



Anne Silber. *Very Small Zebra* (detail). Serigraph, © 1999. Sheet size 13" x 20".

Measurements of practice performance could influence outcomes of patients with non-small cell lung cancer.

Quality-of-Care Indicators for Non-Small Cell Lung Cancer

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Background: *Quality-of-care indicators are measurable elements of practice performance that can be used to assess the quality or change in quality of the care provided. To date, the literature on quality-of-care indicators for non-small cell lung cancer (NSCLC) has not been reviewed.*

Methods: *A search was performed to identify articles reporting on quality-of-care indicators specific for NSCLC published from January 2003 to May 2009 (using MEDLINE and American Society of Clinical Oncology abstract databases). Web sites of major quality care organizations were also searched. The identified indicators were then classified by their aspect of care provision (structure-of-care, process-of-care, or outcome-of-care indicator).*

Results: *For structure-of-care quality indicators, the most cited indicators were related to the quality of lung surgery. These included being National Cancer Institute-designated cancer centers or high-volume hospitals. For process-of-care quality indicators, the most common indicators were the receipt of surgery for early-stage NSCLC and the administration of chemotherapy for advanced-stage NSCLC. For outcome-of-care quality indicators, the most cited indicators were related to postoperative morbidity or mortality after lung surgery.*

Conclusions: *Several quality-of-care indicators for NSCLC are available. Process-of-care indicators are the most studied. The use of these indicators to measure practice performance holds the promise of improving outcomes of patients with NSCLC.*

Introduction

Several reasons lend support to a closer look at the quality of care for patients with non-small cell lung cancer (NSCLC). First, lung cancer continues to be the leading cause of cancer death. In 2008 alone, about 160,000 Americans died of lung cancer, and approximately 90% of these deaths were due to NSCLC.¹ Second, treatment of NSCLC is complex, resulting in wide variations in the patterns of care and thus the potential for suboptimal care. Appropriate care of patients with NSCLC requires coordination among multidisciplinary specialists, and

the staging system for NSCLC has undergone numerous changes.² Third, newer diagnostic methods and treatments for NSCLC are costly. For instance, bevacizumab for metastatic NSCLC costs about \$350,000 per year of life gained.³ Such great expenditure clearly deserves a close monitoring of whether moneys are used appropriately. Finally, in recent years, data from several high-quality randomized clinical trials have become available, making it possible to objectively define certain standards of care based on patient outcomes.

Measuring the quality of care in NSCLC, however, is not an easy task. It is unclear what should be used to make this measurement. Based on the aspect of care provision, three types of quality indicators can be classified, each having their own inherent advantages and disadvantages.⁴ The first type, structure of care, focuses on the setting or the delivery of care, such as university hospital vs community hospital, and readily reflects the available resources — and thus corresponding potential capacity. However, this type of mea-

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sure is not always actionable, thus providing limited opportunities for improvement. The second type of indicator, process of care, focuses on the type of care a patient receives for a given situation, such as radiation vs surgery, and is thus more actionable and has often been linked more strongly to patient outcome than structure-of-care indicators are. Process-of-care indicators, however, do not take into account the individual patient's unique situation, which may justify deviation from a standard care. The third type of indicator, direct outcome of care, focuses on the end results of care, such as a mortality rate, thus truly reflecting the "bottom line." This type of indicator has a limitation when used in a small-volume setting because variations in the patient population, rather than in the quality of care itself, can confound this measurement and result in an inaccurate interpretation.

To date, the literature on quality-of-care indicators for NSCLC has never been reviewed. There is no universal agreement on what should constitute the quality-of-care indicators for NSCLC, although several reports have attempted to investigate the care patterns in NSCLC. Therefore, the focus of this article is to review literature on contemporary quality-of-care indicators in NSCLC. To reflect the current state of practice, this article summarizes the quality-of-care indicators that have been used to measure the quality of care in patients with NSCLC, published during the past 5 years or available on the Internet in May 2009. The identified indicators are classified by their aspect of care provision. Lastly, the results of measurements by the reported indicators are reviewed.

Literature Search

The MEDLINE database was searched for studies of lung cancer care published from January 2003 to May 2009. The search terms used included the Medical Subject Heading terms "retrospective studies" and "outcomes," with keywords "quality," "physician practice patterns," "receipt," "guidelines," and "health services research," modified with keywords "lung cancer" and "lung neoplasm," and the Medical Subject Heading term "lung neoplasms — therapy." Abstracts from resulting citations were reviewed, and relevant journal articles were

retrieved and reviewed. In addition, reference lists of the retrieved articles were checked for additional relevant articles. Abstracts from the American Society of Clinical Oncology annual meetings from 2003 to 2008 were also searched. In addition, because many of the quality indicators have been developed by organizations that list their results on the Internet but do not necessarily publish these results in scientific literature, an Internet search was performed using the Google search engine. Web sites of organizations dealing with quality-of-care issues, including the Agency for Healthcare Research and Quality (AHRQ), the National Quality Measures Clearinghouse (NQMC), the National Committee for Quality Assurance (NCQA), the Healthcare Effectiveness Data and Information Set (HEDIS), the National Quality Forum (NQF), and the Organization for Economic Cooperation and Development (OECD), were specifically searched for relevant quality-of-care indicators in NSCLC.

Structure-of-Care Quality Indicators for NSCLC

Seven unduplicated reports were identified that described structure-of-care indicators specific for NSCLC (Table 1).⁵⁻¹³ Due to the structural characteristic of the indicators, they are often applicable to other cancers, not necessarily only to NSCLC.

The most cited indicators were related to the quality of lung surgery. Birkmeyer et al⁵ described a clear difference in the quality of care among low-volume and high-volume hospitals with regard to lung resection. Centers in the lowest 20% by volume, when compared with those in the highest 20% by volume, were less likely to prescribe a stress test, a recommended procedure before thoracic surgery, and less likely to initiate perioperative invasive monitoring. In addition, mortality rates for thoracic surgery were lower for patients treated at National Cancer Institute-designated cancer centers than for patients treated at other institutions.⁶

Other indicators not related to lung surgery are available. For instance, Hermens et al⁹ and Ouwens et al^{10,11} proposed the use of multidisciplinary clinic consultation as an indicator. Arguably one of the most important aspects of lung cancer care is the use of a multidisciplinary approach because lung cancer is a complex disease

Table 1. — Structure-of-Care Quality Indicators Specific for NSCLC

Source	Quality Indicators
Birkmeyer et al ⁵	Thoracic surgery performed at high-volume hospital as opposed to low-volume hospital
Birkmeyer et al ⁶	Thoracic surgery performed at National Cancer Institute designated cancer centers as opposed to other centers
Cheung et al ⁷	Thoracic surgery performed at a teaching facility as opposed to nonteaching facility
Farjah et al ⁸	Thoracic surgery performed by a thoracic surgeon as opposed to a general surgeon
Hermens et al ⁹ Ouwens et al ^{10,11}	Availability of a multidisciplinary lung cancer consultation
The National Quality Forum ¹²	Availability of treatment summary upon radiation treatment completion; availability of documented cancer stage
National Quality Measures Clearinghouse ¹³	Availability of correlation with other relevant imaging studies (x-ray, CT scan, MRI) in diagnostic radionuclide scan report

requiring coordination among multiple specialists, including a pathologist, radiologist, thoracic surgeon, radiation oncologist, medical oncologist, oncology nurse, pharmacist, and social worker. A multidisciplinary clinic, which often involves a multidisciplinary meeting (sometimes called a “tumor board”), enables direct discussion between specialties to determine the best treatment approach for each patient. In the management of lung cancer, multidisciplinary consultation has been shown to increase the use of appropriate treatments, with associated improved patient survival.¹⁴

Process-of-Care Quality Indicators for NSCLC

Nine unduplicated reports were identified that contained process-of-care indicators specific for NSCLC (Table 2).^{9-13,15-21} One report¹⁶ focused only on patients

who were undergoing pulmonary resection. Compared with structure-of-care indicators, process-of-care indicators in NSCLC have several distinct features.

Unlike the structure-of-care indicators, process-of-care indicators are more frequently supported by randomized controlled trials. Perhaps the best two examples are the use of adjuvant chemotherapy for early-stage NSCLC and palliative chemotherapy for advanced-stage NSCLC. According to a pooled analysis of randomized controlled trials of 4,584 patients, postoperative cisplatin-based chemotherapy increased the absolute 5-year survival rate by 5.4% among patients with early-stage NSCLC.²² For patients with advanced-stage NSCLC, systemic chemotherapy, as shown in multiple large randomized trials, also increased patient survival when compared with best supportive care alone.^{23,24}

Table 2. — Process-of-Care Quality Indicators Specific for NSCLC

Source	Quality Indicators
Blayney et al ¹⁵	Adjuvant chemotherapy recommended and received by patients after curative resection for NSCLC stage IIA, IIB, or IIIA Adjuvant cisplatin-based chemotherapy recommended and received for patients within 60 days after curative resection for NSCLC stage IIA, IIB, or IIIA Adjuvant chemotherapy recommended and received after curative resection for NSCLC stage IB or II (lower score: better)
Cassivi et al ¹⁶	Smoking cessation consultation offered to all smokers within 30 days of pulmonary resection For lung resection, documentation of mediastinal staging by one of the following procedures: cervical mediastinoscopy, FDG-PET, or mediastinal lymphadenectomy Incentive spirometry used following lung resection After lung resection, for patients with analog pain of at least 6/10, treatment implemented with reassessment of pain score within 2 hours Pulmonary function testing obtained within 1 year before lung resection ECG obtained within 90 days before lung resection Smoking history documented before lung resection
Chien et al ^{17,18}	Adjuvant radiation for stage I–III NSCLC Neoadjuvant chemotherapy for locally advanced NSCLC Definitive chemoradiation for locally advanced NSCLC Chemotherapy for advanced NSCLC
Hermens et al ⁹ Ouwens et al ^{10,11}	Mediastinoscopy preceded by FDG-PET Cervical mediastinoscopy carried out according to guideline criteria Cervical mediastinoscopy and biopsies of at least 4 of the 6 accessible lymph node stations Clinical stage III NSCLC for which a skeletal scintigraphy and a CT or MRI of the brain was done before the start of combination therapy Locally advanced NSCLC with performance status 0 or 1 that was treated with combination therapy
M. D. Anderson Physicians Network ¹⁹	Smoking history documented at initial assessment Patients assessed with numeric pain scale at every episode of care Patients assessed for family history of lung cancer
The National Quality Forum ¹²	For radiation oncology, radiation dose limits to normal tissue Pain intensity quantified and plan of care for pain available
National Quality Measures Clearinghouse ¹³	For lung cancer patients receiving 3-dimensional conformal radiation therapy, radiation dose limits to normal tissues were established prior to the initiation for a minimum of 2 tissues
Oxnard et al ²⁰	Stage IA, lobectomy Stage IB and II, lobectomy with adjuvant chemotherapy or lobectomy alone (before International Adjuvant Lung Cancer Trial [IALT]) Stage IIIA and IIIB, neoadjuvant chemoradiation with resection or chemoradiation with platinum doublet Stage IV (including IIIB with malignant effusion), platinum doublet or single-agent chemotherapy
Potosky et al ²¹	Stage I and II, pneumonectomy or lobectomy Stage IIIA, pneumonectomy, lobectomy, or chemoradiation Stage IIIB, chemoradiation Stage IIIB, with pleural effusion, chemotherapy with or without radiotherapy Stage IV, chemotherapy
FDG-PET = fluorodeoxyglucose-positron-emission tomography.	

In addition, unlike structure-of-care indicators, these reported process-of-care indicators are often systematically derived from clinical practice guidelines, with refinement by expert consensus (Table 3).^{9-11,15-18,20,21} One report used a Delphi method to develop indicators.⁹⁻¹¹ The Delphi method is a systematic, interactive forecasting process that relies on a panel of independent experts.²⁵ The process begins with experts providing input in two or more rounds; then, after each round, a facilitator provides an anonymous summary of the experts' forecasts from the previous round. Participants are encouraged to revise their earlier input based on replies from other members of the group. During this process, the variability of the opinions will decrease and the group will converge toward the optimal answer.

Nevertheless, the available process-of-care indicators have limitations. When classified by applicable tumor stage (Table 4),^{9-11,15,17,18,20,21} it is clear that some are not adequately inclusive. For example, some contain no process-of-care quality indicators specific for stage IV NSCLC, the most common stage of NSCLC at presentation. In addition, other reports are outdated. For instance, adjuvant chemotherapy for early-stage NSCLC was initially not routinely recommended, as reflected in the earliest three publications in Table 4, but subsequently recommended, as reflected in the two subsequent publications. Of these latter two publications, only one truly reflects the standard of care because adjuvant chemotherapy is currently no longer routinely recommended for stage IB patients.

Table 3. — Methodology in Development of Selected Process-of-Care Quality Indicators in NSCLC

Characteristic	Potosky et al ²¹	Chien et al ^{17,18}	Hermens et al ⁹ Ouwens et al ^{10,11}	Oxnard et al ²⁰	Blayney et al ¹⁵	Cassivi et al ¹⁶
Year of publication	2004	2006	2006	2007	2007	2009
Country	United States	Taiwan	The Netherlands	United States	United States	United States
Source of indicators	Literature review and practice guidelines	Textbook and practice guidelines	Expert consensus, patient, and practice guidelines	Literature review and practice guidelines	Not specified	Expert consensus and NQF
Method of indicator selection	Not specified	Evidences from randomized controlled trials	A panel of experts with Delphi method	Not specified	Not specified	Not specified
Number of total quality-of care indicators	5	15	5	4	6	13
Clinometric measurement	Process of care	Process of care	Process of care, structure of care, and direct outcome of care	Process of care	Process of care	Process of care, structure of care, and direct outcome of care
Number of process-of-care indicators	5	5	5	7	6	5

NQF = The National Quality Forum.

Table 4. — Process-of-Care Quality Indicators Classified by NSCLC Stage

Characteristic	Potosky et al ²¹	Chien et al ^{17,18}	Hermens et al ⁹ Ouwens et al ^{10,11}	Oxnard et al ²⁰	Blayney et al ¹⁵
Stage I	Lobectomy or pneumonectomy	No adjuvant radiation	Patients with surgery had mediastinoscopy preceded by PET	For IA, lobectomy; for IB, lobectomy with adjuvant chemotherapy	No adjuvant chemotherapy recommended for stage IA or IB; no adjuvant radiation recommended for stage IA or IB
Stage II	Lobectomy or pneumonectomy	No adjuvant radiation	Patients with surgery had mediastinoscopy preceded by PET	Lobectomy with adjuvant chemotherapy	Adjuvant chemotherapy after curative resection recommended or received; adjuvant cisplatin-based chemotherapy within 60 days after resection
Stage III	For IIIA, lobectomy, pneumonectomy, or chemoradiation; for IIIB, chemoradiation	Neoadjuvant chemotherapy or definitive chemoradiation	Patients with surgery had mediastinoscopy preceded by PET; bone scan and MRI or CT of the brain performed	Neoadjuvant chemoradiation with resection or chemoradiation with platinum doublet	For IIIA, adjuvant chemotherapy after curative resection recommended or received; for IIIA, adjuvant cisplatin-based chemotherapy within 60 days after resection
Stage IIIB with effusion or IV	Chemotherapy with or without radiation for IIIB; chemotherapy for IV	Chemotherapy	Not applicable	Chemotherapy with platinum doublet or single-agent chemotherapy	Not applicable

Other identified process-of-care indicators may not be specific to NSCLC such as pain assessment and management (Table 2). Arguably one of the strongest and best-known cancer quality-of-care indicators, standardized assessment of pain has been shown in numerous studies to improve both patient and staff satisfaction with pain management, sometimes leading to improved analgesic prescribing practices.²⁶ Another important quality-of-care indicator is smoking intervention. The documentation of smoking history as a vital sign can increase the rate of interventions given to smokers, but it may not necessarily increase the rate of smoking cessation.²⁷

Outcome-of-Care Quality Indicators for NSCLC

Fewer reports on outcome-of-care indicators in NSCLC are available than process-of-care indicators. Four reports were identified that included outcome-of-care indicators specific for NSCLC (Table 5).^{9-11,16,19,28} The most frequent indicators were those specifically for surgical patients. These indicators measure fatality or notable complications following pulmonary resection and therefore are largely applicable for patients with early-stage NSCLC.

Other outcome-of-care indicators include patient satisfaction and promptness of treatment. For patients with advanced-stage NSCLC, prognosis is poor and survival outcome alone may not be an optimal indicator for quality of care. For this purpose, patient perception and satisfaction appear more practical. Hermens et al⁹ and Ouwens et al^{10,11} proposed outcome measurements on pain and psychosocial well-being. The M. D. Anderson

Physicians Network proposed time from diagnosis to the first treatment as indicators, although this can be difficult to interpret because the time taken from diagnosis to the first treatment can vary based on the certainty of diagnosis and the type of decided treatment.

Quality of Care in NSCLC Based on Selected Indicators

Many of the quality indicators listed here have been used to measure the quality of care in actual practices. The findings are reviewed below. Observations are grouped by whether the indicators were structure of care, process of care, or outcome of care.

Structure-of-Care Indicators

Based on their structure-of-care indicators, Hermens et al⁹ and Ouwens et al^{10,11} reported on the results when applied to six large hospitals in The Netherlands. A multidisciplinary clinic consultation was available in only two hospitals; the proportion of patients who had a multidisciplinary consultation was 57% (range, 26% to 91%). Regarding quality of lung surgery, Farjah et al,⁸ using a SEER database, reviewed 19,745 patients who underwent lung surgery from 1992 through 2002. Of these patients, 24% were operated on by general surgeons rather than by thoracic or cardiothoracic surgeons.

Process-of-Care Indicators

For process of care, there were five unduplicated reports with stage-specific indicator results (Table 6).^{9-11,15,17,18,20,21} Quality-of-care in NSCLC in these reports, particularly

Table 5. — Outcome-of-Care Quality Indicators Specific for NSCLC

Source	Quality Indicators
M. D. Anderson Physicians Network ¹⁹	Time from diagnosis to first treatment Percentage of surgery patients dying within 30 days of surgery Percentage of patients enrolled in clinical trials
Cassivi et al ¹⁶	In-hospital and 30-day mortality after lung surgery Documentation of any “never events”* relevant to general thoracic surgery Occurrence of significant pain at least 6/10 on analog scale Atrial fibrillation after lung resection treated within 45 minutes of its onset
Hermens et al ⁹ Ouwens et al ^{10,11}	Diagnostic trajectory completed within 21 calendar days from first visit to pulmonologist Patients started therapy within 35 calendar days from first visit to the pulmonologist Patients reported that attention was paid to physical symptoms: pain, suffocation, nausea, fatigue, weight loss and insomnia Patients reported that they were asked about psychosocial stress factors and psychological symptoms Patients reported that they were asked about psychosocial problems in family and problems at work Patients who needed psychosocial care received it from trained providers Patients reported that they were treated adequately Patients reported that they were informed about the existence of an oncology nurse specializing in lung cancer
Mainz et al ²⁸	For surgical patient, 30-day in-hospital mortality rate For surgical patient, 30-day fatality rate

* “Never events” refer to undesirable outcomes defined by the National Quality Forum. These include surgery performed on the wrong body part, surgery performed on the wrong patient, wrong surgical procedure, retention of foreign object in a patient after surgery, intraoperative or immediately postoperative death of a normal American Society of Anesthesiologist Class I patient, death or serious disability associated with the use of contaminated drugs, devices, or other biologics, death or a previous disability due to a device used other than as intended, death or disability due to intravascular air embolism, medication error, incompatible blood product, or hypoglycemia, stage 3 or 4 pressure ulcer in hospital, any incident in which a line designated for oxygen or other gas to be delivered to a patient contains the wrong gas or is contaminated by toxic substance, patient death or disability associated with a burn, a fall, or use of a restraint or bed rail in hospital.

in early-stage NSCLC, appeared good. For early-stage NSCLC, the mainstay of treatment is surgical resection followed by adjuvant chemotherapy. These reports indicated that the rate of surgical resection for early-stage NSCLC ranged from 24% to 91%. The lowest rate was observed in the one study that focused on an elderly population.²⁰ With regard to adjuvant chemotherapy for early-stage NSCLC, the rate of compliance in a small, preliminary set of patients in a single tertiary care center was reported to be excellent, appropriately administered to 91% of patients.¹⁵

However, the quality of care for locally advanced (stage III) and advanced NSCLC (stage IIIB or IV) appears to have room for improvement. For patients with stage III disease, recommended therapy is either surgery or chemoradiation. It appears that patients receive appropriate therapy in only about 50% of cases. For patients with advanced NSCLC, the appropriate therapy is chemotherapy. The rate of chemotherapy usage as observed in these reports ranged from 6% to 41%, with the lowest rate shown in the one study conducted in elderly patients.²⁰

Outcome-of-Care Indicators

For outcome of care related to surgery, Cassivi et al¹⁶ evaluated the care of 606 patients who underwent pulmonary resection at the Mayo Clinic in Rochester, Minnesota, in 2005. The 30-day mortality rate was 2%. The occurrence of National Quality Forum “never events” (Table 5) was 0%. In their report, atrial fibrillation treatment within 45 minutes was achieved in 71%, and pain treatment was carried out appropriately in 81% of patients. Mainz et al²⁸ reported on a national benchmarking project among Nordic countries in 2005. For lung cancer, the 30-day in-hospital mortality rate after lung surgery was 3.2%, and the 30-day fatality rate was 3.8%.

For the outcome of care in NSCLC not related to surgery, Hermens et al⁹ and Ouwens et al^{10,11} reported on patient-oriented outcomes. The authors found that 58% of patients reported that adequate attention was paid to their physical symptoms (pain, suffocation, nausea, fatigue, weight loss, and insomnia), and 34% of patients reported that they were asked about psychosocial stress factors and psychological symptoms.

Table 6. — Examples of Quality of Care in NSCLC as Assessed by Process-of-Care Quality Indicators

Characteristic	Potosky et al ²¹	Chien et al ^{17,18}	Hermens et al ⁹ Ouwens et al ^{10,11}	Oxnard et al ²⁰	Blayney et al ¹⁵
Total number of patients tested	898 (240 stage I or II, 297 stage III, 361 stage IV)	4,565 (stages not specified)	276 (57 stage I, 22 stage II, 74 stage III, 123 stage IV)	104 (17 stage IA, 17 stage IB and II, 20 stage III, 50 stage IV)	80 (stages not specified)
Population being measured	Random patients from SEER registry during 1998–1999	All patients with lung cancer treated in a center during 1991–2002	All patients diagnosed with NSCLC from 6 centers in The Netherlands 2004–2005	All patients with NSCLC age 80 years or older treated as outpatients at a center 2001–2005	Selected patients with NSCLC at a tertiary care center in 2007
Care of stage I NSCLC patients	Pneumonectomy or lobectomy 69%	Postoperative radiation 0.5%	For operated patients, mediastinoscopy preceded by PET scan 88%; mediastinoscopy according to guideline 84%; biopsies of at least 4 lymph node stations 50%	Stage IA, lobectomy 32%; stage IB, lobectomy 24%	Appropriate adjuvant chemotherapy 91%
Care of stage II NSCLC patients	Pneumonectomy or lobectomy 69%	Postoperative radiation 0.5%	For operated patients, mediastinoscopy preceded by PET scan 88%; mediastinoscopy according to guideline 84%; biopsies of at least 4 lymph node stations 50%	Lobectomy 24%	Appropriate adjuvant chemotherapy 91%
Care of stage III NSCLC patients	Lobectomy, pneumonectomy or chemoradiation 48%	For operated patients, postoperative radiation 16% and preoperative chemotherapy 26%; for nonoperated patients, chemoradiation 70%	For operated patients, mediastinoscopy preceded by PET scan 88%; mediastinoscopy according to guideline 84%; biopsies of at least 4 lymph node stations 50%; bone scan and MRI or CT of the brain performed before treatment 3%	Neoadjuvant chemoradiation with resection 5%; chemoradiation with platinum doublet 30%	Appropriate adjuvant chemotherapy 91%
Care of stage IIIB with effusion or IV NSCLC patients	Chemotherapy 41%	Chemotherapy 40%	Not applicable	Platinum doublet 6%; single-agent chemotherapy 30%	Not applicable

SEER = Surveillance, Epidemiology and End Results (including data from Connecticut; Iowa; New Mexico; Atlanta, GA; Detroit, MI; San Francisco-Oakland, CA; Seattle-Puget Sound, WA; Utah; San Jose-Monterrey, CA; and Los Angeles, CA).

Discussion

Based on this review, there are many structure-of-care, process-of-care, and outcome-of-care indicators with their own unique advantages and disadvantages. Assessing quality of care is one of the first steps in ultimately improving health outcomes in patients as it provides a baseline of the rate of current health practices. In addition, the process of assessing care can itself immediately improve the care as the physicians are aware of the ongoing assessment (Hawthorne effect).

In recent years, initiatives have been established to improve the care of cancer patients. Perhaps the most well-known is the Quality Oncology Practice Initiative (QOPI).²⁹ QOPI is a quality improvement project supported by the American Society of Clinical Oncology that allows oncology practices to record their performance on selected quality indicators and then compare their results with other practices on a biannual basis. This initiative provides results that served as a benchmark for other oncology practices using a Web-based program.¹⁵ The recording of the timely changes in quality indicators is important, especially for process of care, which constantly changes according to changing standards of care.

A few limitations to this report should be mentioned. While this review provides an overview of available current quality-of-care indicators in NSCLC, it is not comprehensive. Also, other important indicators may have been missed. The identified indicators are classified by the aspect of care provision, although such classification may not always be reliable since this is subject to individual interpretation.

Conclusions

Several quality-of-care indicators in NSCLC are available in the literature, and they have their own unique advantages and disadvantages. Through the use of these indicators, there is a potential to improve the care of patients with NSCLC. Further studies are needed to continually improve on these indicators and to understand their impact on patient outcomes.

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