



## Review

## Timeliness of access to lung cancer diagnosis and treatment: A scoping literature review



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## ARTICLE INFO

## Keywords:

Lung cancer  
Wait time  
Access  
Timeliness  
Literature review

## ABSTRACT

The Institute of Medicine recently called for increased understanding of and commitment to timely care. Lung cancer can be difficult to diagnose, resulting in delays that may adversely affect survival; rapid diagnosis and treatment therefore is critical for enabling improved patient outcomes. This scoping review provides an update on timeliness of lung cancer care over the past decade. We searched PubMed for English-language articles published from 2007 to 2016 that report wait time intervals related to diagnosis and treatment of lung cancer. Two authors independently reviewed titles and abstracts for inclusion. Abstracted data included sample size, patient population, study type, dates of study, wait times, and information on disparities, survival, costs, healthcare utilization, and interventions. The final review included 65 studies from 21 different countries. A total of 96 unique variations of wait intervals were reported (e.g., time to diagnosis from first pulmonologist visit, imaging, or initial evaluation), making comparisons across studies difficult. The most common interval was diagnosis to treatment initiation, with reported medians ranging from 6 to 45 days. Fourteen articles reported information on survival, 14 on healthcare utilization, 18 on disparities, and 14 on interventions; results varied by study. Significant variation exists in how access to care time delays are reported. Many patients across different facilities and countries appear to be facing substantial waits to receive lung cancer diagnosis and care. Further research, using common wait-interval metrics, is needed to evaluate and improve timeliness of lung cancer diagnosis and treatment.

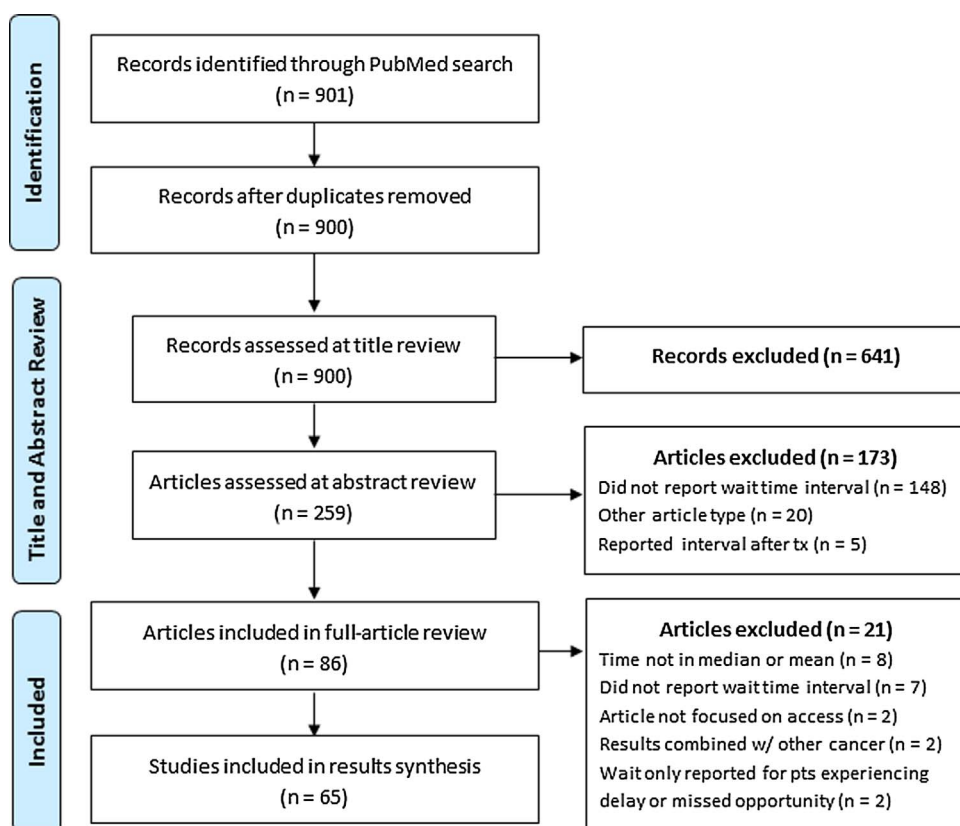
### 1. Introduction

The Institute of Medicine (IOM) released a report in June 2015 calling for greater attention to timeliness of care, which is the least studied and least understood of the IOM's six fundamental properties of high quality healthcare [1,2]. The IOM report also proposed an idealized benchmark that new patients should wait no longer than ten days for new specialty care visits, and no more than one day for urgent specialty care such as oncology.

Lung cancer can be difficult to diagnose and is the leading cause of cancer deaths worldwide [3]. Timely detection, diagnosis, and subsequent treatment for lung cancer is critical to patient outcomes and well-being. Delays in any part of the process, from initial evaluation and referral, to definitive diagnosis, treatment, follow-up, and survivorship care, may lead to adverse patient outcomes. In an effort to reduce such

delays, experts have established consensus-based standards for maximum acceptable waiting times for referral, diagnosis, and treatment specifically for lung cancer. In 1998, the British Thoracic Society (BTS) formulated a set of recommendations under the BTS Standards of Care Committee and in 2000 the RAND Corporation published target intervals for lung cancer access to care [4,5]. In 2011, the United Kingdom's (UK) National Institute for Health and Care Excellence (NICE) published revised guidelines on lung cancer care diagnosis and treatment [6]. They recommended that patients with suspected lung cancer receive a specialist appointment within two weeks and that x-rays be performed within two weeks for patients meeting certain clinical criteria for lung cancer risk. More recently, UK's National Optimal Lung Cancer Pathway proposes patient assessment pathways to be used in reference with BTS and NICE guidelines to help achieve maximum waiting times of 14 days for diagnosis and 28 days for treatment [7].

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**Fig. 1.** Identification and Selection of Articles. Articles were identified on the PubMed database and were reviewed independently by two authors at three levels: title, abstract, and full article. Tx: treatment; W/: with; Pts: patients.

Unfortunately, these standards are not always upheld, and significant delays in lung cancer care persist [8].

To begin to assess the evidence about these delays and to formulate potential questions and analytic approaches for further research, we conducted a scoping review of the literature. The primary objectives of this review were to examine how wait times experienced by patients with lung cancer have been measured and to summarize existing evidence on delays in timely care. Reviews of the timeliness of lung cancer care were published in 2009 by Olsson et al. [8] and in 2014 by Vinas et al. [9], examining lung cancer care waiting times and the relationship between waiting times and outcomes such as patient survival. We focused our review on literature published since June 2007 and expanded information collected to include costs, healthcare utilization, and disparities.

## 2. Methods

We conducted a scoping review of the medical literature using methods outlined by Arskey and O'Malley and Levac et al. [10]. Using Medical Subject Heading (MeSH) terms and keywords, we searched PubMed for English-language articles on timeliness of lung cancer diagnosis and treatment published from June 2007 to July 2016; the time period following a previously published literature review on timeliness of lung cancer care [8]. The full search term for the current review are provided in the online Supplement.

Titles were screened independently by two authors (MMJ, SCS). Articles were excluded if they represented case reports or drug trials, or did not specifically assess timeliness of lung cancer care. Articles for which there were disagreements on eligibility were included for abstract review. Abstracts of remaining articles were subjected to a second round of more detailed independent review by two authors (MMJ, SCS), and were included only if they reported a wait time interval as a study measure or result. Articles reporting only intervals after treatment initiation were excluded. Articles without abstracts available were

included for full review.

In the full article review, studies were excluded if no wait time interval was reported, wait time was reported in a value other than mean or median, reported wait times included cancer types other than lung cancer, wait times were reported only for patients already experiencing delays in care, or the primary focus of the article was not access to care. Two articles were excluded based on this last criterion: one focused on outsourcing of cytological samples for EGFR testing and the second focused on the effect of time between staging and radiation therapy on radiation target volumes. The following data were abstracted from all included articles: study country, sample size, patient population, study type, data source, dates of study, lung cancer histology, and reported wait time intervals (including mean, median, or interquartile ranges). If an article included results from more than one dataset, the sample size for lung cancer patients were summed. We also examined whether the study reported data on health care disparities, survival, costs, and healthcare utilization and if the article reported results of an intervention. All wait time intervals in this review were analyzed in days (if an article reported delays in weeks, these values were multiplied by 7; if it reported delays in months, they were multiplied by 30).

Consistent with the exploratory goals, nature, and methods of scoping reviews [10], which aim at “mapping key concepts, types of evidence, and gaps in research” [11], we did not conduct detailed assessments of the methodological quality of included studies. The primary focus of our review was to summarize existing evidence on the range of care delays reported in the literature, but also to explore the heterogeneity in how lung cancer wait times have been reported and studied. We therefore sought to report on all studies, regardless of quality, to gain a better understanding of how researchers and clinicians have evaluated timeliness of lung cancer care in various countries and settings.

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