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MANATŪ HAUORA

New Zealand Government

Proposed Lung Cancer Quality Performance Indicators: Draft Descriptions for Review

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Contents

1 Introduction **4**

Background 5

National data for indicators 6

Stratifying variables 6

Glossary of terms 7

2 Lung cancer quality performance indicators **11**

LCQI 1. Route to diagnosis 13

LCQI 2. Stage at diagnosis 14

LCQI 3. Histopathological diagnosis 16

LCQI 4. Timeliness of key diagnostics 17

LCQI 5. Positron emission tomography–computed tomography (PET-CT) 19

LCQI 6. Molecular testing 20

LCQI 7. Multidisciplinary discussion 22

LCQI 8. Clinical Nurse Specialist 24

LCQI 9. Psychosocial support 25

LCQI 10. Surgical resection for lung cancer 27

LCQI 11. Systemic anti-cancer therapy for lung cancer 28

LCQI 12. Radiotherapy 31

LCQI 13. Stereotactic ablative radiotherapy (SABR) 33

LCQI 14. Chemoradiation for lung cancer 34

LCQI 15. Treatment survival 36

LCQI 16. Overall survival 38

LCQI 17. Follow up 40

LCQI 18. Palliative Care 42

LCQI 19. Aggressiveness of care at the end-of-life 44

Appendix 1: Working group members **46**

1 Introduction

Tēnā koutou katoa

We are seeking your clinical review of proposed quality performance indicators for lung cancer.

The Ministry and the National Lung Cancer Working Group (the Working Group) have worked together to develop a set of proposed quality performance indicators (QPIs) for lung cancer.

The proposed indicators have been selected to measure performance and drive quality improvement in lung cancer diagnosis and treatment services. The Working Group has identified a set of 19 QPIs that measure the quality of care and outcomes for people with lung cancer in New Zealand and support continuous quality improvement in lung cancer care.

Data will be collected on a national basis from existing Ministry National Collections.

What feedback are we seeking?
We are providing an opportunity for all clinicians involved in lung cancer services to provide feedback on this set of 19 lung cancer QPIs. In particular, we would like to know;

- if you think these QPIs are useful measures that can drive quality improvement for services provided to people diagnosed and treated for lung cancer in New Zealand
- if you have any feedback on the QPI descriptions and/or data descriptions.

Who are we seeking feedback from?
Primarily we are seeking feedback from clinicians who provide diagnosis and treatment services for people with lung cancer in New Zealand. Other DHB staff may also wish to comment on the indicators.

We expect clinicians will assess the indicators in areas that relate to their specialist knowledge. A clinician may review as many indicators as they wish.

How can you provide your feedback?
You can provide feedback via the Ministry of Health consultation hub using the following link:
https://consult.health.govt.nz/cancer-services/lung-cancer-qpis/

You can also send your feedback, comments and any queries about the indicator development process to **joyce.brown@health.govt.nz**

When do we need feedback by?
Please complete your review of the indicators and submit any other feedback by **Monday 22 July 2019**

Background

What is the lung cancer quality performance indicator project about?
High quality cancer care in New Zealand requires a nationally consistent, coordinated approach that advances equity and is structured to enable DHBs to deliver quality improvement.

Addressing variation in the quality of cancer services is pivotal to delivering quality improvements. This is best achieved if there is consensus and clear indicators for what good cancer care looks like. Developing QPIs to quantitatively measure processes and outcomes is an internationally accepted approach to driving quality improvement in cancer care.

National tumour specific QPIs are being developed by the Ministry in partnership with sector led working groups.

Key principles of the process are clinical engagement, consultation and consensus.
QPIs selected are:

- evidence-based (ie, supported by sound, current evidence that the indicator can drive quality improvement)
- important (ie, address an area of clinical importance that could significantly impact on the quality and outcome of care delivered)
- supportive of the goals of achieving Māori health gain, equity and national consistency
- measurable with an end view to collecting data nationally.

The first set of QPIs have been developed for the diagnosis and treatment of bowel cancer and the Bowel Cancer Quality Improvement Report was published in March 2019.
https://www.health.govt.nz/publication/bowel-cancer-quality-improvement-report-2019

How did we come up with these indicators?
The development process for lung cancer QPIs is aligned with that used to develop an agreed set of QPIs for the diagnosis and treatment of bowel cancer.

A 'long list' of 40 lung cancer was produced by the Working Group based on international/national searches of grey and academic literature as well as previous indicator work undertaken in 2014. The Working Group reviewed the 40 lung cancer indicators at their meeting in October 2018 and considered which indicators are most valuable to drive quality improvements for lung cancer care in New Zealand. A 'short list' of 23 indicators were identified and carried forward for further discussion by sub-work groups and initial assessment of measurability of data items required.

After consultation and further work by the sub work groups, the short list was presented and endorsed by the Working Group meeting in March 2019.

Further refinement of the QPI descriptions has resulted in a set of 19 proposed QPIs for wider clinical consultation and feedback. These QPIs include nine lung cancer specific QPIs, five 'common' QPIs identified by the National Bowel Cancer Working Group and a further five QPIs identified by the Working Group as being both important and potentially relevant to other tumour streams.

What will happen next?
Your feedback will be presented and considered at the next Working Group meeting on 2 August 2019. Feedback will be incorporated into an agreed final set of QPIs to develop further. The next phase of the

project is to assess the data and develop data specifications for extracting data. We will also develop the reporting requirements for each indicator.

National data for indicators

Data requirements have been considered for each indicator and assessed as to whether the data is available in existing national data collections. If the data is currently available, it will be used to further develop and report the indicators. National data improvement projects are underway to collect clinical stage and clinically diagnosed cancers and to develop structured pathology reporting. This data will enable ongoing development of the proposed QPIs described in this document.

QPIs that are either currently available, or will be become available on the completion of these projects, are noted in the document as being "measurable". QPIs identified as important but not currently feasible to collect nationally are designated as "aspirational". The Ministry will work with their clinical advisory groups and other groups within the Ministry and service provider organisations (eg, DHBs) to develop technical solutions.

This document refers to the following national data sources.

- **Mortality Collection** – classifies the underlying cause of death for all deaths registered in New Zealand
- **New Zealand Cancer Registry (NZCR)** – a population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous and basal cell skin cancers
- **National Minimum Dataset (NMDS)** – a collection of public and private hospital discharge information, including coded clinical data for inpatients and day patients
- **National Non-Admitted Patients Collection (NNPAC)** – includes event-based purchase units that relate to medical and surgical outpatient events and emergency department events
- **Pharmaceutical Collection (PHARMS)** – a data warehouse that supports the management of pharmaceutical subsidies, and contains claim and payment information from pharmacists for subsidised dispensings
- **Radiation Oncology Collection (ROC)** – a collection of radiation oncology treatment data, including both public and private providers.

More information on these data sources can be found on the Ministry of Health's website: **www.health.govt.nz**.

Stratifying variables

In addition to DHB and regional cancer network, the indicators will be stratified by the following variables where possible:

- age
- sex
- ethnicity (Māori, Pacific, Asian, European/Other)
- social deprivation
- rurality
- public/private provider.

Glossary of terms

Term	Description
Adenocarcinoma	Cancer that begins in cells that line certain internal organs and that have gland-like (secretory) properties.
Biopsy	Removal of tissue to be looked at under a microscope to help in the diagnosis of a disease.
Carcinoma	The medical term for cancer.
Chemoradiotherapy	Treatment that combines chemotherapy with radiotherapy.
Chemotherapy	Treatment aimed at destroying cancer cells using anti-cancer drugs, which are also called cytotoxic drugs.
Clinical trials	A type of research study that tests how well new medical approaches or medicines work. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease.
Common indicator	Indicator of quality of diagnosis and treatment (ie, service provision) applied to more than one tumour group.
Computerised tomography (CT)	An X-ray imaging technique, which allows detailed investigation of the internal organ of the body.
Curative intent	Treatment which is given with the aim of curing the cancer.
Diagnosis	The process of identifying a disease, such as cancer, from its signs and symptoms.
District health board (DHB)	An organisation responsible for ensuring publicly funded health and disability services are provided to people living in a geographical area.
Emergency surgery	Unscheduled surgery performed promptly and often for lifesaving purposes.
Epidermal growth factor receptor (EGFR)	The protein found on the surface of cells and to which epidermal growth factor binds, causing the cells to divide. It is found at abnormally high levels on the surface of cancer cells.
Extensive stage disease	Cancer that has spread beyond the initial site of development and is not usually possible to cure by local measures alone.
Grade of cancer	A description of a tumour based on how abnormal the cancer cells and tissue look under a microscope and how quickly the cancer cells are likely to grow and spread.
Histology	The study of tissues and cells under a microscope.
Histological/histopathological	The study of the structure, composition and function of tissues under the microscope, and their abnormalities.
Inoperable	Describes a condition too extensive to be treated by surgery.

Term	Description
Limited stage SCLC	A staging classification for small cell lung cancer developed by the Veterans' Administration Lung Study Group. Using the 7th edition of the TNM staging system this broadly includes T1-4, N1-3, M0 disease.
Lobectomy	A surgical procedure that is used to take out a segment of the lung (called a lobe).
Lung cancer	There are two types of primary lung cancer: Small Cell Lung Cancer (SCLC) and Non-small Cell Lung Cancer (NSCLC) which behave and respond to treatment differently.
Lung carcinogenesis	A complex, stepwise process that involves the acquisition of genetic mutations and epigenetic changes that alter cellular processes, such as proliferation, differentiation, invasion, and metastasis.
Lymph nodes	Small oval shaped structures found in clusters throughout the lymphatic system. They form part of the immune system and are also known as lymph glands.
Malignancy	Cancerous. Malignant cells can invade and destroy nearby tissue and spread to other parts of the body.
Mediastinal malignancy	Cancerous growths that form in the area of the chest that separates the lungs. This area, called the mediastinum, is surrounded by the breastbone in front, the spine in back, and the lungs on each side. The mediastinum contains the heart, aorta, oesophagus, thymus and trachea.
Metastasis	The spread of cancer from the primary site (place where it started) to other places in the body via the blood stream or the lymphatic system.
Morbidity	How much ill health a particular condition causes.
Mortality	Either (1) the condition of being subject to death; or (2) the death rate, which reflects the number of deaths per unit of population in any specific region, age group, disease or other classification, usually expressed as deaths per 1000, 10,000 or 100,000.
Multidisciplinary	A treatment planning approach or team that includes a number of doctors and other health care professionals who are experts in different specialties (disciplines).
Non-small cell lung cancer (NSCLC)	The most common type of lung cancer representing between 70-80% of cases. There are three types of NSCLC: Squamous Cell Carcinoma, Adenocarcinoma and Large Cell Carcinoma.
Palliative care	Care given to improve the quality of life of patients who have a serious or life-threatening disease.
Palliative treatment	Anything which serves to alleviate symptoms due to the underlying cancer, but is not expected to cure it.

Term	Description
Pathological stage	The stage of cancer (amount or spread of cancer in the body) that is based on how different from normal the cells in samples of tissue look under a microscope.
Performance status	a measure of how well a patient is able to perform ordinary tasks and carry out daily activities eg, WHO score of 0=asymptomatic, 4=bedridden, Eastern Cooperative Oncology Group (ECOG) score of 0 = fully active, 5 = dead
Platinum-based chemotherapy	Chemotherapy drugs that contain derivatives of the metal platinum.
Pneumonectomy	An operation to remove an entire lung.
Positron emission tomography / computed tomography (PET CT)	A specialised imaging technique which demonstrates uptake of tracer in areas of high cell metabolism and can help differentiate between benign and malignant masses. It is most frequently used to help stage lung cancer by demonstrating or excluding distant metastases.
Primary tumour	Original site of the cancer. The mass of tumour cells at the original site of abnormal tissue growth.
Prognosis	An assessment of the expected future course and outcome of treatment.
Radical treatment	Treatment which is given with the aim of destroying cancer cells to attain cure.
Radiotherapy	Treatment using high energy X-rays to destroy cancer cells.
Recurrence	When new cancer cells are detected, at the site of original tumour or elsewhere in the body, following treatment.
Small cell lung cancer (SCLC)	A type of lung cancer in which the cells are small and round. SCLC is often fast growing and can spread quickly.
Stage	Staging is a way of describing the size of a cancer and how far it has grown. Staging is important because it helps decide which treatments are required.
Stratification	Data stratification is the separation of data into smaller, more defined groups based on a predetermined set of criteria.
Surgical margin	How close the cancer cells are to the edges of the whole area of tissue removed during surgery.
Surgical resection	Surgery to remove tissue or part or all of an organ.
Systemic anti-cancer therapy (SACT)	Treatment of cancer using drugs which induce a reduction in tumour cell population, for example cancer chemotherapy or hormone therapy.
Thoracoscopy	Thoracoscopy is the insertion of an endoscope, a narrow diameter tube with a viewing mirror or camera attachment, through a very small incision (cut) in the chest wall.
Tissue	A group or layer of cells that work together to perform a specific function.

Term	Description
Tumour	An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumours may be benign (not cancer), or malignant (cancer).
TNM group stage	It is often useful to combine TNM system categories into groups. Tumours localised to the organ of origin are generally staged as I or II depending on the extent, locally extensive spread, to regional nodes are staged as III, and those with distant metastasis staged as stage IV. While most Stage I tumours are curable; most Stage IV tumours are inoperable. Within each stage group the categories are more or less the same in respect of survival, and the survival rates are distinctive between groups.
TNM system	The TNM system is a global standard used to record the anatomical extent of disease. In the TNM system, each cancer is assigned a letter or number to describe the tumour, node, and metastases. T stands for the original (primary) tumour. N stands for nodes (indicates whether the cancer has spread to the nearby lymph nodes). M stands for metastasis.
Toxicity	The extent to which something is poisonous or harmful.

2 Lung cancer quality performance indicators

The table below lists each indicator, with a hyperlink to the detailed descriptions for each indicator on the following pages.

ID	Indicator title	Indicator description	Measurable nationally
1	**Route to diagnosis**	Proportion of people with lung cancer who are diagnosed following presentation to an emergency department, by stage	Yes (without stage)
2	**Stage at diagnosis**	Lung cancer registrations, by stage	No
3	**Histopathological diagnosis**	Proportion of people who have a histopathological diagnosis of lung cancer	Yes
4	**Timeliness of key diagnostics**	i) Proportion of people with lung cancer who have a positron emission tomography–computed tomography (PET-CT) scan within seven calendar days of receipt of referral ii) Proportion of people with lung cancer who have a bronchoscopy/ endobronchial ultrasound (EBUS) within seven calendar days of receipt of referral iii) Proportion of people with lung cancer who have a computed tomography (CT)-guided biopsy within seven calendar days of receipt of referral	No
5	**PET-CT**	Proportion of people with lung cancer who have a positron emission tomography–computed tomography (PET-CT) scan prior to treatment with curative intent	No
6	**Molecular testing**	Proportion of people with lung cancer who receive tests for molecular subtyping for which treatments are available in public system in New Zealand	No
7	**Multidisciplinary discussion**	Proportion of people with lung cancer registered or discussed at a multidisciplinary meeting (MDM)	No
8	**Clinical nurse specialist**	Proportion of people with lung cancer who have a documented contact with CNS/coordinator	No
9	**Psychosocial support**	i) Proportion of people with lung cancer who receive an assessment for psychosocial support needs ii) Proportion of people with lung cancer assessed as in need of psychosocial support who are referred to psychosocial support service	No
10	**Surgical resection for lung cancer**	Proportion of people with **non-small cell lung cancer** receiving surgical resection with curative intent, by stage and ECOG performance status	Yes (without stage, ECOG)
11	**Systemic anti-cancer therapy for lung cancer**	Proportion of people with lung cancer receiving systemic anti-cancer therapy, by stage and ECOG performance status (i) Proportion of people with **non-small cell lung cancer** receiving systemic anti-cancer therapy, by stage and ECOG performance status	Yes (without stage, ECOG)

ID	Indicator title	Indicator description	Measurable nationally
		(ii) Proportion of people with **small cell lung cancer** receiving systemic anti-cancer therapy, by stage and ECOG performance status	
12	**Radiotherapy**	Proportion of people with lung cancer receiving radiotherapy, by stage, ECOG performance status, intent and type of lung cancer (NSCLC/SCLC)	Yes (without stage, ECOG)
13	**Stereotactic ablative radiotherapy (SABR)**	Proportion of people with lung cancer receiving stereotactic ablative radiotherapy (SABR), by stage, ECOG performance status, intent and type of lung cancer (NSCLC/SCLC)	Yes (without stage, ECOG)
14	**Chemoradiation for lung cancer**	Proportion of people with lung cancer receiving chemoradiation, by stage and ECOG performance status (i) Proportion of people with **non-small cell lung cancer** receiving chemoradiation, by stage and ECOG performance status (ii) Proportion of people with **small cell lung cancer** receiving chemoradiation, by stage and ECOG performance status	Yes (without stage, ECOG)
15	**Treatment survival**	Proportion of people with lung cancer who died within 30 or 90 days of treatment with curative intent (surgery, systemic anti-cancer therapy, radiotherapy), by type (NSCLC/SCLC) and stage	Yes (without stage)
16	**Overall survival**	Overall survival for people with lung cancer at 1, 2, 3 and 5 years from diagnosis, by type (NSCLC/SCLC) and stage	Yes (without stage)
17	**Follow-up**	i) Proportion of people with lung cancer who have a follow up appointment after completion of treatment ii) Proportion of people with lung cancer and their general practitioners who are provided with a written follow up plan after completion of first treatment cycle	Part (i only)
18	**Palliative care**	i) Proportion of people with stage IV non-small cell lung cancer referred to palliative care within 30 days of diagnosis ii) Proportion of people dying from lung cancer whose care is aligned with Te Ara Whakapiri principles iii) Number of days out of hospital within the 90 days prior to date of death for people with lung cancer	Part (iii only)
19	**Aggressiveness of care at the end-of-life**	Proportion of people with lung cancer who receive systemic anti-cancer therapy within 30 days of death	Yes

LCQI 1. Route to diagnosis

Measurability		Measurable: ✓	Aspirational:
Indicator description		Proportion of people with lung cancer who are diagnosed following presentation to an emergency department, by stage.	
Rationale and evidence		1. Although guidelines for the referral of people with suspected lung cancer commonly assume that patients are referred from a general practitioner (GP) to a respiratory specialist, research indicated that 37% of all (565) cases with lung cancer diagnosed in 2004 in the Auckland-Northland region initially presented to secondary care through an emergency department (ED), whilst only 28% were referred from a GP to a respiratory specialist [1]. 2. People presenting via the emergency department more often had advanced, incurable disease [1]. 3. After adjusting for age, gender, ethnicity, social deprivation, co-morbidity, tumour type and tumour stage in multivariate analysis, patients who presented via ED were significantly less likely than people presenting via other routes to receive any anticancer treatment. Cases that presented via ED also had significantly reduced survival (median 205 days; IQR 160, 249) compared with cases that entered secondary care via other routes (median 473 days; IQR 421, 526) [1].	
Equity/Māori health gain		Māori were more likely to present with locally advanced rather than localised disease compared with Europeans[2].	
Specifications	**Numerator**	Number of people with lung cancer whose diagnosis followed an emergency presentation.	
	Denominator	All people with lung cancer.	
	Exclusions	Number of people diagnosed with lung cancer at death.	
Data sources		NZ Cancer Registry, National Minimum Dataset, National Non-Admitted Patient Collection.	
Notes		People with lung cancer will be identified from the NZ Cancer Registry. An emergency presentation can be self-presentation to an emergency department, an emergency GP referral, an emergency transfer, or an emergency (acute) admission to hospital. The emergency presentation will be the initial presentation to secondary care for a lung cancer diagnosis. Explore possibility of separating out from national data, people who present to ED and go on to have an incidental finding of lung cancer.	

References

1. Beatty, S., Stevens, W., Stevens, G., et al. (2009). Lung cancer patients in New Zealand initially present to secondary care through the emergency department rather than by referral to a respiratory specialist. The New Zealand Medical Journal (Online), 122(1294).
2. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244

LCQI 2. Stage at diagnosis

Measurability		Measurable:	Aspirational: ✓
Indicator description		Lung cancer registrations, by stage.	
Rationale and evidence		1. TNM stage, performance status, and weight loss are independent prognostic factors in people with non-small cell lung cancer, and should be documented at diagnosis in all people[1]. 2. In non-metastatic NSCLC, detailed loco regional staging according to the 8th TNM staging system and the cardiopulmonary fitness determine the choice of treatment[2]. 3. The staging process is an essential step of the clinical pathway, as further treatment (or no treatment) decisions are based on this information[3].	
Equity/Māori health gain		Māori more commonly present with locally advanced rather than localised disease compared with Europeans. Intrastage variation was also apparent; of those with stage I/II NSCLC Māori more commonly had stage IIB disease than did Europeans[4]. The histologic subtype of NSCLC varied, with adenocarcinoma being the most common subtype in European and Pacific cases, and squamous carcinoma being the most common in Māori and Asians[4]. Among cancers registered during 1996-2001, Māori were significantly less likely than non-Māori to have stage recorded for cancers of the trachea, bronchus and lung, breast, colon, rectum and anus, stomach, cervix, uterus, testis, brain and oesophagus[5].	
Specifications	**Numerator**	Number of people diagnosed with lung cancer by TMN group stage.	
	Denominator	Number of people diagnosed with lung cancer.	
	Exclusions	People that were registered on the basis of a death certificate only.	
Data sources		NZ Cancer Registry	
Notes		People with lung cancer will be identified from the NZ Cancer Registry. Extent of disease is recorded for lung cancer cases on the NZ Cancer Registry. TMN group stage is not consistently reported to the Registry and only individual T, N and M values can be recorded at present.	

References

1. Stirling, R. G., Evans, S. M., McLaughlin, P., et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.
2. Postmus, P. E., Kerr, K. M., Oudkerk, M., et al. (2017). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology, 28(suppl_4), iv1-iv21.
3. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**

4. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.
5. Cormack, D., Robson, B., Purdie, G., et al. (2008). Access to cancer services for Māori: A Report prepared for the Ministry of Health, Wellington School of Medicine and Health Sciences, 2005. Online]. Available: **https://www.health.govt.nz/system/files/documents/publications/Māoricancerserviceaccess.pdf**

LCQI 3. Histopathological diagnosis

Measurability		Measurable: ✓	Aspirational:
Indicator description		Proportion of people who have a histopathological diagnosis of lung cancer.	
Rationale and evidence		1. A definitive diagnosis is valuable in helping inform people with lung cancer and carers about the nature of the disease, the likely prognosis and treatment choice[1]. Appropriate treatment of lung cancer depends on accurate diagnosis and distinction between histological types of lung cancer[2,3]. 2. The last decade has seen significant advances in our understanding of lung cancer biology and management. Identification of key driver events in lung carcinogenesis has contributed to the development of targeted lung cancer therapies, resulting in personalised medicine for lung cancer. As a result, histological subtyping and molecular testing has become of paramount importance, placing increasing demands on often small diagnostic specimens[4].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with histopathological confirmation of the diagnosis of lung cancer	
	Denominator	All people diagnosed with lung cancer	
	Exclusions	None	
Data sources		NZ Cancer Registry	
Notes		People will lung cancer will be identified by the diagnosis field from the NZ Cancer Registry	

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1
2. NHS Quality Improvement Scotland (2008). Management of Lung Cancer Services [online]. Available from: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=b3c9ed90-ad73-4ddf-b46c-c37da71deab4&version=-1
3. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf
4. Davidson, M. R., Gazdar, A. F., & Clarke, B. E. (2013). The pivotal role of pathology in the management of lung cancer. Journal of thoracic disease, 5(Suppl 5), S463.

LCQI 4. Timeliness of key diagnostics

Measurability		Measurable:	Aspirational: ✓
Indicator description		i) Proportion of people with lung cancer who have a positron emission tomography–computed tomography (PET-CT) scan within seven calendar days of receipt of referral. ii) Proportion of people with lung cancer who have an endobronchial ultrasound (EBUS - linear or radial) within seven calendar days of receipt of referral. iii) Proportion of people with lung cancer who have a computed tomography (CT)-guided biopsy within seven calendar days of receipt of referral.	
Rationale and evidence		1. Accurate staging is important to ensure appropriate treatment is delivered to people with lung cancer[1]. 2. NICE guidelines recommend every regional cancer service should have a) a system of rapid access to PET-CT scanning for eligible people and b) at least one centre with EBUS and/or endoscopic ultrasound (EUS) to ensure timely access [2]. 3. NICE guidelines recommend that key diagnostic services are offered to people with lung cancer in the following situations. a) Offer PET-CT as the preferred first test after CT with a low probability of nodal malignancy (lymph nodes below 10 mm maximum short axis on CT), for people with lung cancer who could potentially have treatment with curative intent[2]. b) Offer endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) for biopsy of paratracheal and peri-bronchial intra-parenchymal lung lesions[2]. c) Offer image-guided biopsy to people with peripheral lung lesions when treatment can be planned on the basis of this test[2]. 4. National Optimal Lung Cancer Pathway recommends that PET-CT be done in 5 days[3]. 5. Delays in patient flow through lung imaging and longer wait times may result in an overall increase in tumour size and stage[4]. 6. All diagnostic images should be available to the multidisciplinary team to allow the evaluation of growth rate/malignant potential of a tumour[5].	
Equity/Māori health gain		No statistically significant difference existed between ethnic groups with respect to diagnostic or staging investigations in the study of 565 patients diagnosed with lung cancer in 2004 in Northland and Auckland[6].	
Specifications	**(i) Numerator**	Number of people with lung cancer who have a PET-CT scan within seven calendar days of receipt of referral	
	Denominator	All people with lung cancer who have a PET-CT scan	
	Exclusions	None	

	(ii) Numerator	Number of people with lung cancer who have an EBUS procedure within seven calendar days of receipt of referral
	Denominator	All people with lung cancer who have an EBUS procedure
	Exclusions	None
	(iii) Numerator	Number of people with lung cancer who have a CT-guided biopsy within seven calendar days of receipt of referral
	Denominator	All people with lung cancer who have a CT-guided biopsy
	Exclusions	None
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), Radiation Oncology Collection (ROC)
Notes		Seven day time frame from referral is taken from the current lung standards for EBUS and CT-guided biopsy. The seven day time frame refers to the time from referral to when the diagnostic procedure is carried out and the biopsy is taken, but does not include time for the pathological reporting of the specimen. People with lung cancer will be identified from the NZ Cancer Registry

References

1. NHS Scotland (2017). Lung Cancer Clinical Quality Performance Indicators [Online]. Available: **http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1**
2. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**
3. Lung clinical expert group (2017). National Optimal Lung Cancer Pathway [Online]. Available: **https://www.cancerresearchuk.org/sites/default/files/national_optimal_lung_pathway_aug_2017.pdf**
4. Byrne, S. C., Barrett, B., & Bhatia, R. (2015). The impact of diagnostic imaging wait times on the prognosis of lung cancer. Canadian Association of Radiologists Journal, 66(1), 53-57.
5. Lim, E., Baldwin, D., Beckles, M., et al. (2010). Guidelines on the radical management of patients with lung cancer. Thorax, 65(Suppl 3), iii1-iii27.
6. Sevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.

LCQI 5. Positron emission tomography–computed tomography (PET-CT)

Measurability		Measurable:	Aspirational: ✓
Indicator description		Proportion of people with lung cancer who have a positron emission tomography–computed tomography (PET-CT) scan prior to treatment with curative intent	
Rationale and evidence		1. All people being considered for radical treatment with curative intent should have a PET-CT scan completed and reported before treatment[1]. 2. Offer PET-CT to all people potentially suitable for treatment with curative intent in order to look for metastases[2]. 3. PET has been found to be more accurate than CT in mediastinal nodal staging for non-small cell lung cancer. A negative PET is highly specific, but positive PET nodes are not always malignant and histological confirmation may be required before advancing to definitive management. PET is more accurate in overall M staging than conventional staging methods[3].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with lung cancer in whom a PET-CT was obtained before the start of their first treatment with curative intent	
	Denominator	All people with a lung cancer diagnosis, who receive treatment with curative intent	
	Exclusions	None	
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), Radiation Oncology Collection (ROC)	
Notes		Important to assess variability across the country in having access to PET-CT. Timeliness aspect is considered in a separate indicator. Belgian indicator has a time frame of 3 months from PET-CT to first treatment. People will lung cancer will be identified from the NZ Cancer Registry	

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1
2. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
3. Stirling, R. G., Evans, S. M., McLaughlin, P., et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.

LCQI 6. Molecular testing

Measurability		Measurable:	Aspirational: ✓
Indicator description		Proportion of people with lung cancer who receive tests for molecular subtyping for which treatments are available in public system in New Zealand.	
Rationale and evidence		1. As response to epidermal growth factor receptor (EGFR) targeted therapy depends on the presence of activating EGFR mutations, tests for these mutations should be offered to people with non-squamous NSCLC or never/light smokers with mixed squamous/non-squamous cell carcinoma, potentially eligible for EGFR targeted therapy[1]. 2. EGFR mutations and anaplastic lymphoma kinase (ALK) translocation are the most effectively targeted oncogenes in NSCLC. EGFR mutations and ALK gene rearrangements are successfully being targeted with specific tyrosine kinase inhibitors[2]. 3. For non-squamous NSCLC, which accounts for more than half of all lung cancer cases, routine testing for EGFR mutations and ALK rearrangements is recommended. In cases with identified EGFR (approximately 15% of NSCLC) or ALK alterations (approximately 5% of NSCLC), molecularly targeted therapy with EGFR- or ALK-targeting drugs is now the preferred initial approach to treatment[3]. 4. EGFR-TKI treatment was associated with improved outcomes in mutation-positive compared to untested patients[4]. 5. Analyses based on a population-based cohort of 2701 patients diagnosed with non-squamous NSCLC in northern New Zealand between January 2010 and December 2015, showed that only 39.2% of patients were tested, of whom 21.6% were mutation positive[5].	
Equity/Māori health gain		EGFR mutation testing uptake was consistently low in Māori patients over the study period of 2010 to 2015[5].	
Specifications	**Numerator**	Number of people with non-squamous cell NSCLC in whom mutation analysis was performed	
	Denominator	All people with non-squamous cell NSCLC	
	Exclusions	None	
Data sources		NZ Cancer Registry, Laboratory data	
Notes		People will non-squamous cell NSCLC lung cancer will be identified from the NZ Cancer Registry The Belgian indicator numerator uses a nine month time frame from diagnosis. Ensuring sufficient tumour tissue is reserved from existing samples to allow molecular testing is important.	

References

1. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
2. Rothschild, S. (2015). Targeted therapies in non-small cell lung cancer—beyond EGFR and ALK. Cancers, 7(2), 930-949.

3. Gerber, D. E., Oxnard, G. R., & Govindan, R. (2015). ALCHEMIST: Bringing genomic discovery and targeted therapies to early-stage lung cancer. Clinical Pharmacology & Therapeutics, 97(5), 447-450.
4. McKeage, M., Elwood, M., Tin, S. T., et al. (2017). EGFR Mutation Testing of non-squamous NSCLC: Impact and Uptake during Implementation of Testing Guidelines in a Population-Based Registry Cohort from Northern New Zealand. Targeted oncology, 12(5), 663-675.
5. Tin, S. T., McKeage, M. J., Khwaounjoo, P., et al. (2018). Incomplete uptake of EGFR mutation testing and its impact on estimation of mutation prevalence in patients with non-squamous NSCLC: A population-based study in New Zealand. Cancer epidemiology, 57, 24-32.

LCQI 7. Multidisciplinary discussion

Measurability		Measurable:	Aspirational: ✓
Indicator description		Proportion of people with lung cancer registered or discussed at a multidisciplinary meeting (MDM).	
Rationale and evidence		1. International evidence shows that multidisciplinary care is a key aspect to providing best-practice treatment and care for people with cancer. Multidisciplinary care involves a team approach to treatment planning and care provision along the complete patient cancer pathway. 2. Cancer MDMs are part of the philosophy of multidisciplinary care. Effective MDMs result in positive outcomes for people receiving the care, for health professionals involved in providing the care and for health services overall. Benefits include improved treatment planning, improved equity of patient outcomes, more people being offered the opportunity to enter into relevant clinical trials, improved continuity of care and less service duplication, improved coordination of services, improved communication between care providers and more efficient use of time and resources. 3. Higher active treatment rates have been observed in cases discussed at MDMs in Australia. Discussion at an MDM was an independent factor determining receipt of any specific anticancer treatment, as well as potentially curative therapy. Although this positive association could be attributable to selection bias, discussion of all cases at an MDM may result in higher treatment rates and, hence, improve overall outcomes. 4. Evidence suggests that people with cancer managed by a multidisciplinary team have a better outcome. There is also evidence that the multidisciplinary management of people increases their overall satisfaction with their care[1]. 5. The care of all people with a working diagnosis of lung cancer should be discussed at a lung cancer MDT meeting[2]. 6. An experienced multidisciplinary team is of paramount importance in any complex multimodality treatment strategy decision, including the role of surgery[3].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with lung cancer registered or discussed at MDM	
	Denominator	All people diagnosed with lung cancer	
	Exclusions	None	
Data sources		NZ Cancer Registry, MDM databases, National Patient Flow (NPF)	

Notes	People with lung cancer will be identified from the NZ Cancer Registry. This indicator will initially measure the number of people who were discussed at an MDM. Over time more criteria will be added i.e. person with lung cancer discussed at an MDM prior to treatment.

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: **http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1**
2. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**
3. Postmus, P. E., Kerr, K. M., Oudkerk, M., et al. (2017). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology, 28(suppl_4), iv1-iv21.

LCQI 8. Clinical Nurse Specialist

Measurability		Measurable:	Aspirational: ✓
Indicator description		Proportion of people with lung cancer who have a documented contact with CNS/coordinator.	
Rationale and evidence		1. Care coordination refers to a system or a role primarily intended to expedite patient access to services and resources, improve communication and the transfer of information between services, address people's informational needs and improve continuity and coordination of care throughout the cancer continuum. Services need to ensure they have strategies in place that improve the coordination of care[1]. 2. Ensure that a lung cancer clinical nurse specialist is available at all stages of care to support people and carers[2]. 3. DHBs with a care coordinator reported favourable results from patient and staff feedback and judged the position as a success. People and their whanau/family were better informed about the clinical pathway, felt better supported and were more able to participate in decision-making[3].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with lung cancer who have a documented contact with CNS or lung cancer coordinator	
	Denominator	All people with lung cancer	
	Exclusions	None	
Data sources		NZ Cancer Registry, National non-admitted patient collection (NNPAC), National Patient Flow (NPF)	
Notes		People with lung cancer will be identified from the NZ Cancer Registry. This indicator may be developed as a Standard of Care.	

References

1. National Lung Cancer Working Group (2016) Standards of Service Provision for Lung Cancer Patients in New Zealand (2nd edn). Wellington: Ministry of Health
2. NICE (2012) NICE Guidance on Lung cancer in adults [Online]. Available: **https://www.nice.org.uk/guidance/qs17**
3. Northern Cancer Network (2010) National Stocktake of Innovative Services for People with Suspected Lung Cancer [Online]. Available: **http://www.northerncancernetwork.org.nz/LinkClick.aspx?fileticket=6r0PGP5s2gk=&tabid=139&language=en-NZ**

LCQI 9. Psychosocial support

Measurability		Measurable:	Aspirational: ✓
Indicator description		i) Proportion of people with lung cancer who receive an assessment for psychosocial support needs. ii) Proportion of people with lung cancer assessed as in need of psychosocial support who are referred to psychosocial support service.	
Rationale and evidence		1. Around the time of a diagnosis of cancer, approximately half of all people experience levels of anxiety and depression severe enough to adversely affect their quality of life. About one quarter continue to be affected during the following six months. Among those who experience recurrence of disease, the prevalence of anxiety and depression rises to 50% and remains at this level throughout the course of advanced illness. In the year following diagnosis, around one in ten people will experience symptoms severe enough to warrant intervention by specialist psychological/psychiatric services. Such symptoms can also be seen in 10-15% of people with advanced disease[1]. 2. Commissioners and providers of cancer services, , should ensure that all people undergo systematic psychological assessment at key points and have access to appropriate psychological support[1]. 3. Ensure that psychological support and services are available as part of an integrated cancer service[2]. 4. Offer prompt referral for psychological assessment to people affected by cancer who have significant levels of psychological distress to determine the need for treatment and management[2]. 5. The overall number of unmet psychosocial needs in lung cancer people is significantly higher than the other major cancer groups, including breast, bowel, prostate and skin cancer/melanoma. The very large proportion of people (40–50%) reporting high levels of needs clearly identifies psychological assessment and support as priorities for support when lung cancer is diagnosed[3].	
Equity/Māori health gain		Data not available.	
Specifications	**(i) Numerator**	Number of people with lung cancer who receive an assessment for psychosocial support needs	
	Denominator	All people with lung cancer	
	Exclusions	None	
	(ii) Numerator	Number of people with lung cancer who are assessed as being in need of psychosocial support and referred to psychosocial support service	
	Denominator	All people with lung cancer who are assessed as being in need of psychosocial support	
	Exclusions	None	
Data sources		NZ Cancer Registry, National Patient Flow (NPF), specialist/oncology psychosocial support national dataset	

Notes	People with lung cancer will be identified from the NZ Cancer Registry. The psychosocial needs of a patient may change along the patient pathway and may need to be reassessed. The QPI can be for the initial assessment for all people and could be framed around a timeframe from diagnosis. This indicator may be developed as a Standard of Care.

References

1. NICE (2004) Guidance on Cancer Services: Improving supportive and palliative care for adults with cancer – The manual. London: National Institute for Clinical Excellence. [Online]. Available: **https://www.nice.org.uk/guidance/csg4/resources/improving-supportive-and-palliative-care-for-adults-with-cancer-pdf-773375005**
2. Ministry of Health. (2010) Guidance for Improving Supportive Care for Adults with Cancer in New Zealand. Wellington: Ministry of Health [Online]. Available: **https://www.health.govt.nz/system/files/documents/publications/supp-care-guidance-mar2010.pdf**
3. Li, J., & Girgis, A. (2006) Supportive care needs: are patients with lung cancer a neglected population?. Psycho-Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer, 15(6), 509-516.

LCQI 10. Surgical resection for lung cancer

Measurability		Measurable: ✓ (without stage, ECOG)	Aspirational:
Indicator description		i. Proportion of people with **non-small cell lung cancer** receiving surgical resection with curative intent, by stage and ECOG performance status.	
Rationale and evidence		1. Surgical resection is recommended for early stage non-small cell lung cancer, as this gives the best results of any form of treatment[123]. 2. For people with a non-centrally located resectable tumour and absence of nodal metastasis on both CT and PET images, surgical resection is recommended [4].	
Equity/Māori health gain		Māori were four times less likely to receive curative rather than palliative anticancer treatment for non-metastatic disease compared with Europeans, even after controlling for age, gender, NZDep, CCI, tumour type, stage, and the patient declining management[5].	
Specifications	**Numerator**	Number of people with non-small cell lung cancer who receive surgical resection with curative intent	
	Denominator	All people with non-small cell lung cancer	
	Exclusions	None	
Data sources		Cancer Registry, National Minimum Dataset	
Notes		Staging and ECOG performance data is not currently available; excluded from the specifications. People will non-small cell lung cancer will be identified from the NZ Cancer Registry	

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1
2. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
3. Stirling, R. G., Evans, S. M., McLaughlin, P.,et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.
4. Postmus, P. E., Kerr, K. M., Oudkerk, M., et al. (2017). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology, 28(suppl_4), iv1-iv21.
5. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.

LCQI 11. Systemic anti-cancer therapy for lung cancer

Measurability	Measurable: ✓ (without stage, ECOG)	Aspirational:
Indicator description	i. Proportion of people with **non-small cell lung cancer** receiving systemic anti-cancer therapy, by stage and ECOG performance status. ii. Proportion of people with **small cell lung cancer** receiving systemic anti-cancer therapy, by stage and ECOG performance status.	
(i) Rationale and evidence - NSCLC	1. Systemic anti-cancer therapy should be offered to all people with NSCLC and good performance status, to improve survival, disease control and quality of life[1]. 2. Chemotherapy and/or anti-programmed death-1 (anit-PD-1) immunotherapy is appropriate treatment for people with advanced NSCLC who have good performance status (ECOG 0-1) and are otherwise medically fit as it has been shown to improve survival[2]. 3. Immunotherapy alone is an appropriate treatment for people with tumour PD-L1 expression levels of 50% or more[2]. Chemotherapy and immunotherapy may be considered for people with lower PD-L1 expression levels[3,4]. Chemotherapy alone is appropriate for people without access to immunotherapy[5]. 4. People with targetable mutations in EGFR, ALK or ROS-1 (c-ros oncogene 1) and advanced stage lung cancer should be offered tyrosine kinase inhibitors (TKIs) which have been shown to increase progression-free survival[6,7,8].	
(ii) Rationale and evidence - SCLC	1. People with SCLC should receive combination chemotherapy, dependant on fitness levels, as this has a proven survival benefit and provides palliation for symptoms caused by primary or metastatic tumour[1]. 2. Platinum-etoposide regimens are considered the standard systemic anti-cancer chemotherapy in the treatment of small cell lung cancer[9]. 3. In extensive stage disease the addition of immunotherapy to platinum-etoposide chemotherapy should be considered where this is accessible[10].	
Equity/Māori health gain	To be completed for non-small cell lung cancer. Small cell lung cancer has a strong correlation with cigarette smoking. Smoking has been particularly damaging for Māori, who have higher smoking rates and higher rates of death and tobacco-related illness than non-Māori[11].	
Specifications **(i) Numerator**	Number of people with non-small cell lung cancer who receive systemic anti-cancer therapy	

	Denominator	All people with non-small cell lung cancer
	Exclusions	People who receive curative intent surgery for lung cancer
	(ii) Numerator	Number of people with small cell lung cancer who receive plantinum-etoposide based systemic anti-cancer therapy
	Denominator	All people with small cell lung cancer
	Exclusions	None
Data sources		Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS)
Notes		Staging and ECOG performance status data are not currently available, so excluded from the specifications. However, this data should be added once available (as per the indicator description). It should be noted that in the absence of staging and performance status data this indicator has very limited interpretability, and should not be used as the basis for decision making. People with non-small cell lung cancer and small cell lung cancer will be identified from the NZ Cancer Registry. Patients with incurable NSCLC, without a targetable activating mutation (EGFR, ALK, ROS-1), and with good performance status (ECOG 0-1) should be offered platinum-based chemotherapy and / or anti-PD-1 immunotherapy to improve survival, disease control and quality of life. Patients who cannot tolerate platinum-based combination chemotherapy may be considered for single agent chemotherapy with a third generation drug.

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1 (Scotland)
2. Reck, M., Rodríguez-Abreu, D., Robinson, A. G., et al. (2019). Updated Analysis of KEYNOTE-024: Pembrolizumab Versus Platinum-Based Chemotherapy for Advanced Non–Small-Cell Lung Cancer With PD-L1 Tumor Proportion Score of 50% or Greater. Journal of Clinical Oncology, 37(7), 537-546.
3. Gandhi, L., Rodríguez-Abreu, D., Gadgeel, S., et al. (2018). Pembrolizumab plus chemotherapy in metastatic non–small-cell lung cancer. New England journal of medicine, 378(22), 2078-2092.
4. Paz-Ares, L., Luft, A., Vicente, D., et al. (2018). Pembrolizumab plus chemotherapy for squamous non–small-cell lung cancer. New England Journal of Medicine, 379(21), 2040-2051.
5. NSCLC Meta-Analyses Collaborative Group (2008). Chemotherapy in addition to supportive care improves survival in advanced non–small-cell lung cancer: A systematic review and meta-analysis of individual patient data from 16 randomized controlled trials. Journal of Clinical Oncology, 26(28), 4617.
6. Lee, C. K., Davies, L., Wu, Y. L., et al. (2017). Gefitinib or erlotinib vs chemotherapy for EGFR mutation-positive lung cancer: individual patient data meta-analysis of overall survival. JNCI: Journal of the National Cancer Institute, 109(6).
7. Solomon, B J., Mok, T., Kim, DW.,et al. (2014). First-line crizotinib versus chemotherapy in ALK-positive lung cancer. New England Journal of Medicine, 371(23), 2167-2177.
8. Shaw, AT., Ou, SHI., Bang, YJ., et al. (2014). Crizotinib in ROS1-rearranged non–small-cell lung cancer. New England Journal of Medicine, 371(21), 1963-1971.

9. European Lung Cancer Working Party (2000). A systemic review of the role of etoposide and cisplatin in the chemotherapy of small cell lung cancer with methodology assessment and meta-analysis. Lung Cancer, 30 (1), 23-36
10. Horn, L., Mansfield, A S., Szczęsna, A., et al. (2018). First-line atezolizumab plus chemotherapy in extensive-stage small-cell lung cancer. New England Journal of Medicine, 379(23), 2220-2229.
11. Smokefree New Zealand (2019). Facts & figures Information about New Zealand's smoking rates and how they are changing [Online]. Available: **https://www.smokefree.org.nz/smoking-its-effects/facts-figures#bookmark-1**

LCQI 12. Radiotherapy

Measurability		Measurable: ✓ (without stage, ECOG)	Aspirational:
Indicator description		Proportion of people with lung cancer receiving radiotherapy, by stage, ECOG performance status, intent and type of lung cancer (NSCLC/SCLC).	
Rationale and evidence		1. For people with stage I, II or III NSCLC, radical radiotherapy is the recommended treatment option if people are not suitable for surgery[1]. 2. People with stage III NSCLC who are not suitable for surgery should receive chemoradiotherapy, as this has a proven survival benefit. Potential benefit of survival does however have to be balanced with the risk of additional toxicities from this treatment[1]. 3. In people with inoperable stage I NSCLC and good performance status, high dose radiotherapy is an appropriate treatment option[2]. 4. In people with inoperable NSCLC and who have no evidence of distant metastases, radiotherapy is recommended to loco-regional disease because it may be associated with a survival advantage compared with placebo[2]. 5. Radiotherapy is an effective modality for the management of certain symptoms caused by uncontrolled intrathoracic disease, and short courses of radiotherapy are as effective as more fractionated regimens[2]. 6. Fit people with limited stage small cell lung cancer should receive thoracic radiotherapy concurrently with the first cycle of chemotherapy or as soon as possible thereafter[2]. 7. Offer prophylactic cranial irradiation to people with SCLC with response to treatment and stable disease [3]. 8. Consider thoracic radiotherapy with prophylactic cranial irradiation for people with extensive-stage disease SCLC who have had a partial or complete response to chemotherapy within the thorax and at distant sites[4].	
Equity/Māori health gain		Although multivariate analysis did not indicate a statistically significant association between ethnicity and anticancer service referral, there was a significant association between ethnicity and the type of anticancer service referral received. After adjusting for age, gender, NZDep and CCI, tumour type and stage, Māori were less likely to be referred to medical oncology and more likely to be referred to radiation oncology than any of the other ethnic groups[5].	
Specifications	**Numerator**	Number of people with lung cancer who receive radiotherapy	
	Denominator	All people with lung cancer	
	Exclusions	None	
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), Radiation Oncology Collection (ROC)	

Notes	Staging and ECOG performance data is not currently available; excluded from specifications. Treatment intent is available from ROC People with lung cancer will be identified from the NZ Cancer Registry.

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1 (Scotland)
2. Stirling, R. G., Evans, S. M., McLaughlin, P., et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.
3. Lim, E., Baldwin, D., Beckles, M.,et al. (2010). Guidelines on the radical management of patients with lung cancer. Thorax, 65(Suppl 3), iii1-iii27.
4. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**
5. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.

LCQI 13. Stereotactic ablative radiotherapy (SABR)

Measurability		Measurable: ✓ (without stage, ECOG)	Aspirational:
Indicator description		Proportion of people with lung cancer receiving stereotactic ablative radiotherapy, by stage, ECOG performance status, intent and type of lung cancer (NSCLC/SCLC).	
Rationale and evidence		1. SABR is now a recognised treatment option for people with medically inoperable early stage lung cancer. People with stage I lung cancer who are not suitable for surgery should receive SABR as this has a proven survival benefit[1]. 2. SABR for early-stage peripheral lung tumours is associated with low toxicity in people with chronic obstructive pulmonary disease (COPD) and the elderly[2]. 3. For people with stage I–IIA (T1a–T2b, N0, M0) NSCLC who decline surgery or in whom any surgery is contraindicated, offer SABR. If SABR is contra-indicated, offer either conventional or hyperfractionated radiotherapy[3].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with lung cancer who receive SABR	
	Denominator	All people with lung cancer	
	Exclusions	People who receive curative intent surgery for lung cancer	
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Radiation Oncology Collection (ROC)	
Notes		Staging and ECOG performance data is not currently available – so excluded from specifications. People with lung cancer will be identified from the NZ Cancer Registry.	

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1 (Scotland)
2. Postmus, P. E., Kerr, K. M., Oudkerk, M., et al. (2017). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology, 28(suppl_4), iv1-iv21.
3. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**

LCQI 14. Chemoradiation for lung cancer

Measurability	Measurable: ✓ (without stage, ECOG)	Aspirational:
Indicator description	(i) Proportion of people with non-small cell lung cancer receiving chemoradiation, by stage and ECOG performance status. (ii) Proportion of people with small cell lung cancer receiving chemoradiation, by stage and ECOG performance status.	
(i) Rationale and evidence - NSCLC	1. People with stage III NSCLC who are not suitable for surgery should receive chemoradiotherapy, as this has a proven survival benefit[1]. 2. Randomised controlled trials have shown a benefit in progression-free and overall survival with combined chemoradiation compared to radiotherapy alone in fit people, at the cost of increased, but manageable, toxicity (stage III NSCLC)[2]. 3. The combination of cisplatin-based chemotherapy and radical radiotherapy in people with good performance status is associated with a small but significant survival advantage compared with radiotherapy alone in NSCLC[3]. 4. Concurrent chemoradiotherapy is the treatment of choice in people evaluated as unresectable in stage IIIA and IIIB [I, A][4]. 5. People who complete radical chemoradiotherapy and who have not progressed should be considered for 12 months of immunotherapy, where this is accessible, as this has a proven progression-free and overall survival benefit[5].	
(ii) Rationale and evidence - SCLC	1. People with limited stage disease SCLC should receive concurrent chemoradiotherapy, as this is proven to improve survival[1]. 2. Fit people with limited stage small cell lung cancer should receive thoracic radiotherapy concurrently with the first cycle of chemotherapy or as soon as possible thereafter[3]. 3. Offer concurrent chemoradiotherapy to people with limited-stage disease SCLC (broadly corresponding to T1–4, N0–3, M0) and a WHO performance status of 0 or 1 if they present with disease that can be encompassed in a radical thoracic radiotherapy volume. Start the radiotherapy during the first or second cycle of chemotherapy[6]. 4. Offer sequential radical thoracic radiotherapy to people with limited-stage disease SCLC (broadly corresponding to T1–4, N0–3, M0) who are unfit for concurrent chemoradiotherapy but who respond to chemotherapy[6].	
Equity/Māori health gain	Data not available.	
Specifications **(i) Numerator**	Number of people with non-small cell lung cancer who receive concurrent chemoradiation	

	Denominator	All people with non-small cell lung cancer
	Exclusions	Patients undergoing curative intent surgery
	(ii) Numerator	Number of people with small cell lung cancer who receive concurrent or sequential chemoradiation
	Denominator	All people with non-small cell lung cancer
	Exclusions	None
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS)
Notes		Staging and ECOG status data are not currently available – so excluded from specifications. People will non-small cell lung cancer will be identified from the NZ Cancer Registry Staging and ECOG performance status data are not currently available – so excluded from specifications. People will small cell lung cancer will be identified from the NZ Cancer Registry

(i) References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1 (Scotland)
2. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
3. Stirling, R. G., Evans, S. M., McLaughlin, P., et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.
4. Postmus, P. E., Kerr, K. M., Oudkerk, M., et al. (2017). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. Annals of Oncology, 28(suppl_4), iv1-iv21.
5. Antonia, S. J., Villegas, A., Daniel, D., et al. (2018). Overall survival with durvalumab after chemoradiotherapy in stage III NSCLC. New England Journal of Medicine, 379(24), 2342-2350.
6. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**
7.

LCQI 15. Treatment survival

Measurability		Measurable: ✓ (without stage)	Aspirational:
Indicator description		Proportion of people with lung cancer who died within 30 or 90 days of treatment with curative intent (surgery, systemic anti-cancer therapy, chemoradiation, radiotherapy), by type (NSCLC/SCLC) and stage.	
Rationale and evidence		1. Treatment related mortality is a marker of the quality and safety of the whole service provided by the Multi-Disciplinary Team (MDT). Outcomes of treatment, including treatment related morbidity and mortality should be regularly assessed[1]. 2. Treatment should only be undertaken in individuals that may benefit from that treatment, that is, treatments should not be undertaken in futile situations[1]. 3. Short-term mortality is a marker of the quality and safety of the therapeutic care provided. Treatment should only be offered to people for whom the benefits are likely to balance the risks[2].	
Equity/Māori health gain		Data not available.	
Specifications	**(i) Numerator**	Number of people with lung cancer who die within 30 days of treatment with curative intent (surgery, systemic anti-cancer therapy, chemoradiation, radiotherapy)	
	Denominator	All people with lung cancer who receive curative intent treatment (surgery, systemic anti-cancer therapy, chemoradiation, radiotherapy)	
	Exclusions	None	
	(ii) Numerator	Number of people with lung cancer who die within 90 days of treatment with curative intent (surgery, systemic anti-cancer therapy, chemoradiation, radiotherapy)	
	Denominator	All people with lung cancer who receive curative intent treatment (surgery, systemic anti-cancer therapy, chemoradiation, radiotherapy)	
	Exclusions	None	
Data sources		NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), Radiation Oncology Collection (ROC), Mortality collection	
Notes		People with lung cancer will be identified from the NZ Cancer Registry. This indicator will be reported by treatment modality, i.e. surgery, systemic anti-cancer therapy, chemoradiation and radiotherapy. Date of death to be sourced from the Mortality collection.	

References

1. NHS Scotland (2017) Lung Cancer Clinical Quality Performance Indicators [Online]. Available: **http://www.healthcareimprovementscotland.org/his/idoc.ashx?docid=ed239e0f-b863-4ab4-aa9e-a806eeae88df&version=-1**

2. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**

LCQI 16. Overall survival

Measurability		Measurable: ✓ (without stage)	Aspirational:
Indicator description		Overall survival for people with lung cancer at 1, 2, 3 and 5 years from diagnosis, by type (NSCLC/SCLC) and stage.	
Rationale and evidence		1. To treat people with cancer by screening early and detecting, observed survival and relative survival are commonly accepted indicators of the effectiveness of a healthcare system. 2. For the majority of cancers, survival five years after diagnosis is generally accepted as an indicator of cure. As lung cancer has one of the worst vital prognoses, one-year survival time is also admitted as an indicator of effectiveness of care[1]. 3. Five-year survival for lung cancer was low between 1998 and 2011, ranging from 9.0% to 11.0%[2]. 4. The five-year relative survival rates from lung cancer in New Zealand of 9.5% for males and 11% for females (1994 – 2003) are higher than those in the United Kingdom: 6% for males and 7.5% for females (1998 – 2001). However, these rates are low by comparison with Australia, the United States and Canada[3].	
Equity/Māori health gain		The five-year relative survival for lung cancer (1994–2003) for Māori was poor (5.4%) compared with that for non-Māori (11%). Māori not only had a higher (2.8 times higher) age-standardised incidence ratio than non-Māori but also their age-standardised mortality ratio was even higher (3.5 times), indicating a higher case-fatality ratio for Māori than non-Māori[4]. Once diagnosed with lung cancer, Māori were more likely than non-Māori to die from their cancer. The survival disparity was significant among each stage group[5].	
Specifications	**Numerator**	Number of people with lung cancer who survive at 1, 2, 3 and 5 years from diagnosis	
	Denominator	All people with lung cancer	
	Exclusions	None	
Data sources		NZ Cancer Registry, Mortality collection	
Notes		People with lung cancer will be identified from the NZ Cancer Registry. Overall survival can currently be measured for all people with lung cancer as a whole but not by stage as TNM group stage is not consistently available from NZCR. Date of death to be sourced from the Mortality collection.	

References

1. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
2. Ministry of Health. (2015) Cancer patient survival 1994–2011. Wellington: Ministry of Health.
3. Stevens, W., Stevens, G., Kolbe, J., et al. (2007). Lung cancer in New Zealand: patterns of secondary care and implications for survival. Journal of Thoracic Oncology, 2(6), 481-493.

4. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.
5. Robson B, Purdie G, Cormack D. (2006) Unequal Impact: Māori and Non-Māori Cancer Statistics 1996–2001. Wellington: Ministry of Health.

LCQI 17. Follow up

Measurability		Measurable: ✓ (Part I only)	Aspirational: ✓ (Part ii)
Indicator description		i) Proportion of people with lung cancer who have a follow up appointment after completion of treatment ii) Proportion of people with lung cancer and their general practitioners who are provided with a written follow up plan after completion of treatment.	
Rationale and evidence		1. Offer all people with lung cancer an initial specialist follow-up appointment within six weeks of completing treatment to discuss ongoing care. Offer regular appointments after this, rather than relying on the person requesting appointments when they experience symptoms[1]. 2. Appropriate follow-up will allow for detection and management of radiation-related toxicity, early detection of recurrent disease and differentiation of recurrence from radiation-induced lung injury[2]. 3. Explanation of the follow-up care plan, beyond the written component, enhances survivor self-efficacy for managing cancer as a chronic condition — an important mediator for improving health care utilisation outcomes[3]. 4. All people finishing treatment receive a survivorship care plan that contains the following information: (a) cancer type, treatments received, and their potential consequences (b) specific information about the timing and content of recommended follow-up (c) recommendations regarding preventive practices and how to maintain health and well-being (d) information on legal protections regarding employment and access to health insurance, and (e) availability of psychosocial services in the community[4].	
Equity/Māori health gain		Data not available.	
Specifications	**(i) Numerator**	Number of people with lung cancer who receive treatment (surgery, radiotherapy or systemic anti-cancer therapy) and have a follow up appointment with a specialist service within six weeks of treatment completion (Specialist service includes respiratory medicine, general medicine, thoracic surgery, medical oncology and radiation oncology)	
	Denominator	All people with lung cancer who receive treatment (surgery, radiotherapy or systemic anti-cancer therapy)	
	Exclusions	People who die within six weeks of treatment completion	
	(ii) Numerator	Number of people with lung cancer who receive treatment (surgery, radiotherapy or systemic anti-cancer therapy) and have a written follow up plan provided to them and their GP within six weeks of treatment completion	
	Denominator	All people with lung cancer who receive treatment (surgery, radiotherapy or systemic anti-cancer therapy)	
	Exclusions	People who die within six weeks of treatment completion	

Data sources	NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), National Patient Flow (NPF)
Notes	People with lung cancer will be identified from the NZ Cancer Registry. Six week timeframe is taken from NICE guidelines. This indicator may be developed as a Standard of Care.

References

1. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: **https://www.nice.org.uk/guidance/ng122/chapter/Recommendations**
2. Huang, K., Palma, D. A., & IASLC Advanced Radiation Technology Committee. (2015). Follow-up of patients after stereotactic radiation for lung cancer: a primer for the nonradiation oncologist. Journal of Thoracic Oncology, 10(3), 412-419.
3. Kenzik, K. M., Kvale, E. A., Rocque, G. B., et al. (2016). Treatment summaries and follow-up care instructions for cancer survivors: Improving survivor self-efficacy and health care utilisation. The oncologist, 21(7), 817-824.
4. Hewitt, M., Greenfield, S., & Stovall, E. (2006). From cancer patient to cancer survivor: lost in transition. Committee on cancer survivorship: improving care and quality of life, institute of medicine and national research council.

LCQI 18. Palliative Care

Measurability		Measurable: (Part iii only)	Aspirational: ✓
Indicator description		i) Proportion of people with stage IV non-small cell lung cancer referred to palliative care within 30 days of diagnosis. ii) Proportion of people dying from lung cancer whose care is aligned with Te Ara Whakapiri principles. iii) Number of days out of hospital within the 90 days prior to date of death for people with lung cancer.	
Rationale and evidence		1. Specialist palliative care services should be used to improve outcomes in the care of people with cancer[1]. 2. It is recommended to refer people with stage IV inoperable NSCLC to palliative care at the time of diagnosis of metastatic disease[1]. 3. Palliative care is particularly important in people with lung cancer. The majority of people with lung cancer will ultimately die of their disease; most experience a significant symptom burden during their cancer journey. Palliative care interventions can prolong survival in people with NSCLC[2]. 4. Identify and refer people who may benefit from specialist palliative care services without delay[3]. 5. Te Ara Whakapiri: Principles and guidance for the last days of life outlines the essential components and considerations required to promote quality care at the end of life for all adults in New Zealand. Te Ara Whakapiri is based on an extensive evaluation of the available literature and is informed by local research, ensuring it is applicable to the unique context that is Aotearoa New Zealand. The seven principles of care set out in Part A are underpinned by Te Whare Tapa Whā model, a holistic approach to care that addresses a person's physical, family/whānau, mental and spiritual health[4].	
Equity/Māori health gain		Māori were four times more likely to receive palliative anticancer (rather than curative) treatment for non-metastatic disease compared with Europeans[5].	
Specifications	**(i) Numerator**	Number of people with stage IV non-small cell lung cancer referred to palliative care, where time between date of diagnosis and date of referral is less than or equal to 30 days	
	Denominator	All people with stage IV non-small cell lung cancer	
	Exclusions	People who die prior to referral within 30 days of diagnosis	
	(ii) Numerator	Number of people with lung cancer referred to palliative care where an assessment is done and documented, for care in the last days of life as per the Te Ara Whakapiri principles	
	Denominator	All people with lung cancer referred to palliative care	
	Exclusions	None	
	(iii) Numerator	Median number of days out of hospital within the 90 days prior to date of death for people with lung cancer	

	Denominator	All people with lung cancer who died
	Exclusions	None
Data sources		NZ Cancer Registry, Hospice data
Notes		People with lung cancer will be identified from the NZ Cancer Registry. This indicator may be developed as a Standard of Care.

References

1. Stirling, R. G., Evans, S. M., McLaughlin, P., et al. (2014). The Victorian Lung Cancer Registry pilot: improving the quality of lung cancer care through the use of a disease quality registry. Lung, 192(5), 749-758.
2. National Lung Cancer Working Group (2016) Standards of Service Provision for Lung Cancer Patients in New Zealand (2nd edn). Wellington: Ministry of Health
3. NICE (2019). Lung cancer: diagnosis and management, Clinical guideline [CG122] [Online]. Available: https://www.nice.org.uk/guidance/ng122/chapter/Recommendations
4. Ministry of Health. (2017). Te Ara Whakapiri: Principles and guidance for the last days of life. (2nd edn). Wellington: Ministry of Health [Online]. Available: **https://www.health.govt.nz/system/files/documents/publications/te-ara-whakapiri-principles-guidance-last-days-of-life-apr17.pdf**
5. Stevens, W., Stevens, G., Kolbe, J., et al. (2008). Ethnic differences in the management of lung cancer in New Zealand. Journal of Thoracic Oncology, 3(3), 237-244.

LCQI 19. Aggressiveness of care at the end-of-life

Measurability		Measurable: ✓	Aspirational:
Indicator description		Proportion of people with small cell lung cancer receiving systemic anti-cancer therapy, by stage and ECOG performance status.	
Rationale and evidence		1. As the prognosis for people with advanced and recurrent lung cancer is poor, it is recommended to implement advance care planning and obtain the patient's preferences early in the disease process. People's quality of life should be prioritised and anticancer therapy should be offered only when there is a reasonable chance that it will provide a meaningful clinical benefit. Continuing cancer directed treatment at the end of life should be avoided[1]. 2. In order to care for dying people it is essential to "diagnose dying" However, diagnosing dying is often a complex process. In a hospital setting, where the culture is often focused on "cure," continuation of invasive procedures, investigations, and treatments may be pursued at the expense of the comfort of the patient[2]. 3. Goals of care for people in the dying phase - Comfort measures: Goal 1—Current medication assessed and non-essentials discontinued Goal 2—As required subcutaneous drugs written up according to protocol (pain, agitation, respiratory tract secretions, nausea, vomiting) Goal 3—Discontinue inappropriate interventions (blood tests, antibiotics, intravenous fluids or drugs, turning regimens, vital signs); document if the person does not want cardiopulmonary resuscitation[2]. 4. Oncologists have a critical role in setting the timing of palliative care referral and in choosing the best therapeutic option to avoid overly aggressive care near the end of life[3]. 5. Compared with people with timely reporting of palliative care needs, those with late or very late identification of their palliative care needs were more likely to receive aggressive treatments during their final month of life[3]. 6. Many studies have shown that end of life (EOL) chemotherapy, mainly aggressive EOL care, is associated with potentially negative effects, including higher rates of emergency room (ER) visits, hospitalisations, and admissions to the intensive care unit (ICU), and receipt of less hospice services[4].	
Equity/Māori health gain		Data not available.	
Specifications	**Numerator**	Number of people with lung cancer who receive systemic treatment within 30 days prior to death	
	Denominator	All people with lung cancer who died	
	Exclusions	None	

Data sources	NZ Cancer Registry, National Minimum Dataset, National non-admitted patient collection (NNPAC), Pharmaceutical Collections database (PHARMS), Mortality collection
Notes	People with lung cancer will be identified from the NZ Cancer Registry.

References

1. Belgian Health Care Knowledge Centre (2016) Quality Indicators for the Management of Lung Cancer – Supplement – Technical Fiches for Indicators [Online]. Available: **https://kce.fgov.be/sites/default/files/atoms/files/KCE_266S_LungCancer_Supplement.pdf**
2. Ellershaw, J., Neuberger, R. J., & Ward, C. (2003). Care of the dying patient: the last hours or days of life Commentary: a "good death" is possible in the NHS. BMJ, 326(7379), 30-34.
3. Goldwasser, F., Vinant, P., Aubry, R., et al. (2018). Timing of palliative care needs reporting and aggressiveness of care near the end of life in metastatic lung cancer: A national registry-based study. Cancer. 124(14):3044-3051.
4. Zhu, Y., Tang, K., Zhao, F., et al. (2018). End-of-life chemotherapy is associated with poor survival and aggressive care in patients with small cell lung cancer. Journal of cancer research and clinical oncology, 1-9.

Appendix 1: Working group members

The National Lung Cancer Working Group members in 2018/2019 were:

Chair
Dr Paul Dawkins, Respiratory Physician, Counties Manukau DHB

Members

Dr Jonathan Adler, Consultant Palliative Care, Capital & Coast DHB

Dr Denise Aiken, Physician and Clinical Director Medicine, Lakes DHB

Dr Scott Babington, Radiation oncologist, Christchurch Hospital

Dr Ben Brockway, Consultant and senior lecturer in respiratory medicine, Dunedin Hospital and Dunedin School of Medicine, University of Otago, Dunedin

Dr Paul Conaglen, Cardiothoracic Specialist, Waikato DHB

Dr James Entwisle, Clinical leader, radiology department, Wellington Hospital

Dr Greg Frazer, Respiratory and general physician, Christchurch Hospital; clinical senior lecturer, University of Otago, Christchurch

Dr David Hamilton, Radiation oncologist, Capital & Coast DHB

Jeremy Hyde, Consultant Anatomical Pathologist at Canterbury Health Laboratories, Christchurch.

Dianne Keip, Clinical care coordinator, Hawke's Bay DHB

Dr George Laking, Medical Oncologist, Auckland DHB, Hēi Āhuru Mowai

Professor Ross Lawrenson, Professor of Population Health University of Waikato; Clinical Director Waikato Hospital

Dr Brendan Luey, Consultant medical oncologist, Capital & Coast DHB

Dr Kim McAnulty, Radiologist, Waikato Hospital, Waikato Clinical School, University of Auckland

Dr Felicity Meikle, Cardiothoracic Specialist, Waikato DHB

Dr Aisha Paulous, General Practitioner, South Island

Jo Stafford, consumer and Māori representative, Auckland