Public Health England

Protecting and improving the nation's health

Case mix adjusted 30-day mortality post systemic anti-cancer therapy rates

A companion brief to support the interpretation of this data

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Summary

In September 2020, the National Cancer Registration and Analysis Service (NCRAS) team at Public Health England (PHE) produced a workbook documenting case mix adjusted 30-day mortality post systemic anti-cancer therapy (SACT) rates (CMAR) for four tumour sites. These CMAR were calculated for NHS trusts and the workbook was circulated to all trusts. The data is case mix adjusted to allow for comparisons to be made between trusts and within trusts over time. Trusts were able to request NHS numbers of patients who had died within 30 days of receiving SACT at their trust. We developed this information to support clinical governance at trusts and potentially identify areas where clinical care could be improved. We provided all trusts with the opportunity to comment on their data.

Background

In 2016, the SACT team at PHE published a paper in the Lancet Oncology providing 30-day mortality post SACT rates for breast and lung cancer. NHS trusts, NHS England and the clinical community fed back to PHE that this work had been beneficial in terms of setting a national benchmark, identifying variation in clinical practice between trusts and identifying areas where patient care could have been improved. This information helped to inform advancements to clinical practice.

In December 2018, the SACT team released a workbook to trusts providing crude rates for 30-day mortality post SACT for all cancers combined and breakdowns for Acute Myeloid Leukaemia, Breast, Colon, Children's Teenagers and Young Adults (CTYA), Small Cell Lung Cancer, Non-Small Cell Lung Cancer, Upper Gastro-Intestinal Oesophageal.

Feedback generated from this release highlighted the need for 30-day mortality data which was more timely to support clinical audit, as well as case-mix adjusted which would facilitate the comparison of performance between trusts. Unfortunately, these two needs cannot be met in a single data feed. Case mix adjusted data cannot be produced soon enough after treatment activity to support clinical audit as it requires linkage to cancer registry data to provide supplementary patient information which operates at an 18-month time lag, and additional analytical time to conduct the work. Furthermore, for rarer cancer types, case mix adjustment may only be possible when several years of data have accrued to provide sufficient patient number to support analysis. The SACT team have therefore met these two needs through two outputs: the Rapid Data Review (RDR) and the CMAR. The RDR provides a quarterly data feed to all NHS trusts in England providing key information on patients who died within 30 days of receiving SACT at their trust. This aims to inform 'mortality and morbidity' meetings and develop communications between trusts on initiatives undertaken to reduce 30-day mortality. The CMAR produces 30-day mortality post SACT rates that are adjusted for key variables which means that rates can be compared between trusts and within trusts over time.

In August 2020, the SACT team released a workbook containing case-mix adjusted 30-day post-SACT mortality rates for a range of cancer sites. This first CMAR workbook reviewed patients diagnosed between 2010 and 2017 treated for lung, gastric, pancreatic cancer, and cancer of unknown primary (CUP) in 2017-2018 (depending on the site), as reported by NHS trusts in England through their monthly routine SACT data uploads. In advance of this publication, the workbook was sent to the NHS Trusts for review, giving them the opportunity to provide a statement to accompany their data. These statements have been included in the companion report released with the August 2020 CMAR workbook.

For further information on the SACT data reports please see http://www.chemodataset.nhs.uk/reports/

Workbook

The workbook is based on routine data submitted by NHS trusts to the SACT dataset and includes patients diagnosed with cancer in England between 2010 and 2018 and treated with SACT in all NHS trusts in England between January 2018 and December 2019[1]. The period of treatment activity used varies depending on the cancer type studied (see Table 1) and patients were only included if they received their latest treatment during the treatment period (i.e. patients still receiving treatment in 2020 were excluded). Each patient was allocated to the trust where they received their final treatment, regardless of any prior treatment received at other trusts.

Table 1. ICD-10 code and treatment activity covered for each cancer site

Cancer site	ICD-10 code	Period of treatment activity
Bowel	C18-C20, C21.8	Jan 2019 – Dec 2019
Breast	C50	Jan 2019 – Dec 2019
Myeloma	Multiple myeloma: • ICD10: C90.0 Plasma cell leukaemia: • ICD10: C90.1	Jan 2018 – Dec 2019
Ovarian	C48.1 C56-C57.4	Jan 2018 – Dec 2019

The cancer registry is a database of information about cancer patients collected directly from hospitals. The SACT dataset collects systemic anti-cancer therapy activity from all NHS England providers. For the purposes of the analysis, patients were selected from the cancer registry data. This cohort of patients was then linked to SACT data to retrieve the latest treatment records for these patients. Certain restrictions were applied to the data to ensure that the appropriate patients and treatment data were selected for each cancer site. These restrictions mean that some trusts may have no data included in the workbook because their patients and patients' treatment activity did not fit the criteria applied. The restrictions applied to the data are outlined below.

Tumour restrictions

- Diagnosis was restricted to tumours diagnosed between 2010 and 2018.
- Patients whose most recent cancer diagnosis was one of the cancer sites of interest were selected. If patients had more than one tumour diagnosed on the same day, the tumour in cancer groups we were analysing was selected.

It is important to note that in some cases, the cancer diagnosis recorded in the cancer registry may differ from that recorded by the trust.

[1] All patients treated during the selected time frame were included – not only those who started treatment during the period of interest.

If you would like support in improving the quality of the data feed into the cancer registry then please contact a member of the National Disease Registration Service Data Improvement Team. Contacts are listed below by region:

Northern and Yorkshire – Karen Graham Karen.Graham@phe.gov.uk
North West – Paul Stacey Paul.Stacey@phe.gov.uk
East Midlands – Simon Cairnes Simon.Cairnes@phe.gov.uk
West Midlands and Oxford- Gemma Feeney Gemma.Feeney@phe.gov.uk
London – Katrina Sung Katrina.Sung@phe.gov.uk
Eastern – Marianne Mollett Marianne.Mollett@phe.gov.uk
South West – James Withers James.Withers@phe.gov.uk

Data completeness restrictions

- Trusts with less than 70% completeness for the following key variables: stage[2]; performance status; and co-morbidity score were excluded from the analysis. Please note that these variables were sourced from the SACT dataset, the Cancer Outcomes and Services Dataset (COSD) and Hospital Episodes Statistics (HES) data. The cancer types were selected for analysis on the basis that less than 20% of trusts would be excluded using the 70% completeness threshold.

Age restrictions

- The cohort was restricted to those aged 18+.

Treatment restrictions

For the purposes of the analysis, and to ensure treatment data was relevant to the cancer site, the following rules were applied when linking SACT data to the cohort of patients identified from the registry:

1. For those patients with only one cancer diagnosed, all treatment records within the relevant time frame were selected.
2. For those patients with more than one cancer diagnosed, treatment records were selected if they fit the following criteria:
    - Within the relevant time frame (January 2018- December 2019).
    - The first three characters of the primary diagnosis recorded in SACT for that treatment record matched the first three characters of the cancer site identified in the registry.
3. For those patients with treatment records that did not fall within categories 1 and 2 outlined above, records were selected if they were within the relevant time frame and fell within 31 days before and 183 days after the diagnosis of interest. This ensures that treatment given soon after diagnosis is included for those patients where the diagnosis codes recorded in the cancer registry are not an exact match to those recorded in SACT. This is particularly relevant for some cancers where coding of the cancer site sometimes differs between data sources. The 'Linking treatment tables – chemotherapy, tumour resections and radiotherapy' standard operating procedure (published here) recommends the following post-diagnosis time periods:
    - Bowel and breast: 365 days
    - Myeloma: 456 days
    - Ovarian: 274 days

[2] For myeloma, the data completeness threshold was only applied to performance status and co-morbidity score due to lack of staging data for this site.

A post-diagnosis time period of 183 days was set across all sites for this analysis, which differs slightly from the standard operating procedure recommendations above. This means a very small proportion (~1%) were not included in the analysis. However, post-diagnosis time periods for future CMAR releases will be adjusted to match the relevant sites detailed in the linking treatment tables guidance. Please note that the ICD-10 codes selected may differ from the standard operating procedure referenced. The codes used for this work were selected in accordance with previous releases of 30-day mortality post SACT rates.

Non-harmful, supportive treatments, hormones and non-chemo drugs as well as records submitted in error were excluded from the analysis. The regimen names of those excluded treatments are listed below. These were selected for exclusion in consultation with pharmacists.

- Not Chemo
- Trial
- Anagrelide
- Anastrozole
- Anti-Histamines
- Anti-Emetics
- APML
- B12
- Bisphosphonates
- Denosumab
- Exemestane
- Folinic Acid
- GCSF
- Goserelin
- Hepatoblastoma
- Hydroxycarbamide
- Ibandronic Acid
- Lanreotide
- Letrozole
- Medroxyprogesterone
- Megestrol
- Octreotide
- Pamidronate
- Pasireotide
- Progesterone
- Retinoblastoma
- Sandostatin
- Signifor
- Somatuline
- Somatostatin
- Steroid[3]
- Stilboestrol
- Stilbestrol
- Tamoxifen

[3] Steroids were included for myeloma if they were dexamethasone.

- Triple Intrathecal
- Vitamin
- Zoledronic Acid

Communication of the workbook

The SACT helpdesk at PHE (SACT@phe.gov.uk) compiled a list of named contacts at each NHS trust including the SACT uploader, lead cancer clinician, the regimen mapper, CEO and medical director, unless otherwise notified.

The workbook was sent to these named contacts. There was no patient identifiable data included in the workbook. Trusts were invited to request the NHS numbers of patients in their data who have died within 30 days of receiving SACT. NHS numbers were only provided via secure means following a request from a trust. This aims to restrict the circulation of this sensitive information to individuals who intend to use it for clinical audit and local governance processes.

We informed the trusts that we would be making the workbook publicly available in late autumn 2020 and invited them to provide a statement for inclusion in this companion report. The workbook will be published on the SACT website (http://www.chemodataset.nhs.uk/) and will be publicised through a range of channels, including the SACT and the National Disease Registration Service (NDRS) newsletters.

Interpretation of the data

Case-mix adjusted mortality post SACT rates are reported in this workbook. Each trust will see and treat a wide variety of patients depending on the population they serve and the services they provide. The case-mix adjusted rates take into account these differences by producing rates that are based on an average group of patients as opposed to the trust's own group of patients. The rates can then be compared between trusts. This was done using statistical modelling (in this case, a mixed effects logistic regression model).

The following variables were adjusted for in the analysis:

- Age calculated as of the 1st January 2019
- Sex[4]
- Stage at diagnosis[5]
- Co-morbidity score[6]
- Ethnicity[7]
- Performance status at diagnosis
- Index of Multiple Deprivation
- Hospital trusts (as a random effect[8])

These variables were chosen because they are known to influence 30-day post SACT mortality and because they are available in the data and have better completeness compared with other variables that could be included. It is important to note that due to the absence of any information on critical factors such as patient choice and clinical factors such as liver function tests, the case-mix adjustment may not fully correct for the differences in case load between trusts.

The funnel plot[9] presented in the workbook is a means of visualising 30-day mortality post-SACT rates for the eligible[10] trusts in England.

- The volume of patients is on the horizontal axis. The more patients treated by your trust, the further to the right your trust will be.
- The 30-day mortality post-SACT is on the vertical axis. The higher the mortality post SACT rate at your trust, the further up the graph it will appear.
- The solid red horizontal line shows the average mortality post SACT rate of all trusts.

[4] Sex was not adjusted for in the breast and ovarian analyses as these were restricted to female patients only.
[5] This was not adjusted for in the myeloma analysis due to lack of staging data for this site. For patients who had more than one tumour of interest diagnosed on the same day (e.g. two diagnoses of C18 for bowel cancer site analysis), the tumour record with the highest stage was selected.
[6] The co-morbidity score relates to the Charlson comorbidity score derived using inpatient Hospital Episode Statistics data from 27 to 3 months prior to cancer diagnosis, with the same methodology as described by Maringe *et al.*
[7] Grouped into White, non-White and Unknown categories for analysis as there were insufficient numbers in the other ethnic groups for robust analysis.
[8] In a model, a random effect is usually a grouping factor (e.g. general practice, school, university), in this case the trust, for which we are trying to control and which we expect to be influencing the pattern of 30-day mortality.
[9] More information on funnel plot uses and interpretation can be found here.
[10] See data completeness restrictions.

- Your trust is indicated by the yellow diamond, other trusts are represented by the blue diamonds.
- The dotted lines represent the ±2 standard deviations (SDs) (roughly equivalent to 95% confidence intervals); the dashed lines represent the ±3 standard deviations (SDs) (roughly equivalent to 99.8% confidence intervals). They are higher on the left because when a trust treats a smaller number of patients, chance will have a greater impact on the rate, and therefore the confidence intervals will be wider to reflect this.

The confidence intervals presented in the workbook reflect the distribution of trust mortality post SACT rates around the national average. The workbook highlights the mortality post SACT rates for ±2 standard deviations (SDs) (roughly equivalent to 95% confidence intervals) and ±3 standard deviations (SDs) (roughly equivalent to 99.8% confidence intervals). Trusts with rates above the upper, +3SD will be identified as outliers.

- Trusts with rates above the upper, +3SD have a significantly higher than average 30-day post SACT mortality rate.
- Trusts with rates below the lower, −3SD have a significantly lower than average 30-day post SACT mortality rate.
- Trusts with rates within the confidence limits have an average 30-day post SACT mortality rate.

Trusts with no data

Some trusts had 'no data' in the workbook. This means that they had no activity data for patients being treated for the particular cancer site for the time period, who fit the inclusion criteria. Strict criteria were applied to the data for this work and so there are a few reasons why a trust may have no data in the workbook. Examples of this include:

- Patients were still receiving treatment after the period of interest (e.g. in 2020)
- Patients were treated with regimens that were excluded from the analysis (see list of excluded regimens)
- Patients received their last treatment at a different trust
- We were not able to match the patient's diagnosis in the registry to that of the trust and the patient's treatment fell outside of the diagnosis-to-treatment time window

The table below presents those trusts with no data in the analysis, by cancer site.

Table 2. Trusts with no data, by cancer site

Trust name	Bowel	Breast	Myeloma	Ovarian
Ashford and St Peter's Hospitals NHS Foundation Trust	No data	No data		No data
Barnsley Hospital NHS Foundation Trust	No data	No data		No data
Basildon and Thurrock University Hospitals NHS Foundation Trust	No data	No data		No data
Bolton Hospital NHS Foundation Trust				No data
Chelsea and Westminster Hospital NHS Foundation Trust				No data
Chesterfield Royal Hospital NHS Foundation Trust				No data
Countess Of Chester Hospital NHS Foundation Trust	No data			No data
County Durham and Darlington NHS Foundation Trust				No data
Croydon Health Services NHS Trust		No data		No data
Doncaster and Bassetlaw Hospitals NHS Foundation Trust				No data
East Cheshire NHS Trust		No data		No data
Epsom and St Helier University Hospitals NHS Trust		No data		No data
Harrogate and District NHS Foundation Trust				No data
Homerton University Hospital NHS Foundation Trust		No data	No data	No data
King's College Hospital NHS Foundation Trust				No data
Kingston Hospital NHS Foundation Trust	No data	No data		No data

Lewisham and Greenwich NHS Trust				No data
Liverpool University Hospitals NHS Foundation Trust		No data		No data
London North West University Healthcare NHS Trust				No data
Manchester University NHS Foundation Trust				No data
Mid Cheshire Hospitals NHS Foundation Trust	No data	No data		No data
North Bristol NHS Trust	No data	No data		No data
North Middlesex University Hospital NHS Trust				No data
North Tees and Hartlepool NHS Foundation Trust				No data
Pennine Acute Hospitals NHS Trust	No data			No data
Salford Royal NHS Foundation Trust	No data	No data		No data
Sandwell and West Birmingham Hospitals NHS Trust		No data		
Southport and Ormskirk Hospital NHS Trust	No data	No data		No data
St Helens and Knowsley Hospitals NHS Trust	No data	No data		No data
Stockport NHS Foundation Trust	No data	No data		No data
Tameside and Glossop Integrated Care NHS Foundation Trust	No data	No data		No data
The Hillingdon Hospital NHS Foundation Trust		No data		No data
The Princess Alexandra Hospital NHS Trust				No data
The Rotherham NHS Foundation Trust		No data		No data
Warrington and Halton Hospitals NHS Foundation Trust	No data	No data		No data
West Hertfordshire Hospitals NHS Trust	No data			No data
West Suffolk NHS Foundation Trust				No data
Whittington Health NHS Trust				No data
Wirral University Teaching Hospital NHS Foundation Trust	No data	No data		No data
Wrightington, Wigan and Leigh NHS Foundation Trust		No data		No data
Wye Valley NHS Trust	No data			No data

Excluded trusts and outlying trusts

The table below presents those trusts that were found to be outliers for the 30-day post SACT mortality rates and those trusts that were excluded based on the 70% data completeness threshold[11] for each cancer site included in the analysis.

Table 3. Trusts that were outliers for the 30-day post SACT mortality rates and trusts excluded based on the 70% completeness threshold[12], by cancer site

Trust name	Bowel	Breast	Myeloma	Ovarian
Basildon and Thurrock University Hospitals NHS Foundation Trust			Outlier (>3SD)	
Blackpool Teaching Hospitals NHS Foundation Trust			Excluded	
Calderdale and Huddersfield NHS Foundation Trust			Excluded	Excluded
Chelsea and Westminster Hospital NHS Foundation Trust			Excluded	
Chesterfield Royal Hospital NHS Foundation Trust		Excluded		
Croydon Health Services NHS Trust	Excluded		Outlier (>3SD)	
Dartford and Gravesham NHS Trust		Excluded		
East Suffolk and North Essex NHS Foundation Trust	Excluded	Excluded		Excluded
East Sussex Healthcare NHS Trust			Outlier (>3SD)	
Epsom and St Helier University Hospitals NHS Trust	Excluded			
Frimley Health NHS Foundation Trust		Excluded		
Hampshire Hospitals NHS Foundation Trust		Excluded		Excluded
Isle of Wight NHS Trust			Excluded	
Kettering General Hospital NHS Foundation Trust				Outlier (>3SD)
Liverpool University Hospitals NHS Foundation Trust	Excluded			
London North West University Healthcare NHS Trust	Excluded	Excluded	Excluded	
Maidstone and Tunbridge Wells NHS Trust	Excluded		Excluded	Excluded

[11] Trusts with less than 70% completeness for the following key variables: stage at diagnosis; performance status; and co-morbidity score were excluded from the analysis. For myeloma, the data completeness threshold was only applied to performance status and co-morbidity score due to lack of staging data for this site. Please note that these variables were sourced from the SACT dataset, the Cancer Outcomes and Services Dataset (COSD) and Hospital Episodes Statistics (HES) data. For myeloma, the data completeness threshold was only applied to performance status and comorbidity score due to lack of staging data for this site.

[12] Trusts excluded based on the 70% completeness threshold are referred to as 'Excluded' in the table.

Medway NHS Foundation Trust	Excluded		Excluded	Excluded
Norfolk and Norwich University Hospitals NHS Foundation Trust			Excluded	
North West Anglia NHS Foundation Trust			Excluded	
Oxford University Hospitals NHS Trust			Excluded	
Pennine Acute Hospitals NHS Trust		Excluded	Excluded	
Portsmouth Hospitals NHS Trust			Excluded	
Royal Berkshire NHS Foundation Trust			Excluded	
Royal Free London NHS Foundation Trust				Excluded
Sandwell and West Birmingham Hospitals NHS Trust			Excluded	Excluded
Sheffield Teaching Hospitals NHS Foundation Trust				Excluded
Shrewsbury and Telford Hospital NHS Trust			Excluded	
South Tyneside And Sunderland NHS Foundation Trust	Outlier (>3SD)			
St Helens and Knowsley Hospitals NHS Trust			Excluded	
Surrey and Sussex Healthcare NHS Trust	Excluded		Excluded	
Tameside and Glossop Integrated Care NHS Foundation Trust			Excluded	
The Clatterbridge Cancer Centre NHS Foundation Trust			Excluded	
The Princess Alexandra Hospital NHS Trust	Excluded	Excluded	Excluded	
The Royal Wolverhampton NHS Trust			Excluded	Excluded
University Hospitals of North Midlands NHS Trust				Outlier (>3SD)
University Hospitals Plymouth NHS Trust			Excluded	Excluded
West Suffolk NHS Foundation Trust			Excluded	
Weston Area Health NHS Trust	Excluded	Excluded	Excluded	Excluded
Worcestershire Acute Hospitals NHS Trust			Outlier (>3SD)	

Trust comments

Trusts were invited to comment on their results. We received the following comments:

Basildon and Thurrock University Hospitals NHS Foundation Trust

In September 2020, Public health England (PHE) notified Basildon hospital as an outlier for case-mix adjusted 30-day mortality after Systemic Anti-Cancer Treatment (SACT) analysis of Myeloma patients treated between 2018 and 2019. We understand that results were predicted based on the following parameters -age, sex, co-morbidities, ECOG performance score, deprivation index, stage of disease.

After detailed investigations it emerged that the data we have provided to PHE for SACT analysis in 2018 to 2019 had a performance score of 0, for all the patients. The SACT data we understand was extracted from the 'Chemocare' chemotherapy prescribing system and uploaded for SACT analysis on a monthly basis , without any clinical review for triangulation of data. Following the alert, we found Chemocare system was set at default code to 00 for Performance Score, irrespective of Performance Score entered by the clinician. This error in the Chemocare system was not identified by the clinical team until we received the Rapid Data Release data from PHE-SACT team in July 2020. We have now rectified this problem by contacting the technical team of Chemocare. Our last data from September 2020 reflects the correct details.

At Basildon Hospital 46 Myeloma patients received SACT in 2018-2019 and there were 9 deaths. We undertook a structured judgement review of these 9 deaths using SACT Audit tool and confirmed that majority of patients were elderly, with performance status between 1-3, with multiple co-morbidities, advanced stage of disease (4 / 9 had progressed to plasma cell leukaemia) and the treatment was given within acceptable clinical reasons. Basildon hospital Haematology department has Mortality review as part of its monthly governance meetings which reviews all deaths and serious incidents for quality improvement and shared learning.

We believe that the data provided for analysis at 2018- 2019 is inaccurate and not a true reflection of the care for Myeloma patients at Basildon Hospital. At this point we also believe that if the analysis is performed in other haematological cancers treated at Basildon Hospital for period preceding October 2020, we would be an outlier for the same reasons. We understand that we may not be able to make any changes to your existing data, however taking into consideration of the above factors, we believe we would not be an outlier, if we had provided accurate data with correct performance status.

Bedford Hospital NHS Trust

Bedford Hospital NHS Trust has not been identified as an outlier. The notes of all patients that the trust was unaware of will be reviewed by the Oncologist. A number of these patients should not have been classed as 30-day deaths due to the last Chemotherapy treatment recorded on the system not actually delivered.

Croydon Health Services NHS Trust

We have looked at the 30-day mortality data for myeloma at Croydon. We are flagging as an outlier however we note the following which we would want included as commentary.

Data for CHS is skewed giving a falsely elevated estimate of treatment related mortality for a number of reasons:

- Patient numbers are low and further eroded due to data exclusion (completeness threshold)
- Cancer registry data has been utilised as a denominator which does not tally with SACT monthly reporting data for the 2108/19 period
- A number of patients have been included who, although prescribed medication within the 30-day timeframe, were unable to take this medication causing a false elevation of treatment related mortality in this cohort.

These data quality issues are being further investigated for future resolution.

East Sussex Healthcare NHS Trust

Patients are treated by the haematology multidisciplinary team and discussed in the weekly MDM. All treatment decisions are made in conjunction with the patient and their family. Decisions to stop therapy are done on an individual basis bearing in mind these considerations. The information in this report will of course be reviewed, and fed into the Trust's routine Clinical Governance framework to ensure that treatment remains patient-centred and clinically appropriate.

Kettering General Hospital NHS Foundation Trust

Kettering General Hospital have reviewed the dataset for Ovarian Cancer 30-day mortality post-SACT. Total of 14 patients treated. Of those 14, 4 patients were identified by SACT within the 30-day mortality criteria. Kettering General Hospital requested NHS numbers to all 14 patients however, only the 4 that met the 30-day criteria were provided by SACT. A thorough review of these 4 patients has been carried out. Our findings detail that only one patient has been correctly identified as meeting the 30-day mortality criteria. Full narrative of our findings are provided below.

- Patient 1 - Correctly identified as 30-day post chemotherapy mortality however, the patient passed away having received care interventions related to a recognised surgical complication (on day 30).

- Patient 2 – Patients performance scored reviewed – receiving SACT for spindle cell carcinoma of likely ovarian origin. Stage 4 disease at diagnosis. Patient identified as requiring neoadjuvant chemotherapy. Pre chemotherapy, the patient had a performance score of 1 however, they had developed a cardiology comorbidity.

- Patient 3 – Historical cured ovarian cancer for which the patient did not receive SACT for and received surgical treatment. The patient had a further diagnosis and received chemotherapy for pancreatic cancer with metastasis. Patient data included within

Pancreatic cancer dataset and was therefore not a death within 30 days of ovarian SACT and should not have been included within the dataset.

- Patient 4 - Receiving treatment since 2017. On review, the patient had a performance score reviewed. A change in treatment on the chemotherapy regimen was made, due to progression. The patient had a performance score of 0 pre chemotherapy however, had extensive metastatic disease and comorbidities which had been acknowledged by Oncologists during patient review. This patient did not receive the identified chemotherapy which had been authorised but not given as they required referral to Urology due to a complication. Subsequently, we have identified that the Trust SACT data was uploaded for this patient from an authorised position and not an administered position. This is due to a change with the scheduled upgrade.

South Tyneside And Sunderland NHS Foundation Trust

This is a complex group of patients with multiple co-morbidities. The Trust reviews every death related to SACT through an MDT process to learn any lessons and no concerns have been identified in those with bowel cancer. The Trust is in the process of undertaking a further data analysis on this group of patients and will undertake any further clinical reviews as required.

University Hospitals of North Midlands NHS Trust

In this notification University Hospitals of North Midlands (UHNM) NHS Trust was identified as an outlier (>3 standard deviations) for the ovarian cancer analysis in 2018 and 2019.

We are aware that we are unable to change the submitted SACT data and appreciate being able to investigate our practice and comment on our findings.

At UHNM a total of 87 patients were treated 2018 and 2019 with ovarian cancer. From the patient data provided we have reviewed 19 patients who appear to have died within 30-days of SACT. In 10 patients, SACT had been prescribed but not administered, meaning that these patients had not died within 30-days of SACT administration. Nine patients with ovarian cancer had died within 30-days of SACT instead of the reported 19. Although we have not calculated our case-mix adjusted mortality rate a crude estimate would be between 10 - 13% which we believe would fall within the 3 standard deviations and UHNM be not be classed as an outlier for ovarian cancer. UHNM CMAR previously reported as an outlier at 22.9%.

Treatments are prescribed in advance pending bloods and nurse review. The 10 patients identified that had not died within 30-days of SACT had had treatment pre-prescribed, however, the electronic prescriptions had not been deleted despite non-administration and reported as if given. Ovarian patients included in this analysis 2018 and 2019 we reported with a customised v2.0 SACT report which reported all SACT prescribed. Since September 2019 UHNM have changed to v3.0 SACT report which reports SACT electronically administered or dispensed (oral SACT). This will remove potential over-reporting of SACT as only patients who have received treatment will be reported.

We did not identify any prescribing trends that needed to be investigated further. UHNM will review our processes for data management and promote completion of SACT Outcomes when treatment finishes.

Worcestershire Acute Hospitals NHS Trust

The national SACT team has provided Worcestershire Acute Hospitals NHS Trust with the patient data associated with the publication of the 30-day mortality report for myeloma patients for the period January 2018 to December 2019. The Trust has had the opportunity to review and validate the data and 30% of the patients included in the published report were not administered treatment within 30 days of their death. If the 21 patients confirmed to have died within 30 days of SACT are used for data analysis, this leads to an adjusted 30-day mortality rate of 25.6% (rather than 36.6%) which would not be in outlying position but within 3SD.

Unfortunately the published data cannot be amended, however the Trust would like to reassure patients that treatment for myeloma is delivered in line with national guidance. All patients who suffer any adverse outcomes are discussed at regular mortality and morbidity meetings and it has been identified that most patients are elderly with incurable cancer with a number receiving their 4th and 5th lines of systemic therapy and nearing a palliative stage. The clinical team have reflected on the treatment plans for this cohort of patients are now considering the appropriateness of SACT at these late stages of disease. The team have recognised that those patients who are approaching or entering a palliative phase, particularly those with significant frailty and comorbidity require extra consideration to balance the risk and benefits of any intervention.

The corrected data is tabulated below:

Findings	**Patient numbers**
Never started chemotherapy, but was prescribed	8
Treatment delayed beyond 30 days but still prescribed	1
Died within 30 days of treatment	21

If you have any questions regarding this work, please contact the SACT Helpdesk (SACT@phe.gov.uk).