 9 |
| Restaging (rather than staging) | 2 | 0 | 3 | 0 | 2 | 7 |
| Post treatment scan (rather than pre treatment) | 0 | 0 | 2 | 0 | 2 | 4 |
| Hodgkins not non-Hodgkins | 1 | 0 | 0 | 0 | 0 | 1 |
| Not locally advanced | 0 | 0 | 1 | 0 | 0 | 1 |
| Not squamous | 0 | 0 | 1 | 0 | 0 | 1 |
| Total | 6 | 0 | 20 | 2 | 8 | 36 |
| Percentage of requests (excluding variance committee) | 32% | 0% | 14% | 8% | 9% | 13% |

By definition, all PET scans which were classed as 'Incorrect' were deemed noncompliant with the national clinical indications. Half (9/18) of the PET scans for indication 2, "evaluation of residual structural abnormality on diagnostic imaging in patients who are currently symptomatic following definitive treatments for colorectal carcinoma (CRC)", were deemed non compliant with the national clinical indications. This was influenced by a notable number of patients who were not symptomatic. Once again the auditors felt this was due to ambiguity in the indication rather than poor clinical judgement by the requesting clinicians.

Additional confusion could have been as a result of the CRG PET request form stating "asymptomatic" in indication 2, whereas Ministry of Health documents state that patients should be symptomatic. Seven clinical indications (1, 3-8) had a compliance percentage over 90%.

Figure 6: Percentage of PET scans that were deemed compliant with a national clinical indication, by indication, South Island DHBs, 2010/11



For six South Island patients in the audit, PET scans were requested under an approved clinical indication when they should have been put before the Variance Committee. The following table summarises the indications which were incorrectly requested.

The auditors felt that clinician's may be requesting scans by selecting an indication that is closest to that of their patient's clinical situation so as to avoid the requirement to present to the Variance Committee (please note small numbers are represented here).

Table 9: Incorrectly used clinical indications when request should have gone to Variance Committee, South Island DHBs, 2010/11

| Clinical indication incorrectly used | Reason for incorrectness | Volume |
|--|---|--------|
| (2) Evaluation of residual structural abnormality on diagnostic imaging in patients who are currently symptomatic following definitive treatments for colorectal carcinoma (CRC) | Anal cancer not colorectal | 3 |
| (1) Preoperative evaluation for patients considered for resection of hepatic/lung metastases in colorectal carcinoma (CRC) | Patient didn't have bowel cancer. PET done to investigate abdominal mass? Patient had metastatic lung cancer - never curative lung cancer | 1 |
| (8) Restaging of residual neck masses in head and neck cancers following radiotherapy/chemotherapy | Patient never had radiotherapy or chemotherapy | 1 |
| (9) Staging for metastatic squamous carcinoma in cervical lymph nodes from unknown primary | Known primary supraglottic cancer | 1 |

In a further 17 instances, clinicians had inadvertently requested the wrong indication on the request form, but the patient still met the criteria for another approved clinical indication. In all but one instance, these cases were deemed compliant with the national

clinical indications by the auditors. Note that for the analysis contained in this report, the indications have been changed to that which should have been requested.

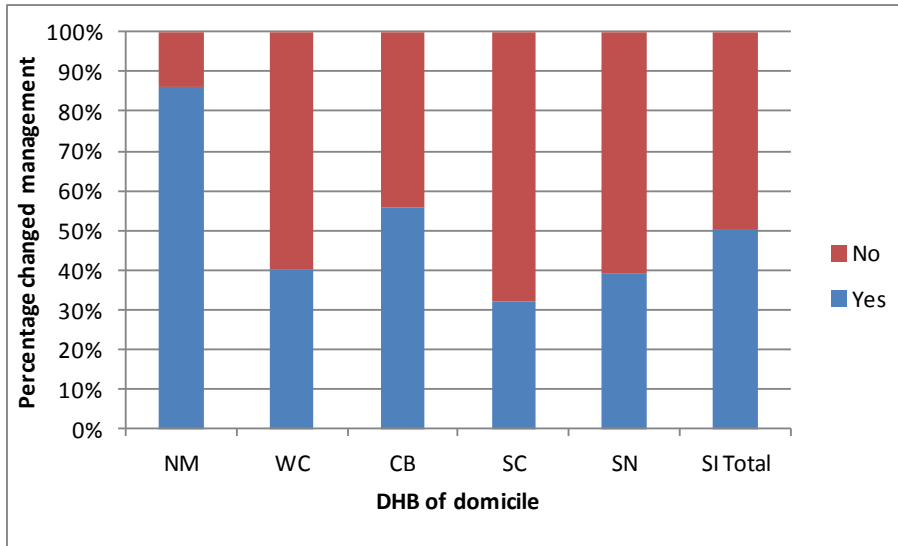
Table 8: Incorrect clinical indication inadvertently selected, South Island DHBs, 2010/11

| Inadvertently requested clinical indication | Nelson Marlborough | West Coast | Canterbury | South Canterbury | Southern | South Island Total |
|--|--------------------|------------|------------|------------------|------------|--------------------|
| 3 instead of 4 | 0 | 1 | 0 | 0 | 4 | 5 |
| 2 instead of 1 | 0 | 1 | 0 | 0 | 3 | 4 |
| 4 instead of 3 | 0 | 0 | 2 | 0 | 0 | 2 |
| 1 instead of 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| 2 instead of 11 | 0 | 0 | 0 | 0 | 1 | 1 |
| 5 instead of 7 | 0 | 0 | 1 | 0 | 0 | 1 |
| 8 instead of 9 | 0 | 0 | 1 | 0 | 0 | 1 |
| 9 instead of 8 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9 instead of 10 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 0 | 3 | 4 | 0 | 10 | 17 |
| Percentage of requests (excluding variance committee) | 0% | 30% | 3% | 0% | 11% | 6% |

4.5 CLINICAL MANAGEMENT

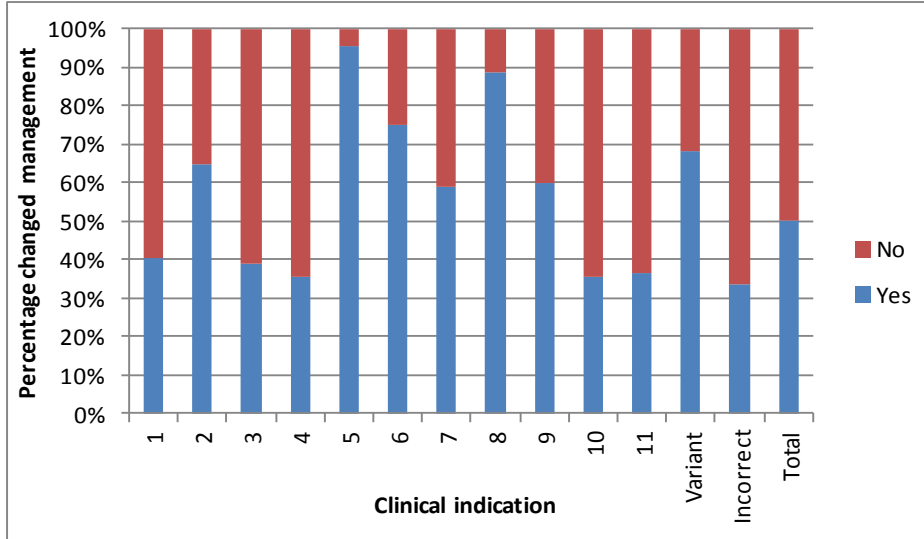
Based on an audit of records, 50% of South Island patients had their clinical management changed as a result of PET scan findings. By DHB this ranged from 32% (South Canterbury) to 86% (Nelson Marlborough). Note that whether the scan findings changed management was not known for a patient from each of Nelson Marlborough and Southern DHBs, and two Canterbury patients (note that one of the latter was not a cancer patient).

Figure 7: Percentage of PET scans that changed management, South Island DHBs, 2010/11



Clinical management changed for 95% (21/22) of patients who came under clinical indication 5 (restaging of residual mass for Non Hodgkin’s Lymphoma following definitive treatment).

Figure 8: Percentage of PET scans that changed management by clinical indication, South Island DHBs, 2010/11



If we look only at patients where the PET scan was compliant with the national clinical indications (including variant cancers), then the percentage of cases for which management changed differs only by a few percent when examined by DHB.

4.6 TIMELINESS OF REPORTS

The first three tables below show the wait time parameters from the date PET scans were requested to the date of the scans. This is presented for all South Island scans in 2010/11 (n=313), all scans excluding variant scans (n=287), and variant scan only (n=26). Calculations include all days (weekdays and weekends).

Two Canterbury patients are excluded from this analysis due to extra-ordinary circumstances influencing their wait times. One patient had a delay of 168 days due to the Christchurch earthquake. Another patient with a variant scan had a wait of 126 days as their clinician made the request and then went overseas so there was a delay until the clinician could present the case to the PET Variance Committee.

For the South Island total, the median wait time was only slightly longer for scans that went through the Variance Committee compared to scans that did not (13 days vs. 11 days respectively). The average wait time was similar (14 days for variant scans, 15 days for non variant scans).

Table 9: Wait time parameters from date PET scan requested to date of PET scan, all South Island PET scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 3 | 55 | 12 | 16 | 23 |
| West Coast | 3 | 33 | 9 | 12 | 10 |
| Canterbury | 1 | 77 | 13 | 17 | 154 |
| South Canterbury | 2 | 32 | 8 | 11 | 28 |
| Southern | 1 | 42 | 9 | 12 | 98 |
| Total | 1 | 77 | 11 | 15 | 313 |

Table 10: Wait time parameters from date PET scan requested to date of PET scan, South Island PET scans excluding variant scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 3 | 55 | 9 | 17 | 19 |
| West Coast | 3 | 33 | 9 | 12 | 10 |
| Canterbury | 1 | 77 | 13 | 18 | 141 |
| South Canterbury | 5 | 32 | 8 | 11 | 26 |
| Southern | 1 | 42 | 9 | 12 | 91 |
| Total | 1 | 77 | 11 | 15 | 287 |

Table 11: Wait time parameters from date PET scan requested to date of PET scan, South Island variant PET scans only, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 12 | 18 | 16 | 15 | 4 |
| West Coast | N/A | N/A | N/A | N/A | 0 |
| Canterbury | 3 | 38 | 13 | 16 | 13 |
| South Canterbury | 2 | 8 | 5 | 5 | 2 |
| Southern | 2 | 26 | 8 | 11 | 7 |
| Total | 2 | 38 | 13 | 14 | 26 |

The following three tables below show the wait time parameters from the date PET scans were requested to the report date of the scans. This is presented for all South Island scans in 2010/11 (n=313), all scans excluding variant scans (n=287), and variant scan only (n=26).

Table 12: Wait time parameters from date PET scan requested to report date of PET scan, all South Island PET scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 3 | 55 | 13 | 17 | 23 |
| West Coast | 6 | 34 | 11 | 14 | 10 |
| Canterbury | 3 | 77 | 13 | 19 | 154 |
| South Canterbury | 3 | 34 | 9 | 12 | 28 |
| Southern | 2 | 49 | 12 | 15 | 98 |
| Total | 2 | 77 | 13 | 17 | 313 |

Table 13: Wait time parameters from date PET scan requested to report date of PET scan, South Island PET scans excluding variant scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 3 | 55 | 10 | 17 | 19 |
| West Coast | 6 | 34 | 11 | 14 | 10 |
| Canterbury | 3 | 77 | 13 | 19 | 141 |
| South Canterbury | 6 | 34 | 10 | 13 | 26 |
| Southern | 2 | 49 | 12 | 15 | 91 |
| Total | 2 | 77 | 13 | 17 | 287 |

Table 14: Wait time parameters from date PET scan requested to report date of PET scan, South Island variant PET scans only, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 13 | 20 | 16 | 16 | 4 |
| West Coast | N/A | N/A | N/A | N/A | 0 |
| Canterbury | 4 | 42 | 14 | 17 | 13 |
| South Canterbury | 3 | 9 | 6 | 6 | 2 |
| Southern | 10 | 26 | 13 | 15 | 7 |
| Total | 3 | 42 | 14 | 16 | 26 |

The following three tables below show the wait time parameters from the date PET scans were performed to the report date of the scans. This is presented for all South Island scans in 2010/11 (n=313), all scans excluding variant scans (n=287), and variant scan only (n=26).

Table 15: Wait time parameters from date PET scan performed to report date of PET scan, all South Island PET scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 0 | 3 | 0 | 1 | 23 |
| West Coast | 1 | 4 | 1 | 2 | 10 |
| Canterbury | 0 | 7 | 1 | 1 | 154 |
| South Canterbury | 0 | 9 | 1 | 2 | 28 |
| Southern | 0 | 30 | 2 | 3 | 98 |
| Total | 0 | 30 | 1 | 2 | 313 |

Table 16: Wait time parameters from date PET scan performed to report date of PET scan, South Island PET scans excluding variant scans, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|--------------------|------------|------------|---------------|----------------|--------------------|
| Nelson Marlborough | 0 | 1 | 0 | 0 | 19 |
| West Coast | 1 | 4 | 1 | 2 | 10 |
| Canterbury | 0 | 7 | 1 | 1 | 141 |
| South Canterbury | 0 | 9 | 1 | 2 | 26 |
| Southern | 0 | 30 | 2 | 3 | 91 |
| Total | 0 | 30 | 1 | 2 | 287 |

Table 17: Wait time parameters from date PET scan performed to report date of PET scan, South Island variant PET scans only, 2010/11

| DHB of domicile | Min (days) | Max (days) | Median (days) | Average (days) | Count of PET scans |
|------------------------|-------------------|-------------------|----------------------|-----------------------|---------------------------|
| Nelson Marlborough | 0 | 3 | 1 | 1 | 4 |
| West Coast | N/A | N/A | N/A | N/A | 0 |
| Canterbury | 0 | 4 | 1 | 1 | 13 |
| South Canterbury | 1 | 1 | 1 | 1 | 2 |
| Southern | 0 | 11 | 2 | 4 | 7 |
| Total | 0 | 11 | 1 | 2 | 26 |

5. REFERENCES

December 2009, Ministry of Health letter to the South Island CEOs providing the 2008/09 volumes and modelling of volumes for 2010/11

August 2011, PET scan memo from the Ministry of Health Cancer Team to the Cancer Treatment Advisory Group (CTAG)

6. APPENDIX

Table 18: 2010/11 approved clinical indications

| Cancer | Number | Approved clinical indication |
|--------------------|--------|--|
| Colorectal | 1 | Preoperative evaluation for patients considered for resection of hepatic/lung metastases in colorectal carcinoma (CRC) |
| | 2 | Evaluation of residual structural abnormality on diagnostic imaging in patients who are currently symptomatic following definitive treatments for colorectal carcinoma (CRC) |
| Lung | 3 | Staging of non-small cell lung cancer (NSLC) prior to surgery or radiotherapy with curative intent |
| | 4 | Isolated pulmonary nodules not amenable to fine needle aspiration (FNA) or which have failed pathological characterisation |
| Lymphoma | 5 | Restaging of residual mass for Non Hodgkin's Lymphoma following definitive treatment |
| | 6 | Staging of early stage low grade non Hodgkin's lymphoma |
| | 7 | Staging of Hodgkin's Disease |
| Head and neck | 8 | Restaging of residual neck masses in head and neck cancers following radiotherapy/chemotherapy |
| | 9 | Staging for metastatic squamous carcinoma in cervical lymph nodes from unknown primary |
| Oesophagus | 10 | Staging of locally advanced oesophageal cancer for preoperative chemotherapy/radiotherapy |
| Malignant Melanoma | 11 | Preoperative evaluation in patients considered for surgical resection of apparent limited disease from melanoma |