NLCA
National Lung Cancer Audit

NATCAN
National Cancer Audit Collaborating Centre

Quality Improvement Plan

2026

Citation for this document:
National Cancer Audit Collaborating Centre, Royal College of Surgeons of England, 2026.

This document was prepared by members of the NLCA project team:
- Neal Navani, NLCA Senior Clinical Lead
- John Conibear, NLCA Oncology Lead
- Doug West, NLCA Thoracic Surgical Lead
- David Cromwell, NLCA Lead Methodologist
- Lauren Dixon, NLCA Clinical Fellow
- Sarah Cook, NLCA Methodologist
- Adrian Cook, NLCA Statistician
- Jessica Thomas, NLCA Data Scientist
- Joanne Boudour, NLCA Senior Project Manager
- Faine Chan, NLCA Project Coordinator

With review and input from:
NLCA Clinical Reference Group

NATCAN Executive Team

The Royal College of Surgeons of England is an independent professional body committed to enabling surgeons to achieve and maintain the highest standards of surgical practice and patient care. As part of this it supports audit and the evaluation of clinical effectiveness for surgery. Registered Charity no: 212808.

TThe National Cancer Audit Collaborating Centre (NATCAN) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and funded by NHS England and Welsh Government as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). NATCAN delivers national audits in bowel, breast (primary and metastatic), kidney, lung, non-Hodgkin lymphoma, oesophago-gastric, ovarian, pancreatic and prostate cancers© 2025 Healthcare Quality Improvement Partnership (HQIP)

Copyright All rights reserved. No part of this publication may be reproduced in any form (including photocopying or storing it in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication) without the written permission of the copyright owner. Applications for the copyright owner's written permission to reproduce any part of this publication should be addressed to the publisher.

Contents

Executive Summary 4
1. Introduction 5
1.1 Aim and objectives of the Quality Improvement Plan 5
1.2 The National Cancer Audit Collaborating Centre 5
2. Background on lung cancer 6
2.1 Main issues in lung cancer care 6
2.2 Care pathways 6
2.3 Guidelines on the management of lung cancer 7
3. Approach to developing the Quality Improvement Plan 8
3.2 Approach to prioritising performance indicators 8
3.3 Data provision 8
3.4 Data limitations 8
3.5 Stakeholder involvement 9
3.6 Service provision 9
4. Audit scope 10
5. Quality Improvement Goals & Performance indicator 10
6. Quality Improvement Methods 12
7. Improvement activities 13
7.1 National and Regional 13
7.2 Local 14
7.3 Improvement tools 14
7.4 Improvement workshops 14
7.5 Designing a National Quality Improvement Initiative 14
7.6 Patient and Public Involvement 14
7.7 Communication & dissemination activities 15
8. Evaluation 16
Appendix 17
1. National Cancer Audit Collaborating Centre (NATCAN) 17
2. Data provision 18

Executive Summary

The National Lung Cancer Audit (NLCA) has been commissioned to evaluate lung cancer care delivered in NHS hospitals across England and Wales. It aims to help NHS organisations to benchmark their lung 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 lung cancer.

The audit will use a set of performance indicators as the basis of this evaluation. The indicators will be closely aligned to the recommendations in the 2019 NICE lung cancer guideline (NG122) the NICE quality standards from 2012 and 2019 as well as relevant NICE technology appraisals, and the National Optimal Lung Cancer Pathway.

This NLCA strategy for quality improvement aims to provide NHS providers and commissioners with information on the possible reasons for variation in lung cancer care. These might be related to:

- differences in the nature and extent of disease, notably the distinct tumour subtypes of non-small-cell lung cancer (NSCLC) and small-cell lung cancer (SCLC) given their distinct patterns of care and prognosis.
- differences in the prevalence and severity of comorbidities and frailty that may contraindicate surgery, systemic anti-cancer therapy (SACT) or radiotherapy.
- Variations in the uptake of and access to new technologies and treatment techniques e.g., stereotactic radiotherapy, hospitals participating in clinical trials.

The NLCA improvement goals were developed in consultation with the patient and professional representatives in the CRG such as Lung Cancer Nursing UK and the Roy Castle Lung Cancer Foundation and with members of the standalone NLCA PPI Forum.

A key priority for the lung cancer services is to improve survival by targeting the following areas of care: earlier detection, increasing the proportion of people who have treatment with curative-intent and improving the use of anti-cancer therapies for advanced disease.

The following improvement goals have been identified for the NLCA:

1. Improving early diagnosis in lung cancer and increasing the proportion of patients who receive treatment with curative intent.

2. Increase the proportion of people with lung cancer receiving Systemic Anti-Cancer Therapy (SACT) and reduce unwarranted variation in access to SACT

3. Improve access to lung cancer nurse specialists.

4. Improve the movement of patients through the care pathway, with greater compliance with the National Optimal Lung Cancer Pathway.

5. Improve and reduce variation in lung cancer outcomes

The NLCA has identified 10 indicators, mapped to these 5 improvement goals and clinical guidelines. This document 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 Quality Improvement Plan describes the approach taken to develop the NLCA'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 NLCA's Quality Improvement Plan was developed in consultation with key stakeholders, including people with lived experience of lung cancer and will be reviewed on an annual basis.

1.2 The National Cancer Audit Collaborating Centre

The NLCA 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.

2. Background on lung cancer

Lung cancer is one of the most common and serious types of cancer with around 40,000 new cases diagnosed each year in England and Wales. Lung cancer is the second most common cancer in the UK after breast cancer and is the most common cause of cancer-related death.

Survival figures remain comparatively poor compared with other cancers. For patients diagnosed in 2022, one-year survival was 48% in England and 43% in Wales. It is hoped that with earlier diagnosis and improvements in treatment modalities, these survivals will improve.

2.1 Main issues in lung cancer care

Current issues for lung cancer are the role out of screening / rates of early diagnosis, diagnostic capacity, biomarker testing and choice of SACT, and waiting times for treatment.

The Targeted Lung Health Checks (TLHC) programme is the newly implemented screening initiative for lung cancer in England and Wales. The aim of TLHC is to diagnose more lung cancers at an earlier and hopefully curable stage. It is not uncommon for lung cancer to be diagnosed at a late stage, for example, in 2022, nearly half of all people with lung cancer were diagnosed at stage 4[1]. An important and encouraging finding from the 2022 data is that the proportion of patients with lung cancer who are diagnosed with stage I/II disease increased from 30.5% in 2021 to 33.8% in England and from 24% in 2021 to 30% in Wales. Some of this increase may be due to the impact of TLHC in England that diagnosed 1,087 cases in 2022. In order to evaluate the effectiveness of TLHC, it is important for the NLCA to report on the outcomes of people with screen-detected lung cancers.

In England and Wales during 2022, 60% of patients diagnosed with NSCLC (stages IIIB-IV, PS 0–1) had Systemic Anti-Cancer Therapy (SACT). Only 44 of 124 NHS trusts (35%) met or exceeded the NICE and NLCA audit standard of 70% for patients with NSCLC (stages IIIB-IV, PS 0–1) receiving SACT. Over recent years, there has been a rapid expansion of immunotherapy and targeted therapies licensed for advanced lung cancer. Biomarker testing is important to determine which strategy of SACT will be most effective for individuals.

Waiting times from 'Decision to Treat' to the start of first treatment have continued to lengthen during 2022 in both England and Wales. The National Optimal Lung Cancer Pathway (NOLCP) recommends that the time from referral to the start of treatment is less than 49 days and that the time between diagnosis and the start of treatment for NSCLC is a maximum of 21 days. In 2022, the median time from 'Decision to Treat' to starting treatment for patients with stage IV NSCLC was 43 days in England and 52 days in Wales.

2.2 Care pathways

The management of lung cancer depends on the type, stage and the performance status of the patient. For early stage lung cancer, management is usually with curative intent with surgery or radiotherapy. Management of advanced stage lung cancer usually involves systemic anti-cancer therapy (SACT).

Surgery

Surgery is used to remove the cancer from the lung and surrounding lymph nodes/glands. Surgery is mainly an option when a person has early-stage non-small cell lung cancer.

Radiotherapy

Radiotherapy involves aiming high energy x-rays at cancer cells to kill them. Although the x-rays are targeted to the cancer cells, nearby cells can be affected by the radiation which leads to side effects.

Systemic Anti-Cancer Therapy (SACT)

(a) Chemotherapy
Chemotherapy targets and kills any rapidly growing cells in the body. The drugs can also affect immune cells, hair cells, and cells that line the gut. This can cause a variety of side effects. Normal cells are able to repair and replenish themselves while the cancer cells cannot.

(b) Targeted Therapy
When a biopsy of a lung cancer is tested, doctors and scientists look for certain changes in the genes of the cancer cell (called mutations). Medicines have been designed to target specific mutations in cancer cells. These targeted therapies therefore treat cancer cells but do not affect the normal cells in the rest of the body. Not all lung cancers have specific mutations, and some known mutations don't yet have targeted treatments, so not all patients can be offered targeted therapies.

(c) Immunotherapy
Immunotherapy uses the body's natural defences to fight cancer by improving the immune system's ability to recognise and then attack cancer cells. People who receive treatment using immunotherapy for NSCLC may receive immunotherapy alone or in combination with chemotherapy. This often used in later stage NSCLC when a targeted therapy cannot be used.

[1] Results from the NLCA State of the Nation Report 2024.

Supportive and Palliative Care

Supportive care involves a wide range of support for patients and families involving social support, psychological support and symptom control. Palliative care is important if a person's lung cancer cannot be cured and may still involve active treatments like immunotherapy to slow the cancer progression. A focus of palliative care is maintaining a person's quality of life as well as prolonging life. End of life care is an extremely important part of palliative care and involves care and support in the final months or year of life. End of life care is an extremely important part of palliative care and involves care and support in the final year of life.

2.3 Guidelines on the management of lung cancer

The National Institute for Clinical Excellence (NICE) guidelines on the management of Lung cancer can be found here: https://www.nice.org.uk/guidance/NG122

Briefly, patients with stage I and II lung cancer should be considered for curative intent treatment with surgery. Post-operatively, patient with stage T2b-4 or any nodal (N1-2) disease, should be offered SACT. For people with operable disease who can have surgery and are well enough for multimodality therapy, it is advised to consider SACT (neo-adjuvant therapy) with surgery 3-5 weeks later. Patients with Stage IIIB-IV lung cancer should be considered for SACT. The SACT agent should be determined by results of Biomarker testing.

NOLCP have published guidance on the Lung cancer diagnosis and management pathway with recommended waiting times. This pathway can be found here: https://www.england.nhs.uk/long-read/implementing-a-timed-lung-cancer-diagnostic-pathway/

Due to a number of factors such as resource availability, NLCA has shown significant variability of lung cancer management across England and Wales[2].

[2] Results from the NLCA State of the Nation Report 2024.

3. Approach to developing the Quality Improvement Plan

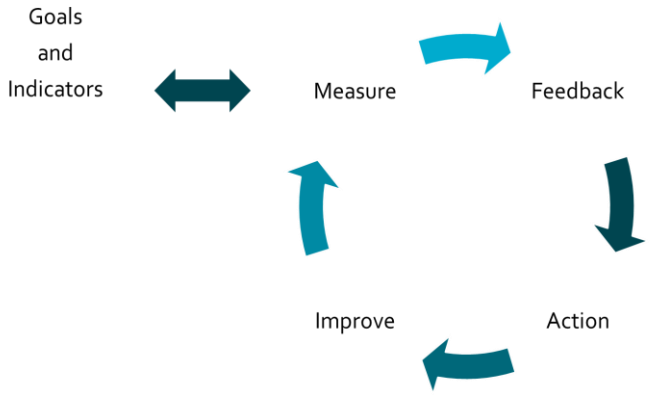
This Quality Improvement Plan outlines 10 performance indicators that have been mapped to clinical guidelines and the 5 improvement goals (Section 5).

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.

3.2 Approach to prioritising performance indicators

Clinical Performance Feedback Intervention Theory (CP-FIT)[3] 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



The audit and feedback cycle is only as strong as its weakest link: to enhance the NLCA'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.[4]
- 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 the exact causes of low levels of performance as several factors may be implicated, existing levels of performance, or the exact intervention required to improve the quality deficit). 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 NLCA's goals and performance indicators are likely to evolve over time too and recommendations built in will become more focused as the evaluation of positive or negative deviants/outliers (see below) is undertaken as well as more detailed case studies of improvement activity.

3.3 Data provision

The NLCA will use information from routine national health care datasets. These capture details on the diagnosis, management and treatment of every patient newly diagnosed with lung 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 NLCA:

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 is used for 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

[3] 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.

[4] 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.

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.

3.5 Stakeholder involvement

The NLCA is provided through a partnership that combines clinical leadership, methodological expertise, project management and a secure environment for data analysis, representing BTOG, SCTS 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. NLCA has also established a Patient and Public Involvement (PPI) Forum that meets twice a year, whose members represent people who have lung cancer, survived lung cancer or are a friend, family member and/or carer to a lung cancer patient.

3.6 Service provision

Lung cancer care in England and Wales is organised around specialist centres, where specialist multidisciplinary teams review new diagnoses of lung cancer, plan treatment, and carry out surgical resections for people who are eligible.

There are 28 specialist surgical centres in England, and two surgical centres in Wales. This centralised service model was implemented following the publication of national guidance in 2001. A national service framework document was produced in 2017[4]. These recommend that thoracic surgical units have a minimum of three full-time general thoracic surgeons. [5]

[5] NHS England Thoracic Surgery Service Specification

4. Audit scope

4.1. Patient inclusion criteria

The NLCA includes adults (≥18 years of age) diagnosed and/or treated in England or Wales by NHS hospital services for lung cancer if ICD-10 diagnosis code C34 was used to record a new diagnosis of primary lung cancer. Table 1 outlines tumour morphology codes used to identify the subtypes of lung cancer. Patients with small cell lung cancer (SCLC) or non-small-cell lung cancer (NSCLC) subtypes were included.

Patients with mesothelioma subtype, as documented through either ICD-10 codes (C450; C451; C457) or the tumour morphology codes in Table 1 are excluded.

Table 1: Tumour morphology codes and lung cancer type.

Lung cancer type	Tumour morphology code
Included cases	
Small cell lung cancer	8041/3, 8042/3, 8043/3, 8045/3
Carcinoid	8240/3
Non-small-cell lung cancer	M8070/3, 8140/3, any other type of epithelial lung cancer
Excluded cases	
Mesothelioma	9050/3, 9051/3, 9052/3, 9053/3

4.2. Care pathway

The audit covers the pathway from first diagnosis of lung cancer through to the end of primary treatment.

Primary treatment will include planned treatments with and without curative intent. Treatments may be multimodal and include any of surgery, chemotherapy (CT), radiotherapy (RT), or best supportive care. Interventions aimed at relief of symptoms will not be considered primary treatment unless they are part of best supportive care.

Treatment pathways for small cell and non-small cell lung cancer will be reported separately.

The audit will monitor emerging personalised medicine approaches in lung cancer and report on system factors that support personalisation.

5. Quality Improvement Goals & Performance indicators

The table overleaf summarises the five quality improvement goals and 10 performance indicators that will be used to measure the performance of lung cancer services and monitor progress towards achieving these goals. In some cases, the performance indicator may be reported for specific groups of patients, so that services have information that is more actionable.

The audit will undertake work to assess the utility of indicators that provide more detailed information on the use of systemic anti-cancer therapies. In particular, we will evaluate the quality of data and the robustness of derived results for the following indicators:

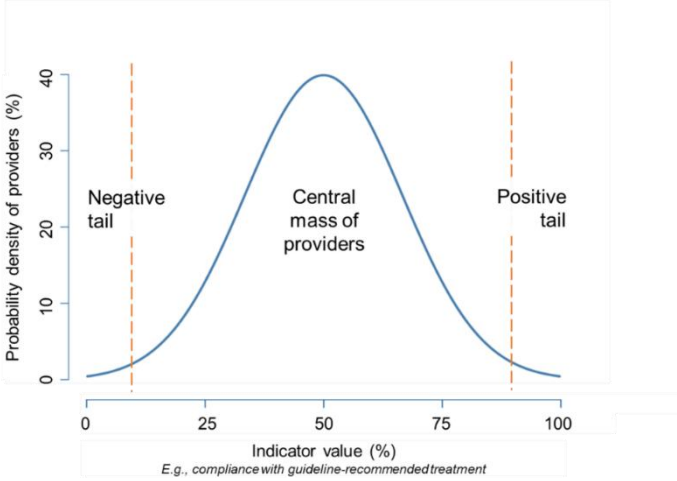
- Proportion of patients with EGFR+ / ALK+ stage 4 lung cancer (with PS0-1) who receive first line treatment with an appropriate SACT regime.
- Proportion of patients with stage 4 non-small cell lung cancer (with PS 0-1) who received their molecular marker test results within 2 weeks of sample being taken.
- The proportion of patients participating in clinical trials.

These indicators are aligned with the recommendations in the 2019 NICE lung cancer guideline (NG122) and the National Optimal Lung Cancer Pathway.

Quality improvement goal	Performance indicators*	National Guidance/standards
Goal 1 Improve early diagnosis of lung cancer	Proportion of patients diagnosed with Stage I or II lung cancer (among those with data on stage)	The NHS Long Term Plan seeks to diagnose at least 75% of (all) cancers at stage I/II by 2028
	Proportion of patients with pathological diagnosis (PS 0–1)	https://www.nice.org.uk/guidance/ng122/chapter/Diagnosis-and-staging . NICE 2019 Quality Standard QS (statement 6) https://www.nice.org.uk/guidance/ng122
	Proportion of patients diagnosed with lung cancer via emergency presentation	NICE 2019 Quality Standard QS (statement 5) https://www.nice.org.uk/guidance/ng122
Goal 2 Increase the proportion of patients who receive treatment with curative intent	Proportion of patients with NSCLC who had curative treatment, stratified for people with Stage I-II (PS 0–2) and Stage IIIA (PS 0–2) and by treatment type	NICE 2019 Quality Standard QS (statement 5) https://www.nice.org.uk/guidance/ng122
	Proportion of patients with NSCLC who had surgery	NICE 2019 Quality Standard QS (statement 1) https://www.nice.org.uk/guidance/ng122
Goal 3 Increase the proportion of people with lung cancer receiving Systemic Anti-Cancer Therapy (SACT) and reduce unwarranted variation in access to SACT	Proportion of patients with NSCLC (IIIB–IV, PS 0–1) who had systemic anti-cancer therapy	NICE has algorithms for the treatment of squamous and non-squamous stage 3B and 4 NSCLC.
	Proportion of patients with SCLC receiving chemotherapy within 2 weeks of diagnosis	https://www.nice.org.uk/guidance/ng122. Recommends that people with limited-stage SCLC should be offered cisplatin-based combination chemotherapy and that people with extensive-stage SCLC should be offered a platinum-based combination chemotherapy.
Goal 4 Improve the quality of the patient pathway	Median time from referral/diagnosis to treatment (days)	National Optimal Lung Cancer Pathway (NOLCP) https://rmpartners.nhs.uk/wp-content/uploads/2024/09/national-optimal-lung-cancer-pathway_v4_01jan2024.pdf
	Proportion of patients seen by lung CNS	NICE 2019 Quality Standard QS (statement 3) https://www.nice.org.uk/guidance/ng122
Goal 5 Improve and reduce variation in lung cancer outcomes	One year survival	

6. Quality Improvement Methods

The figure below shows a hypothetical example of how the values of a performance indicator may be distributed across NHS providers nationally at a single time point. On this indicator, a lower value indicates worse performance. 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).



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

Negative tail

Example methods: Regulation and public reporting of outliers with worse than expected performance

- National clinical audits have 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 the distance 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 have indicator values that lie in the central mass of the distribution. Efforts focussed heree may present the greatest scope for improving overall levels of care nationally. Methods in this domain suggest that all providers can improve their performance, regardless their current levels. Longitudinal monitoring by national clinical audits provides feedback about whether or not improvements occur.

Positive tail

Example methods: Positive deviance

- Some NHS providers perform exceptionally well despite similar constraints experienced by other providers, 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 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 NLCA will select which methods to implement to improve lung 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.

7. Improvement activities

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

The two principal strategies for reporting NLCA results are to produce:

- A short 'State of the Nation' (SotN) report for NHS Trusts in England and Health Boards in Wales. This annual report publishes five key recommendations and highlights where services should focus quality improvement activities. These recommendations support quality improvement activities at the Cancer Alliance level where applicable. The recommendations reflect the interpretation of audit results by the audit teams, and input from the clinical reference group, PPI forum, and major national stakeholders.
- A quarterly dashboard facilitates benchmarking and the monitoring of performance at regular intervals so improvements can be tracked over time.

7.1 National and Regional

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

Stakeholder	NLCA activity
NATIONAL	
NHS England and Wales	Identify issues and make recommendations, on the organisation and delivery of lung 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 and options for aligning recommendations with specific incentives e.g. CQUIN.
Professional organisations	Identify issues and make recommendations regarding the delivery of lung 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 NLCA 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 NLCA supports local NHS cancer services in their care of NLCA cancer patients in the following ways:

NLCA 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 giving quarterly updates	Presents results for individual NHS organisations that allows the user to compare the results of a selected provider against a peer organisation. Results will be updated quarterly.
Local Action Plan template	Allows NHS organisations to document how they will respond to the State of the Nation Report recommendations.
Outlier reporting	The NLCA will report provider values that are unexpectedly low or high when compared to the expected level of performance and labelled as an outlier. The NLCA will support negative outliers to identify areas for 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 NLCA website includes a Quality Improvement resources page with links to the 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 NLCA will host webinars to present the audit data, and to introduce quality improvement initiatives. These will be in collaboration with BTOG.
- The NLCA 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 NLCA are conducting a national Quality Improvement initiative aiming to improve Lung Cancer Nurse Specialist provision and data quality. This is through a quarterly process of audit and feedback directly to NHS trusts.

7.6 Patient and Public Involvement

- Members of the NLCA PPI Forum are 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
    - 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 NLCA 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 NLCA's quality improvement goals, activities and outputs by ensuring this work is relevant from a patient perspective.

7.7 Communication & dissemination activities

The NLCA communicates regularly with stakeholders, including patients and the public in the following ways:

7.7.1. Newsletters

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

The NLCA LinkedIn and Bluesky accounts posts 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 NLCA presents audit results at national conferences and publish articles in medical journals and other media.

8. Evaluation

Descriptive methods

The NLCA will report year-on-year progress against improvement goals to the audit's Clinical Reference Group 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 NLCA 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.

Appendix

1. National Cancer Audit Collaborating Centre (NATCAN)

NLCA 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 (National Disease Registration Service [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 Tom Roques), the Director of the CEU (Prof David Cromwell) and Senior Statistician (Prof Kate Walker) 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,[6] 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 2) 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).

[6] 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

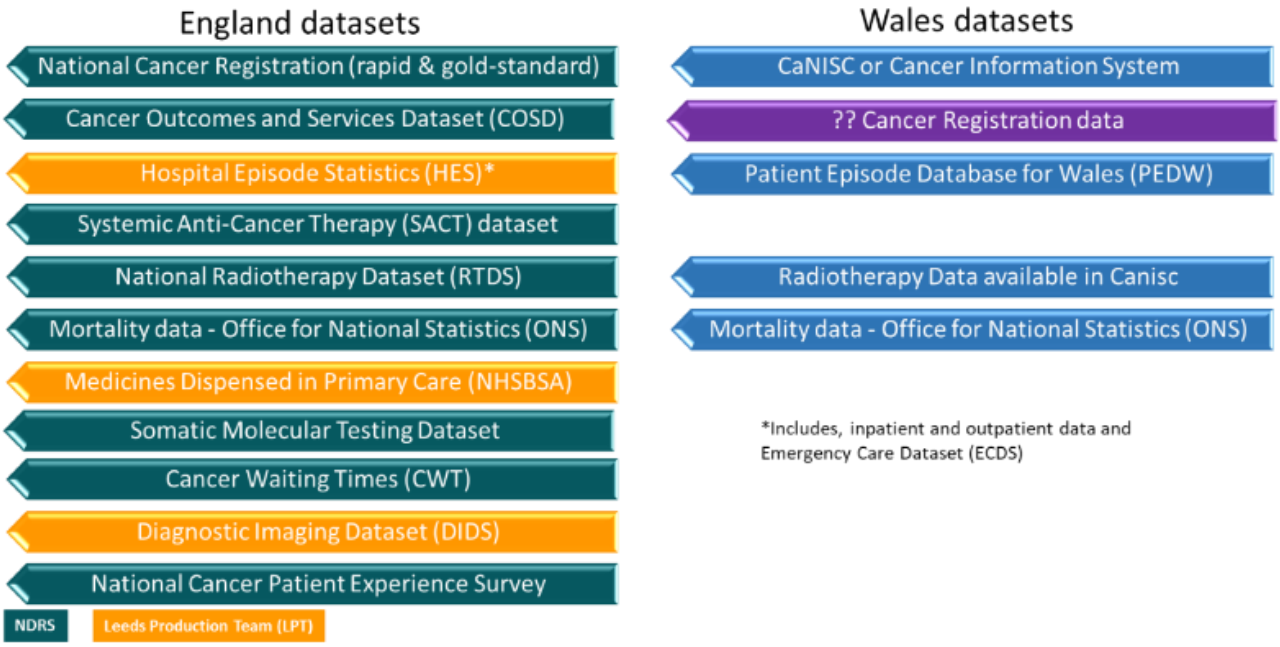



Figure 2. National datasets available to NATCAN