NNHLA
National Non-Hodgkin Lymphoma Audit

NATCAN
National Cancer Audit Collaborating Centre

National Non-Hodgkin Lymphoma Audit

State of the Nation Report 2024

Methodological Supplement

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Cancer Registration in England and Wales

This work uses data that has been provided by patients and collected by the NHS as part of their care and support. For patients diagnosed in England, the data is collated, maintained and quality assured by the National Disease Registration Service (NDRS), which is part of NHS England. Access to the data was facilitated by the NHS Digital Data Access Request Service. For patients diagnosed in Wales, the NNHLA dataset is captured through a national system, Cancer Information System for Wales (CaNISC), after identification by hospital cancer services and uploaded via electronic MDT data collection systems to the Wales Cancer Network (WCN), Public Health Wales.

Contents

Abbreviations

Acronym	Description
BSH	British Society for Haematology
CaNISC	Cancer information system for Wales
CCI	Charlson comorbidity index
CLL	chronic lymphocytic leukaemia
CNS	Clinical nurse specialist
COSD	Cancer outcomes and services dataset
CRD	Cancer registration dataset
ECOG	Eastern cooperative oncology group
FLIPI	Follicular Lymphoma International Prognostic Index
HES	Hospital episode statistics
ICD-10	International classification of diseases and related health problems, 10th revision
ICD-O3	International classification of diseases for oncology, 3rd edition
IMD	Index of multiple deprivation
IPI	International Prognostic Index
LDH	Lactate dehydrogenase
LSOA	Lower super output areas
MDT	Multidisciplinary team
NDRS	National Disease Registration Service
NICE	National Institute for Health and Care Excellence
NNHLA	National non-Hodgkin lymphoma audit
ONS	Office for National Statistics
PEDW	Patient episode database for Wales

PS	Performance status
RCRD	Rapid cancer registry data
RCS	Royal college of surgeons of England
R-IPI	Revised International Prognostic Index
RTDS	Radiotherapy dataset
SACT	Systemic anti-cancer dataset
WCN	Wales Cancer Network

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1 Routine and cancer registration datasets

The national non-Hodgkin lymphoma audit (NNHLA) uses routine national health care datasets. These capture details on the diagnosis, management and treatment of every adult patient newly diagnosed with non-Hodgkin lymphoma (NHL) in England and Wales.

1.1 England

The NNHLA data collection partner in England is the National Disease Registration Service (NDRS).

Data are submitted to the NDRS from a range of healthcare providers and other services (including histopathology and haematology services, systemic ant-cancer therapy and radiotherapy departments, screening services). Following initial registration by a cancer registration officer, a 6-month period is allowed for treatment to occur, the healthcare provider to submit data and the data to be processed. The quality and accuracy of the data are validated and processed to ensure that they are consistent and to a high standard. Once all the expected records for any one incidence year have been received and validated, NDRS takes a snapshot of the dataset, which provides a single, consistent source of cancer registrations. This time lag results in improved data completeness and quality, but it prevents the publication of more timely data. For more information on the NCRD, please see the Data Resource Profile[1]. Once each year of data is assessed as being complete, it is released to produce official statistics and made available for researchers and others to use via the NHSE Data Access and Release Service. Routine full registration data is normally available around 18-24 months post diagnosis cohort. The NCRD for 2021 was created from a snapshot taken on 2 September 2023, for the period January to December 2021, and provided to NATCAN in February 2024.

As with cancer registries in other countries, cancer registrations in England can take up to 5 years after the end of a given calendar year to reach 100% completeness and stability. The National Disease Registration Service (NDRS) uses an active system of gathering information on cancer diagnoses from multiple sources across the patient pathway. Completeness varies by tumour type because different patient pathways provide different opportunities for data flows into NDRS. The 'Gold standard' cancer registration dataset that is used in cancer statistics bulletins and available for analysis outside of NDRS contains over 98% of all the people that will eventually be found by the registration process, and the completeness for a calendar year of data increases over time. More information about the cancer registration process can be found here.

The CRD was linked to other national health care datasets, including Hospital Episode Statistics (HES) admitted patient records, the National Radiotherapy Dataset (RTDS), the Systemic Anti-Cancer Therapy Dataset (SACT), and the Office for National Statistics (ONS) death register.

For the 2024 NNHLA State of the Nation report, English patients were allocated to NHS Trust based on the "place of diagnosis" recorded within the dataset.

1.2 Wales

The NNHLA data collection partner in Wales is the Wales Cancer Network (WCN), Public Health Wales. The NNHLA dataset is captured through a national system, Cancer Information System Cymru (CaNISC), after identification by hospital cancer services and uploaded via electronic MDT data collection systems

The Welsh registration records were linked to records from the Patient Episode Database for Wales (PEDW) which contains data describing all inpatient and day case activity undertaken within the NHS in Wales, alongside data for Welsh patients treated within English NHS trusts.

For the 2024 NNHLA State of the Nation report, patients in Wales were allocated to NHS hospitals based on the "Trust Site Code" recorded within the dataset.

2 Patient inclusion

Patients were eligible for inclusion in analysis conducted for the 2024 NNHLA State of the Nation (SotN) report if they met the following inclusion criteria:

1. Aged 18 years and over
2. Newly diagnosed with NHL, as classified by any of the ICD-10[2] codes in Table 1 or any of the ICD-O3 codes in Table 2
3. Diagnosed with NHL either between January 2020 and December 2021 in England, or between January 2022 and December 2022 in Wales.
4. Received care provided by the National Health Service in England or Wales.

Patients were excluded if:

1. Diagnosis was based on death certificate or date of diagnosis was the same as date of death.
2. Diagnosis of NHL occurred prior to the auditing period.
3. Diagnosis and treatment took place entirely outside of the NHS.

Table 1: ICD-10 codes[2] used to classify patients as diagnosed with non-Hodgkin lymphoma.

Non-Hodgkin lymphoma subtype	ICD-10 code
Follicular lymphoma	C82
Non-follicular lymphoma	C83
Mature T/NK-cell lymphomas	C84
Other and unspecified types of non-Hodgkin lymphoma	C85
Other specified types of T/NK-cell lymphoma	C86
Malignant immunoproliferative diseases	C88
Chronic lymphocytic leukaemia of B-cell type	C91.1

Table 2: ICD-O3 codes[3] for defining Non-Hodgkin Lymphoma.

ICD-O-3	NHL sub-type
9687/3	Burkitt lymphoma
9823/3	Chronic lymphocytic leukaemia
9597/3, 9690/3, 9695/3, 9698/3	Follicular lymphoma
9679/3, 9680/3, 9688/3, 9698/3, 9712/3, 9735/3	Large B-cell lymphomas
9673/3	Mantle cell lymphoma
9689/3, 9699/3	Marginal zone lymphoma
9591/3	NHL, not otherwise specified
9700/3, 9701/3, 9709/3, 9718/3, 9726/3	Cutaneous T-cell lymphomas
9702/3, 9705/3, 9714/3, 9716/3, 9717/3, 9719/3, 9827/3	Peripheral T-cell lymphomas

2.1 Non-Hodgkin lymphoma subtypes

NHL is classified into various subtypes, according to the types of cells from which the cancer originates and rate of disease progression. This section describes how we used the International Classification of Diseases (ICD) codes to differentiate NHL subtypes.

The International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3)[3] is used in tumour or cancer registries to code the site (topography) and the histology (morphology) of neoplasms, therefore providing greater detail than ICD-10 and enabling greater granularity of NHL subtypes to be reported by the NNHLA. Relevant ICD-O3 codes for NHL subtypes included in the NNHLA were identified with guidance from the Haematological Malignancy Research Network (HMRN)[4] and are listed in Table 3.

We classified people diagnosed with NHL as belonging to one of the subtypes included in the NNHLA if:

- EITHER they were assigned one of the corresponding ICD-O-3 codes listed in Table 3
- OR, where the ICD-O3 code was missing, they were assigned an ICD-10 code listed in Table 1 - these were mapped to subtypes, as detailed in Table 3.

If NEITHER of these two criteria were met, we classified people diagnosed with NHL as “NHL, other”.

Table 3: ICD-O3 codes[3] used to classify non-Hodgkin lymphoma subtype.

NHL subtype	ICD-O-3 code	ICD-10 code
MATURE B-CELL NEOPLASMS		
Burkitt lymphoma	9687/3	C83.7
Chronic lymphocytic leukaemia	9823/3	C91.1
Follicular lymphoma	9597/3, 9690/3, 9695/3, 9698/3	C82
Large B-cell lymphomas	9679/3, 9680/3, 9688/3, 9698/3, 9712/3, 9735/3	C83.3
Mantle cell lymphoma	9673/3	C83.1
Marginal zone lymphoma	9689/3, 9699/3	
NHL, not otherwise specified	9591/3	
MATURE T- AND NK-CELL NEOPLASMS		
Cutaneous T-cell lymphomas	9700/3, 9701/3, 9709/3, 9718/3, 9726/3	C84.8 C86.6
Peripheral T-cell lymphomas	9702/3, 9705/3, 9714/3, 9716/3, 9717/3, 9719/3, 9827/3	C84.4

2.2 Classification of high-grade vs. low-grade NHL

NHL subtypes can be classified according to their rate of disease progression, which influences the choice of treatment approach and subsequent prognosis.

Low-grade or indolent NHL subtypes are characterised by slow disease progression, do not always require immediate treatment, but are harder to completely cure than high-grade NHL.

High-grade or aggressive NHL subtypes are characterised by rapid disease progression, require immediate treatment, but respond better to treatment than low-grade NHL and can often be cured.

High-grade and low-grade classification of NHL subtypes included in the NNHLA were determined with advice from the NNHLA clinical experts. Further details are outlined in Table 13 in the Appendix.

3 Definition of variables

The aim of the NNHLA, commissioned by the Healthcare Quality Improvement Partnership, is to evaluate the care received by patients diagnosed with NHL in NHS hospitals within England and Wales.

The NNHLA considers the following possible reasons for variation in NHL care:

1. Differences in patient frailty and prevalence of comorbidities that may contraindicate systemic anti-cancer therapy (SACT) or radiotherapy.
2. Differences in the nature and extent of disease, notably the distinct tumour subtypes of high-grade NHL and low-grade NHL given their distinct patterns of care and prognosis.
3. Variations in the uptake of and access to new technologies and treatment techniques e.g., hospitals participating in clinical trials.

The audit uses a set of performance indicators as the basis of this evaluation. This section describes the variables used in the calculation of the performance indicators.

3.1 Performance status

Performance status is used by clinicians to classify a patient's functional impairment. It is used to group patients when comparing treatment effectiveness and assessing prognosis to help remove differences in patient case-mix. This is important for the audit because the distribution of patient performance status can vary between organisations, and risk adjustment is required for some indicators. Details of the indicators for which risk adjustment was performed can be found in Table 12.

Various scoring systems exist for evaluating performance status. The Eastern Cooperative Oncology Group (ECOG) system was widely used by cancer services and is collected by the cancer registration services. Table 4 outlines the ECOG performance status scale. Clinicians use standard criteria to assign patient's a performance status score, and each category describes the extent to which a person can perform activities of daily living.

Table 4: Performance status scale, as defined by the Eastern Cooperative Oncology Group (ECOG) and published by Oken et al.[5]

Grade	Description
0	Fully active, able to carry on all pre-disease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light housework, office work
2	Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours
3	Capable of only limited self-care, confined to bed or chair more than 50% of waking hours
4	Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair
5	Dead

3.2 Comorbidity status

The NNHLA team used the Royal College of Surgeons of England (RCS) modified Charlson Comorbidity Index (CCI) to measure the comorbidity burden of patients (see Armitage *et al*.[6] for details).

The CCI is a commonly used scoring system for medical comorbidities. It consists of a grouped score that is calculated based on the absence (0) or presence (≥1) of the pre-specified medical conditions listed in Table 5. The CCI was calculated using information on secondary diagnoses (ICD-10 codes) in the hospital admission data (HES/PEDW) recorded within the 12-month period up to a patient's diagnosis. Patients with no HES/PEDW admission in the 12 months up to diagnosis had missing information on CCI.

The CCI score was used to perform risk-adjustment for overall one-year survival.

Table 5: Pre-specified conditions included in the assignment of Charlson Comorbidity Index score and their associated codes

Medical condition	ICD-10 diagnostic code(s)
AIDS/HIV infection	B20; B21; B22; B23; B24
Cerebrovascular disease	G45; G46; I6
Chronic pulmonary disease	Chronic: I26; I27; J40; J41; J42; J43; J44; J45; J47; J60; J61; J62; J63; J64; J65; J66; J67; J684; J701; J703 Acute: J46**
Congestive cardiac failure	I11; I13; I42; I43; I50; I255; I517
Dementia	A810; F00; F01; F02; F03; F051; G30; G31
Diabetes mellitus	E10; E11; E12; E13; E14
Hemiplegia or paraplegia	G114; G81; G82; G83
Liver disease	B18; I85; I864; I982; K70; K71; K721; K729; K76; R162; Z944
Metastatic solid tumour	C77; C78; C79
Myocardial infarction (MI)	Acute MI: I21**; I22**; I23**
History of MI	I252
Peripheral vascular disease	I70; I71; I72; I73; I770; I771; K551; K558; K559; R02; Z958; Z959
Renal disease (RD)	Chronic: I12; I13; N01; N03; N05; N07; N08; N18; N25; Z49; Z940; Z992 Acute: N171**; N172**; N19**
Rheumatological disease	M05; M06; M09; M120; M315; M32; M33; M34; M35; M36

** Code associated with an acute episode, only counted in admissions prior to the index admission

3.3 Socioeconomic status

In England and Wales, small regional areas are assigned a measure of social deprivation, called the Index of Multiple Deprivation (IMD). The Index is constructed from various individual deprivation scales and a score is derived for each area (Lower Super Output Areas [LSOA], which contain approximately 1500 people) in England and Wales. Separate IMD scores are derived from England and Wales.

In the analyses, patients were categorised into one of five socioeconomic groups (1=most deprived; 5=least deprived) based on the IMD score of the area in which they lived. The five categories were based on the quintiles of the ranked IMD scores.

3.4 Disease staging

The extent to which a tumour has grown and spread within and beyond the lymphatic system is denoted by the disease stage. This is an important factor that patients and clinicians consider when making treatment decisions and is used to determine prognosis.

Disease stage is therefore an important variable to consider when performing risk adjustment. However, at the time of completing analysis for the 2024 NNHLA SotN report, data completeness for this variable was insufficient for it to be incorporated into risk adjustment.

Improved data completeness was a key recommendation included in the 2024 SotN report and the NNHLA will continue to publish data quality as part of its quarterly reports to help drive improvement.

To support improvements in data completeness for NHL disease staging, we here outline the key staging data for NHL.

TNM staging is not collected for haematological cancers. Instead, people diagnosed with chronic lymphocytic leukaemia (CLL) have their disease staged using the Binet system[7] and people diagnosed with all other NHL subtypes have their disease staged using the Ann Arbor system[8].

3.4.1 The Binet staging system

The Binet system[7] classifies chronic lymphocytic leukaemia (CLL) into three disease stages, according to haematological cell counts and number of sites involved. Criteria used by the Binet classification system to define each disease stage are described in Table 6.

Table 6: The Binet system[7] for classifying chronic lymphocytic leukaemia (CLL) disease stage.

Stage	Definition
A	• No anaemia (Hb ≥100 g/l (6.21 mmol/l) • No thrombocytopenia (platelets ≥100 × 10^9/l) • <3 involved lymphoid sites (axillary, cervical or inguinal lymph nodes, spleen or liver)
B	• No anaemia (Hb ≥100 g/l (6.21 mmol/l) • No thrombocytopenia (platelets ≥100 × 10^9/l) • ≥3 involved lymphoid sites (axillary, cervical or inguinal lymph nodes, spleen or liver)
C	• Any number of involved sites • Anaemia (Hb <100 g/l (6.21 mmol/l)) and/or thrombocytopenia (platelets <100 × 10^9/l)

3.4.2 The Cotswolds-modified Anne Arbor staging system

The Cotswolds-modified Anne Arbor system[8] classifies NHL into four disease stages according to where the disease is located and what symptoms are present. Criteria used by the Ann Arbor classification system to define each disease stage are described in Table 7.

Table 7: The Cotswolds-modified Anne Arbor system[8] for classifying NHL disease stage (excluding chronic lymphocytic leukaemia), as described by NDRS.[9]

Stage	Definition
1	One lymph node region or extralymphatic site
2	Two or more lymph node regions on the same side of the diaphragm
3	Involvement of lymph node regions or structure on both sides of diaphragm
4	Bone marrow involvement or extranodal sites beyond those designated E including multiple lung nodules and any involvement of brain or liver
ADDITIONAL QUALIFIERS	
A	No symptoms
B	Fever, sweats, weight loss (more than 10% body weight)
E	Involvement of a single extranodal site, contiguous in proximity to a known nodal site
X*	Bulky disease. Mass > 1/3 transthoracic diameter at T5 on CXR or any mass > 10cm maximum dimension
S	Spleen involvement

Abbreviations: CXR: chest x-ray; T5: fifth thoracic vertebral body

3.5 Prognostic indices

Prognostic indices stratify patients into risk groups based on survival and are used to inform treatment decisions.

3.5.1 Follicular Lymphoma International Prognostic Index (FLIPI)

The Follicular Lymphoma International Prognostic Index (FLIPI)[10] uses five prognostic variables to classify patients diagnosed with follicular lymphoma into one of three risk groups.

Table 8 outlines the adverse prognostic factors included in the FLIPI and Table 9 outlines the risk groups defined by the FLIPI.

Table 8: Adverse prognostic factors included in the Follicular Lymphoma International Prognostic Index.[10]

Parameter	Adverse prognostic factor
Age at diagnosis (years)	≥60
Ann Arbor stage	3 or 4
Haemaglobin level	< 120 g/L
Serum lactate dehydrogenase (LDH)	> Upper limit of normal
Number of nodal sites	> 4

Table 9: Risk groups defined by the Follicular Lymphoma International Prognostic Index.[10]

Risk group	Number of adverse risk factors
Low	0-1
Intermediate	2
High	≥ 3

3.5.2 Revised International Prognostic Index (R-IPI)

The International Prognostic Index (IPI)[11] uses five prognostic variables to classify patients diagnosed with diffuse large B-cell lymphoma into four different risk groups.

The Revised International Prognostic Index (R-IPI)[12] includes the same variables as the IPI but classifies patients into three risk groups.

Table 10 outlines the adverse prognostic factors included in the R-IPI and Table 11 outlines the risk groups defined by the R-IPI.

Table 10: Adverse prognostic factors included in the Revised International Prognostic Index.[12]

Parameter	Risk factor
Age at diagnosis (years)	> 60
ECOG performance status	> 2
Serum lactate dehydrogenase (LDH)	> Upper limit of normal
Number of extranodal sites	> 1
Ann Arbor stage	3 or 4

Abbreviations: ECOG: Eastern Cooperative Oncology Group

Table 11: Risk groups defined by the Revised International Prognostic Index.[12]

Risk group	Number of adverse risk factors
Very good	0
Good	1-2
Poor	3-5

3.6 Treatment allocation

In the 2024 SotN report, patients were considered to have undergone treatment for NHL if they were identified as having received systemic anti-cancer therapy or radiotherapy.

3.6.1 England

Therapies received by patients treated in English NHS trusts required combining information across two datasets with the records in the Cancer Registration Dataset, and were identified as follows:

- **Systemic Anti-Cancer Therapy (SACT)**: The SACT dataset was used to identify patients who received the following treatment modalities:
    - Targeted therapy (including monoclonal antibody therapy and tyrosine kinase inhibitors)
    - Immunotherapy
    - Chemotherapy
    - Trial-based systemic anti-cancer therapy regimens
- **Radiotherapy dataset (RTDS)**: The RTDS dataset was used to identify patients who received teletherapy and/or brachytherapy.

3.6.2 Wales

For Welsh patients, the analysis of modes of therapy was restricted to the details in the CaNISC cancer registration dataset. Information on the receipt of chemotherapy was described in terms of the date that chemotherapy started, the treatment intent and the organisation at which the chemotherapy was delivered. Similar fields contained information on whether radiotherapy was delivered.

4 Performance indicators

The NNHLA uses key performance indicators to monitor progress against the audit's healthcare improvement goals. These indicators align to the recommendations in the National Institute for Health and Care Excellence (NICE) guideline for the diagnosis and management of NHL (NG52)[13], the NICE guideline for improving outcomes of haematological cancer (NG47)[14] , the British Society for Haematology (BSH) Guideline for the management of newly diagnosed large B-cell lymphoma[15], the (BSH) Guideline for the investigation and management of follicular lymphoma[16] and the NICE quality standards (QS150)[17].

The NNHLA published six performance indicators in the first State of the Nation Report, published in September 2024, four of which could be published for patients treated in Wales. Additional indicators 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.

Table 12 defines the performance indicators included in the NNHLA 2024 State of the Nation report. It provides details of the data variables used in their calculation and outlines which indicators were risk adjusted.

Several indicators are restricted to patients diagnosed with high-grade NHL, owing to the fact their patterns of care and prognosis are distinct to that of patients diagnosed with low-grade NHL. Some indicators are further restricted to specific NHL subtypes, owing to the fact their diagnostic pathway is distinct to that of other NHL subtypes.

Differences in patient frailty and prevalence of comorbidities, which may contraindicate systemic anti-cancer therapy (SACT) or radiotherapy, could be possible valid reasons for variation in NHL care. Therefore, as the distribution of such prognostic variables can vary greatly between organisations, a risk adjustment was performed when calculating some of the indicators. Further details of risk adjustment can be found in section 5.3.

Table 12: Definition of performance indicators included in the national non-Hodgkin lymphoma audit 2024 State of the Nation report.

Indicator	Description
DIAGNOSIS TO TREATMENT PATHWAY	
Proportion of people diagnosed with NHL discussed at a lymphoma/haematology MDT within four weeks of diagnosis	To calculate this process indicator, a numerator is divided by a denominator. **NUMERATOR**: Number of patients diagnosed with non-Hodgkin lymphoma, who were discussed at a lymphoma MDT meeting within four weeks of diagnosis **DENOMINATOR**: Number of patients diagnosed with non-Hodgkin lymphoma, where date of diagnosis and date of MDT meeting are completed **RISK ADJUSTMENT**: None
Proportion of people diagnosed with NHL seen by a clinical nurse specialist	To calculate this process indicator, a numerator is divided by a denominator. **NUMERATOR**: Number of patients diagnosed with non-Hodgkin lymphoma who were seen by a clinical nurse specialist **DENOMINATOR**: Number of patients diagnosed with non-Hodgkin lymphoma who had a record of the status of clinical nurse specialist. RISK ADJUSTMENT: None

Indicator	Description
	Reported in 2024 State of the Nation report: YES
Proportion of people with high-grade lymphoma (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell) who start chemotherapy within 62 days of referral	To calculate this process indicator, a numerator is divided by a denominator. **NUMERATOR**: Number of patients diagnosed with high-grade lymphoma patients (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell) who started chemotherapy within 62 days of referral **DENOMINATOR**: Number of patients diagnosed with high-grade lymphoma patients (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell), where date of starting chemotherapy and date of referral are complete. **RISK ADJUSTMENT**: None
TREATMENT	
Proportion of people with high-grade lymphoma (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell) who start radiotherapy within eight weeks of end of first line chemotherapy	To calculate this process indicator, a numerator is divided by a denominator. **NUMERATOR**: Number of patients diagnosed with high-grade lymphoma patients (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell) receiving radiotherapy who started radiotherapy within eight weeks of end of first line chemotherapy.

Indicator	Description
	DENOMINATOR: Number of patients diagnosed with high-grade lymphoma patients (Burkitt lymphoma, diffuse large b-cell lymphoma or high-grade T-cell) receiving radiotherapy, who started radiotherapy within six months of end of first line chemotherapy. **RISK ADJUSTMENT**: None
Proportion of people diagnosed with NHL who received radiotherapy within one year of diagnosis.	To calculate this process indicator, a numerator is divided by a denominator. **NUMERATOR**: Number of patients diagnosed with non-Hodgkin lymphoma, who received radiotherapy within one year of diagnosis. **DENOMINATOR**: Number of patients diagnosed with non-Hodgkin lymphoma. **RISK ADJUSTMENT**: None
OUTCOMES	
Two-year survival of people with high-grade lymphoma (BL, DLBCL, mantle cell or high-grade T-cell).	This outcome indicator describes the number of patients diagnosed with high-grade lymphoma (BL, DLBCL, mantle cell or high-grade T-cell) who are still alive two years after their diagnosis. In the 2024 State of the Nation Report survival rates are also reported for patients with low-grade NHL.

Indicator	Description
	In the 2024 State of the Nation Report one-year survival rates are reported to allow results to be presented for 2020 and 2021 in England and for 2022 in Wales. In the next State of the Nation Report two-year survival rates will be reported. **RISK ADJUSTED**: YES: age, sex, CCI, performance status, subtype and year of diagnosis for England; age, sex CCI and performance status for Wales.

5 Statistical analyses

All statistical analyses were performed using STATA version 17.0.

In the 2024 NNHLA State of the Nation report, descriptive statistics summarise categorical data items as percentages (%). The denominator of these percentages is, in most cases, the number of patients for whom the value of the data item was not missing. Results are grouped by NHS trust (England) or Hospital (for Wales).

5.1 Missing data

Missing data were reported as percentages of total number of patients in the report. For risk adjustment, missing data were created a separate category and included in regression analyses.

5.2 Small number suppression

To reduce the data disclosure risk associated with presenting small numbers, results for centres with indicator denominator values less than 10 or numerator values less than 5 were suppressed.

5.3 Risk adjustment

Multivariable logistic regression was performed to risk adjust the one-year survival. The regression model was used to estimate the probability of a patient having an event, and to produce the expected number of events at an organisation, the individual probabilities of the patients at that organisation were summed. The adjusted indicator value for an organisation was then calculated as: the observed number of events divided by the expected number, multiplied by the overall national average.

Risk-adjustment was performed separately for England and Wales, with the data variables used in risk adjustment for each country listed below:

- **England**: Age (seven categories), sex, performance status, CCI, NHL subtype and year of diagnosis
- **Wales**: Age (four categories), sex, performance status and CCI.

6 Cause for concern process

It should be noted that these provider-specific results are affected by varying levels of data completeness and quality and random variation (i.e., the “role of chance”). At this stage, the audit has not implemented HQIP’s formal “outlier process” (i.e., a formal process to assess the performance of healthcare providers with results that are outside the expected range). This is because, although there is sufficient confidence to report the results publicly, it is the first time that provider-specific results are being provided with untested data completeness

and quality, and risk adjustment methods are in development. Instead, where results highlight a potential cause for clinical concern, we will contact the providers within one month following publication of the SotN Report, and work with them to explore factors that may explain their results, according to HQIP's formal guidance. This process is with a view to being able to adopt the formal outlier process in 2025

Table 12

7 References

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8 Appendices

8.1 Appendix 1: High-grade and low-grade classification of NHL subtypes

High-grade and low-grade classification of NHL subtypes were determined with advice from the NNHLA clinical experts.

Table 13: High-grade and low-grade classification of NHL subtypes using ICD-10 codes.

ICD-10 code	Description	Grade (high/low)
C82.0	Follicular lymphoma grade I	Low grade
C82.1	Follicular lymphoma grade II	Low grade
C82.2	Follicular lymphoma grade III, unspecified	Low grade
C82.3	Follicular lymphoma grade IIIa	Low grade
C82.4	Follicular lymphoma grade IIIb	High grade
C82.5	Diffuse follicle centre lymphoma	Low grade
C82.6	Cutaneous follicle centre lymphoma	Low grade
C82.7	Other types of follicular lymphoma	Low grade
C82.9	Follicular lymphoma, unspecified Nodular lymphoma NOS	Low grade
C83.0	Small cell B-cell lymphoma: 1. Lymphoplasmacytic lymphoma 2. Nodal marginal zone lymphoma 3. Non-leukaemic variant of B-CLL 4. Splenic marginal zone lymphoma Excl.: 1. Chronic lymphocytic leukaemia (C91.1) 2. Waldenström macroglobulinaemia (C88.0) 3. Mature T/NK-cell lymphomas (C84.-)	Low grade
C83.1	Mantle cell lymphoma 1. Centrocytic lymphoma 2. Malignant lymphomatous polyposis	High grade
C83.3	Diffuse large B-cell lymphoma 1. Anaplastic 2. CD30-positive 3. Centroblastic 4. Plasmablastic 5. Immunoblastic 6. Subtype not specified 7. T-cell rich Excl.: 1. Mediastinal (thymic) large B-cell lymphoma (C85.2) 2. Mature T/NK-cell lymphomas (C84.-)	High grade

ICD-10 code	Description	Grade (high/low)
C83.5	Lymphoblastic (diffuse) lymphoma 1. B-cell precursor lymphoma 2. Lymphoblastic B-cell lymphoma 3. Lymphoblastic lymphoma NOS 4. Lymphoblastic T-cell lymphoma 5. T-cell precursor lymphoma	High grade
C83.7	Burkitt lymphoma 1. Atypical Burkitt lymphoma 2. “Burkitt-like” lymphoma Excl.: 1. Mature B-cell leukaemia Burkitt-type (C91.8)	High grade
C83.8	Other non-follicular lymphoma 1. Primary effusion B-cell lymphoma 2. Intravascular large B-cell lymphoma 3. Lymphoid granulomatosis Excl.: 1. Mediastinal (thymic) large B-cell lymphoma (C85.2) 2. T-cell rich B-cell lymphoma (C83.3)	High grade
C83.9	Non-follicular (diffuse) lymphoma, unspecified	High grade
C84.0	Mycosis fungoides	Low grade
C84.1	Sézary disease 1. Lennert’s lymphoma 2. Lymphoepithelioid lymphoma	High grade
C84.4	Peripheral T-cell lymphoma, not elsewhere classified	High grade
C84.5	Other mature T/NK-cell lymphomas Note: If T-cell lineage or involvement is mentioned in conjunction with a specific lymphoma, code to the more specific description. Excl.: 1. Angioimmunoblastic T-cell lymphoma (C86.5) 2. Blastic NK-cell lymphoma (C86.4) 3. Enteropathy-type T-cell lymphoma (C86.2) 4. Extranodal NK-cell lymphoma, nasal type (C86.0) 5. Hepatosplenic T-cell lymphoma (C86.1) 6. Primary cutaneous CD30-positive T-cell proliferations (C86.6) 7. Subcutaneous panniculitis-like T-cell lymphoma (C86.3) 8. T-cell leukaemia (C91.-)	High grade
C84.6	Anaplastic large cell lymphoma, ALK-positive 1. Anaplastic large cell lymphoma, CD30-positive	High grade

ICD-10 code	Description	Grade (high/low)
C84.7	Anaplastic large cell lymphoma, ALK-negative Excl.: 1. Primary cutaneous CD30-positive T-cell proliferations (C86.6)	High grade
C84.8	Cutaneous T-cell lymphoma, unspecified	Low grade
C84.9	Mature T/NK-cell lymphoma, unspecified 1. NK/T cell lymphoma NOS Excl.: 1. Mature T-cell lymphoma, not elsewhere classified (C84.4)	High grade
C85.1	B-cell lymphoma, unspecified Note: If B-cell lineage or involvement is mentioned in conjunction with a specific lymphoma, code to the more specific description	High grade
C85.2	Mediastinal (thymic) large B-cell lymphoma	High grade
C85.7	Other specified types of non-Hodgkin lymphoma	High grade
C85.9	Non-Hodgkin lymphoma, unspecified 1. Lymphoma NOS 2. Malignant lymphoma NOS 3. Non-Hodgkin lymphoma NOS	High grade
C86.0	Extranodal NK/T-cell lymphoma, nasal type	High grade
C86.1	Hepatosplenic T-cell lymphoma 1. Alpha-beta and gamma-delta types	High grade
C86.2	Enteropathy-type (intestinal) T-cell lymphoma 1. Enteropathy associated T-cell lymphoma	High grade
C86.3	Subcutaneous panniculitis-like T-cell lymphoma	High grade
C86.4	Blastic NK-cell lymphoma	High grade
C86.5	Angioimmunoblastic T-cell lymphoma 1. Angioimmunoblastic lymphadenopathy with dysproteinaemia [AILD]	High grade
C86.6	Primary cutaneous CD30-positive T-cell proliferations 1. Lymphomatoid papulosis 2. Primary cutaneous anaplastic large-cell lymphoma 3. Primary cutaneous CD30-positive large T-cell lymphoma	Low grade
C88.0	Waldenström macroglobulinaemia 1. Lymphoplasmacytic lymphoma with IgM-production 2. Macroglobulinaemia (primary)(idiopathic) Excl.: 1. Small cell B-cell lymphoma (C83.0)	Low grade

ICD-10 code	Description	Grade (high/low)
C88.2	Other heavy chain disease 1. Franklin disease 2. Gamma heavy chain disease 3. Mu (μ) heavy chain disease	Outside scope of NNHLA
C88.3	Immunoproliferative small intestinal disease 1. Alpha heavy chain disease 2. Mediterranean lymphoma	Outside scope of NNHLA
C88.4	Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue [MALT-lymphoma] Note: Use additional code (C83.3) if desired, to specify transition to high malignant (diffuse large cell) lymphoma 1. Lymphoma of skin-associated lymphoid tissue (SALT-lymphoma) 2. Lymphoma of bronchial-associated lymphoid tissue (BALT-lymphoma)	Low grade
C88.7	Other malignant immunoproliferative diseases	Outside scope of NNHLA
C88.9	Malignant immunoproliferative disease, unspecified 1. Immunoproliferative disease NOS	Outside scope of NNHLA
C91.1	Chronic lymphocytic leukaemia of B-cell type 1. Lymphoplasmacytic leukaemia 2. Richter syndrome Excl.: 1. lymphoplasmacytic lymphoma (C83.0)	Low grade