Clinical and Organizational Factors in the Initial Evaluation of Patients with Lung Cancer

Diagnosis and Management of Lung Cancer, 3rd ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines

David E. Ost, MD, MPH; Sai-Jing Yeung, MD, PhD; Lynn Tanoue, MD; and Michael K. Gould, MD

Affiliations: from The University of Texas MD Anderson Cancer Center, Department of Pulmonary Medicine (Dr Ost) and Department of Endocrinology (Dr Yeung); Department of Pulmonary and Critical Care Medicine (Dr Tanoue), Yale University, New Havent, CT; and Department of Research and Evaluation (Dr Gould), Kaiser Permanente Southern California,
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Correspondence to: David Ost, MD, 1515 Holcombe Blvd, Unit 1462, Houston, Tx 77030-4009; e-mail: dost@mdanderson.org

1.0 METHODS

To evaluate the timeliness of care and lung cancer outcomes, we searched MEDLINE and the Cochrane Database of Systematic Reviews from 1965 to June 2011, by using the following keywords and MeSH terms: lung neoplasms, lung cancer, time management, time factors, waiting lists, timeliness, delay, survival, survival analysis, survival rate, mortality, neoplasm staging, prognosis, anxiety, depression, costs and cost analysis, and cost-benefit analysis. We also searched our own files and scanned reference lists of review articles and included reports. Our search identified 1998 studies, 130 of which were determined to be potentially relevant after scanning titles and abstracts. Of these, 8 studies described one or more time intervals for lung cancer care in a U.S. clinical setting, 18 studies examined the association between timeliness and survival or another outcome, and 6 studies reported an intervention to improve timeliness of care or surgical resection rates (Table 1S).

To evaluate whether multidisciplinary team management, as compared to conventional care, improved survival in patients with known or suspected lung cancer, we conducted an electronic search to identify all human studies from May 2005 to July 2010 using the search term keywords and combinations of "lung cancer", "multidisciplinary", "team approach" or "management". A single reviewer screened all titles and abstracts, identifying potentially relevant articles for full text retrieval. Exclusion criteria included failure to use a multidisciplinary team, failure to have a non-multidisciplinary team control arm, failure to measure impact on survival, failure to deal with lung cancer patients specifically. Review of the full text articles was then conducted. The references of the retrieved articles were also screened

and relevant review articles were searched to identify additional reports. Findings were reviewed and approved by the members of the chapter writing committee. There were 31 studies identified, and of these 14 studies were pulled for full text review. An additional 18 studies were identified through reference review.[1-21] One abstract and one letter[14] were excluded. In the remaining studies there was too much clinical heterogeneity in terms of the participants, outcomes, and comparators to statistically pool the results. These results are similar to a previously published systematic review.[22] A flow diagram is shown in Figure 1S.

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FIGURE 1S. [Section 5.0, Online Supplement]. Flow Diagram: Evaluating whether multidisciplinary team management as compared to conventional care improves survival.
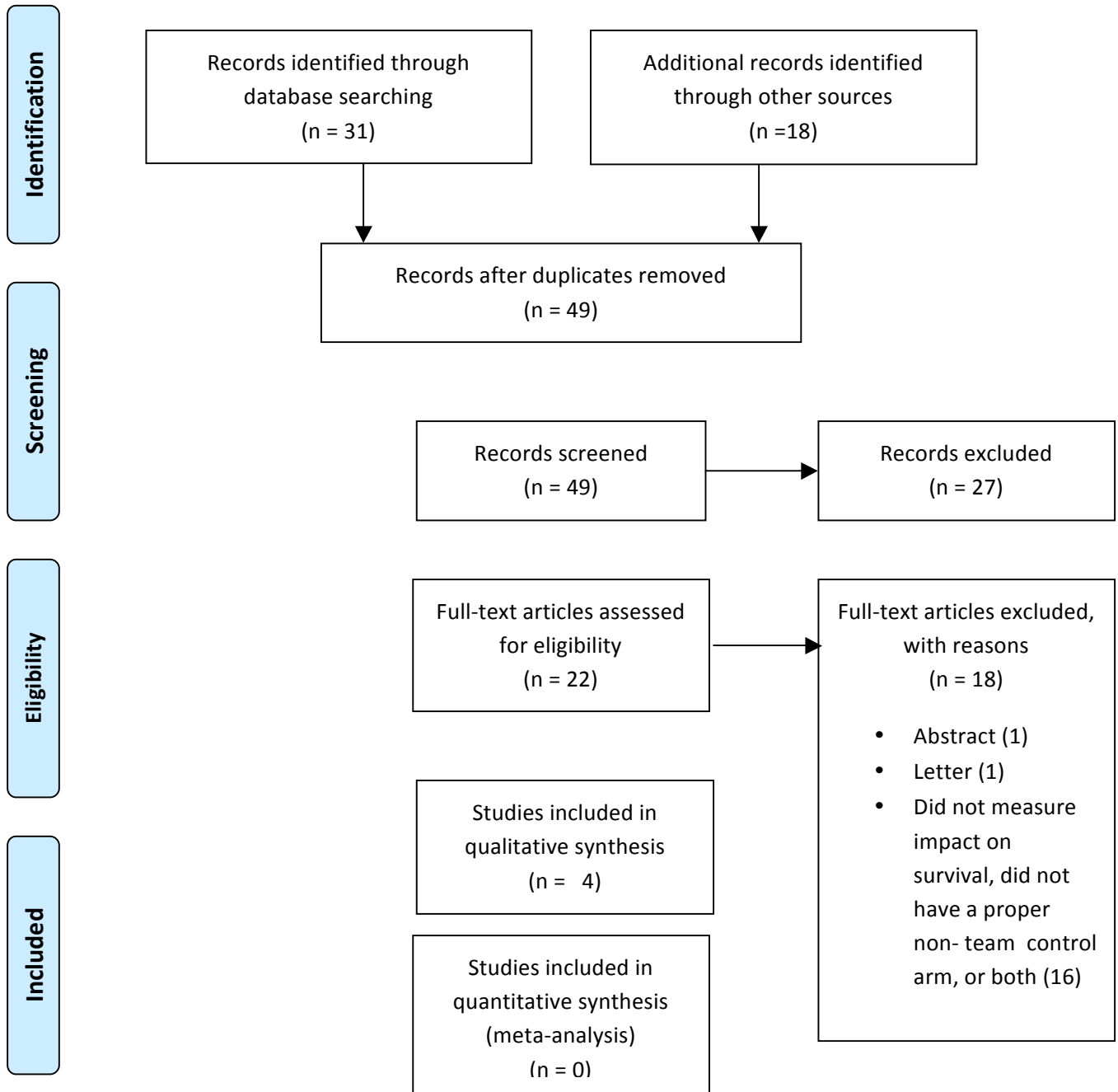
Identification

Records identified through database searching
(n = 31)

Additional records identified through other sources
(n =18)

Records after duplicates removed
(n = 49)

Screening

Records screened
(n = 49)

Records excluded
(n = 27)

Eligibility

Full-text articles assessed for eligibility
(n = 22)

Full-text articles excluded, with reasons
(n = 18)

- Abstract (1)
- Letter (1)
- Did not measure impact on survival, did not have a proper non- team control arm, or both (16)

Included

Studies included in qualitative synthesis
(n = 4)

Studies included in quantitative synthesis (meta-analysis)
(n = 0)

Table 1S—*[Section 1.0] Structured Clinical Questions*

Section	Patient Population	Intervention	Comparator	Outcome	Methods
4.4	Patients with known or suspected lung cancer	Timeliness of care	Less timely care	Response Rates and Survival	RCTs, Case control, Retrospective and prospective cohort
5.1	Patients with lung cancer requiring multimodality therapy	Multidisciplinary team care	No multidisciplinary team care	Survival	RCTs, Case control, Retrospective and prospective cohort

Table E-2. Studies of the association between timeliness of care and outcomes: methods and patient characteristics

| | Risk of bias | | | | Patient characteristics | | | | |
Author, year	Prospective?	Consecutive enrollment?	Adjustment for baseline differences?	Covariates	Inclusion criteria	Subjects, N	Age (yrs)	% men	Follow-up duration
Annakaya,[1] 2007	Yes	Not specified	Yes	Tumor stage, tumor invasion, lymph node involvement, and presence of mestastasis.	Lung cancer. Patients not admitted to hospital were excluded.	103	Median 63, Range 37-82	93	Mean 7.4±8.7 months, Median 6 months, Range 1-54 months
Aragoneses,[2] 2002	No	Yes	Yes	Age, histology, clinical and pathological stage	Surgically resected stage I and II NSCLC. Patients with no preoperative diagnosis, stage III and IV, and those not operated on within 154 days after diagnosis were excluded.	1082	Median 65, Range 32-87	Not specified	Not specified
Berthelet,[3] 2006	No	Not specified	Yes	Performance status, serum LDH levels, pleural effusion and chemotherapy.	Limited SCLC	166	Median 68, Range 35-86	44	Median 52 months, Range 10-92 months
Bozcuk,[4] 2001	No	Not specified	Yes	Demographics, histology, performance status, weight loss, labs, referral, treatment.	NSCLC (170); unknown histology (19)	189	Median 70, Range 37-89	71	NS
Bryant,[5] 2008	Yes	Yes	Yes	Age, sex, hx of smoking	NSCLC (biopsy proven and clinically staged using CT/PET) and underwent complete resection and had a complete thoracic lymphadenectomy.	762	Median: <45 group 42; >45 group 68	60	Median 3.9 years
Buccheri,[6] 2004	Yes	Yes	Yes	Performance status, stage, chest infection, cough, weight loss, bloody sputum.	Cytologically or histologically proven lung cancer.	1277	Median 66, Range 32-90	86	31 weeks
Comber,[7] 2005	Not specified	Not specified	Yes	Tumor size, age, and sex.	All incident cases of lymphomas, breast, lung, prostate, and colorectal cancers in Ireland in 1999.	2424	Not specified	Not specified	Not specified
Gould,[8] 2008	No	Yes	Yes	Age, gender, race/ethnicity, stage, histology, and treatment	NSCLC	129	Mean 67	98	Median 270 days from the date of initial suspicion and 147 days from the date of treatment.
Kanashiki,[9] 2003	No	Not specified	No		Patients with lung cancer detected through mass screening.	83	Age <70 (27) and ≥ 70 (56)	57	Not specified
Kashiwabara,[10] 2002	Not specified	Not specified	No		Asymptomatic patients with lung cancer found by mass screening and who had undergone mass screening chest roentgenorgrams one year before the disease was found.	143	Mean: Control group 68.3, Delayed group 70.3	64	Not specified
Kashiwabara,[11] 2003	Not specified	Not specified	Yes	Tumor size; Pathological type, TNM classification	Asymptomatic patients with lung cancer found by mass screening and who had undergone mass screening chest roentgenorgrams one year before the disease was found.	198	Mean: Males 70.3, Females 69.3	69	Not specified
Liberman,[12] 2006	No	Not specified	Yes	Presenting symptom, procedure, tumor pathology, TNM classification.	NSCLC patients who had undergone surgical resection or biopsy for lung cancer.	256	Mean 65.3	61	Not specified
Loh,[13] 2006	No	Not specified	No	No	NSCLC patients	122	Not specified	Not specified	Not specified
Myrdal,[14] 2004	No	Not specified	Yes	Sex, age, histology, type of treatment	NSCLC patients who received treatment with surgery, chemotherapy, or radiation.	466	Males: Mean 66, Range 44-86; Females: Mean 64, Range 39-89	58	20.4 months.
Pita-Fernandez,[15] 2003	No	Not specified	Yes	Age, sex, TNM stage, and small-cell histology.	Cytohistologically confirmed lung cancer.	378	Mean 66, Median 66, Range 31-90.	96	Mean 12.4 months, Median 6.5 months.
Quarterman,[16] 2003	No	Not specified	No		Patients who underwent surgical intervention for pathologic stage I or II NSCLC.	84	Mean 66	95	Median 3.3 years
Ringbaek,[17] 1999	No	Yes	Yes	Gender, tumor stage, histology, and treatment.	Patients with cancer-suspect lesions.	467	Mean 78	64	Median 1 year
Salomaa,[18] 2005	No	Not specified	Yes	Age, gender, histology, stage, treatment, delay in specialist therapy.	Lung cancer	132	Mean 69	72	Not specified

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Table E-3. Studies of the association between timeliness of care and outcomes: results

Author, year	Subgroups	Time intervals	Outcome(s)	Metric	Results
Annakaya,[1] 2007	All NSCLC SCLC All NSCLC SCLC	Symptom to treatment (≤60 days vs. >60 days)	Survival	Median	7 vs. 11 months, p=0.015 6 vs. 11 months, p=0.032 8 vs. 11 months, p=0.765 9 vs. 11 months, p=0.240 10 vs. 13 months, p=0.526 8 vs. 11 months, p=0.862
Aragoneses,[2] 2002		Pathological diagnosis to surgery, days	Survival	Hazard ratio	Not significant
		Pathological diagnosis to surgery (1-20 vs. 21-40; 1-20 vs 41-60; 1-20 vs. >60 days)	Survival	Hazard ratio	Not significant
Berthelet,[3] 2006		Abnormal chest x-ray to pathological diagnosis (>20 days vs. <20 days)	Complete response	Odds ratio	3.6 (1.1 to 11.3)
		Pathological diagnosis to first oncology consult (>12 days vs. <12 days)	Complete response	Odds ratio	0.35 (0.11 to 1.1)
		Oncology consult to thoracic radiation (>63.5 days vs. <63.5 days)	Complete response	Odds ratio	0.45 (0.07 to 3.1)
		Chemotherapy to thoracic radiation (>48 days vs. <48 days)	Complete response	Odds ratio	0.44 (0.07 to 2.7)
Bozcuk,[4] 2001	Stages I and II	Receipt of referral letter to first treatment (log transformed days).	Survival	Hazard ratio	Unadjusted HR 0.43, p=0.28
	Stage III				Unadjusted HR 1.3, p=0.55
	Stage IV				Unadjusted HR 0.67, p=0.22
Bryant,[5] 2008		Initial symptom or incidental finding to surgery	Survival	Median	p = 0.023
		Initial symptom or incidental finding to surgery	Survival	Hazard ratio	Not significant.
Buccheri,[6] 2004		First symptom to specialist referral, months	Symptoms	Median	Late referral associated with cough, systemic symptoms, poor performance status, weight loss, LDH, advanced stage and less effective treatment (p<0.001 for all)
		First symptom to specialist referral (≤2 months vs >2 months)	Survival	Median	43.4 months vs. 31.9 months, p<0.01
			Survival	Hazard ratio	Not significant
Comber,[7] 2005		Time to treatment	Survival	Hazard ratio (referent group <1 month)	0.67 (1-2 months), 0.36 (2-3 months), 0.49 (3-4 months), 0.45 (4-5 months), 0.39 (>5 months).
Gould,[8] 2008		Initial suspicion to treatment (<84 days vs. >84 days)	Mortality	Percent	55% vs. 80%, p=0.003
			Survival	Hazard ratio	1.6 (1.3 to 1.9)
	Solitary nodule (n=23)		Survival	2-year	100% vs. 65%, p=0.13
Kanashiki,[9] 2003		Mass-screening to final diagnosis (≤ 4 months vs. >4 months)	Survival	Median	p=0.049
Kashiwabara,[10] 2002		One year delayed detection of lung cancer on mass screening	Survival	5-year	58% (controls) vs. 46% (delayed group), P=0.13.
Kashiwabara,[11] 2003		Comparison of those who consulted a doctor when abnormal shadows were detected on chest roentgenograms (controls) and those who did not consult a doctor for at least 1 year (delayed consultation)	Survival	Hazard ratio	2.15 (1.2 to 3.8), P=0.01 (delayed consultation vs. controls)
			Survival	5-year	21% (delayed consultation) vs. 51% (controls), P=0.0003.
Liberman,[12] 2006		Symptom onset or physician visit to surgery	TNM stage I or II (vs. III or IV)	Odds ratio	1.00 (0.999 to 1.001)
		First contact with thoracic surgeon to surgery	TNM stage I or II (vs. III or IV)	Odds ratio	1.00 (0.997 to 1.002)
Loh,[13] 2006		Symptom onset to first hospital consultation (<3 months, 3 to 6 months, and >6 months)	Survival	Median	4.1 (9.9 to 1.7) versus 5.1 (10.9 to 3.2) versus 5.7 (12.3 to 2.1) months.
		Hospital consultation to treatment or decision to treat (<30 days, 30-60 days, and >60 days)	Survival	Median	4.1 (10.8 to 1.8) vs. 7.6 (13.7 to 3.2) vs. 5.3 (16.0 to 3.0) months.
Myrdal,[14] 2004		Symptom to treatment (<3 months, 3-6 months, >6 months)	Survival	3-year	11% (5% to 17%) vs. 31% (23% to 39%) vs. 35% (26% to 43%).
		Symptom to treatment, days	Survival	Hazard ratio	0.79 (0.61 to 0.97)
		First hospital visit to start of treatment (<1 month, 1-2 months, 2-3 months, and >3 months)	Survival	3-year	19% (12% to 28%), 34% (26% to 41%), 36% (25% to 46%), and 43% (31% to 55%).
		First hospital visit to start of treatment, days	Survival	Hazard ratio	0.87 (0.75 to 1.00)
Pita-Fernandez,[15] 2003		Symptom to diagnosis, months	Survival	Hazard ratio	1.01 (0.94 to 1.08)
	SCLC	Symptom to diagnosis, months	Survival	Hazard ratio	1.01 (0.75 to 1.35)
Quarterman,[16] 2003		Initial detection to surgery, days	Survival (from surgical intervention to death or last follow-up)	Hazard ratio	1.06 (0.87 to 1.30) for each 90 day increment
		Initial detection to surgery (≤ 90 days and > 90 days)	Survival (from surgical intervention to death or last follow-up)	Median	P=0.78
		Initial detection to surgery, days	Survival (from date of presentation to death or last follow-up)	Hazard ratio	HR 0.87 (0.47-1.61) for each 90-day increment
		Initial detection to surgery (≤ 90 days and > 90 days)	Survival (from date of presentation to death or last follow-up)	Median	P=0.45
		Initial detection to surgery, days	Cancer-related survival (from the date of surgical intervention)	Median	P=0.64
		Initial detection to surgery (≤ 90 days and > 90 days)	Cancer-related survival (from the date of surgical intervention)	Median	P=0.23
Ringbaek,[17] 1999		Time to operation (from initial referral?)	Survival	Hazard ratio	P=NS
Salomaa,[18] 2005		First visit to a specialist to treatment (≥ median time and < median time)	Survival	Hazard ratio	0.84 (0.52 to 1.34)

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