NOCA
National Ovarian Cancer Audit

NATCAN
National Cancer Audit Collaborating Centre

National Ovarian Cancer Audit

Quality Improvement Plan – September 2024

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NATCAN Executive Team

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The National Cancer Audit Collaborating Centre (NATCAN**)** is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). NATCAN delivers national cancer audits in non-Hodgkin lymphoma, bowel, breast (primary and metastatic), oesophago-gastric, ovarian, kidney, lung, pancreatic and prostate cancers. HQIP is led by a consortium of the Academy of Medical Royal Colleges and the Royal College of Nursing. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical, and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies. https://www.hqip.org.uk/national-programmes

Contents

Executive Summary

The National Ovarian Cancer Audit (NOCA) has been commissioned to evaluate ovarian cancer care delivered in NHS hospitals across England and Wales. It aims to help NHS organisations to benchmark their ovarian cancer care against measurable standards, to identify unwarranted variation in care, and to provide tools to help services improve quality of care for people with ovarian cancer.

The NOCA Quality Improvement Plan sets out the scope, care pathway, five improvement goals and seven performance indicators for the NOCA. The NOCA Quality Improvement Plan builds on the Ovarian Cancer Audit Feasibility Pilot (OCAFP), a project carried out in partnership between the National Disease Registration Service (NDRS), the British Gynaecological Cancer Society (BGCS), Ovarian Cancer Action and Target Ovarian Cancer. It also draws on work done by the BGCS on developing quality performance indicators.

Based on this work, the NOCA proposes to include patients diagnosed in NHS trusts with ovarian cancer in England and Wales. The audit will cover the diagnostic care pathway, treatments received and clinical outcomes.

The following improvement goals have been identified for the NOCA:

1. Increase the proportion of patients receiving timely diagnosis and treatment decisions.
2. Increase the proportion of patients receiving molecular diagnostics.
3. Increase the proportion of patients receiving surgery.
4. Increase the proportion of patients receiving chemotherapy.
5. Improve rates of survival and reduce variation in survival.

The NOCA has identified seven performance indicators, mapped to these five improvement goals and clinical guidelines. It sets out improvement methods, improvement activities and approaches to evaluation of the Quality Improvement Plan.

1. Introduction

1.1 Aim and objectives of the Quality Improvement Plan

The NOCA's Quality Improvement Plan builds on the previous Scoping Exercise which sets out the scope and care pathway of the NOCA and identified five key quality improvement goals. The Quality Improvement Plan aims to define seven key performance indicators, and how they map to the NOCA improvement goals, national guidelines and standards. These key performance indicators will be used by the NOCA to monitor progress towards its improvement goals and to stimulate improvements in ovarian cancer care. They align closely with the indicators suggested by the BGCS[1].

The Quality Improvement Plan describes the approach taken to develop the NOCA's improvement goals and performance indicators. In addition, it aims to set out the improvement methods and activities that will support implementation of the plan, including strategies for reporting and disseminating results, in addition to describing the approaches to evaluation.

The NOCA Quality Improvement Plan was developed in consultation with key stakeholders, including people with lived experience of ovarian cancer and will be reviewed on an annual basis.

1.2 The National Cancer Audit Collaborating Centre

The NOCA is part of the National Cancer Audit Collaborating Centre (NATCAN) a new national centre of excellence to strengthen NHS cancer services by looking at treatments and patient outcomes across the country. It was set up on 1 October 2022 to deliver six new national cancer audits, including kidney, ovarian, pancreatic, breast (two separate audits in primary and metastatic disease) and non-Hodgkin Lymphoma. Existing audits in prostate, lung, bowel, and oesophago-gastric cancers moved into NATCAN in 2023. The centre is commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England and the Welsh Government.

The aim of the ten NATCAN audits is to:

1. Provide regular and timely evidence to cancer services of where patterns of care in England and Wales may vary.
2. Support NHS services to increase the consistency of access to treatments and help guide quality improvement initiatives.
3. Stimulate improvements in cancer detection, treatment and outcomes for patients, including survival rates.

Further information about NATCAN and key features of its approach to audit can be found in the appendix.

[1] Sundar S, Nordin A, Morrison J, Wood N, Ghaem-Maghami S, Nieto J, et al. British Gynaecological Cancer Society Recommendations for Evidence Based, Population Data Derived Quality Performance Indicators for Ovarian Cancer. Cancers. 2023;15(2):337.

2. Background on ovarian cancer

2.1 Main issues in ovarian cancer care and outcomes

There are around 7,400 cases of ovarian cancer (including fallopian tube cancer and primary peritoneal carcinoma) diagnosed in the UK each year. Many patients are diagnosed at a late stage; two-thirds of patients are diagnosed at stage 3, stage 4 or are unstaged. Survival lags behind similar countries with age-standardised survival of 72.3% at one year and overall survival of 45% at five years[2].

2.2 Care pathways

The management of ovarian cancer involves a variable sequence of treatments which depend on cancer and patient characteristics. Optimal surgical staging for people with a suspected early (stage I) ovarian cancer includes: midline laparotomy to allow thorough assessment of the abdomen and pelvis, a total abdominal hysterectomy, bilateral salpingo-oophorectomy and infracolic omentectomy, biopsies of any peritoneal deposits, random biopsies of the pelvic and abdominal peritoneum, and retroperitoneal lymph node assessment. Some people may be offered adjuvant systemic therapy consisting of 6 cycles of platinum-based chemotherapy after their surgery. Patients suitable for fertility-sparing surgery should be identified by the MDT and the advantages and disadvantages of this discussed with them, so that they can make an informed choice[3]. This includes unilateral salpingo-oophorectomy in combination with surgical staging. People who have advanced (stage II to IV) ovarian cancer may be offered surgery with the aim of maximal cytoreductive surgery which constitutes of safe removal of all identifiable disease before chemotherapy or after neoadjuvant chemotherapy. Patients affected with a specific type of ovarian cancer[4] will be offered genetic testing, germline and/or tumour testing, as poly (ADP-ribose) polymerase (PARP) inhibitors are established in the treatment of some types of ovarian cancer.

2.3 Guidelines on the management of ovarian cancer

Guidelines for ovarian cancer (CG122) were published by the National Institute for Health and Clinical Excellence (NICE) in 2011 and include recommendations for the treatment of early (stage 1) and advanced (stage 2 to 4) ovarian cancer. More recently, NICE published interventional procedures guidance (IPG757) on maximal cytoreductive surgery which supported the use of this surgery in accredited specialised units for patients with advanced ovarian cancer. Guidelines on managing familial and genetic risk were published in March 2024 by NICE and BGCS. NICE has also published several technology appraisals on chemotherapy treatment of early and relapsed ovarian cancer and a number of appraisals are in progress.

2.4 The Ovarian Cancer Audit Feasibility Pilot

- Incidence has remained reasonably stable since 2001.
- Incidence and stage at presentation varies between Cancer Alliances.
- Survival has been improving but substantial variation in 1- and 5-year survival is seen across Cancer Alliances.
- Treatment utilisation rates vary between Cancer Alliances and are more marked in surgery than in chemotherapy.
- Patients diagnosed at stage IV or unstaged are less likely to receive treatment compared to patients with stage I-III disease.
- Treatment utilisation rates vary by age with women over 79 years less likely to receive surgery compared with younger women.
- Early (2 month) mortality is worse for older patients, those diagnosed at a late or unknown stage, patients with unknown morphology, emergency or urgent presentations, patients with comorbidities and with higher deprivation. There was limited variation between Cancer Alliances.
- Surgical radicality scores can be extracted from HES data using BGCS agreed codes, however validation work is necessary before these scores can be used to compare surgical practice or to derive performance indicators[5].
- Scope for improving completeness of recorded stage data, patient's performance status and residual disease status after surgery.

[2] NHS Digital. Cancer Survival in England, cancers diagnosed 2016 to 2020, followed up to 2021.

[3] British Gynaecological Cancer Society (BGCS). Tubo-ovarian Cancer Guidelines: Recommendations for Practice Update 2024.

[4] This includes epithelial ovarian cancer for germline testing and advanced stage epithelial ovarian cancer for tumour testing.

[5] Aletti GD, Dowdy SC, Podratz KC, Cliby WA. Relationship among surgical complexity, short-term morbidity, and overall survival in primary surgery for advanced ovarian cancer. American Journal of Obstetrics and Gynecology. 2007;197(6):676.e1-.e7.

3. Approach to developing the Quality Improvement Plan

This NOCA Quality Improvement Plan builds on the NOCA Scoping Document which set out the patient inclusion criteria and care pathway (Section 4) as well as five healthcare improvement goals for the NOCA (Section 5). This Quality Improvement Plan outlines seven performance indicators that have been mapped to clinical guidelines and the five improvement goals (Section 5).

In Sections 6 and 7, improvement methods and improvement activities are outlined. Finally, Section 8 sets out the approaches to evaluation of the Quality Improvement Plan. Given that this is the first national audit of ovarian cancer in England and Wales, the Quality Improvement Plan is expected to evolve over subsequent years.

3.1 Approach to developing the audit scope

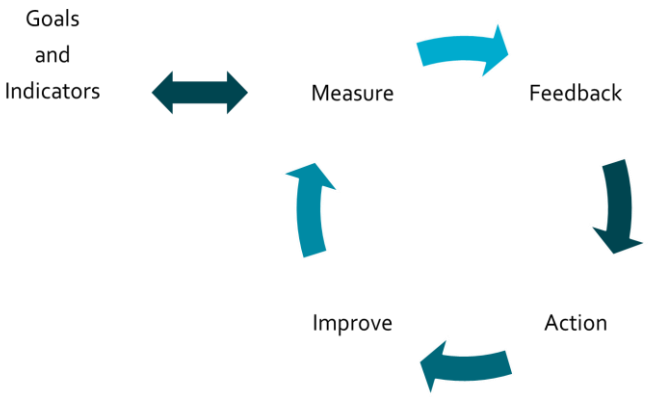
The scoping exercise aimed to ensure that the scope and design of the audit considers the needs of stakeholders whilst driving local and national quality improvement in services and outcomes for patients with ovarian cancer. The exercise built on the OCAFP, a project carried out in partnership between the NDRS, the BGCS, Ovarian Cancer Action and Target Ovarian Cancer. It also drew on work done by the BGCS on developing quality performance indicators.

The audit team summarised key evidence and proposed five improvement goals in a scoping brief that was circulated to the Clinical Reference Group (CRG). Potential performance indicators were presented for each of the proposed improvement goals. Areas for potential improvement goals that require longer-term development work were also reported. The scope of the audit was presented and discussed at a meeting of the CRG on 14th September 2023. CRG members also provided written feedback by email. The scoping brief was updated to incorporate stakeholder feedback.

3.2 Approach to prioritising performance indicators

Clinical Performance Feedback Intervention Theory (CP-FIT)[6] states that developing improvement goals and performance indicators are the first steps in the audit and feedback cycle (Figure 1).

Figure 1: The audit and feedback cycle



Using the 5 improvement goals outlined in its Scoping Document, the NOCA developed a list of candidate performance indicators for the performance of NHS providers. Prioritisation of 7 indicators from this list of candidates was informed by the following set of key principles.

The audit and feedback cycle is only as strong as its weakest link: to enhance the NOCA's ability to inform improvements in care, its performance indicators must have three properties:

- **Measurable** so that they can be the basis of credible feedback about performance. This property means that the indicators can be defined with available data in a valid, reliable, and fair manner that allows performance to be attributed to a specific unit.[7]
- **Actionable** so that feedback translates into action to improve care. Indicators should therefore be important and address a specific pathway of care that is clear to all stakeholders. Stakeholders should understand the drivers of variation in performance within this pathway and control the levers for change. These changes should be evidence-based and address policy priorities.
- **Improvable** so that actions have the desired effect on patient care. There should therefore be clear scope for improvement (low baseline levels or large unwarranted variation) in a large population and a receptive context, with no unintended consequences. Some interventions may have demonstrated improvements to certain indicators in existing literature.

Some of these properties are difficult to know in advance of selecting and investigating a performance indicator (such as existing levels of performance, the drivers of low performance, or interventions that can improve care). In addition, clinical practice and its context may change over time so that properties of indicators also change (such as whether they relate to a policy priority). Therefore, the NOCA's goals and performance indicators are likely to evolve over time too. Recommendations will also evolve and become more focused as the NOCA learns through the audit and feedback cycle.

[6] Brown B, Gude WT, Blakeman T, van der Veer SN, Ivers N, Francis JJ, et al. Clinical Performance Feedback Intervention Theory (CP-FIT): a new theory for designing, implementing, and evaluating feedback in health care based on a systematic review and meta-synthesis of qualitative research. Implement Sci 2019;14:40.

[7] Geary RS, Knight HE, Carroll FE, Gurol-Urganci I, Morris E, Cromwell DA, van der Meulen JH. A step-wise approach to developing indicators to compare the performance of maternity units using hospital administrative data. BJOG 2018;125:857-65.

3.3 Data provision

The NOCA will use information from routine national health care datasets. These capture details on the diagnosis, management and treatment of every patient newly diagnosed with ovarian cancer in England and Wales. Further details on data acquisition can be found in the appendix.

3.4 Data limitations

For accurate and timely benchmarking, it is essential that data used by the NOCA:

1. Includes all the data items required to measure and risk-adjust performance indicators
2. Is timely
3. Has a high-level of case-ascertainment
4. Has high levels of data completeness
5. Is accurate.

For patients treated in England, Rapid Cancer Registration Data (RCRD) linked to other national healthcare datasets, will be used for quarterly reporting. This dataset is mainly compiled from Cancer Outcomes and Services Dataset (COSD) records and is made available more quickly than the gold standard National Cancer Registration Data (NCRD). The speed of production means that case ascertainment and data completeness are lower, and the range of data items in the RCRD is limited. This may restrict the extent to which risk adjustment can be applied to performance indicators used for quarterly reporting. For patients treated in Wales, no equivalent of RCRD is currently available but WCISU cancer registration data and All Wales dataset forms will be used for annual data submission.

3.5 Stakeholder involvement

NOCA is provided through a partnership that combines clinical leadership, methodological expertise, project management and a secure environment for data analysis, representing BGCS and NATCAN.

The audit team is supported by twice-yearly meetings of stakeholders in its CRG, which includes clinicians from across the patient pathway, patient representatives, commissioners and funder representatives. NOCA has also established a Patient and Public Involvement (PPI) Forum that meets twice a year, whose members represent people who have ovarian cancer, survived ovarian cancer or are a friend, family member and/or carer to an ovarian cancer patient.

3.6 Service provision

In England, care is provided by NHS hospital trusts grouped into cancer systems in a hub- (cancer centre) and spoke (cancer unit) model. The trusts are located in 21 Cancer Alliances with each Alliance hosting between 1-4 of the 40 cancer centres. In 2022, 42 Integrated Care Systems (ICS) were established in England. ICSs are partnerships between NHS, local authority and other organisations and their remit includes improving healthcare outcomes and reducing inequalities in outcomes.

In Wales, care for gynaecological cancer is provided by cancer units and three cancer centres located in Health Boards/Trusts. Some care for patients in north Wales is provided by NHS Trusts in England. The Wales Cancer Network covers all of Wales.

4. Audit scope

4.1 Patient inclusion criteria

The audit will include all patients newly diagnosed with ovarian cancer. This will comprise women with an ICD-10 diagnosis of ovarian cancer (C56), fallopian tube cancer (C57), primary peritoneal carcinoma (C48) or neoplasms of the ovary of uncertain or unknown behaviour (D39.1). Patients with sarcomas or borderline tumours will be excluded.

4.2 Care pathway

The audit will cover the pathway from first diagnosis of ovarian cancer through to the end of primary treatment.

Primary treatment will include planned treatments of surgery and/or chemotherapy. Treatment pathways may be further sub-categorised into 1) primary surgery and chemotherapy and 2) neoadjuvant chemotherapy and surgery in the future.

Genetic aberrations play key roles in the pathogenesis of some types of ovarian cancer with prognostic and predictive implications for the patients affected with the disease. Molecular diagnostic pathways will be reported and divided into germline and tumour testing.

5. Quality Improvement Goals & Performance indicators

Quality improvement goal	Performance indicators*	National Guidance/standards
Increase the proportion of patients receiving timely diagnosis and treatment decisions.	Proportion of patients with ovarian cancer who had an emergency admission within 28 days prior to diagnosis.	Patients can be diagnosed late with advanced disease and a poor performance status due to delays in presenting for medical care, delays in primary care, delays between primary and secondary care or delays in secondary care. The OCAFP showed that women diagnosed via an emergency presentation were 4 times more likely to die within two months of diagnosis than those diagnosed via the two-week wait referral system[8].
Increase the proportion of patients receiving molecular diagnostics.	Proportion of patients with epithelial ovarian cancer on histology receiving germline panel testing. Proportion of patients with advanced stage (stage III/IV or unstaged) high grade epithelial ovarian cancer on histology receiving HRD testing (BRCA 1/2 and/or genomic instability).	Patients with BRCA mutations have a substantial progression-free survival benefit when receiving PARP-inhibitors[9]. Testing is also recommended by the BGCS. Additionally, it offers the opportunity for cascade testing of family members, allowing for preventative treatment for both breast and ovarian cancer. NICE guidelines on managing familial and genetic risk were published in March 2024.
Increase the proportion of patients receiving surgery.	Proportion of patients with stage II-IV or unstaged ovarian cancer who receive any cytoreductive surgery.	Surgical treatment is the cornerstone of ovarian cancer management[10]. NICE guidelines recommend maximal cytoreductive surgery for advanced ovarian cancer. That involves the removal of all identifiable disease. The OCAFP shows that on average only 51% of women with FIGO Stage II-IV and unstaged ovarian cancer will receive cytoreductive surgery in England in the nine months following diagnosis[11].
Increase the proportion of patients receiving chemotherapy.	Proportion of patients with epithelial, stage II or above or unstaged, ovarian cancer who receive platinum-based chemotherapy.	First line chemotherapy treatment in ovarian cancer should include a platinum based compound, either in combination or as a single agent. Carboplatin is the platinum agent most commonly used, alone or in combination with paclitaxel,

[8] Group OCAFP. Short-term mortality in ovarian, fallopian tube and primary peritoneal carcinomas across England. 2022.

[9] Tattersall A, Ryan N, Wiggans AJ, Rogozińska E, Morrison J. Poly(ADP-ribose) polymerase (PARP) inhibitors for the treatment of ovarian cancer. Cochrane Database Syst Rev. 2022;2(2):Cd007929.

[10] British Gynaecological Cancer Society (BGCS). Tubo-ovarian Cancer Guidelines: Recommendations for Practice Update 2024.

[11] Group OCAFP. Disease Profile in England: Incidence, mortality, stage and survival for ovary, fallopian tube and primary peritoneal carcinomas. 2020.

		when the potential benefits outweigh the potential toxicity that paclitaxel is associated with[12].
	Proportion of patients with stage II-IV or unstaged ovarian cancer who receive any type of treatment (surgery and/or chemotherapy).	The OCAFP showed that 20.3% of patients did not have any treatment recorded between 1 month prior and 9 months following diagnosis[13]. Those patients were also more likely to die within 2 months following diagnosis (56.9%). This could have been because patients presented with advanced disease, high burden of comorbidity or poor performance status, have limited treatment options.
Improve rates of survival and reduce variation in survival.	Proportion of patients with ovarian cancer who are alive 1 year after the diagnosis.	Significant variation in 1-year survival across Cancer Alliances was highlighted in the OCFAP[14]. The 1-year survival was estimated to be 69% (which lags behind similar countries). That means that almost 1 in 3 women will die within 12 months following diagnosis and 14% within 2 months[11].

* The NOCA will publish initial performance indicators (this may be less than seven) in the first State of the Nation Report published in September. Additional indicators (maybe up to a maximum of ten) will be reported in quarterly reports and future State of the nation reports. The publication of indicators is aligned with data availability and completion of robust, methodological development work including appropriate risk-adjustment models.

[12] British Gynaecological Cancer Society (BGCS). Tubo-ovarian Cancer Guidelines: Recommendations for Practice Update 2024.

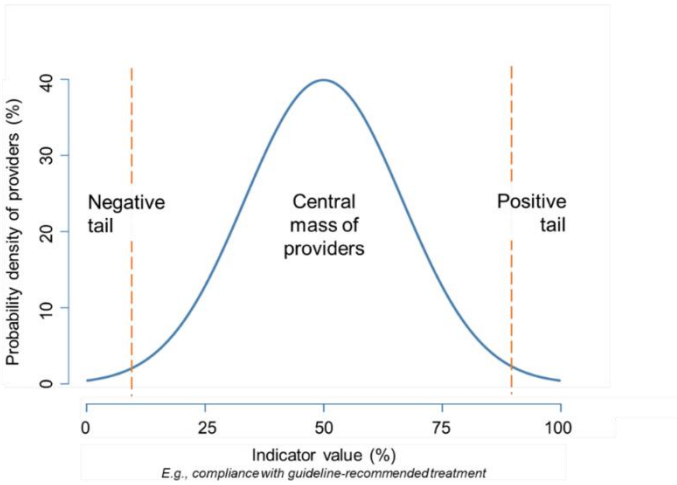
[13] Group OCAFP. Short-term mortality in ovarian, fallopian tube and primary peritoneal carcinomas across England. 2022.

[14] Group OCAFP. Disease Profile in England: Incidence, mortality, stage and survival for ovary, fallopian tube and primary peritoneal carcinomas. 2020.

6. Quality Improvement Framework

Figure 2 below shows a hypothetical example of how a performance indicator may be distributed across NHS providers nationally at a single time point. This distribution can be separated into three domains: the negative tail (suggestive of worse performance), the central mass (centred on the national average, for example), and the positive tail (suggestive of better performance).

Figure 2: Distribution of an indicator across NHS providers



Each domain is associated with a different set of methods for improving healthcare:

Negative tail

Example methods: Regulation and public reporting of outliers

- Clinical audit has traditionally focused on the negative tail to improve healthcare. This approach implies that some NHS providers are doing something systematically wrong that can be resolved through direct intervention. Such intervention may be necessary to assure minimum standards of care and to reduce inequality between the best and worst performing NHS providers. Cancer audits that pre-date NATCAN have formally reported negative outliers (see Appendix).

Central mass

Example methods: Statistical process control and iterative testing of interventions

Most providers exist in the central mass of the distribution (by definition) which may present the greatest scope for improving average levels of care nationally. Methods in this domain suggest that all providers can improve their performance, regardless of baseline levels. Longitudinal monitoring provides feedback about whether improvements occur or not.

Positive tail

Example methods: Positive deviance

- Some NHS providers perform exceptionally well despite similar constraints to others, which presents opportunities to learn how this is achieved. 'Positive deviance' approaches assert that generalisable solutions to better performance already exist within the system. Such solutions are therefore more likely to be acceptable and sustainable within existing resources. These approaches aim to identify local innovations and spread them to other settings (see Appendix).

The NOCA will select which methods to implement to improve ovarian cancer care after investigating the distributions of its performance indicators (outlined in section 5). This includes the distribution of performance indicators between providers at a given time point and within providers over time. It also includes investigation of variation at the patient, hospital, and regional levels to see where most variation exists and which variables help to explain it (see Appendix for more detail).

7. Improvement activities

Improvement activities and outputs of the NOCA will be aligned to the Quality Improvement Plan. The NOCA will: (1) engage in key collaborations, (2) align with other initiatives in ovarian cancer care, and (3) provide outputs to support quality improvement at the national, regional and local level.

The two principal strategies for reporting NOCA results include:

- A short 'State of the Nation' (SotN) report for NHS Trusts/Health Boards within England and Wales. This annual report publishes five key recommendations highlighting where services should focus quality improvement activities. These recommendations will be at the Cancer Alliance level where applicable and be formed between audit teams, clinical reference groups and major national stakeholders.
- A quarterly dashboard will facilitate benchmarking and the monitoring of performance at regular intervals so improvements can be tracked over time.

7.1 National and Regional

The NOCA undertakes various activities that directly support national stakeholders and regional NHS organisations to tackle system-wide aspects related to the delivery of high-quality ovarian cancer services:

Stakeholder	NOCA activity
NATIONAL	
NHS England and Wales	Identify issues and make recommendations, on the organisation and delivery of ovarian cancer services, which might involve national leadership. Recommendations published in audit's State of the Nation reports.
National incentives	Provide the Care Quality Commission (CQC), Care Inspectorate Wales, and Getting It Right First Time (GIRFT) with information to support local visits to NHS organisations.
Professional organisations	Identify issues and make recommendations regarding the delivery of ovarian cancer care that fall within the remit of the professional organisations.
REGIONAL	
Cancer Networks / Alliances / Vanguards	Support the monitoring role of Welsh Cancer Networks and the English Cancer Alliances / Integrated Care Boards by publishing results for their region/area.

At a national level, the NOCA team will also provide the National Cancer Registration and Analysis Service (NCRAS) Data Improvement Leads (in England), and the Wales Cancer Network with information to help them support their NHS organisations to improve the quality of their routine data submissions.

7.2 Local

The NOCA supports local NHS cancer services in their care of ovarian cancer patients in the following ways:

NOCA feedback activity	Description
Annual "State of the Nation" Reports	State of the Nation reports that allow NHS organisations in England and Wales to benchmark themselves against clinical guideline recommendations and the performance of their peers.
Web-based dashboard	Presents results for individual NHS organisations that allows the user to compare the results of a selected provider against a peer organisation.
Local Action Plan template	Allows NHS organisations to document how they will respond to the State of the Nation Report recommendations.
Outlier reporting	In the future, NOCA will report NHS provider values that are more than three standard deviations from the expected level of performance (i.e. deemed a potential outlier). NOCA will support outliers to identify areas of improvement.
Data case studies	Examples of different approaches used by NHS trusts in England to ensure their Cancer Outcomes and Services Dataset (COSD) submissions to NCRAS are as complete as possible.
Improvement Case Studies	Examples of different approaches used by NHS trusts to improve care quality or recommendations identified from review of processes at positive or negative outliers, with a specific focus on the pathway of care (see actionable earlier)
Interventions	This will include possible interventions that have been identified in the literature linked to the performance indicators assessed by the audit or include interventions developed by Trusts/Alliances in the NHS.
Targets	Recommendations may include targets or thresholds for performance indicators e.g. XX % expected to receive treatment.
Materials supplementary to the State of the Nation Report	Including tools for improving data completeness.

7.3 Improvement tools

The NATCAN website includes a Quality Improvement Resources page with links to the Royal College of Surgeons of England (RCSEng) website and other web-based material that direct healthcare providers to various quality improvement tools including:

- 'How to' guides including quality improvement methodology
- Links to existing resources
- Links to training courses for quality improvement
- Good practice repository with contact information where possible.

7.4 Improvement workshops

- The NOCA will host webinars to present the audit data, and to introduce quality improvement initiatives. These will be in collaboration with the BGCS.
- The NOCA team will discuss with the RCSEng Quality Improvement (QI) Collaborative about sharing expertise for quality improvement initiatives going forwards.

7.5 Designing a National Quality Improvement Initiative

Using rapid cancer registry data, the NOCA will design a national Quality Improvement initiative aiming "to close the audit cycle" following an approach commonly referred to as the "plan-do-study-act" method.[15] The design and methodology underpinning this Quality Improvement initiative will be available in the next iteration of the Quality Improvement Plan in 2025 further to consultation with NOCA stakeholders.

7.6 Patient and Public Involvement

- Establishing a standalone ovarian Patient and Public Involvement (PPI) Forum, a key stakeholder group developed in consultation with the ovarian cancer patient charities, Target Ovarian Cancer and Ovarian Cancer Action.
- Members of the NOCA PPI Forum will be regularly consulted on the design of the audit and the communication of its results. Members will:
- Be active participants in the production of audit outputs including:

15 Taylor MJ, McNicholas C, Nicolay C, Darzi A, Bell D, Reed JE. Systematic review of the application of the plan-do-study-act method to improve quality in healthcare. BMJ Qual Saf. 2014 Apr;23(4):290-8. doi: 10.1136/bmjqs-2013-001862.

    - the development and review of patient information materials and summaries of the State of the nation reports
    - co-development and/or co-authorship of scientific papers that explore NOCA results.

- Undertake a key advisory role in developing the design and function of the website to ensure that patients and the public can easily find relevant results together with appropriate explanatory information.
- Shape the development of the NOCA's quality improvement goals, activities and outputs by ensuring this work is relevant from a patient perspective.

7.7 Communication & dissemination activities

The NOCA will communicate regularly with stakeholders, including patients and the public in the following ways:

7.7.1. Newsletters

The NOCA newsletter is distributed to key stakeholders on a quarterly basis, highlighting quality improvement methods and tools (where appropriate). These are also all published on the NOCA website.

Project team members may also contribute items for newsletters created by professional societies and patient charities.

7.7.2. Website and Social Media

The NOCA website will be reviewed and updated regularly (as appropriate) and will include the improvement tools described in section 7.3.

The NOCA Twitter account will tweet (and retweet) about key resources, publications, or topics of interest to our stakeholders, including tools to aid quality improvement.

7.7.3. Conferences and Peer Reviewed Papers

The NOCA will present audit results at national conferences and publish articles in medical journals and other media.

8. Evaluation

Descriptive methods

The NOCA will report year-on-year progress against improvement goals to the audit's CRG and in the SotN reports on an annual basis. This will focus on describing how values of performance indicators have changed over time at a national level.

To evaluate the impact of specific NOCA or other national interventions on the performance of NHS providers, quasi-experimental methods (when allocation of providers to certain groups cannot be controlled) or experimental methods (when group allocation can be controlled) will be used.

The NOCA will examine the opportunities for and strengths and limitations of quasi-experimental and experimental evaluation methods once it is more fully established.

Appendix

1. National Cancer Audit Collaborating Centre (NATCAN)

NOCA is part of the National Cancer Audit Collaborating Centre (NATCAN), a national centre of excellence launched on 1 October 2022 to strengthen NHS cancer services by looking at treatments and patient outcomes in multiple cancer types across the country. The centre was commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England and the Welsh Government with funding in place for an initial period of three years.

NATCAN is based within the Clinical Effectiveness Unit (CEU), the academic partnership between the Royal College of Surgeons of England (RCS Eng) and the London School of Hygiene & Tropical Medicine. The CEU is recognised as a national centre of expertise in analytic methodology and the development of administrative and logistic infrastructure for collating and handling large-scale data for assessment of health-care performance.

NATCAN was set up on 1 October 2022 to deliver six new national cancer audits, including kidney, ovarian, pancreatic, breast (two separate audits in primary and metastatic disease) and non-Hodgkin Lymphoma. Existing audits in prostate, lung, bowel, and oesophago-gastric cancers moved into NATCAN in 2023. This critical mass of knowledge and expertise enable it to respond to the requirements of the funders and stakeholders.

The aim of the ten NATCAN audits is to:

1. Provide regular and timely evidence to cancer services of where patterns of care in England and Wales may vary.
2. Support NHS services to increase the consistency of access to treatments and help guide quality improvement initiatives.
3. Stimulate improvements in cancer detection, treatment and outcomes for patients, including survival rates.

Key features of NATCAN's audit approach

The design and delivery of the audits in NATCAN has been informed by the CEU's experience delivering national audits, built up since its inception in 1998. Key features of all audit projects within the CEU include:

- Close clinical-methodological collaboration
- Use of national existing linked datasets as much as possible
- Close collaboration with data providers in England ([NDRS, NHSE] and Wales (Wales Cancer Network [WCN], Public Health Wales [PHW])
- A clinical epidemiological approach, informing quality improvement activities.
- "Audit" informed by "research".

All these features will support NATCAN's focus on the three "Rs", ensuring that all its activities are clinically relevant, methodologically robust, and technically rigorous.

Organisational structure of NATCAN

Centre Board

NATCAN has a multi-layered organisational structure. NATCAN's Board provides top-level governance and oversees all aspects of the delivery of the contract, ensuring that all audit deliverables are produced on time and within budget and meet the required quality criteria. The Board also provides the escalation route for key risks and issues. It will also consider NATCAN's strategic direction. The Board will meet at 6-monthly intervals and will receive regular strategic updates, programme plans, and progress reports for sign-off. Risks and issues will be reported to the NATCAN Board for discussion and advice.

Executive Team

NATCAN's Executive Team is chaired by the Director of Operations (Dr Julie Nossiter) and includes the Clinical Director (Prof Ajay Aggarwal), the Director of the CEU (Prof David Cromwell), the Senior Statistician (Prof Kate Walker), and the Senior Clinical Epidemiologist (Prof Jan van der Meulen) with support provided by NATCAN's project manager (Ms Verity Walker). This Executive Team is responsible for developing and implementing NATCAN's strategic direction, overseeing its day-to-day running, and coordinating all activities within each of cancer audits. This group meets monthly. The Executive Team will provide 6-monthly updates to NATCAN's Board.

Advisory groups

The Executive Team will be supported by two external groups. First, the Technical Advisory Group including external senior data scientists, statisticians, and epidemiologists as well as representatives of the data providers (NDRS, NHSD and WCN, PHW), co-chaired by NATCAN's Senior Statistician and Senior Epidemiologist, will advise on national cancer data collection, statistical methodology, development of relevant and robust performance indicators to stimulate QI, and communication to practitioners and lay audiences.

Second, the Quality Improvement Team includes national and international experts who have extensive experience in QI and implementation research. This team will provide guidance on the optimal approaches to change professional and organisational behaviour. It will be chaired by NATCAN's Clinical Director and managed by the Director of Operations.

This set up will provide a transparent and responsive management structure allowing each audit to cater for the individual attributes of the different cancer types, while also providing an integrated and consistent approach across the NATCAN audits. The integrated approach will result in efficient production of results through sharing of skills and methods, a common "family" feel for users of audit outputs, and a shared framework for policy decisions and, project management.

Audit Project Teams

Audit development and delivery is the responsibility of each Project Team. The Project Team works in partnership to deliver the objectives of the audit and is responsible for the day-to-day running of the audit and producing the deliverables. It will lead on the audit design, data collection, data quality monitoring, data analysis and reporting.

Each cancer audit Project Team is jointly led by two Clinical Leads representing the most relevant professional organisations, and senior academics with a track record in health services research, statistics, data science and clinical epidemiology, affiliated to the London School of Hygiene and Tropical Medicine. In addition, each audit will have a clinical fellow, who contributes to all aspects of the audits, reinforcing the audits' clinical orientation and contributing to capacity building.

The delivery of the audit is coordinated by an audit manager who is supported by NATCAN's wider infrastructure. Data scientists with experience in data management and statistics and methodologists with experience in performance assessment and QI work across audits.

Audit Clinical Reference Groups

Each audit has a Clinical Reference Group representing a wide range of stakeholders. This group will act as a consultative group to the Project Team on clinical issues related to setting audit priorities, study methodology, interpretation of audit results, reporting, QI, and implementation of recommendations.

Effective collaboration within the centre and across audits facilitates the sharing of expertise and skills in all aspects of the delivery process, notably: designing the audits, meeting information governance requirements, managing and analysing complex national cancer data to produce web-based performance indicator dashboards / state of the nation reports, and supporting quality improvement.

This organisation creates "critical mass" and audit capacity that is able to respond to the requirements of the funders (NHS England and Welsh Government) and the wider stakeholder "family".

Audit PPI Forums

Patients and patient charities are involved in all aspects of the delivery of the cancer audits. Each audit has a standalone Patient and Public Involvement (PPI) Forum to provide insight from a patient perspective on strategic aims and specific audit priorities. This will include shaping the development of each audit's quality improvement initiatives by ensuring this work is relevant from a patient perspective. A key activity of the PPI Forums will be to actively participate in the production of patient-focussed audit outputs (including patient and public information, patient summaries of reports, infographics and design and function of the NATCAN website), guiding on how to make this information accessible.

2. Data provision

The NATCAN Executive Team has worked closely with data providers in England (NDRS, NHSE) and in Wales (WCN, PHW) to establish efficient "common data channels" for timely and frequent access to datasets, combining data needs for all cancers into a single request in each Nation and only using routinely collected data, thereby minimising the burden of data collection on provider teams.

Annual and quarterly data

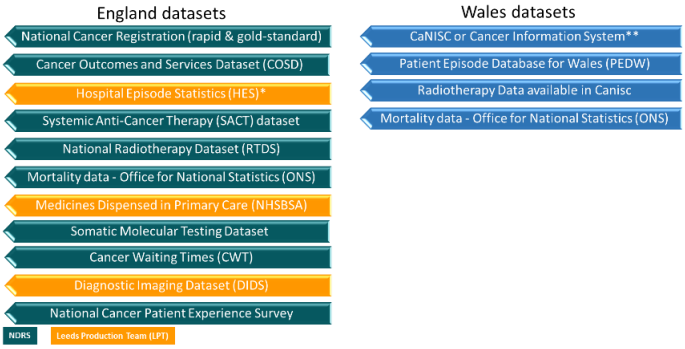
NATCAN will utilise two types of routinely collected data in England. First, an annual "gold-standard" cancer registration dataset, released on an annual basis with a considerable delay between the last recorded episode and the data being available for analysis, and second, a "rapid" cancer registration dataset (RCRD), released at least quarterly with much shorter delays (3 months following diagnosis). The CEU's recent experience with English rapid cancer registration data, in response to the COVID pandemic has demonstrated the latter's huge potential,[16] despite a slightly lower case ascertainment and less complete staging information.

NATCAN will utilise these data across all cancers linked to administrative hospital data (Hospital Episode Statistics/Systemic Anti-Cancer Therapy/Radiotherapy Data Set/Office for National Statistics among other routinely collected datasets, see Figure 1) for describing diagnostic pathway patterns, treatments received and clinical outcomes.

An equivalent data request will be made to the Wales Cancer Network (WCN)/Public Health Wales (PHW).

[16] Nossiter J, Morris M, Parry MG, Sujenthiran A, Cathcart P, van der Meulen J, Aggarwal A, Payne H, Clarke NW. Impact of the Covid-19 pandemic on the diagnosis and treatment of men with prostate cancer. BJU Int. 2022; doi: 10.1111/bju.15699

Figure 1. National datasets available to NATCAN



* Includes inpatient and outpatient data and Emergency care Dataset (ECDS).

** NHS Wales will use Welsh registry information for the initial years data for the audit. NATCAN submitted a request for historical data from the Welsh Cancer Registry in Q4 2023 (not received to date). From 2022 data submissions will be from either Canisc or the new cancer dataset forms.

3. Quality Improvement Framework – Supplementary information

Negative tail

Regulation and public reporting of outliers

National cancer audits that pre-date NATCAN have used a formal process for reporting outliers publicly. This process includes contacting outliers before publication to: (1) verify the data, (2) identify the reasons for the low level of performance identified, and (3) determine what corrective interventions have been put in place. The findings are reported publicly and may inform care practices in other NHS Trusts.

Central mass

Statistical process control and iterative testing of interventions

Most providers exist in the central mass of the distribution (by definition). Just because something is common it does not mean that it is alright: performance may be systematically below an achievable standard nationally for example (such as 75% of eligible patients receiving a particular treatment). We recommend that individual providers verify their performance data and undertake internal audits to assess areas for improvement and consider evaluation of their processes of care.

Positive tail

Positive deviance

Positive deviants may perform consistently better than comparators over time or demonstrate a clear upward trend in performance between two time points. It may be possible to learn from these providers to identify practices of care that have driven high levels of performance. This could include care protocols or factors related to system organisation which may inform quality improvement amongst providers in the negative tail and central mass of performance.

Determinants of variation

To support targeting of improvement interventions and recommendations, the audit will analyse particular patient, hospital and regional factors associated with variation in processes and outcomes of care. For example, for the utilisation of a particular evidence-based treatment, factors associated with utilisation may include advanced age, social deprivation and frailty, clinician preferences, and regional policies. Findings may be reported at an aggregated national or regional (alliance) level and can support NHS Trusts to target interventions or evaluation at particular patient populations.