

**North, South East and West of Scotland
Cancer Networks**

**Sarcoma National Managed Clinical
Network**



Audit Report

Sarcoma Quality Performance Indicators

**Clinical Audit Data:
01 April 2014 to 31 March 2015**

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Executive Summary

Introduction

The purpose of this report is to present an assessment of performance of Sarcoma Services relating to patients diagnosed across Scotland during 2014/15 through clinical audit data. Results are measured against the Sarcoma Quality Performance Indicators¹ (QPIs) which were implemented for patients diagnosed on or after 1st April 2014.

The National Cancer Quality Steering Group (NCQSG) completed a programme of work to develop national QPIs for all cancer types to enable national comparative reporting and drive continuous improvement for patients in 2014. In collaboration with the National Managed Clinical Network (NMCN) for Sarcoma and Information Services Division (ISD) the Sarcoma QPIs¹ were published by Healthcare Improvement Scotland (HIS) in March 2014 and implemented for patients diagnosed on or after 1st April 2014. Data definitions and measurability criteria to accompany the Sarcoma QPIs are available from the ISD website².

Twelve months of data are measured against the Sarcoma QPIs and presented within this audit report. There are no annual comparisons as this is the first year of analysis since implementation of the QPI dataset. Unlike most other tumour types which have undergone pre-QPI data collection and analysis, this is the first year of such an undertaking for sarcoma. The first year of data collection and analysis for sarcoma coincides with the implementation of QPIs. Future reports will present aggregated results for greater confidence and year-on-year comparison to illustrate trends.

Background

Sarcomas are a rare group of cancers that arise from connective tissue, including: bone, cartilage, muscle, blood vessels, nerves and fat⁵ which are broadly divided into bone and soft tissue sarcomas. In 2014/15 the audit identified 233 patients diagnosed with a new primary invasive sarcoma or gastrointestinal stromal tumour (GIST) in Scotland. Bone and soft tissue sarcomas account for around 1% of all new cancer diagnoses in the UK⁵. In Scotland bone and connective tissue cancers are ranked 22nd most common cancer, accounting for only 0.6% of all cancers diagnosed in Scotland in 2013³.

Unlike many other cancers, sarcomas can affect people of any age. From 2011 to 2013 in the UK 52% of all bone sarcomas occurred in people under the age of 50, whilst 57% of soft tissue sarcomas occurred in the under 65's in 2010⁴.

Incidence of bone sarcomas has been stable in the UK since the late 1970s whilst incidence of soft tissue sarcoma has increased overall since the late 1990s. This likely reflects improved diagnosis and data recording rather than a true increase in incidence⁴. In England 5 year survival for bone and soft tissue sarcoma is 56%, for patients diagnosed 2000 to 2004⁴.

The table below details the five centres carrying out sarcoma treatment in Scotland. These are considered the centres for specialist treatment, which includes surgery, systemic anti cancer therapy (SACT) and radiotherapy. Patients may receive diagnostic and palliative care in their local hospital where appropriate; however the majority of patients are referred to one of the five centres for specialist management.

Centre	Constituent Hospital(s)
Aberdeen	Aberdeen Royal Infirmary (ARI)
Dundee	Ninewells Hospital (NW)
Edinburgh	Surgery: Royal Infirmary of Edinburgh (RIE) Oncology: Western General Hospital (WGH)
Glasgow	Surgery: Gartnavel General Hospital (GGH); Queen Elizabeth University Hospital (QEUH); and Glasgow Royal Infirmary (GRI) Oncology: Beatson West of Scotland Cancer Centre (BWoSCC)
Inverness	Raigmore Hospital

Methodology

The clinical audit data presented in this report was collected by clinical audit staff in each NHS Board in accordance with an agreed dataset and definitions. The data was entered locally into the electronic Cancer Audit Support Environment (eCASE): a secure centralised web-based database. Data relating to patients diagnosed between 1 April 2014 and 31 March 2015 was downloaded from eCASE on 22nd October 2015. SCAN data was collected and analysed locally and the final results were submitted to WoSCAN.

Analysis was performed centrally by the WoSCAN Information Team for NOSCAN and WoSCAN Boards and the timescales agreed took into account the patient pathway to ensure that a complete treatment record was available for each case. Initial results of the analysis were provided to local NHS Boards to check for inaccuracies, inconsistencies or obvious gaps and a subsequent download taken upon which final analysis was carried out. The final data analysis was disseminated for NHS Board verification in line with the regional audit governance process to ensure that the data was an accurate representation of service in each area.

Following data analysis by the WoSCAN Information Team NHS Greater Glasgow and Clyde (NHS GGC) undertook further work to ensure completeness of data capture for cases diagnosed in their Board area and re-analysed the QPIs. These revised figures have been included within the data presented in this report.

Results

This is the first year of data collection for sarcoma by clinical effectiveness teams across NHSScotland. The overall estimated case ascertainment across Scotland is 70% which indicates reasonably good data capture for 2014/15, however there is considerable variance across Boards and Regions, with WoSCAN case ascertainment low at 56%. This is not unexpected given this is the first year of sarcoma clinical audit data in NHSScotland and highlights that further work is required across Scotland to improve data capture and ensure accurate reporting in future. Experience from the implementation of clinical audit for other tumour types demonstrates significant improvements in data quality with subsequent years of collection.

There are also areas where improvement in data capture is required to enable robust measurement against all QPIs, specifically with regards to TNM staging data.

Results for each QPI are shown in detail in the main report and illustrate regional or national performance against each target. Where numbers are small national results are presented to avoid any unwarranted variation associated with small numbers and to minimise the risk of disclosure. Results are presented graphically and the accompanying data table also highlights any missing data and its possible effect on any of the measured outcomes.

The summary of results over page shows the national percentage performance against each QPI target.

Summary of QPI Results

Quality Performance Indicator (QPI)	QPI target	NOSCAN		SCAN		WoSCAN		Scotland	
QPI 1 – Histological Diagnosis Proportion of patients with extremity sarcoma who have a histological diagnosis before undergoing a planned surgical resection.	90%	65.0%		100%		86.1%		83.1%	
		13	20	15	15	31	36	59	71
QPI 2 – Multi-Disciplinary Team (MDT) Meeting Proportion of patients with extremity sarcoma who are discussed at a MDT meeting before definitive treatment.	95%	60.0%		92.0%		85.4%		80.2 %	
		15	25	23	25	35	41	73	91
QPI 3 – Clinical Staging Proportion of patients whose extremity soft tissue sarcoma is staged using the TNM staging system prior to definitive treatment.	95%	9.5%		92.3%		11.5%		28.3%	
		2	21	12	13	3	26	17	60
QPI 4 – Surgical Margins Proportion of patients with extremity sarcoma, who undergo curative surgical resection where R0* resection is achieved.	85%	100%		100%		86.2%		92.6%	
		10	10	15	15	25	29	50	54
QPI 5 – Molecular Staging of Gastrointestinal Stromal Tumour (GIST) Proportion of patients with high or moderate risk GIST, small bowel GISTs and primary metastatic GIST who have mutational analysis within 6 months of diagnosis.	90%	-		66.7%		-		78.6%	
		-	-	4	6	-	-	11	14
QPI 6 – Limb Sparing Surgery Proportion of patients with extremity sarcoma who undergo a primary limb-sparing surgery.	85%	<i>Due to significant issues with the measurability of this QPI, results are not presented at this time.</i>							
QPI 7 – Primary Flap Reconstruction Proportion of patients with extremity sarcoma who undergo successful primary flap reconstruction following surgical resection.	85%	100%		100%		85.7%		92.9%	
		8	8	6	6	12	14	26	28
QPI 8 – Post Operative Radiotherapy Proportion of patients with an extremity soft tissue sarcoma which is deep and grade 2 or 3 who receive post operative radiotherapy within 3 months of a planned marginal or wide local excision (R0 or R1).	90%	-		-		100%		90.0%	
		-	-	-	-	6	6	9	10

Quality Performance Indicator (QPI)	QPI target	NOSCAN		SCAN		WoSCAN		Scotland	
		-	-	-	-	-	-	-	-
QPI 9a - Neo-adjuvant Systemic Anti Cancer Therapy (SACT) for Osteosarcoma Proportion of patients with osteosarcoma sarcoma who receive neoadjuvant combination SACT.	90%	-	-	-	-	-	-	4	6
QPI 9b - Neo-adjuvant Systemic Anti Cancer Therapy (SACT) for Ewings Sarcoma Proportion of patients with Ewings sarcoma who receive neoadjuvant combination SACT.	90%	-	-	-	-	-	-	4	5
QPI 10 - Adjuvant Oncological Treatment for Gastrointestinal Stromal Tumours (GIST) Proportion of patients with high risk GIST who commence adjuvant imatinib within 3 months of complete macroscopic resection.	85%	-	-	-	-	-	-	-	-
QPI 11a - 30 Day Mortality - Curative Oncological Treatment Proportion of patients with extremity or retroperitoneal sarcoma who die within 30 days of curative oncological treatment for sarcoma.	<10%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	49
QPI 11b - 30 Day Mortality - Palliative Oncological Treatment Proportion of patients with extremity or retroperitoneal sarcoma who die within 30 days of palliative oncological treatment for sarcoma.	<15%	-	-	-	-	-	-	2	6

- Data not shown due to small numbers

Conclusions and Action Required

The development of national QPIs for sarcoma will help drive continuous quality improvement in patient care whilst ensuring that activity is focussed on those areas that are most important in terms of improving survival and patient experience. In addition, the introduction of QPIs and the associated governance structure will facilitate regular monitoring and reporting of data to ensure equitable care across the country.

Results presented in this report demonstrate that work is required to ensure patients with sarcoma receive an equitable and consistent standard of care across NHS Scotland. It is evident that many of the QPI targets set have been challenging for centres to achieve and some variance and a number of areas for improvement have been highlighted. It should however be noted that given the rarity of sarcoma numbers included within the measurement of the majority of indicators are small and therefore percentages should be compared with caution.

This audit report has identified areas where data capture must improve to enable more meaningful analysis of performance against QPIs in the coming years, specifically with regards to TNM staging. Overall case ascertainment and data capture is however commendable for the first year of data collection and analysis. This provides a good foundation from which to measure service improvement in future years, however further work is required, specifically in WoSCAN, to ensure good case ascertainment.

It is extremely encouraging that all regions have met the target level for a number of QPIs, including: surgical margins, primary flap reconstruction, post operative radiotherapy and 30 day mortality following curative treatment. Areas for service improvement have been identified relating to variation in histological diagnosis, MDT discussion and 30 day mortality following palliative treatment.

NHS Boards are asked to develop local Action/Improvement Plans in response to the findings presented in the report

Action required:

- Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.
- NOSCAN and WoSCAN Boards to review those cases which did not have a histological diagnosis prior to undergoing surgical resection and feedback to NMCN.
- NOSCAN and WoSCAN Boards to review cases which were not discussed at MDT before definitive treatment and feedback to NMCN.
- NOSCAN and WoSCAN to record TNM for all sarcomas at MDT meeting.
- All patients who died within 30 days of palliative oncological treatment should be discussed at local morbidity and mortality meetings.
- NHS Boards are asked to develop local Action/Improvement Plans in response to the findings presented in the report

Completed Action Plans should be returned to WoSCAN within two months of publication of this report.

Progress against these plans will be monitored by the MCN Advisory Board and any service or clinical issue which the Advisory Board considers not to have been adequately addressed will be escalated to the NHS Board Territorial Lead Cancer Clinician and Regional Lead Cancer Clinician.

The NMCN will actively take forward national actions identified and NHS Boards are asked to develop local Action/Improvement Plans in response to the findings presented in the report.

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2. Background

Sarcomas are a rare group of cancers that arise from connective tissue, including: bone, cartilage, muscle, blood vessels, nerves and fat⁵ which are broadly divided into bone and soft tissue sarcomas. In 2014/15 the audit identified 233 patients diagnosed with a new primary invasive sarcoma or gastrointestinal stromal tumour (GIST) in Scotland.

Bone and soft tissue sarcomas account for around 1% of all new cancer diagnoses in the UK⁵. In Scotland bone and connective tissue cancers are ranked 22nd most common cancer, accounting for only 0.6% of all cancers diagnosed in 2013³. The most common site of bone and soft tissue sarcoma is the extremities⁵ which provides the focus for the majority of data analysis.

Incidence of bone sarcomas has been stable in the UK since the late 1970s whilst incidence of soft tissue sarcoma has increased overall since the late 1990s. This likely reflects improved diagnosis and data recording rather than a true increase in incidence⁴. There has been significant improvement in survival over the past few decades, with 5 year survival from 1996-2000 51% rising to 56% 2006-2010 for soft tissue sarcoma, the picture is very similar for bone sarcoma⁵.

Unlike many other cancers, bone and soft tissue sarcomas can affect people of any age. From 2011 to 2013 in the UK 52% of all bone sarcomas occurred in people under the age of 50, whilst 57% of soft tissue sarcomas occurred in the under 65s in 2010⁴.

Gastrointestinal Stromal Tumours (GIST) are rare with an estimated occurrence of 1/100,000⁶. These tumours are extremely rare in children and young people, with the median age reported as 60-65⁵.

The table over page details the five centres carrying out sarcoma treatment in Scotland. These are considered the centres for specialist treatment, which includes surgery, systemic anti cancer therapy (SACT) and radiotherapy. Patients may receive diagnostic and palliative care in their local hospital where appropriate; however the majority of patients are referred to one of the five centres for specialist management.

Centre	Constituent Hospital(s)
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Inverness	Raigmore Hospital

3. Methodology

The clinical audit data presented in this report was collected by clinical audit staff in each NHS Board in accordance with an agreed dataset and definitions. NOSCAN and WoSCAN data was recorded manually and entered locally into the electronic Cancer Audit Support Environment (eCASE): a secure centralised web-based database. Data relating to patients diagnosed between 1 April 2014 and 31 March 2015 was downloaded from eCASE at 2200 hrs on 22nd October 2015. SCAN data was collected and analysed locally and the final results were submitted to WoSCAN. Cancer audit is a dynamic process with patient data continually being revised and updated as more information becomes available. This means that apparently comparable reports for the same time period and cancer site may produce slightly different figures if extracted at different times.

Analysis was performed centrally by the WoSCAN Information Team for NOSCAN and WoSCAN Boards and the timescales agreed took into account the patient pathway to ensure that a complete treatment record was available for each case. Initial results of the analysis were provided to local NHS Boards to check for inaccuracies, inconsistencies or obvious gaps and a subsequent download taken upon which final analysis was carried out. The final data analysis was disseminated for NHS Board verification in line with the regional audit governance process to ensure that the data was an accurate representation of service in each area.

Following data analysis by the WoSCAN Information Team NHS Greater Glasgow and Clyde (NHS GGC) undertook further work to ensure completeness of data capture for cases diagnosed in their Board area and re-analysed the QPIs. These revised figures have been included within the data presented in this report.

4. Results and Action Required

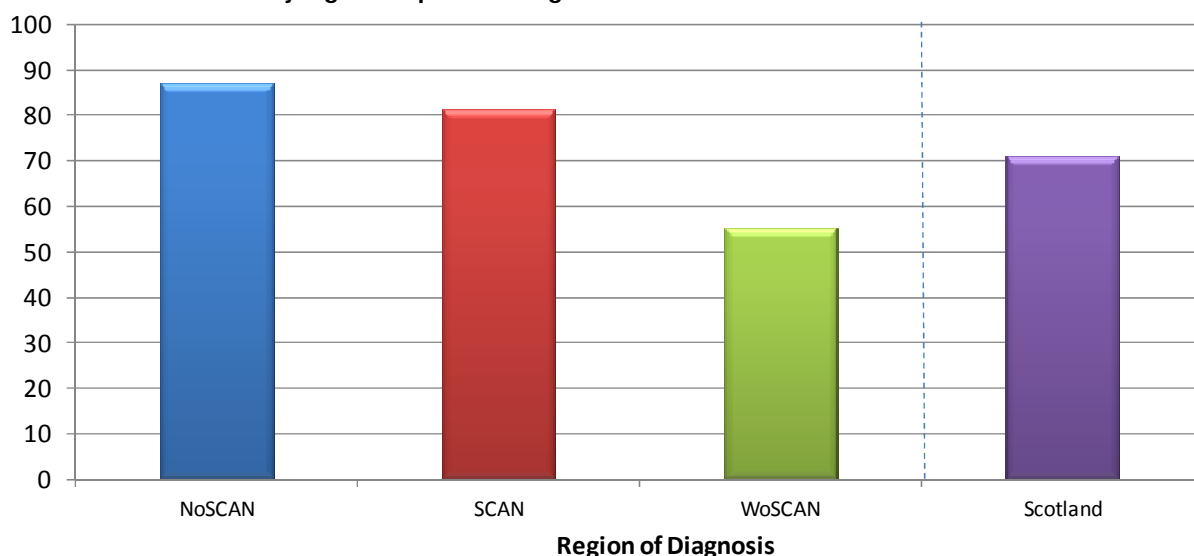
4.1 Data Quality

Audit data quality can be assessed in the first instance by estimating the proportion of expected patients that have been identified through audit. Case ascertainment is calculated as the number of new cases identified by the audit as a proportion of the number of cases reported by the National Cancer Registry (provided by Information Services Division, National Services Scotland). Cancer Registry figures were extracted from ACaDMe (Acute Cancer Deaths and Mental Health), a system provided by Information Services Division (ISD). Cancer Registry figures are an average of the previous five years' figures to take account of annual fluctuations in incidence within NHS Regions.

Overall case ascertainment for Scotland is reasonably good at 70%, however this ranges from 56% in WoSCAN to 87% in NOSCAN. This indicates that the capture of new cases of sarcoma through audit is good in some Boards and overall results are likely to be a reasonably accurate reflection of performance. Case ascertainment figures in WoSCAN are considerably lower at 56% and therefore caution should be given to results as percentages might be a less accurate reflection of actual performance in this region.

Case ascertainment figures are provided for guidance and are not an exact measurement as it is not possible to compare directly with the same cohort. Case ascertainment for each NHS Region is illustrated in Figure 1. Case ascertainment figures do however highlight that work is required across Scotland to improve data capture and ensure accurate reporting in future. It is not surprising that case ascertainment is relatively low in some areas given this is the first year of data collection and the complexity of both the patient pathway and data collection which crosses Board and regional boundaries.

Figure 1: Case ascertainment by region for patients diagnosed with sarcomas in Scotland in 2014/15



	NOSCAN	SCAN	WoSCAN	Scotland
Cases from audit	77	73	83	233
ISD Cases (2010-2013 average)	89	90	151	329
% Case ascertainment	87%	81.1%	55%	71%

Action required:

- Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.

4.2 Performance against Quality Performance Indicators (QPIs)

Results of the analysis of Sarcoma Quality Performance Indicators are set out in the following sections. Graphs and charts have been provided where this aids interpretation and, where appropriate, numbers have also been included to provide context.

Data are presented for each QPI at a national or regional level both graphically and in table format. Centre level data has been reviewed by local teams however given the small numbers involved it has not been presented at this level. Aggregated centre level data will be presented in future reports when sufficient data is available to make more robust conclusions on performance. Specific regional and national actions have been identified to address issues highlighted through the data analysis.

Where the number of cases meeting the denominator criteria for any indicator is between one and four, the percentage calculation has not been shown on any associated charts or tables. This is to avoid any unwarranted variation associated with small numbers and to minimise the risk of disclosure. Any charts or tables impacted by this are denoted with a dash (-). Any commentary provided by NHS

Boards relating to the impacted indicators is however be included as a record of continuous improvement.

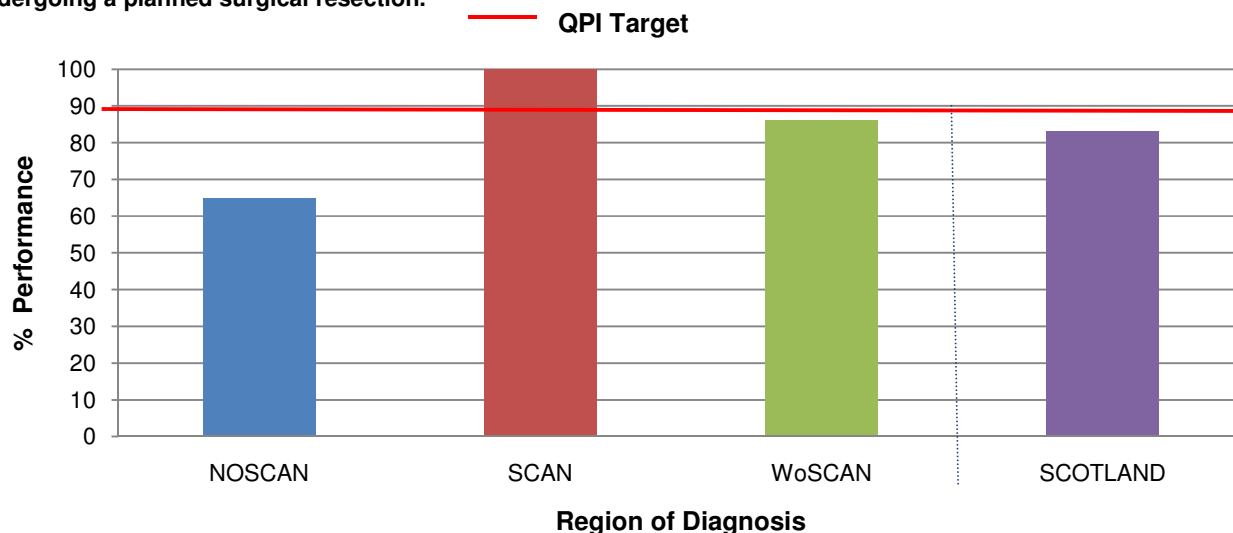
The sarcoma QPIs focus on extremity sarcomas as determined by the Sarcoma QPI Development Group, unless otherwise specified. Data is however collected on all sarcomas diagnosed in Scotland. Extremity sarcoma is defined as sarcoma of the: upper limb, shoulder girdle to fingers or lower extremity, iliac crest/buttock to toes. Extremity sarcomas account for 50-60% of all sarcomas¹.

QPI 1 – Histological Diagnosis

Histological typing of extremity sarcomas is essential for planning appropriate treatment and to provide important information relating to prognosis¹. A histological diagnosis should be obtained before a planned surgical resection takes place as unplanned surgery has been shown to affect morbidity and mortality¹. The 90% target set for the QPI accounts for small superficial lesions where the diagnosis of sarcoma may not be reasonably suspected clinically and emergency situations¹.

QPI Title:	Patients with extremity sarcoma should have a histological diagnosis before undergoing a planned surgical resection.
Numerator:	Number of patients with extremity sarcoma who undergo a planned surgical resection who have a histological diagnosis before surgical resection takes place.
Denominator:	All patients with extremity sarcoma who undergo a planned surgical resection.
Exclusions:	No exclusions
Target:	90%

Figure 2: Proportion of patients with extremity sarcoma that should have a histological diagnosis before undergoing a planned surgical resection.



QPI 1	NOSCAN	SCAN	WoSCAN	Scotland
Performance (%)	65.0%	100.0%	86.1%	83.1%
Numerator	13	15	31	59
Denominator	20	15	36	71
Not recorded numerator	0	0	0	0
Not recorded numerator (%)	0.00%	0.00%	0.00%	0.00%
Not recorded exclusions	0	0	0	0
Not recorded exclusions (%)	0.0%	0.0%	0.0%	0.0%
Not recorded denominator	2	0	1	3

Scotland wide performance against this indicator is 83% which is only slightly below the target level, however only SCAN are reaching this level as a region, with some variance in performance across regions.

NHS Grampian has reviewed all cases which did not meet the indicator and noted that patients were initially treated by other teams, e.g. plastic surgery, or initial biopsy was inconclusive.

All other Boards should review cases which did not have a histological diagnosis prior to undergoing planned surgical resection and feedback to the NMCN on reasons for this.

Action required:

- NOSCAN and WoSCAN Boards to review those cases which did not have a histological diagnosis prior to undergoing surgical resection and feedback to NMCN.

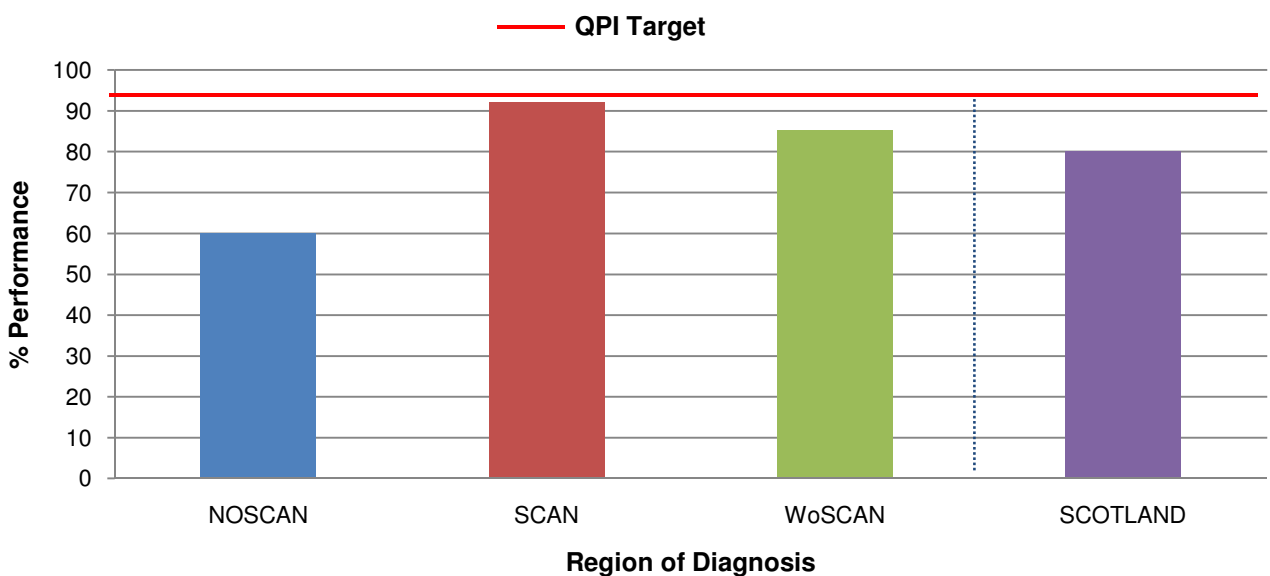
QPI 2 – Multi Disciplinary Team Meeting

Evidence suggests that patients with cancer managed by a multi-disciplinary team have a better outcome. There is also evidence that the multidisciplinary management of patients increases their overall satisfaction with their care¹.

Discussion prior to definitive treatment decisions being made provides reassurance that patients are being managed appropriately¹. The target for this QPI is 95%, which accounts for situations where patients require treatment urgently¹.

QPI Title:	Patients with extremity sarcoma should be discussed by a multidisciplinary team (MDT) prior to definitive treatment.
Numerator:	Number of patients with extremity sarcoma discussed at the MDT before definitive treatment.
Denominator:	All patients with extremity sarcoma.
Exclusions:	Patients who died before first treatment.
Target:	95%

Figure 3: Proportion of patients with extremity sarcoma that should be discussed by a multidisciplinary team (MDT) prior to definitive treatment.



QPI 2	NOSCAN	SCAN	WoSCAN	Scotland
Performance (%)	60.0%	92.0%	85.4%	80.2%
Numerator	15	23	35	73
Denominator	25	25	41	91
Not recorded numerator	0	0	0	0
Not recorded numerator (%)	0.0%	0.0%	0.0%	0.0%
Not recorded exclusions	0	0	0	0
Not recorded exclusions (%)	0.0%	0.0%	0.0%	0.0%
Not recorded denominator	0	0	1	1

Scotland wide performance against this QPI is 80% with no region meeting the target level. SCAN have reviewed the 2 cases not meeting the target level and noted appropriate clinical reasons for this. NHS Grampian also reviewed cases and cited the following reasons for this, patients had been treated by other services prior to referral and sarcoma was an unexpected finding following surgery.

Following baseline review discussion it was agreed that this QPI will be updated for year 2 analysis to ensure that patients who refuse treatment are excluded from the calculation.

Action required:

- NOSCAN and WoSCAN Boards to review cases which were not discussed at MDT before definitive treatment and feedback to NMCN.

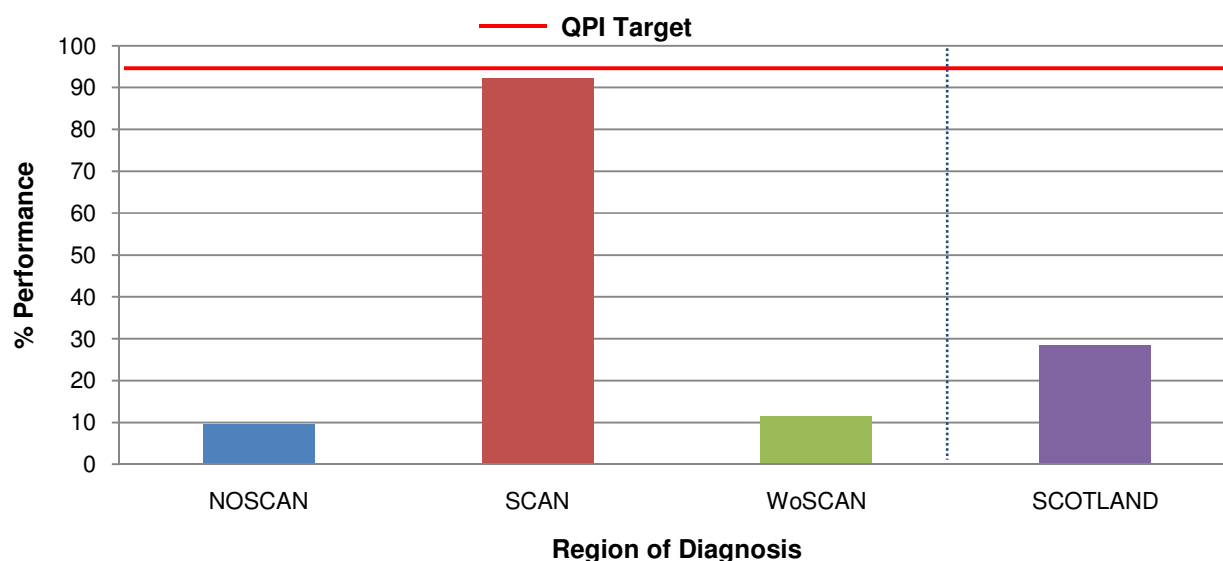
QPI 3 – Clinical Staging

Staging has an important role in determining the most effective treatment for soft tissue sarcoma and provides information on prognosis¹. Clinical staging should follow the principles of TNM classification; this aids the determination of prognosis and choice of therapy¹.

The target for this QPI is set at 95% to account for the fact that some patients may present with very advanced disease therefore may not be fit for investigation and/or treatment. It also accounts for emergency situations.

QPI Title:	Patients with extremity soft tissue sarcoma should be staged using the Tumour Node Metastases (TNM) staging system.
Numerator:	Number of patients with extremity soft tissue sarcoma who are clinically staged using TNM staging system prior to definitive treatment.
Denominator:	All patients with extremity soft tissue sarcoma.
Exclusions:	Patients with rhabdomyosarcomas.
Target:	95%

Figure 4: Proportion of patients with extremity soft tissue sarcoma who should be staged using the Tumour Node Metastases (TNM) staging system.



QPI 3	NOSCAN	SCAN	WoSCAN	Scotland
Performance (%)	9.5%	92.3%	11.5%	28.3%
Numerator	2	12	3	17
Denominator	21	13	26	60
Not recorded numerator	19	0	17	36
Not recorded numerator (%)	90.5%	0.0%	65.4%	76.6%
Not recorded exclusions	0	0	0	0
Not recorded exclusions (%)	0.0%	0.0%	0.0%	0.0%
Not recorded denominator	0	0	1	1

Recording of TNM staging at MDT is clearly extremely variable across NHSScotland, with national performance of only 28%. There are a high proportion of cases with not recorded information, of either T, N, or M stage, in both NOSCAN and WoSCAN which accounts for the considerably lower percentage performance in these regions.

Feedback from clinical teams has been that TNM has not traditionally been utilised for sarcomas by all centres however the NMCN have agreed this system should be used in future to ensure consistency and comparability across the country. Improvement in recording of TNM staging information is particularly important as this plays a significant part in the measurement of performance against QPIs and it is therefore imperative that data completeness continues to improve if we are to be able to utilise this prognostic factor in a consistent and comparable way.

Action required:

- NOSCAN and WoSCAN to record TNM for all sarcomas at MDT meeting.

QPI 4 – Surgical Margins

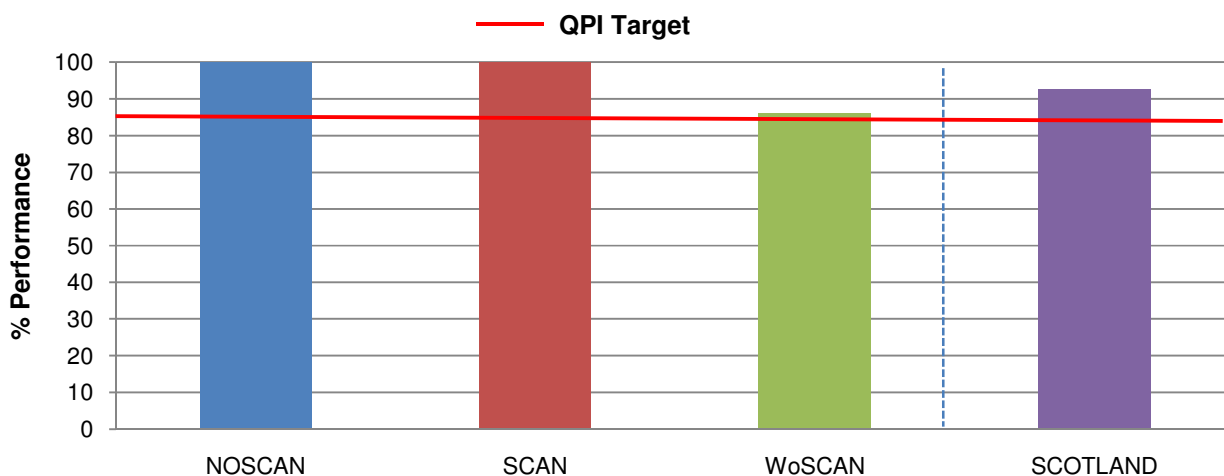
The surgical margin achieved within surgical resection impacts on local recurrence rates and survival of patients¹.

It is important that surgical procedures are planned in advance of surgery, this allows for the necessary treatment planning to take place before the initiation of treatment¹.

The target level for this QPI is set at 85% to account for situations where it is agreed due to anatomical constraints a planned positive surgical margin is acceptable.

QPI Title:	Patients with extremity sarcoma undergoing surgical resection should have their tumour adequately excised.
Numerator:	Number of patients with extremity sarcoma who undergo surgical resection with curative intent where R0 ⁺ resection is achieved.
Denominator:	All patients with extremity sarcoma who undergo surgical resection with curative intent.
Exclusions:	No exclusions
Target:	85%
*R0 resection is a surgical resection where surgical margins are clear of microscopic disease.	

Figure 5: Proportion of patients with extremity sarcoma undergoing surgical resection who should have their tumour adequately excised.



QPI 4	Region of Surgery			
	NOSCANA	SCAN	WoSCAN	Scotland
Performance (%)	100.0%	100.0%	86.2%	92.6%
Numerator	10	15	25	50
Denominator	10	15	29	54
Not recorded numerator	0	0	8	8
Not recorded numerator (%)	0.0%	0.0%	27.6%	27.6%
Not recorded exclusions	0	0	0	0
Not recorded exclusions (%)	0.0%	0.0%	0.0%	0.0%
Not recorded denominator	10	0	6	16

Figure 5 demonstrates good performance across Scotland with 93% of cases meeting this QPI, and all regions meeting the target. This is very encouraging however the small numbers mean that percentages should be compared with caution. In future years aggregated centre data will provide a much more robust analysis of performance across surgical centres.

QPI 5 – Molecular Staging of Gastrointestinal Stromal Tumour

All small bowel GISTs and all intermediate and high risk GISTs, regardless of location, should have mutational analysis performed¹. Mutational analysis provides information on the tumour allows for a more detailed prognosis and influences the choice of treatment¹. Mutational analysis for this patient group should include at least assessment of KIT exons 9 and 11, and PDGFRA exons 12 and 18 for mutations. If apparently wildtype, additional exons will need to be examined to rule out rare primary mutations¹.

The 90% target level accounts for situations where the patient died before the clinical features of GIST, small bowel GISTs and primary metastatic GIST were identified and reported¹.

QPI Title:	Patients with high or moderate risk gastrointestinal stromal tumour (GIST), small bowel GISTs and primary metastatic GIST should have mutational analysis within 6 months of diagnosis.
Numerator:	Number of patients with high or moderate risk GIST, small bowel GISTs and primary metastatic GIST who have mutational analysis within 6 months of diagnosis.
Denominator:	All patients with high or moderate risk GIST, small bowel GISTs and primary metastatic GIST at diagnosis.
Exclusions:	No exclusions
Target:	90%

As GIST is a very rare cancer type unsurprisingly there is a very small number of patients included within the measurement of this QPI therefore results are not presented at a regional level. Performance against this QPI is 79% across Scotland, which represents 11 of 14 cases meeting the QPI across the country. This is only 11 percentage points below the target level however it is very difficult to interpret given the small numbers. Future reports will present aggregated results for greater confidence around results.

It is important to note that there were a number of cases which were not recorded for denominator criteria; therefore these cases were not included in the analysis, which has lowered the numbers included even further. This is principally due to staging data not being complete, as per QPI 3.

Following baseline review this QPI has been revised to measure molecular analysis being undertaken within 3 months of diagnosis therefore this indicator may be more challenging for regions to meet in future years.

QPI 6 – Limb Sparing Surgery

Studies have shown that surgical treatment for approximately 90-95% of patients involves limb sparing surgery¹. Rates of amputation have decreased over the years and this treatment approach is typically reserved for patients with locally advanced disease that cannot be managed by limb sparing surgery¹. Patients who undergo limb sparing surgery have improved quality of life post treatment, uncompromised survival rates and local tumour control, as well as, an asymptomatic and functional limb¹. This indicator has a target level of 85% to account for patient choice.

QPI Title:	Patients with extremity sarcoma should have primary limb-sparing surgery.
Numerator:	Number of patients with extremity sarcoma who undergo a primary limb-sparing surgery.
Denominator:	All patients with extremity sarcoma.
Exclusions:	No exclusions.
Target:	85%

Due to significant issues with the measurability document, specifically the inclusion of inappropriate cases, i.e. cases which were not extremity sarcomas, results are not wholly accurate and are therefore not presented for this first year of data analysis.

Following baseline review discussion the QPI measurability document has been revised to ensure consistent, comparable and accurate reporting of this important quality indicator in future.

QPI 7 – Primary Flap Reconstruction

After surgical resection, reconstructive surgery may be needed to cover wounds, preserve function and/or improve the cosmetic outcome¹. When conducting reconstructive surgery, surgeons should consider the flap success rate as one factor in choosing the best construction for any individual patient¹.

For the purpose of reporting this QPI a successful primary flap has been defined as a patient who does not need to return to theatre for unplanned surgery. The target level for this QPI is 85%; this is to account for situations where re-exploration of flaps is undertaken due to vascular insufficiency.

QPI Title:	Patients with extremity sarcoma should have successful ¹ primary flap reconstruction following surgical resection.
Numerator:	Number of patients with extremity sarcoma who undergo successful ¹ primary flap reconstruction.
Denominator:	All patients with extremity sarcoma who undergo primary flap reconstruction.
Exclusions:	No exclusions.
Target:	85%

¹ Successful has been defined as patients who do not need to return to theatre for unplanned surgical debridement of a sufficient volume of the flap reconstruction such that secondary reconstruction is required.

It is encouraging that Scotland wide performance against this indicator was 93% (26 of 28 cases) and each region met the target level. As with QPI 6, aggregated centre results will be presented in future years.

QPI 8 – Post Operative Radiotherapy

Post operative radiotherapy is advocated for those with a deep tumour (any size, grade 2 or 3), who have had an R0 or R1 excision. Evidence suggests that post operative radiotherapy should start within 3 months of surgery¹. The target level for this indicator is set at 90% to account for situations where co-morbidities, severe post-operative complications or frailty can mean the patient is not suitable for post operative radiotherapy.

QPI Title:	Patients with a high grade, deep*, extremity soft tissue sarcoma should receive radiotherapy within 3 months of a planned marginal or wide local excision.
Numerator:	Number of patients, aged 16 and over, with grade 2 or 3, deep*, extremity soft tissue sarcoma undergoing a planned marginal or wide local excision who commenced post operative radiotherapy within 3 months of surgery.
Denominator:	All patients, aged 16 and over, with grade 2 or 3, deep*, extremity soft tissue sarcoma undergoing a planned marginal or wide local excision.
Exclusions:	Patients undergoing amputation. Patients who undergo a compartmentectomy. Patients who have had pre operative radiotherapy. Patients with rhabdomyosarcoma. Patients with a tumour superficial to the fascia.
Target:	90%
* Deep can be defined as: deep to fascia, this is determined radiologically.	

Scotland performance against this QPI was 90% (9 out of 10 cases), however given the very small number of cases included within the measurement of the indicator further data is required before any assessment of quality of service cancer be made, however this is very encouraging.

QPI 9 – Neo-adjuvant Systemic Anti Cancer Therapy for Osteosarcoma or Ewing’s Sarcoma

Evidence suggests that patients with Osteosarcoma or Ewing’s sarcoma should be given combination neoadjuvant SACT¹. Due to the intensity and toxicity of this neoadjuvant combination chemotherapy it may not be clinically indicated for patients over the age of 40 (osteosarcoma) or 50 (Ewing’s sarcoma)¹. This is due to a number of factors including performance status. Patients who are unsuitable for this type of treatment are considered for alternative treatment plans. The target level for this QPI is 90% this is designed to account for factors of patient choice, co-morbidities and fitness for treatment.

QPI Title:	Patients with osteosarcoma or Ewing’s sarcoma should receive neoadjuvant combination SACT when clinically indicated.
Numerator:	Number of patients with osteosarcoma or Ewing’s sarcoma who are under the age of 40 (50 for Ewing’s sarcoma) who undergo neoadjuvant combination SACT.
Denominator:	All patients with osteosarcoma or Ewing’s sarcoma who are under the age of 40 (50 for Ewing’s sarcoma).
Exclusions:	Patients undergoing emergency primary surgery or radiotherapy.
Target:	90%

Again small numbers affect the presentation of results for this QPI. Scotland wide performance was 73% (8 out of 11 cases) for both osteosarcoma and Ewing’s sarcoma combined. It should be noted that data for osteosarcoma and Ewing’s sarcoma were reported separately for local Board management purposes.

QPI 10 – Adjuvant Oncological Treatment for Gastrointestinal Stromal Tumours

Data for clinical trials demonstrated that adjuvant imatinib therapy given for a period of three years compared to one year, significantly improved the recurrence free survival in adult patients at significant risk of relapse following resection of GIST¹. The target level of this indicator is set at 85% to account for the fact that due to co-morbidities and fitness not all patients will be suitable for imatinib following complete macroscopic resection.

QPI Title:	Patients with high risk [*] Gastrointestinal Stromal Tumour (GIST) should commence adjuvant imatinib within 3 months of complete macroscopic resection.
Numerator:	Number of patients, aged 16 and over, with high risk [*] GIST undergoing complete macroscopic resection who commence adjuvant imatinib within 3 months of complete macroscopic resection.
Denominator:	All patients aged 16 and over, with high risk [*] GIST undergoing complete macroscopic resection.
Exclusions:	Patients who are enrolled in a clinical trial.
Target:	85%

^{*} High risk is defined as: patients with large GIST tumours that have a high chance of recurring.

Only a very small number of patients were included within the measurement of this QPI across Scotland and therefore figures cannot be presented at this time, even at a national level. Following baseline review the measurability document has been updated to ensure accuracy and this may influence reporting of data in future reports.

QPI 11 – 30 Day Mortality Following Oncological Treatment

Treatment related mortality is a marker of the quality and safety of the whole service provided by the Multi Disciplinary Team (MDT)¹. Treatment should only be undertaken in individuals that may benefit from that treatment, that is, treatments should not be undertaken in futile situations. This QPI is intended to ensure treatment is given appropriately, and the outcome reported on and reviewed¹.

The QPI is split into 2 separate sections; the first measures the proportion of patients who die within 30 days of oncological treatment with curative intent and the second those patients who die within 30 days of palliative treatment. The target level is less than 10% for curative treatments and less than 15% for palliative treatments.

QPI 11a - 30 Day Mortality Following Curative Oncological Treatment

QPI Title:	30 day mortality following curative treatment for extremity and retroperitoneal sarcoma.
Numerator:	Number of patients with extremity or retroperitoneal sarcoma who receive oncological treatment with curative intent who die within 30 days of treatment.
Denominator:	All patients with extremity or retroperitoneal sarcoma who receive curative oncological treatment.
Exclusions:	No exclusions.
Target:	<10%

QPI 11a	NOSCAN	SCAN	WoSCAN	Scotland
Performance (%)	0.0%	0.0%	0.0%	0.0%
Numerator	0	0	0	0
Denominator	8	13	28	49
Not recorded numerator	0	0	0	0
Not recorded numerator (%)	0.0%	0.0%	0.0%	0.0%
Not recorded exclusions	0	0	0	0
Not recorded exclusions (%)	0.0%	0.0%	0.0%	0.0%
Not recorded denominator	0	0	0	0

It is extremely encouraging that no patients died within 30 days of curative oncological treatment across Scotland in 2014/15.

It should be noted that following baseline review this indicator has been updated to include mortality following curative surgical resection, and this data will be presented in future reports.

QPI 11b - 30 Day Mortality Following Palliative Oncological Treatment

QPI Title:	30 day mortality following curative treatment for extremity and retroperitoneal sarcoma.
Numerator:	Number of patients with extremity or retroperitoneal sarcoma who receive oncological treatment with palliative intent who die within 30 days of treatment.
Denominator:	All patients with extremity or retroperitoneal sarcoma who receive palliative oncological treatment.
Exclusions:	No exclusions.
Target:	<15%

Scotland wide performance against this indicator was 33% (2 of 6 cases) which reflects the aggressiveness of some sarcomas. Cases which did not meet the target should be reviewed by Boards at local morbidity and mortality meetings.

Action required:

- All patients who died within 30 days of palliative oncological treatment should be discussed at local morbidity and mortality meetings.

5. Conclusions

Cancer audit underpins much of the development and service improvement work of Managed Clinical Networks and the regular reporting of activity and performance are fundamental in assuring the quality of care delivered across NHSScotland. The development and implementation of Sarcoma QPIs will help drive continuous quality improvement in patient care whilst ensuring that activity is focussed on those areas that are most important in terms of improving survival and patient experience. In addition, the introduction of QPIs and the associated governance structure will facilitate regular monitoring and reporting of data to ensure equitable care across the country.

Results presented in this report demonstrate that work is required to ensure patients with sarcoma receive an equitable and consistent standard of care across NHS Scotland. It is evident that many of the QPI targets set have been challenging for centres to achieve and some variance and a number of areas for improvement have been highlighted. It should however be noted that given the rarity of sarcoma numbers included within the measurement of the majority of indicators are small and therefore percentages should be compared with caution.

This audit report has identified areas where data capture must improve to enable more meaningful analysis of performance against QPIs in the coming years, specifically with regards to TNM staging. Overall case ascertainment and data capture is however commendable for the first year of data collection and analysis. This provides a good foundation from which to measure service improvement in future years, however further work is required, specifically in WoSCAN, to ensure good case ascertainment.

It is extremely encouraging that all regions have met the target level for a number of QPIs, including: surgical margins, primary flap reconstruction, post operative radiotherapy and 30 day mortality following curative treatment. Areas for service improvement have been identified relating to variation in histological diagnosis, MDT discussion and 30 day mortality following palliative treatment.

NHS Boards are asked to develop local Action/Improvement Plans in response to the findings presented in the report

Action required:

- Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.
- NOSCAN and WoSCAN Boards to review those cases which did not have a histological diagnosis prior to undergoing surgical resection and feedback to NMCN.
- NOSCAN and WoSCAN Boards to review cases which were not discussed at MDT before definitive treatment and feedback to NMCN.
- NOSCAN and WoSCAN to record TNM for all sarcomas at MDT meeting.
- All patients who died within 30 days of palliative oncological treatment should be discussed at local morbidity and mortality meetings.
- NHS Boards are asked to develop local Action/Improvement Plans in response to the findings presented in the report.

Completed Action Plans should be returned to WoSCAN within two months of publication of this report.

Progress against these plans will be monitored by the MCN Advisory Board and any service or clinical issue which the Advisory Board considers not to have been adequately addressed will be escalated to the NHS Board Territorial Lead Cancer Clinician and Regional Lead Cancer Clinician.

Additionally, progress will be reported to the Regional Cancer Advisory Group (RCAG) annually by NHS Board Territorial Lead Cancer Clinicians and MCN Clinical Leads, as part of the regional audit governance process to enable RCAG to review and monitor regional improvement.

Acknowledgement

This report has been prepared using clinical audit data provided by each of the fourteen NHS Boards in Scotland. We would like to thank colleagues in the clinical effectiveness departments throughout Scotland for gathering, submitting and verifying these data. We would also like to thank the clinicians, nurses and others involved in the management of patients with sarcoma for their contribution to the clinical audit process.

Abbreviations

ARI	Aberdeen Royal Infirmary
ACaDMe	Acute Cancer Deaths and Mental Health
BWoSCC	Beatson West of Scotland Cancer Centre
CMG	Clinical Management Guideline
CT	Computed Tomography
eCASE	Electronic Cancer Audit Support Environment
GGH	Gartnavel General Hospital
GIST	Gastrointestinal Stromal Tumour
GRI	Glasgow Royal Infirmary
HIS	Healthcare Improvement Scotland
ISD	Information Services Division
MDT	Multidisciplinary Team
NW	Ninewells Hospital
NMCN	National Managed Clinical Network
NCQSG	National Cancer Quality Steering Group
NHSGGC	NHS Greater Glasgow and Clyde
NOSCAN	North of Scotland Cancer Network
QEUH	Queen Elizabeth University Hospital
QPI (s)	Quality Performance Indicator (s)
RCAG	Regional Cancer Advisory Group
RIE	Royal Infirmary of Edinburgh
SACT	Systemic Anti Cancer Therapy
SCAN	South and East of Scotland Cancer Network
TNM	Classification of Malignant Tumours
WGH	Western General Hospital

WHO	World Health Organisation
WoS	West of Scotland
WoSCAN	West of Scotland Cancer Network

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4. Cancer Research UK. Soft Tissue Sarcoma Statistics. [Accessed on: 27th April 2016]. Available at: <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/soft-tissue-sarcoma>
5. National Cancer Intelligence Network. Bone and Soft Tissue Sarcomas UK Incidence and Survival 1996 to 2010 v2.0 November 2013.

Appendix 1: NHS Board Action Plans

A summary of actions for each NHS Board has been included within the Action Plan templates in Appendix 1. Completed Action Plans should be returned to WoSCAN within two months of publication of this report.

Action / Improvement Plan

Region:	NOSCAN
Action Plan Lead:	
Date:	

KEY (Status)	
1	Action fully implemented
2	Action agreed but not yet implemented
3	No action taken (please state reason)

No	Action Required	Health Board Action Taken	Timescales		Lead	Progress/Action Status	Status (see key)
			Start	End			
	<i>Action</i>	<i>Detail specific actions that will be taken by the NHS Board.</i>	<i>Insert date</i>	<i>Insert date</i>	<i>Insert name of responsible lead for each specific action.</i>	<i>Provide detail of action in progress, change in practices, problems encountered or reasons why no action taken.</i>	<i>Insert No. from key above</i>
1.	Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.						
2.	NOSCAN Boards to review those cases which did not have a histological diagnosis prior to undergoing surgical resection and feedback to NMCN.						
3.	NOSCAN Boards to review cases which were not discussed at MDT before definitive treatment and feedback to NMCN.						
4.	NOSCAN to record TNM for all sarcomas at MDT meeting.						
5.	All patients who died within 30 days of palliative oncological treatment should be discussed at local morbidity and mortality meetings.						

Action / Improvement Plan

Region:	SCAN
Action Plan Lead:	
Date:	

KEY (Status)	
1	Action fully implemented
2	Action agreed but not yet implemented
3	No action taken (please state reason)

No	Action Required	Health Board Action Taken	Timescales		Lead	Progress/Action Status	Status (see key)
			Start	End			
	<i>Action</i>	<i>Detail specific actions that will be taken by the NHS Board.</i>	<i>Insert date</i>	<i>Insert date</i>	<i>Insert name of responsible lead for each specific action.</i>	<i>Provide detail of action in progress, change in practices, problems encountered or reasons why no action taken.</i>	<i>Insert No. from key above</i>
1.	Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.						

Action / Improvement Plan

Region:	WoSCAN
Action Plan Lead:	
Date:	

KEY (Status)	
1	Action fully implemented
2	Action agreed but not yet implemented
3	No action taken (please state reason)

No	Action Required	Health Board Action Taken	Timescales		Lead	Progress/Action Status	Status (see key)
			Start	End			
	<i>Action</i>	<i>Detail specific actions that will be taken by the NHS Board.</i>	<i>Insert date</i>	<i>Insert date</i>	<i>Insert name of responsible lead for each specific action.</i>	<i>Provide detail of action in progress, change in practices, problems encountered or reasons why no action taken.</i>	<i>Insert No. from key above</i>
1.	Regions should review data collection processes to ensure capture of all new cases of sarcoma within clinical audit.						
2.	WoSCAN Boards to review those cases which did not have a histological diagnosis prior to undergoing surgical resection and feedback to NMCN.						
3.	WoSCAN Boards to review cases which were not discussed at MDT before definitive treatment and feedback to NMCN.						
4.	WoSCAN to record TNM for all sarcomas at MDT meeting.						
5.	All patients who died within 30 days of palliative oncological treatment should be discussed at local morbidity and mortality meetings.						