



## Evidence-Based Series 17-1 Version 2 IN REVIEW

A Quality Initiative of the  
Program in Evidence-Based Care (PEBC), Cancer Care Ontario (CCO)

### Thoracic Surgical Oncology Standards

*The Expert Panel on Thoracic Surgical Oncology*

A Special Project of the Surgical Oncology Program, Cancer Care Ontario and  
The Program in Evidence-Based Care, Cancer Care Ontario  
Developed by the Expert Panel on Thoracic Surgical Oncology

An assessment conducted in January 2026 placed Evidence-based Series (EBS) 17-1 Version 2 IN REVIEW. This means it is undergoing a review for currency and relevance. It is still appropriate for this document to be available while this updating process unfolds. The PEBC has a formal and standardized process to ensure the currency of each document ([PEBC Assessment & Review Protocol](#))

Edits were made with respect to esophagectomy surgical volumes in August 2021.

EBS 17-1v2 is comprised of 5 sections. You can access the summary and full report here:

<https://www.cancercareontario.ca/en/guidelines-advice/types-of-cancer/2171>

Section 1: Standards (ENDORSED)

Section 2: *Systematic Review* (available from [ccopgi@mcmaster.ca](mailto:ccopgi@mcmaster.ca)).

Section 3: Guideline Development and External Review - Methods and Results

Section 4: Document Review Summary and Tool

Section 5: Review of Esophageal Cancer Surgery Recommendations

Release Date: March 4, 2015

For information about the PEBC and the most current version of all reports,  
please visit the CCO website at <http://www.cancercare.on.ca/>

or contact the PEBC office at:

Phone: 905-527-4322 ext. 42822 Fax: 905-526-6775 E-mail: [ccopgi@mcmaster.ca](mailto:ccopgi@mcmaster.ca)

**PEBC Report Citation (Vancouver Style):** The Expert Panel on Thoracic Surgical Oncology. Thoracic surgical oncology standards. Sundaresan S, Haynes AE, reviewers. Toronto (ON): Cancer Care Ontario; 2005 Sep 9; Endorsed 2015 March 4 [In Review 2026 Jan]. Program in Evidence-Based Care Practice Guideline Report No.: 17-1 Version 2 IN REVIEW.

**Journal Citation (Vancouver Style):** Sundaresan S, Langer B, Oliver T, Schwartz F, Brouwers M, Stern H, et al. Standards for thoracic surgical oncology in a single-payer healthcare system. Ann Thorac Surg. 2007;84(2):693-701.

IN REVIEW

## Guideline Report History

GUIDELINE VERSION	SYSTEMATIC REVIEW		PUBLICATIONS	NOTES and KEY CHANGES
	Search Dates	Data		
Original September 2005	1990 through December 2004	Full Report	Peer review publication Web publication	NA
Current Version 2 March 2015	2004 to December 23, 2013	New data found in Section 4: Document Review Summary and Review Tool	Updated web publication	2005 recommendations are <b>ENDORSED</b>
Current Version 2 March 2015	2013 to Feb 2020	New data found in Section 5: Review of Esophageal Cancer Surgery Recommendations	Updated web publication	Changes and new qualifying statement to thoracic surgery volume

**Evidence-Based Series #17-1 Version 2: Section 1**

**Thoracic Surgical Oncology Standards**

*S. Sundaresan, B. Langer, T. Oliver, F. Schwartz, M. Brouwers, H. Stern,  
and the Expert Panel on Thoracic Surgical Oncology*

A Special Project of the Surgical Oncology Program, Cancer Care Ontario and  
The Program in Evidence-Based Care, Cancer Care Ontario.  
Developed by the Expert Panel on Thoracic Surgical Oncology.

**Report Date: September 9, 2005**

**These guideline recommendations have been ENDORSED, which means that the recommendations are still current and relevant for decision making. Please see Section 4: Document Review Summary and Tool for a summary of updated evidence published between 2005 and 2013, and for details on how this Clinical Practice Guideline was ENDORSED. Edits were made with respect to esophagectomy surgical volumes in August 2021; See Section 5.**

**Question**

What is the optimum organization for the delivery of cancer-related thoracic surgery in Ontario?

**Scope of Standards**

The following standards, developed by the Expert Panel on Thoracic Surgical Oncology, apply to thoracic surgical oncology and include the full spectrum of multi-disciplinary assessment and treatment.

**Surgeon Criteria**

General characteristics for surgeons undertaking the management of patients with thoracic cancer are as follows:

- Knowledgeable about thoracic cancer biology, behaviour, and natural history.
- Well informed of appropriate investigation techniques, multidisciplinary treatment options as well as postoperative management and the continuum of care.
- Skilled in modern techniques of surgery of the thoracic region.
- Experienced in the management of patients with thoracic diseases, specifically, the management of their complications, early and late.

- Committed to providing excellence in care to patients with thoracic diseases, specifically cancer patients, and to advancing knowledge in the field to improve patient outcomes.
- Committed to participating as a member of a multidisciplinary oncology team or to consulting with such teams.
- Committed to participating in Cancer Care Ontario initiatives, particularly those of the Surgical Oncology Program, and/or in the Program in Evidence-Based Care through membership in working groups, standing groups, or as active participants in external review and consultation processes.

### **Training**

- Surgeons should have completed formal training in programs such as the Royal College of Physicians and Surgeons of Canada (RCPSC) programs in thoracic surgery, cardiothoracic surgery or cardiovascular and thoracic surgery, or the American Board of Thoracic Surgery or other equivalent training recognized in Canada, and be certified and licensed to practice thoracic surgery in Canada.
- Surgeons should maintain expertise and competence through ongoing education in available Continuing Professional Development (CPD) programs, such as the Maintenance of Certification (MOC) program of the RCPSC or others.

### **Practice Setting**

- Level 1 Tertiary care regional thoracic centres should be equipped to manage the full range of thoracic surgical care, as well as acting as the primary source to manage the most complex cases. To facilitate this goal, there should ideally be at least three thoracic surgeons on staff to provide intraoperative assistance and postoperative care, and weekend, holiday and emergency coverage.
  - This number of surgeons is needed to provide the capacity for tertiary clinical care in addition to the other requirements and responsibilities of a multidisciplinary cancer care facility, including teaching, research, quality improvement, and program advancement.
  - A team approach is understood to improve the quality of surgery in complex cases and the judgment required to manage complications.
- In some regions of the province, the population may not support a Level 1 thoracic centre. In these regions, a Level 2, or secondary care unit, may be established to serve the basic thoracic surgery needs of the population.
  - Level 2 centres should have:
    - A minimum of one thoracic surgeon who performs routine thoracic procedures.
    - A formalized relationship with a Level 1 tertiary centre to which the thoracic surgeon may refer complex thoracic cases (e.g., tracheal resections, esophageal cancers, major chest wall resections, etc.).
    - Arrangements with surgical colleagues in those centres to provide support in the event of the thoracic surgeon's absence.
- Level 2 centres performing esophagectomies should meet the same criteria for human resources, hospital resources, and practice setting recommendations (e.g., three thoracic surgeons and a dedicated surgical service) as a Level 1 centre. The volume of pulmonary resections would remain at 50 cases per year. The volume of esophagectomies should be 15 cases per year.
- Hospitals not meeting Level 1 or 2 thoracic surgery criteria should establish formal relationships with a Level 1 or Level 2 centre to facilitate consultation, appropriate management and referral of patients with thoracic malignancies. For those hospitals where

the geographic location, patient volume or population catchments do not support Level 1 or 2 status, the basic thoracic service needs may still be provided in that area through formal relationships with Level 1 and 2 centres. Guided by the expertise of these centres, much of the initial/pre-operative evaluation can be conducted at that hospital itself. The surgical care would require transferring the patient to the Level 1 or 2 Thoracic surgery unit. However, upon completion of the surgery, the patients can return to the originating centre for ongoing care and follow-up as deemed appropriate and necessary by the multidisciplinary group at the Level 1 or 2 centre.

### **Volume of Thoracic Surgery**

- The practice setting should have a sufficient volume of thoracic surgery to maintain the skills of surgeons in both complex cancer surgery and thoracic surgery.
- Surgical volumes of a minimum of 150 pulmonary resections per unit per year should be considered targets for Level 1 centres.
- Surgical volumes of a minimum of 50 pulmonary resections per unit per year should be considered targets for Level 2 centres.
- Surgical volumes of a minimum of 15 esophagectomy cases per unit per year should be considered targets for either a Level 1 or Level 2 centre.
- These volumes were considered reasonable by the expert panel in light of the current distribution of thoracic surgery in the province, but it is recommended that these numbers be revisited as more data becomes available.
- The panel recognized that some regions may not have the population and cases to support the recommended target volumes but could meet them as the predicted increase in cancer cases occurs.

#### ***Qualifying Statements -***

##### ***Updated in August 2021:***

*Centres offering cancer-related esophagectomy should meet the institutional requirements of a Level 1 centre, including three thoracic surgeons and a minimum 15 esophageal resections per year. See Section 5 for details.*

##### ***Added in the Update and Endorsement in March, 2015***

*The original 2005 recommendations on surgical volumes were modified in 2015 by the Expert Panel. The words 'in the range' and 'anatomic' were deleted. See Section 4, page 16 for additional information.*

*The original and the revisions to the surgical volume target recommendations are based on the expert opinion of the guideline panels. In the updated literature review (to December 2013) no new data were identified to inform the volume target recommendations.*

### **Hospital Criteria**

Important characteristics of the institution in which major thoracic cancer surgery would take place are:

- Commitment to high-quality multidisciplinary thoracic cancer care.
- Commitment to providing or participating in an organizational structure to manage patients with these cancers through all phases of their care.
- Commitment to participate in activities that advance CCO's Provincial Cancer Plan (2004).
- Formal working relationship or association with a regional cancer centre, if a thoracic surgery unit is not located at the cancer centre.

## Physical Resources and Collaborating Services

The following physical resources and collaborating services are considered to be reasonable criteria which Level 1 and 2 hospitals providing thoracic cancer surgery should be expected to meet in providing comprehensive acute care:

- Operating Room that is available 24 hours per day, 7 days per week (24/7), with video capacity for bronchial and esophageal scopes, Video Assisted Thoracic Surgery (VATS) and laparoscopy, intra-operative fluoroscopy capacity, and frozen section available 24/7 for emergencies.
- An interventional radiology suite that has the capacity for needle biopsy of lung and chest masses and drainage of loculated pleural collections and that is available 24/7 for emergencies, either onsite or at an on-call hospital. The capacity for embolization therapy for massive hemoptysis or prior to massive chest wall resections is essential for Level 1 centres.
- Full spectrum of radiological imaging, including X-ray and immediate portable X-ray access 24/7 for emergencies, esophageal contrast studies, CT, MRI, ultrasound, nuclear medicine and vascular imaging.
- For Level 1 units - a dedicated thoracic surgical service with consolidated beds to ensure an appropriate level of nursing, physiotherapy and respiratory therapy expertise.
- Specialized nursing care, including mechanical ventilation and invasive monitoring in a combination of ICU and step-down beds sufficient to support the volume of patients treated.
- Affiliation with a regional cancer centre, with access to radiation therapy equipment and consultation from medical and radiation oncologists.
- Ambulatory endoscopy facility with access to surgeons, pulmonologists and gastroenterologists.
- On-site lab for pulmonary function tests (PFT), cardiac diagnostic assessment services, including echocardiography and nuclear imaging.
- On-site rapid response laboratory (i.e., biochemistry, hematology, transfusion and microbiology) services sufficient to support operating room, ICU, step-down and ward requirements 24/7.
- On-site or rapid access pathology and cytology services sufficient to support operating room, endoscopy and ambulatory services.

## Human Resources

*Human Resources should include:*

- Thoracic surgeons.
- Anesthesiologists skilled in thoracic anesthesia techniques.
- Other medical specialists including gastroenterologists, pulmonary medicine specialists, intensivists, a thoracic pathologist and a radiologist with a subspecialty interest in diagnostic and interventional procedures in the chest.
- Allied professionals, including dedicated nurses; chest physiotherapists accessible 7 days a week; respiratory therapists available 24/7; dietary/nutritional, home care, social work, and pharmacy support; and access to a palliative care team.
- Formalized partnerships and access to oncology specialists including medical oncologists and radiation oncologists.
  - Access to other consulting specialties as needed, such as infectious disease, cardiology and neurology specialists.

### **Organizational Criteria**

- The successful management of patients with thoracic problems, particularly those with thoracic malignancies, by involving a multidisciplinary team approach with the use of standard diagnostic and treatment protocols and the involvement of a variety of surgical and non-surgical specialists.
- For Level 1 units - a designated thoracic unit with identified leadership and accountability.
- A system of regular review of multidisciplinary patient management (e.g. multidisciplinary clinics, clinical rounds, educational rounds, morbidity and mortality review, and formal ongoing outcome measurements and quality assurance) is essential for the achievement of optimal patient outcomes.
- Participation in regional and provincial integrated networks of care as outlined in the CCO Provincial Cancer Plan (2004) to facilitate patient access, consultation, referral, quality improvement and continuing professional development.
- Infrastructure support for participation, and the participation, of patients in clinical research in thoracic care, both in local and national studies.

### **Development of the Standards Document**

Evidence on thoracic cancer surgery was gathered through a systematic search of the literature and a scan of documents from organizations concerned with thoracic surgery quality practice. Evidence was reviewed by members of the Expert Panel on Thoracic Cancer Surgical Oncology (see Appendix 1, Section 3) investigating the delivery of cancer-related thoracic surgery in Ontario.

The panel included thoracic surgeons, general surgeons, a medical oncologist, a radiation oncologist, social and behavioural scientists, a hospital Chief Executive Officer, a Cancer Care Ontario Regional Vice President, pathologists, radiologists and methodologists, and representatives from the Canadian Association of Thoracic Surgeons and the Ontario Association of General Surgeons, with representation from across the province.

The standards were developed using a combination of evidence-based analysis, existing recommendations from other jurisdictions, and incorporated expert opinion based on experience and consensus. The panel analyzed data on the current distribution of thoracic cancer surgery across Ontario to inform the process of developing volume standards for Ontario. The standards were developed to accommodate long-range needs and take into account the projected increase in thoracic cancer surgery needs over the next decade due to a growing and aging population.

### **Related Guidance Documents**

This inventory of related guidance has been updated to include documents published up to March 2015. These complementary guidance resources provide additional recommendations for the care of patients with lung cancer.

- Guidelines for the care of lung cancer patients have been developed by the Lung Cancer Disease Site Group (DSG) and can be accessed at this webpage:  
<https://www.cancercare.on.ca/cms/One.aspx?portalId=1377&pageId=10286>
- PEBC EBS#7-20 Version 2: *18-Fluorodeoxyglucose Positron Emission Tomography in the Diagnosis and Staging of Lung Cancer* (available at:  
<https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=34341>)

- PEBC EBS#7-18: *Positron Emission Tomography in Radiation Treatment Planning for Lung Cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=86361>)
- PEBC EBS#7-14 Version 2: *Surgical Management of Malignant Pleural Mesothelioma* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=34334>)
- PEBC Special Report: *Multidisciplinary Cancer Conference Standards* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=14318>)
- PEBC EBS # 15-10: *Screening high risk populations for lung cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=287881>)
- PEBC EBS #17-6: *Invasive Mediastinal Staging of Non-Small Cell Lung Cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=83787>)
- PEBC EBS #26-3: *Follow-up and surveillance of curatively treated lung cancer patients* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=318621>)
- PEBC PET Recommendation Report 9: *PET Imaging in Small Cell Lung Cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=43155>)
- PEBC ES#22-2-7: *Best practices for pathology secondary review: Lung Cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=311334>)
- PEBC ES#25-1-1: *Fine Needle Aspiration Biopsy versus Core Needle Biopsy in the Diagnosis of Lung Cancer* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=254183>)
- CCO Disease Pathway Management Secretariat: *Lung Diagnosis Pathway* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=298429>)
- CCO Disease Pathway Management Secretariat: *Non-Small Cell Lung Cancer Treatment Pathway* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=298431>)
- CCO Disease Pathway Management Secretariat: *Small Cell Lung Cancer Treatment Pathway* (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=298427>)
- CCO Disease Pathway Management Secretariat: *Esophageal Cancer Treatment Pathway* (available at: <https://www.cancercareontario.ca/sites/ccocancercare/files/assets/EsophagealTreatmentPathway-2019-05.pdf>)
- CCO Cancer Imaging Guidance L-1 Version 1: *Lung Cancer Imaging Guidelines: Integration with the Lung Cancer Diagnosis and Staging Clinical Pathway*. (available at: <https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=295561>)

For further information about this series, please contact:

<p><b>Dr. Gail Darling</b>  University Health Network  200 Elizabeth St,  Toronto, ON  M5G 2C4  Email: Gail.Darling@uhn.ca</p>	<p><b>Dr. Frances Wright</b>  Ontario Health (Cancer Care Ontario)  525 University Avenue  Toronto, ON  M5G 2L7  Email:  frances.wright@sunnybrook.ca</p>	<p><b>Dr. Jonathan Irish</b>  Ontario Health (Cancer Care Ontario)  525 University Avenue  Toronto, ON  M5G 2L7  Email: jonathan.irish@uhn.ca</p>
--	---	---

*Funding*

The PEBC is supported by Cancer Care Ontario (CCO) and the Ontario Ministry of Health and Long-Term Care. All work produced by the PEBC is editorially independent from its funding agencies.

*Copyright*

This evidence-based series is copyrighted by Cancer Care Ontario; the series and the illustrations herein may not be reproduced without the express written permission of Cancer Care Ontario. Cancer Care Ontario reserves the right at any time, and at its sole discretion, to change or revoke this authorization.

*Disclaimer*

Care has been taken in the preparation of the information contained in this document. Nonetheless, any person seeking to apply or consult the evidence-based series is expected to use independent medical judgment in the context of individual clinical circumstances or seek out the supervision of a qualified clinician. Cancer Care Ontario makes no representation or guarantees of any kind whatsoever regarding their content or use or application and disclaims any responsibility for their application or use in any way.

*Contact Information*

For information about the PEBC and the most current version of all reports, please visit the CCO Web site at <http://www.cancercare.on.ca/> or contact the PEBC office at:  
Phone: 905-525-9140, ext. 22055 Fax: 905-522-7681