**Table 1: Timeliness definition and timepoints identified**

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Alexander et al 2016 Australia | Position paper | Recommendations for the timely triage, review and treatment of cancer patients receiving systemic chemotherapy for six priority cancer groups (breast cancer, colorectal cancer, lung cancer (non-small-cell and small cell), ovarian cancer, lymphoma and myeloma) | | | | | | The first medical oncology or haematology review for patients with an urgent presentation (Category 1) should occur immediately, within no longer than 48 h of referral receipt.<br>Patients with suspected cancer, not classed as Category 1 or 2 (Category 3), should be seen in a medical oncology or haematology clinic within 14 days of referral receipt as recommended by existing local and international guidelines. | | | When chemotherapy is the first anti-cancer treatment for a patient, time to chemotherapy should be measured from the date that chemotherapy treatment was decided and the patient was prepared to receive chemotherapy (ready for care) to the date when chemotherapy was first administered (chemotherapy start date). However, in the setting of adjuvant chemotherapy, time to chemotherapy should be measured from the date of surgery. | |
| 2 | Ampil et al 2014 USA | Cross sectional | Evaluating the types of delay in the management of people with SVCO-L Ca and the impact of palliative thoracic radiotherapy (PTR) delay on patient outcomes. | | | | | | | | | | |
| 3 | Barrett & Hamilton 2008 UK | Nested retrospective case-control study | Aimed at identifying and quantifying clinical features of lung cancer | | | | | | | | | | |
| 4 | Baughan et al 2009 UK | Cross sectional | The aim of this study is to gain a better understanding of how quickly patients with cancer initially present to their GP, and how they are then referred to secondary care for further investigation and treatment. | | Date patient first noticed symptoms | Date patient first reported symptoms to primary care | | Date of decision to refer | Date patient first seen by specialist | | Date patient told the diagnosis | | |
| 5 | Bjerager et al 2006 Denmark | Population based observational case series | To explore diagnostic delay in primary health care among patients with lung cancer. | Delay in general practice: the time from the patient's presentation of the first symptoms or signs that could be related to the lung cancer until referral to hospital. Delay in general practice was subdivided into: doctor delay: time elapsed without investigation of cancer-related symptoms and signs. System delay: time elapsed due to waiting times related to investigation of cancer-related symptoms and administration. | | | | | | | | | |
| 6 | Borrayo et al 2016 USA | Mixed Method | To better understand the institution- and the patient-level determinants associated with the timely initiation of cancer treatment among underserved Hispanic patients diagnosed with lung and head and neck cancers. | | | | | | | | | | |
| 7 | Bozcuk & Martin 2001 UK | Retrospective medical record review | to analyse survival in relation both to time to treatment (hospital delay) and other known prognosticators, in a cohort of NSCLC patients presenting in 1 year in a UK Hospital with thoracic surgery and clinical oncology departments. | | | | | | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Brocken et al 2012 Netherlands | Retrospective medical record review | To compare various delays in a rapid outpatient diagnostic program (RODP) for suspected lung cancer patients with those described in literature and with guideline recommendations, to investigate the effects of referral route and symptoms on delays, and to establish whether delays were related to disease stage and outcome. | Timeliness of lung cancer care starts with timely recognition of symptoms by patients themselves, which is often inadequate or delayed | | | | | | | | | |
| 9 | Buccheri & Ferrigno 2004 Italy | Retrospective medical record review | 1) provide a more recent profile of the clinical manifestations of lung cancer; 2) evaluate possible time-related changes in the occurrence of symptoms; and 3) explore the possible relationship between symptoms and time to specialist referral. | | | | | | | | | | |
| 10 | Bullard et al 2017 USA | Retrospective medical record review | To evaluate the impact that the initiation of timely treatment has on patient survival among a cohort of privately insured patients with NSCLC in South Carolina | Analysis of treatment timeliness was informed by the Andersen and Cacioppo model of delays in seeking cancer care.16 Delay in seeking cancer care is defined as the number of days from the identification of the first symptom to visiting a physician, being diagnosed as having a condition, or beginning a regimen for treating the condition. The model interprets delay as an aggregate of underlying decision-making processes imposed by the patient. Treatment delay is the time between receiving medical attention and when care or treatment is initiated.Timely care was defined according to the RAND Corporation as a maximal time limit of 6 weeks (≤42 days) from diagnosis to treatment. | | | | | | | | | |
| 11 | Corner et al 2004 UK | Exploratory study | To explore the pathway to diagnosis among a group of patients recently diagnosed with lung cancer. | | Symptoms were recalled as having started between 4 months and more than 2 years | timing of their visits to the GP | Date of diagnosis | | | | | | |
| 12 | Devbhandari et al 2007 UK | Prospective Cohort | To compare our waiting times with national recommendations | | | | | | | | | | |
| 13 | Devbhandari et al 2008 UK | Prospective Cohort | To ascertain the causes of delays in treatment to all patients presenting to our centre with a working diagnosis of lung cancer | | | | | | | | | | |
| 14 | Dobson et al 2017 UK | Qualitative study | to explore the patient intervals of people with symptoms of lung or colorectal cancer, considering how symptom appraisal and help-seeking experiences were influenced by the wider context of people's lives, such as family and work. | | The date of symptom onset was defined as the first symptom reported | The end of the patient interval was defined as the date on which they consulted about their symptoms. | | | | | | | |
| 15 | Ellis & Vandermeer 2011 Canada | Cross sectional | Our objective was to establish the time delays in each phase to help inform strategies to reduce overall diagnostic delays. | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Emery et al 2013 Australia | Mixed methods study | The overall objective of this study was to identify the major subcomponents of the diagnostic interval for rural cancer patients in WA to inform the design of an intervention aimed at reducing time to diagnosis. | | | | | | | | | | |
| 17 | Evans et al 2016 Australia | Retrospective cohort study | To assess factors associated with second-line delays in the management of patients diagnosed with lung cancer | | | | | | | | | | |
| 18 | Ezer et al 2017 Canada | Cross sectional | The aim of the study was to assess the impact of this model of care (Rapid Investigation Clinic) on timeliness of lung cancer diagnosis , staging and treatment. | | | | | | | | | | |
| 19 | Forrest et al 2014 UK | Population-based, data-linkage study | To investigate the factors (socioeconomic position (SEP), age, sex, histology, co-morbidity, year of diagnosis, stage and performance status (PS)) that may influence the likelihood of post-primary care referral, diagnosis and treatment within target times. | | | | | | | | | | |
| 20 | Kanarek et al 2014 USA | Retrospective cohort | Evaluated the hypothesis that delay to first surgery and other time-related factors reduce survival after treatment (surgery). Then assessed the hypothesis that age, race, gender, place of residence, tumor characteristics, and morbidity confound the relationship between these factors and survival. | | | | | | | | | | |
| 21 | Kim et al 2016 Canada | Retrospective medical record review | The aim of this study was to quantify the time intervals that NSCLC patients in Alberta with stage IeIII disease spend waiting for diagnosis (diagnostic interval), treatment (treatment interval) and their sum (system interval) and to determine which factors are associated with delays. | | | | | | | | | | |
| 22 | Koyi et al 2001 Sweden | Cross sectional | The aim of the present study was to prospectively investigate a material of lung cancer patients in order to measure the delays, both by the patient and by the doctors. | | | | | | | | | | |
| 23 | Kudjawu et al 2016 France | Retrospective medical record review | To describe time delays in each phase of lung cancer treatment after bronchoscopy. | | | | | | | | | | |
| 24 | Largey et al 2015 Australia | Pilot study. | The audit was conducted as part of routine cancer quality improvement activities at Southern Metropolitan Integrative Cancer Services. | | | Dates of first presentation as the time point the clinician started investigation or referral for possible investigation | | Referral | First specialist appointment | Diagnosis | | Referral. | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | Largey et al 2016 Australia | Retrospective medical record audit | (1) examine the current interval times for lung cancer patients from the point of initial referral to the start of first treatment at three large public principal referral hospitals in Victoria; (2) assess the effects difference treatment type (surgery, radiotherapy and chemotherapy) and health service had on interval times across the selected components of the lung cancer pathway; and (3) compare interval times and identify the proportion of patients who met the established target measures. | | | | | | | | | | |
| 26 | Lee et,al. 2002 UK | Retrospective medical record audit | assessed the delays in their care against BTS guidelines. | | | | | | | | | | |
| 27 | Li et al 2012 Canada | Retrospective medical record review | The purpose of this study was to assess the value in measuring specific time intervals across cancer sites to identify potentially important variation in the timeliness of cancer care that may inform needed changes and/or improvements incoordination of care. | | | | | | | dates of diagnosis | | | first treatment, surgery and adjuvant treatment. |
| 28 | Maiga et al 2017 USA | Retrospective cohort study | Investigation of the reasons for delays in treatment and the impact these delays have on tumor-stage progression. | | | | | | | | | | |
| 29 | Malalasekera et al 2018 Australia | Scoping review | 1) synthesise health system related waiting times to milestones of lung cancer care using standardised definitions; 2) benchmark measures of performance against relevant guidelines for timeframes; 3) supplement quantitative findings with barriers to timely care described in the literature; and 4) explore the impact of facilitators such as fast-track referral systems on waiting times. | | | First clinical presentation | First suspicious investigation | First referral to secondary care | First specialist visit | Diagnosis | | | Treatment start |
| 30 | Melling et al 2002 UK | Cross sectional | The purpose of this study was to find out what proportion of patients are referred as lung cancer guidelines assume, whether different referral pathways result in different management and what proportion of patients are seen within recommended time intervals between referral and treatment. | Definitive treatment was defined as surgery (pneumonectomy or lobectomy), radical radiotherapy (radiotherapy directed at treating lung cancer itself) and chemotherapy. Palliative treatment recorded was palliative radiotherapy (for symptom control only), palliative surgery or best supportive care. | Symptom | Presentation | Diagnosis | referral | | | | | treatment |
| 31 | Neal et al 2015 UK | Mixed method | aims to provide a detailed analysis of the diagnostic process of lung cancer from a primary-care perspective. | | Onset of first symptom | face-to-face consultations, nurse consultations, telephone consultations, out of hours, home visits before initial referral or investigation request First presentation to primary care | Date of diagnosis<br><br>CXR requested CXR report received Diagnosis | Referal or admission | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 32 | Girolamo et,al. 2018 England | Retrospective medical record review | To assess the association between meeting waiting time targets, as currently available to the policymakers, and individual patients' cancer survival, and measure the time to different types of treatments. | Maximum two-week wait (TWW) between an urgent referral for a suspicion of cancer from a general practitioner (GP) to being seen by a specialist, a maximum 62 days from the referral to the start of the first treatment, and a maximum 31 days from the decision taken to treat a patient to the start of the first treatment, irrespective of the route to diagnosis the patient went through . | | | | | | | | | |
| 33 | Gozalez et,al. 2014, Spain | Retrospective medical record audit | To analyse the delays in the diagnosis and treatment of LC and the factors associated with the timeliness of care and their possible relationship with the survival of these patients | | | | | | | | | | |
| 34 | Grunfeld et al 2009 Canada | Cross sectional | To prospectively measure peri-diagnostic and surgical time intervals for patients with suspected colorectal, lung, or prostate cancer | | | | date of the pathology or radiology report | the date the referral for diagnostic assessment was received by the consultant | | date of first relevant investigation initiated by consultant, whichever came first; relevant investigations included biopsy, bronchoscopy, chest X-ray, colonoscopy, sigmoidoscopy, CT scan, MRI, PSA, pulmonary function test, transrectal ultrasound, and other | date patient informed of diagnosis | | date of initiation of first treatment (first treatment was definedas neoadjuvant chemotherapy, surgery if no preoperativetreatment was required, chemotherapy, radiotherapy, or a decisionfor no treatment |
| 35 | Helsper et al. 2017 Netherlands | Retrospective medical record review | To chart the diagnostic pathway for the five most common cancers in the Netherlands | | | The date of the first cancer-related GP consultation was defined as the first contact (physical or telephone) with the GP for suspected cancer-related signs or symptoms | | The date of referral was defined as the moment when the responsibility for the patient was transferred from a GP to secondary care | | | the date of diagnosis was the date of the histological confirmation of the primary tumour. | | The date of treatment initiation denotes the date of start of therapy as registered in the NCR |
| 36 | Hsieh et al 2012 Taiwan | Retrospective medical record review | To understand the delay in the diagnosis of lung cancer under the healthcare system in Taiwan, and to identify the factors associated with it | | | | | | | | | | |
| 37 | Hubert et al 2018 Canada | Retrospective medical record review | To measure the timeliness of care with a standardized Rapid diagnostic assessment programs (DAP) in patients with early-stage non-small cell lung cancer (NSCLC) and to evaluate the impact of an ERP (enhanced recovery protocols) in these patients. | | | | | | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38 | Heredia et al 2012 Spain | Cross sectional | To analyze the results obtained in a lung cancer (LC) screening program since its inception five years ago regarding correct referrals, diagnostic and therapeutic delay times and days of hospitalization. To compare the diagnostic–therapeutic delays and hospital stays with those obtained in patients evaluated with the standard system | | | | | | | | | | |
| 39 | Iachina et al 2017 Denmark | Retrospective cohort study | To investigate the significance of primary investigation and treatment at two or more hospitals on the delay in Danish patients with Non-Small Cell Lung Cancer (NSCLC). | ** Time from referral (time of diagnosis) to end of primary investigation = 28 days<br>**Time from referral (time of diagnosis) to first day of treatment = 42 days<br>End of primary investigation is defined as the date of decision on treatment. Referral is defined as the date where the investigating department receives the referral. | | | | | | | | | First day of treatment is defined as the date of initiation of surgical, oncological, or radiological treatment, whichever comes first |
| 40 | Ju et al 2017 USA | Computer process modelling | To evaluate delays in care delivery, in order to identify potential 'bottlenecks' in waiting time, the reduction of whichcould produce greater care efficiency. | | | | | | | | | | |
| 41 | Olsson et al 2009 USA | Systematic review | To summarise all recently published studies that described the timeliness of care in patients with lung cancer, identified factors that were associated with more or less timely care, or examined the association between the timeliness of care and lung cancer outcomes, including stage distribution and survival. In addition, we aimed to identify studies that evaluated interventions to improve the timeliness of care for patients with lung cancer. | | | | | | | | | | |
| 42 | Ost et al 2013 USA | Guideline/review | This guideline is intended to provide an evidence-based approach to the initial evaluation of patients with known or suspected lung cancer. It also includes an assessment of the impact of timeliness of care and multidisciplinary teams on outcome. | | | | | | | | | | |
| 43 | Özlü et al 2004 Turkey | Retrospective medical record review | To determine the delay between the onset and the diagnosis and treatment of patients with lung cancer in two cancer centres in the Eastern Black Sea Region of Turkey. | | onset of symptoms | first presentation to a physician | | | | histopathological diagnosis | | | start of treatment |
| 44 | Rankin et al 2017 Australia | Qualitative study | To describe the lung cancer diagnostic pathway, focusing on the perspective of patients and general practitioners about diagnostic and pretreatment intervals | | | first consultation with HCP | diagnosis | | | | | | start of treatment |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | Rolke et al 2006 Norway | Cross sectional | to evaluate the delays in the diagnostic pathways for primary lung cancer in Southern Norway, and to compare results with recommendations from the British Thoracic Society (BTS) and the Swedish Lung Cancer Group (SLCG). | Patients referred by general practitioners, who have obvious clinical evidence of lung cancer, should be seen within 1 week of referral receipt in a respiratory physician's clinic, i.e. Referral delay.<br>The results of bronchoscopy or any other similar diagnostic test, including the histological or cytological result, should be available and communicated to the patient within 2 weeks of a decision to do it, i.e. Informed diagnostic delay.<br>Suspected lung cancer should wait no more than 1 week before they are investigated by a specialist, i.e. Referral delay.<br>Diagnosed lung cancer should wait no more than 3 weeks since first specialist investigation to a treatment decision is made and no more than 10 days from a treatment decision was made until start of treatment, summarised as Hospital delay. | | | | | | | | |
| 46 | Thapa et al 2014 Nepal | Cross sectional, prospective observational study. | To identify the steps through which the patients passed before he/she finally arrived to specialist care at Manmohan Cardiothoracic Vascular and Transplant Center (MCVTC) and also determine the time lost in each step. | | | | | | | | | | |
| 47 | Verma et al 2018 Australia | Cross sectional | to identify any differences in time delays in lung cancer referral pathways between rural and urban patients and explore patients' perceived barriers to timely lung cancer diagnosis and management. | | | | | | | | | | |
| 48 | Vidaver et al 2017 USA | Mixed method | This study explored when and why delays occur in lung cancer care and compared timeliness between two states with divergent disease incidence. | The RAND Corporation suggested that the diagnosis of lung cancer should be established within 2 months of abnormal radiography, and treatment should begin within 6 weeks of diagnosis.<br><br>British Thoracic Society recommended that patients with suspected lung cancer be seen by a respiratory specialist within 7 days of referral; a specialist visit should occur within 2 weeks of an abnormal radiograph, and surgery should be within 8 weeks of a visit to a respiratory specialist. | | A—first visit to health care provider with symptoms | B— first imaging result with a lung abnormality | C— referral to a specialist | D— first visit to a specialist | E— first diagnostic test<br><br>F— last diagnostic test | G— patient informed of the biopsy result | H— first referral to treatment | I— first treatment |
| 49 | Wai et al 2012 Canada | A case-control study | The primary goal of this study is to investigate if delays in care may decrease the curability of patients with stage III NSCLC.<br><br>The secondary goal is to describe the patterns of staging and diagnostic evaluation for palliatively and radically treated patients with stage III NSCLC in British Columbia. | | | | | | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | Walter et al 2015 UK | Prospective cohort study | To investigate the symptoms and other clinical and sociodemographic factors associated with lung cancer diagnosis, time to diagnosis and stage at diagnosis. | The total diagnostic interval (TDI), or 'time to diagnosis', defined as the time from the first symptom/s to the date of diagnosis. | | | | | | | | | |
| 51 | Wilcock et al 2016 UK | Mixed-methods | to identify areas where there may be potential to improve the care provided so as to inform the need for further focused research. | | | | | | | | | | |
| 52 | Winget et al 2007 Canada | Stakeholders workshop | 1) identify a set of criteria and variables needed to create comparable measures of important time-to-cancer-care intervals that could be applied across provinces and<br>2) use the measures to compare time-to-care across participating provinces for lung cancer patients diagnosed in 2004. | | | | | | | | | | |
| 53 | Yang et al 2015 China | Case control | In this study, we determined the total time from the first symptoms to the initial treatment for lung cancer patients at the Department of Respiratory Disease of Zhongshan Hospital (Fudan University, Shanghai, China), a tertiary health care medical center | In China, a diagnosis delay for lung cancer has been defined as more than 1 month between the first symptom or radiological change and the clinical diagnosis or suspicion for lung cancer. | First symptom | First contact with local doctor | | Referral to hospital | | Diagnosis/ referral to treatment | | | Initiation of treatment |
| 54 | Yilmaz et al 2009 Turkey | Cross sectional | The aims of this study were to investigate the delays in patients with lung cancer from the first symptom to thoracotomy and to examine whether the delays affect the stage of lung cancer at the time of thoracotomy. | The application interval that exceeded 30 days was considered indicative of a patient's delay.<br><br>The interval that exceeded 14 days was considered indicative of a referral delay.<br><br>The diagnosis interval that exceeded 14 days was considered as indicative of a delayed diagnosis.<br><br>The interval that exceeded 14 days was considered as indicative of a delayed treatment.<br><br>The interval that exceeding 6 weeks was considered as indicative of a doctor's delay.<br><br>If exceeding 72 days it was considered indicative of a total delay | date of initial symptoms | date of first doctor visit | | | date of admission to pneumology department of our hospital | date of diagnosis | | | date of thoracotomy |
| 55 | Yorio et al 2009 USA | Cross sectional | to examine the predictors and impact of the timing of lung cancer care in this context, we examined diagnostic and treatment intervals at a large American medical center providing care to a diverse patient population within two different hospital systems. | Date of tissue diagnosis was defined as the date of final pathology report.<br><br>Date of treatment was defined as the date of surgery, initial date of chemotherapy, or initial date of radiation therapy, whichever occurred first. | | | | | | | | | |
| 56 | Zullig et al 2013 USA | Cross sectional | Aim 3: Examine patient-level factors associated with (a) receipt of timely lung cancer care and (b) subsequent health outcomes | | | | | | | | | | |
| 57 | Sachdeva et al 2017 India | Cross sectional | To determine time delay from the onset of initial symptoms to diagnosis of primary lung cancer. | | | | | | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 | Salomaa et al 2001 Finland | Retrospective medical record review | To measure delays of diagnosis and to assess the causes for those delays in patients with lung cancer.<br>To evaluate whether the lengths of the delays were acceptable according to the British recommendations, and To examine the relations between delays and survival | | | the first symptoms until the first visit to a doctor, who was in general, a GP | | the date the consultation request for a specialist was written | the first appointment with the specialist | | | | |
| 59 | Sawicki et al 2013 Poland | Cross sectional | To compare the differences in the periods of time and reasons for delay in diagnosisand initiation of treatment of lung cancer among patients who are inhabitants of the rural and urban regions of LublinVoivodeship, and who were consulted in Thoracic Surgery Department | | | | | | | | | | |
| 60 | Schultz et al 2009 USA | Cross sectional | To evaluate timeliness of lung cancer care and identify institutional characteristics associated with timely care within the Veterans Affairs (VA) health care system | **British Thoracic Society guidelines)**<br>*Specialist visit within 2 wk of abnormal CXR *Surgery within 8 wk of specialist visit<br>**RAND guidelines**<br>*Diagnosis within 8 wk of abnormal CXR *Treatment within 6 wk of diagnosis | | | | | | | Time to diagnosis is the time from the first suspicious chest x-ray or CT scan to the date when a pathologic diagnosis of lung cancer was confirmed | | |
| 61 | Shugarman et al 2009 USA | Cohort study | To evaluate the relationship of sex and race with the receipt of timely and clinically appropriate NSCLC treatment for each stage of diagnosis | Timely treatment as a 6-week timeframe from the date diagnosis to receipt of treatment (surgery, chemotherapy or radiation therapy) | | | | | | | | | |
| 62 | Singh et al 2010 USA | Cohort study | To evaluate characteristics and predictors of missed opportunities for earlier diagnosis of lung cancer in a health care system with an advanced integrated EHR | | the first appearance of a diagnostic clue as the earliest date that the clue could have been recognized by the care providers, regardless of when the patient first started experiencing symptoms | | | | | | | | |
| 63 | Smith et al 2009 Scotland | Cross sectional | To determine what factors are associated with the time people take to consult with symptoms of lung cancer, with a focus on those from rural and socially deprived areas | | the date participant defined first symptom | date of presentation to a medical practitioner | | | | | | | |
| 64 | Sood et al 2009 NZ | Retrospective medical record review | To determine the patient characteristics, referral patterns and delays in assessment and treatment of patients with primary lung cancer in South Auckland, New Zealand and compare with international standards | | | | | | | | | | |

| # | Author, pub date and country | Type/ design of study | Aim of study | Definition/ concept of timeliness in seeking care | Onset of symptom | First visit to healthcare provider | First imaging result with suspicion/ diagnosis | Referral to a specialist | First visit to a specialist | Invasive diagnostic test (e.g. FNAC, biopsy) | Patient informed of the biopsy result | Referral for treatment | Initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Stokstad et al 2017 Norway | Retrospective medical record review | To quantify the proportion of patients who started treatment within the recommended timeframes; and to assess the proportion of non-complex patients for which there were no good reasons for delays. | For suspected lung cancer, the first hospital appointment should be offered within seven calendar days of receiving a referral letter; a treatment decision should be made within 28 calendar days; systemic therapy should start within 35 calendar days, and surgery or radiotherapy within 42 calendar days. According to Norwegian recommendations, start of treatment within 42 days (surgery or radiotherapy) or 35 days (systemic therapy) was considered “timely treatment” | | | | start time as the date when a referral letter for suspected lung cancer was received by the Department of Thoracic Medicine – or the date when the decision was made to start diagnostic workup in patients with a known single pulmonary nodule (SPN) | | | | | the time for treatment decision as the date when such a decision was documented in the EMR |
| 66 | Sulu et al 2011 Turkey | Cross sectional | To investigate patterns of delays among patients with non-small-cell lung cancer and to identify reasons for the delays. | **An application interval that exceeded 30 days was considered indicative of a patient’s delay. **The referral interval that exceeded 14 days was considered indicative of a referral delay. **A diagnosis interval that exceeded 14 days was considered as indicative of a delayed diagnosis. **A treatment interval that exceeded 14 days was considered as indicative of a delayed treatment **Doctor's interval that exceeded 6 weeks was considered as indicative of a doctor’s delay. ** Total interval exceeded 72 days was considered indicative of a total delay | | | | | | | | | |
| 67 | Chandra et al 2009 India | Retrospective review | To determine the average time period required at various steps for diagnosing lung cancer from the onset of symptoms at a tertiary referral centre in Northern India | | | | | | | | | | |
| 68 | Dubey et al 2015 India | Cross sectional | The aim was also to study the time duration for confirming the diagnosis, the relative yield of the investigations in diagnosis of lung cancer and the lung cancer stage in which patients are presenting. | | | | | | | | | | |

**Table 2: Intervals identified**

| # | Author, pub date and country | Symptom to doctor/ GP | GP to LCS/ Chest clinic/ referral/GP to first hospital appointment/ admission | Referral to first attendance to specialist | Chest clinic to referral for Chest Physician | Chest Physician/ hospital appointment to Diagnosis | GP to diagnosis | Diagnosis to referral to LCS/ or hospital | Symptom to hospital admission | LCS to treatment | Hospitalization to treatment referral | Diagnostic intervals (imaging/ biopsy) | Referral for treatment to initiation of treatment | Symptom to 'referral for diagnosis' | Symptom to referral to LCS | Referral for diagnosis' to diagnosis | Symptom to diagnosis | Symptom to referral (by GP or chest physician to next Mx) | Symptom to secondary care | Referral to treatment | GP to treatment | Diagnosis to initiation of treatment | Outpatient to decision to treat | Decision to treat/ specialist consultation to treatment | Symptom to initiation of treatment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Alexander et al 2016 Australia | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Ampil et al 2014 USA | | | | | | | | Patient delay was inferred from the duration of presenting symptoms until hospital admission | | In-hospital delay was defined as the interval from the date of hospitalization to the date of referral for therapy | | Professional delay was defined as the interval from the date of referral to first treatment | | | | | | | | | | | | |
| 3 | Barrett & Hamilton 2008 UK | | | | | | First symptom presented to primary care to diagnosis | | | | | | | Interval between first presentation to primary care with a symptom of lung cancer and referral | | Interval from referral to diagnosis | The intervals between first symptom presentation and diagnosis | | | | | | | | |
| 4 | Baughan et al 2009 UK | time from patient first noticing symptoms to first presentation with a GP | | | | | | | | | | | | | | | | Time from first presentation to time of referral | | | | | | | | |
| 5 | Bjerager et al 2006 Denmark | | | | | | | | | | | | | | | | | | First symptom until referral to secondary care | | | | | | | |
| 6 | Borrayo et al 2016 USA | | | | | | | | | | | | | | | | | | | | | Diagnosis to treatmentinitiation | | | | |

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| 7 | Bozcuk & Martin 2001 UK | | | | | | | | | | | | Time to treatment (*measure of hospital delay*): time from receipt of referral letter from GP /referring physician to first treatment. *Referral time (measure of referral delay):* time from receipt of GP /referring physician referral letter to first appointment in Norfolk & Norwich Hospital. It actually is a component of time to treatment. | | | | | | | | | | | | |
| 8 | Brocken et al 2012 Netherlands | Patient delay as the time from first symptom until the first visit to a GP | GP delay as the time between first GP visit and referral to a chest physician | | referral delay as the time between referral (written or by phone) and first rapid outpatient diagnostic program (RODP) day | Diagnostic delay as the time between first RODP day and date of final (accurate) diagnosis | | | | | | | | | | | | | | | | Therapeutic delay as the time between diagnosis and start of treatment. | | | |
| 9 | Buccheri & Ferrigno 2004 Italy | | | | | | | | | | | | | Referral delay was defined as the time interval between the occurrence of the first symptom of alarm (as reported by the patients and confirmed by their relatives) and the date of the first specialist referral made to the study group). (normally made to the | | | | | | | | | | |

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| | | | | | | | | | | | | | | | study group). | | | | | | | | | | |
| 10 | Bullard et al 2017 USA | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Corner et al 2004 UK | Time between first change in health status and onset of symptom that prompted patient to visit GP or other service Time between onset of symptom prompting patient to visit GP and date of visit to GP or other service | | | | | Visit to GP or other service and date of diagnosis | | | | | | | | | | Time between first recalled change in health status and date of diagnosis | | | | | | | | |
| 12 | Devbhandari et al 2007 UK | | Urgent GP referral to date first seen in outpatient clinics was calculated by subtracting the date of urgent referral from the date first seen in chest outpatient clinics | | | | | | | | | | | | | Intervals for investigations such as bronchoscopy were calculated by subtracting the date of urgent GP referral from the date of investigation | | | GP referral to date of first definitive treatment was calculated by subtracting the date of urgent GP referral from the date of commencement of the first definitive treatment. | | | | | |
| 13 | Devbhandari et al 2008 UK | | | | | | | | | | | | | | | | | | | | | The intervals from out-patient to decision-to-treat | Decision-to-treat to treatment | |
| 14 | Dobson et al 2017 UK | | | | | | | | | | | | | | | | | | | | | | | |

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| 15 | Ellis & Vandermeer 2011 Canada | T1: time from initial symptoms to first presentation to a family doctor or emergency department | T3: time from initial presentation to the first appointment with a specialist, either directly to the JCC or to a respirologist or thoracic surgeon | | T5. Time from JCC referral to initial consultation | T4: time between the initial appointment with the specialist and the last date of additional diagnostic testing | T2: time from initial presentation to the last date of diagnostic testing ordered by the family physician | | | T6: time from initial contact with a medical or radiation oncologist to the starting date of treatment, defined as chemotherapy, radiation therapy, or the decision not to pursue treatment | | | | | | | | | | | | | | | T7: Overall time from onset of symptoms to commencement of defiitive therapy was also calculated as a global delay |
| 16 | Emery et al 2013 Australia | | Fist presentation in general practice to referral (GP interval) | From date of referral to fist attendance at specialist (specialist access interval) | | Time from fist attendance at the specialist to date of diagnosis (specialist interval) | The diagnostic interval is the time from fist presentation until cancer diagnosis | | | | | | | | | | Total diagnostic interval was defied as the time from fist symptom to diagnosis. | | | | | | | | |
| 17 | Evans et al 2016 Australia | | | | | | | | | | | | | | | Referral to diagnosis | | | | Referral to initial definitive management | | Diagnosis to initial definitive management | | | |
| 18 | Ezer et al 2017 Canada | time interval (in days) between first contact with a local physician for suspected lung cancer (T0) | | | | | time interval (in days) between first contact with a local physician to date of tissue diagnosis | | | | | | | | | | | | | | Time interval (in days) between first contact with a local physician to date of first treatment | | | | |
| 19 | Forrest et al 2014 UK | | GP referral date to first hospital appointment date | | | First hospital appointment date to diagnosis date | GP referral date to diagnosis date | | | | | | | | | | | | | | GP referral date to first treatment date | Diagnosis date to first treatment date | | | |
| 20 | Kanarek et al 2014 USA | | | | | | | Time from diagnosis to first contact at SKCCC was defined as the referral interval. | | | | | Time from first contact at SKCCC to first surgery is defined as the treatment interval | | | | | | | | | Diagnosis to first surgery interval | | | |

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| 21 | Kim et al 2016 Canada | | | | | | | | | | | **Diagnostic imaging interval:** From Date of the chest X-ray which preceded the last computed tomography scan prior to the first diagnostic biopsy attempt to Date of the last computed tomography scan prior to the first diagnostic biopsy attempt**Diagnostic biopsy interval:** From Date of the last computed tomography scan priorto the first diagnostic biopsy attempt to Date of the diagnostic biopsy procedure whichprovided pathological diagnosis | | | | | | | | | | | **System interval:** From Date of the chest X-ray which preceded the last computed tomography scan prior to the first diagnostic biopsy attempt to First day of treatment**Treatment interval:** From Date of diagnostic biopsy procedure which provided pathological diagnosis to First day of treatment | | | |
| 22 | Koyi et al 2001 Sweden | the patient's delay is the time from the first symptom(s) until the date he /she visits the doctor, in general the GP | GP delay, from the time a visit was arranged with the GP until the patient was referred to the specialist | | | specialist's delay (Second doctor's delay) is the time from when the lung specialist received the referral papers until the diagnosis was made. | | | | | | | | | | | Time symptom-diagnosis | | | | | | | Time symptom-treatment |
| 23 | Kudjawu et al 2016 France | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | Largey et al 2015 Australia | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | Largey et al 2016 Australia | | | | | | | | | | | | | | | Referral to-diagnosis | | | | Referral-to-treatment | | Diagnosis-to-treatment | | | |
| 26 | Lee et,al. 2002 UK | | | | | | | | | | | | | | | | Onset of symptoms and their first chest radiograph | Onset of symptoms and referral to a surgeon by a chest physician | | | | | | | |
| 27 | Li et al 2012 Canada | | | | | | | | | | | | | | | | | | | | | Time from diagnosis to first treatment | | | |

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| 28 | Maiga et al 2017 USA | | | | | | | | | | | | | | | | | | | | | The interval between T2 and T3 is the diagnosis-totreatment interval for patients with a tissue diagnosis before resection. | | | |
| 29 | Malalasekera et al 2018 Australia | | Primary care interval | | | | Diagnostic interval | | | | | | | | | | | | | Secondary care interval | | Treatment interval | | | |
| 30 | Melling et al 2002 UK | | | Referral by GP to first seen by specialist | | | | 1 week of a CXR request to first hospital visit | | | | | | | | | | | | | First visit to any treatment | | | | |
| 31 | Neal et al 2015 UK | 'Patient interval' (time from symptom onset to presentation) | | | | | Date of request of first GP-initiated chest X-ray and date report received | | | | | | | | | | | | | | | | | | |
| 32 | Girolamo et,al. 2018 England | | | urgent referral for a suspicion of cancer from a general practitioner (GP) to being seen by a specialist | | | | | | | | | | | | | | | | | | | The decision taken to treat a patient to the start of the first treatment | | |
| 33 | Gozalez et,al. 2014, Spain | from the first symptom to the first specialist consultation (specialist delay) | | | | from the first specialist consultation until confirmation of the diagnosis (diagnosis delay) | | | | | | | | | | | | | | From the first specialist consultation until the start of treatment (hospital delay) | From the confirmation of the diagnosis up to the start of the first treatment (treatment delay) | | | | |

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| 34 | Grunfeld et al 2009 Canada | | | Date of referral to date of first diagnostic consultation | | | | | | | | | | | Date of referral to date of confirmed diagnosis | | | | Date of referral to date of initation of first treatment (first tx was defined as neoadjuvant chemotherapy, surgery if no preoperative treatment was required, chemotherapy, radiotherapy, or a decision for no tx | | | | | | **Date the referral for diagnostic assessment was received by the consultant ('date of referral') to date patient informed of diagnosis ** Date of first diagnostic consultation to date patient informed of diagnosis **Date of referral to date of surgery or decision for no surgery ** Date of confirmed diagnosis to date of surgery or decision for no surgery **Date of referral to date of surgery**Date of surgery to date of first oncology consultation or decision for no consultation |
| 35 | Helsper et al. 2017 Netherlands | | the time between the first cancer symptom related contact with the general practitioner (GP) and its corresponding referral to secondary care (Primary care interval (ICP) | | | | the time from the first presentation to the GP to diagnosis (diagnostic interval (ID) | | | | | | | | The time from referral to histological diagnosis (refferal interval (IR) | | | | | The time from the first presentation to the GP to initial treatment (health care interval (IHC) | The time from diagnosis to initiation of the treatment (Treatmnet interval (IT) | | | | |
| 36 | Hsieh et al 2012 Taiwan | | | | | | | | | | | | | | | | | | | | | | | | Delay in diagnosis' has been defined as the period from a patient's initial medical visit to any hospital to his/her confirmed diagnosis of lung cancer |

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| 37 | Hubert et al 2018 Canada | | | | | | | | | | | | | | | | | | | | | | | | **The first one was the interval between the moment that the green file was opened until all lung cancer staging and clinical tests were performed, and patient was referred for surgery after discussion with the respirologist . **The second interval was the time between the referral to the thoracic surgery department the consult with the surgeon ** The last interval was from the surgical consult to the date of surgery |
| 38 | Heredia et al 2012 Spain | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | Iachina et al 2017 Denmark | | | | | | | | | | | | | | | | | | | | | | Time from end of primary investigation to first dayof treatment = 14 days | | |
| 40 | Ju et al 2017 USA | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | Olsson et al 2009 USA | | | from referral to first respiratory specialist visit | | | | | | | | | | | | | | | | GP referral to initial treatment | | from diagnosis to treatment | | specialist consultation to surgery | symptom onset to initial treatment |
| 42 | Ost et al 2013 USA | | | | | | | | | | | | | | | | | | | | | Diagnosis to treatment | | | |

| # | Author, pub date and country | Symptom to doctor/ GP | GP to LCS/ Chest clinic/ referral/GP to first hospital appointment/ admission | Referral to first attendance to specialist | Chest clinic to referral for Chest Physician | Chest Physician/ hospital appointment to Diagnosis | GP to diagnosis | Diagnosis to referral to LCS/ or hospital | Symptom to hospital admission | LCS to treatment | Hospitalization to treatment referral | Diagnostic intervals (imaging/ biopsy) | Referral for treatment to initiation of treatment | Symptom to 'referral for diagnosis' | Symptom to referral to LCS | Referral for diagnosis' to diagnosis | Symptom to diagnosis | Symptom to referral (by GP or chest physician to next Mx) | Symptom to secondary care | Referral to treatment | GP to treatment | Diagnosis to initiation of treatment | Outpatient to decision to treat | Decision to treat/ specialist consultation to treatment | Symptom to initiation of treatment |
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| 43 | Özlü et al 2004 Turkey | From first symptom to presentation | | | | admission and tissue diagnosis | From presentation to tissue diagnosis | | | | | | | | | | | | | | From presentation to first treatment | From diagnosis to treatment | | | From symptoms to treatment |
| 44 | Rankin et al 2017 Australia | | | | | | The diagnostic interval is defined as “the time between first appointment with a health-care provider (HCP) and the formal cancer diagnosis being made.” | | | | | | | | | | | | | | | The pretreatment interval is defined as “the time between formal cancer diagnosis and initiation of treatment” | | | |
| 45 | Rolke et al 2006 Norway | Patient delay: Time from first symptom to first personal contact with doctor | GP delay: Time from first contact with general practitioner (GP) to date on written referral. | Referral delay: Time from dated referral receipt to first contact with pulmonary consultant. | | Specialist delay: Time from first contact with pulmonary consultant to dated diagnostic histology/cytology | | | | | | | | | | | | | | | | | | Hospital delay: Time from first contact with pulmonary consultant to start of treatment. | Total delay: Time from first symptom to start of treatment. |
| 46 | Thapa et al 2014 Nepal | D1=Time from onset of symptoms to fist contact with a doctor (T1-T2) or patient delay | | | | | | D 2=Time from fist contact with doctor to referral to MCVTC (T2-T3) or doctor delay | | | | | | | | | | | | | | | | | |
| 47 | Verma et al 2018 Australia | T2: Time between first symptoms to first GP consultation | T3: Time between GP and specialist consultation | | | | | | | T4: Time between specialist consultation and commencement of treatment. | | | | | | | | | | | | | | | T1: Time from first symptoms to commencement of treatment. |
| 48 | Vidaver et al 2017 USA | | Initial presentation-specialist referral | Specialist referral-specialist consultation | | | Initial presentation-confirmed diagnosis | | | Specialist consultation-treatment | | | | | | | | | | | Initial presentation-treatment | Abnormal radiograph-treatment<br><br>Confirmed diagnosis-treatment | | Treatment consultation-treatment | |

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| 49 | Wai et al 2012 Canada | | | | | | | Diagnosis to cancer centre referral<br><br>Diagnosis to radiation oncology consult | | | | | | | | | First symptom to diagnosis | | | | | | | Radiation oncology consult to start of radiation treatment | |
| 50 | Walter et al 2015 UK | | | | | | | | | | | | | | | | 'time to diagnosis', defined as the time from the first symptom/ sto the date of diagnosis | | | | | | | | |
| 51 | Wilcock et al 2016 UK | | | | | | | | | | | | | | | | | | | | | | | time from lung cancer MDT treatment recommendation to commencement of an 'active' oncological treatment | |
| 52 | Winget et al 2007 Canada | | | | | | | | | | | | | | | | | | | | | 1) diagnosis to first treatment in a cancer facility (that is, radiation or chemotherapy) | | 3) first consult with an oncologist to first treatment in a cancer facility. | |
| 53 | Yang et al 2015 China | Patient delay: First symptom to first contact with a local doctor | Delay in primary care: first contact with a local doctor to referral to hospital | | | | | | | | | | | | | Diagnostic delay in secondary healthcare: referral to hospital to diagnosis | | | | Delay in secondary health care: referral to hospital to initiation of treatment | System delay: First contact with a local doctor to initiation of treatment | Treatment delay: Diagnosis to initiation of treatment | | | |
| 54 | Yilmaz et al 2009 Turkey | patient's application interval was defined as the time passed between the onset of symptoms and the first doctor visit. | The referral interval was defined as the time from the first doctor visit to admission to one of the pneumology departments of our hospital for the further investigation | | | | | | | | | | | | | | | | | | Doctor's interval was defined as the time from the first doctor visit to thoracotomy | The treatment interval was the time passed from the diagnosis to thoracotomy | | | The total interval was the time between the onset of symptoms and thoracotomy |
| 55 | Yorio et al 2009 USA | | | | | | | | | | | | | | | | | | | | | diagnosis to treatment. | | | |

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| 56 | Zullig et al 2013 USA | | | | | | | Days from diagnosis to referral to palliative care or hospice | | | | | | | | | | | | | | Days from diagnosis to initiation of treatment | | | |
| 57 | Sachdeva et al 2017 India | | | | | | | | | | | | | | | | Delay in diagnosis from the onset of initial symptoms to histological confirmation | | | | | | | | |
| 58 | Salomaa et al 2001 Finland | | Patient's delay is the time from the first symptoms until the first visit to a doctor, who was in general, a GP | GP delay, which is the time from the date the patient visited the first doctor until the date the consultation request for a specialist was written | The referral delay is the time between the writing of the referral and the first appointment with the specialist | | The specialist's delay is the time from the first appointment until the diagnosis was made | | | | | | | | | | | | | | | The treatment delay is the time from the diagnosis until the treatment began | | | symptom-to-treatment delay |
| 59 | Sawicki et al 2013 Poland | Time from the first signs of the disease to the first medical examination | | | | | | | | | | | | | | | | | | | the time from the first visit to a doctor to the start of treatment, or disqualification from the causative treatment | | | | |
| 60 | Schultz et al 2009 USA | Time to treatment was the time from the first suspicious radiograph to the date on which any treatment was first initiated ** In patients who refused treatment, we used the date of refusal as the endpoint for time to treatment | | | | | | | | | | | | | | | | | | | | | | | |
| 61 | Shugarman et al 2009 USA | first date recorded for treatment | | | | | | | | | | | | | | | | | | | | | | | |
| 62 | Singh et al 2010 USA | | | | | | | | | | | | | | | | | | | | | | | | |

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| 63 | Smith et al 2009 Scotland | The number of days from date of first symptom defined by the participant until date of presentation of symptoms to a medical practitioner | | | | | | | | | | | | | | | | | | | | | | | |
| 64 | Sood et al 2009 NZ | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | Stokstad et al 2017 Norway | | | | | | | | | | | | | | | | | | | | | | | | |
| 66 | Sulu et al 2011 Turkey | | Patient's application interval was defined as the time elapsed from the onset of symptoms to the first doctor's visit | | The referral interval was defined as the time from the first doctor's visit to admission to our hospital for the further investigation. | | The diagnosis interval was regarded as the time elapsed from admission to our hospital to the pathological diagnosis. | | | | | | | | | | | | | | Doctor's interval was defined as the time elapsed the first doctor's visit to treatment | The treatment interval was the time elapsed from the diagnosis to treatment | | | The total interval was the time elapsed from the onset of symptoms to treatment |
| 67 | Chandra et al 2009 India | | | | | | | | | | | | | | | | symptom-to-diagnosis delay, between the onset of symptoms to confirmed diagnosis | | | | | diagnosis-to-treatment delay, between diagnosis and treatment started | | | symptom-to-treatment delay, between onset of symptoms and treatment |
| 68 | Dubey et al 2015 India | | | | | | | | | | | | | | | | The onset of symptoms to the confirmation of diagnosis | | | | | | | | |

**Table 3: Other uncommon timepoint and intervals**

| # | Author, pub date and country | Other time point or Intervals |
|---|---|---|
| 1 | Alexander et al 2016 Australia | **NSCLC:** Where systemic chemotherapy is the first anti-cancer treatment modality, in either definitive or palliative treatment settings, chemotherapy should commence within 3 weeks of the ready for care date (level III, grade C †). Adjuvant chemotherapy should commence as soon as the patient is medically fit following surgery and within 8 weeks of the date of surgery (level III, grade C †).<br>**SCLC:** Patients with severe or life-threatening symptoms should be regarded as a medical emergency and chemotherapy initiated immediately, within no longer than 48 h ‡ of the ready for care date – hospitalisation may be required (good practice point †). All other patients should commence chemotherapy within 2 weeks of the ready for care date (good practice point †) |
| 12 | Devbhandari et al 2007 UK | GP referral to chest outpatient<br>GP referral to decision to treat<br>GP referral to treatment<br>Oncology referral to chemotherapy<br>Waiting on surgical waiting list<br>Oncology referral to radiotherapy |
| 23 | Kudjawu et al 2016 France | 1) from bronchoscopy to: (a) first neo-adjuvant chemotherapy, (b) first combined neo-adjuvant radiotherapy chemotherapy, (c) surgery, (d) first chemotherapy (in patients who underwent chemotherapy only), (e) first radiotherapy (in patients who underwent radiotherapy only), (f) first treatment (irrespective of treatment type);2) from last neo-adjuvant chemotherapy to surgery; 3) from last combined neo-adjuvant radiotherapy-chemotherapyto surgery; 4) from surgery to: a) first chemotherapy, and b) first radiotherapy.1- Patients with surgical pathwayTime from bronchoscopy to surgery, Time from bronchoscopy to first neo-adjuvant chemotherapy, Time from bronchoscopy to first neo-adjuvant radiotherapy (combined to chemotherapy), Time from surgery to first chemotherapy, Time from last neo-adjuvant chemotherapy to surgery 2- Patients with non-surgical pathwayTime from bronchoscopy to first chemotherapy, Time from bronchoscopy to first radiotherapy 3- Treatment combinationTime from bronchoscopy to first treatment, Time from bronchoscopy to surgery as first treatment, Time from bronchoscopy to surgery as only treatment, Time from bronchoscopy to first chemotherapy as only treatment, Time from bronchoscopy to first radiotherapy as only treatment, Surgery followed by chemotherapy, Time from bronchoscopy to surgery, Time from surgery to first chemotherapy, Surgery followed by radiotherapy, Time from bronchoscopy to surgery, Time from surgery to first radiotherapy Chemotherapy followed by surgery and chemotherapy, Time from bronchoscopy to first neo-adjuvant chemotherapy, Time from last neo-adjuvant chemotherapy to surgery, Time from surgery to first chemotherapy, Time from bronchoscopy to surgery Chemotherapy followed by surgery, Time from bronchoscopy to first neo-adjuvant chemotherapy, Time from last neo-adjuvant chemotherapy to surgery, Time from bronchoscopy to surgery, Surgery followed by chemotherapy and radiotherapyTime from bronchoscopy to surgery, Time from surgery to first chemotherapy, Time from surgery to first radiotherapy |
| 26 | Lee et,al. 2002 UK | interval between referral by a respiratory physician and surgical out-patient attendance between referral by a respiratory physician and the surgical procedure time from surgical out-patient attendance to the surgical procedure |
| 27 | Li et al 2012 Canada | Time from surgery to post-surgical treatment.<br>Time from surgery to consultation with an oncologist. |
| 28 | Maiga et al 2017 USA | **Timepoints:**Time zero (T0) is the date of lung nodule identification on computed tomography (CT) imaging according to the medical record; T1 is the date when a lung nodule originally less than 10 mm in size was documented as having new growth on CT imaging. T2 is the date of pathology diagnosis. T3 is time of resection and final pathology diagnosis.**Intervals:**Date of lung nodule identification on CT (T0) or date when a lung nodule originally less than 10 mm (T1) to time of resection and final pathology diagnosis (T3) is the time-totreatment interval. |
| 29 | Malalasekera et al 2018 Australia | Doctor interval: First clinical presentation to First suspicious investigation<br>System interval: First suspicious investigation to Treatment start |
| 38 | Heredia et al 2012 Spain | **Interval in days between the 1st evaluation and staging<br>**Interval in days between the first evaluation and the start of treatment<br>**Interval in days between the referral date and staging<br>**Interval in days between the staging date of the tumor and the start of treatment<br>**Therapeutic delays in days since the first evaluation : Interval until surgical treatment, Interval until the start date of oncologic treatment, Interval until the start date of palliative treatment |
| 39 | Iachina et al 2017 Denmark | ** Time from referral (time of diagnosis) to end of primary investigation = 28 days<br>**Time from referral (time of diagnosis) to first day of treatment = 42 days<br>**End of primary investigation is defined as the date of decision on treatment. Referral is defined as the date where the investigating department receives the referral. |
| 40 | Ju et al 2017 USA | 1. initial radiologic lesion detection by chest x-ray or CT scan (Step 1) tp diagnostic biopsy (Step 2),<br>2. diagnostic biopsy (Step 2) to radiologic staging (Step 3),<br>3. radiologic staging (Step 3) to invasive staging (Step 4),<br>4. invasive staging (Step 4) to surgery (Step 5).<br>5. initial radiologic lesion detection by chest x-ray or CT scan (Step 1) to radiologic staging (Step 3)<br>6. initial radiologic lesion detection by chest x-ray or CT scan (Step 1) to invasive staging (Step 4)<br>7. initial radiologic lesion detection by chest x-ray or CT scan (Step 1) to surgery (Step 5) |
| 41 | Olsson et al 2009 USA | Waiting list for surgery Decision-to-treat to treatment other than surgery |
| 42 | Ost et al 2013 USA | Suspicion to treatment |
| 45 | Rolke et al 2006 Norway | Informed diagnostic delay: Time from decision of doing a diagnostic procedure to informing patient of diagnosis. |
| 46 | Thapa et al 2014 Nepal | T1=Time since the onset of symptoms to assessment at hospital (MCVTC)<br>T2=Time since fist contact with a doctor to assessment at Hospital<br>T 3=Time since referral to MCVTC with suspicion of Lung Cancer |
| 48 | Vidaver et al 2017 USA | First diagnostic test-last test |
| 49 | Wai et al 2012 Canada | Driving times to the nearest cancer center at the time of diagnosis<br>First symptom to first abnormal test<br>First abnormal test to diagnosis |
| 51 | Wilcock et al 2016 UK | From emergency admission to diagnosis<br>From emergency admission to discussion at the lung cancer MDT |
| 52 | Winget et al 2007 Canada | 2) diagnosis to first consult with an<br>oncologist |
| 54 | Yilmaz et al 2009 Turkey | The diagnosis interval was regarded as the time passed between the admission to our hospital and the pathological diagnosis was<br>made. |
| 55 | Yorio et al 2009 USA | Survival time was defined as the interval between the date of treatment and the date of death or censoring.<br>The intervals included in this analysis were image to diagnosis.<br>Image to treatment |
| 56 | Zullig et al 2013 USA | Days from diagnosis to death |
| 62 | Singh et al 2010 USA | Two types of missed opportunities that could result in diagnostic delays: (1) type I missed opportunities, defined as episodes of care in which there was failure to recognize a predefined clinical clue (ie, no required action or work-up was initiated within 7 days of clue appearance); appropriate decisions to watch and wait were not considered missed opportunities; and (2) type II missed opportunities, defined as episodes<br>of care in which there was failure to complete within 30 days a diagnostic procedure, consultation, or other requested follow-up action in response to a predefined clue. |
| 63 | Smith et al 2009 Scotland | Two definitions of first symptom were used—participant-defined and health professional defined—using a checklist of symptoms compiled from CancerResearch UK lung cancer symptoms and SIGN guidelines. **the number of days from date of earliest symptom from the symptom checklist until date of presentation of symptoms to a medical practitioner |

| # | Author, pub date and country | Other time point or Intervals |
|---|---|---|
| 64 | Sood et al 2009 NZ | ** postal delay (time taken to receive the referral at the outpatient clinic from the referrer)<br>**grading delay (time taken to grade the referral)<br>**clinic delay (interval between date of receiving referral and to date of patient assessment)<br>**interval from initial chest physician assessment to bronchoscopy<br>**interval from initial respiratory assessment to CT chest<br>**interval from initial CT chest to CT-guided fine needle aspiration (CT FNA)<br>** First respiratory assessment to final diagnosis<br>**Date referral received to diagnosis achieved<br>**Date of GP referral to first respiratory assessment<br>**First respiratory assessment to surgery<br>**Date referred to surgeons to surgery<br>**Date of oncology referral to commencement of radiotherapy<br>**Date of oncology referral to commencement of chemotherapy |
| 65 | Stokstad et al 2017 Norway | Timepoint:<br>Start of treatment as date of surgery, first fraction of radiotherapy, first day of intra-venous chemotherapy, or date of prescription of oral cancer therapy.<br><br>Time to start of treatment was defined as the number of calendar days from start time until start of treatment<br>** time to treatment decision: start time to the date when such a decision was documented in the EMR |