



Guideline 7-21 REQUIRES UPDATING

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

**Radiotherapy with Curative Intent in Patients with Early Stage,
Medically Inoperable, Non-Small Cell Lung Cancer**

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An assessment conducted in November 2021 indicated that Guideline 7-21 **REQUIRES UPDATING**. 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](#))

Guideline 7-21 is comprised of 5 sections. You can access the summary and full report here:

<https://www.cancercareontario.ca/en/guidelines-advice/types-of-cancer/31811>

- Section 1: Guideline Recommendations
- Section 2: Recommendations and Key Evidence
- Section 3: Guideline Methods Overview
- Section 4: Systematic Review
- Section 5: Internal and External Review

Report Date: May 4, 2016

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PEBC Report Citation (Vancouver Style): Falkson CB, Vella E, Yu E, El-Mallah M, Ung YC, Ellis PM, Mackenzie R. Radiotherapy with curative intent in patients with early stage, medically inoperable, non-small cell lung cancer. Toronto (ON): Cancer Care Ontario; 2016 May 4 [Requires Updating 2021 Nov]. Program in Evidence-based Care Evidence-based Series No.: 7-21 REQUIRES UPDATING.

Journal Citation (Vancouver Style): Falkson CB, Vella ET, Yu E, El-Mallah M, Mackenzie R, Ellis PM, Ung YC. Guideline for radiotherapy with curative intent in patients with early-stage medically inoperable non-small-cell lung cancer. *Curr Oncol.* 2017 Feb;24(1):e44-e49. doi: 10.3747/co.24.3358.

Falkson CB, Vella ET, Yu E, El-Mallah M, Mackenzie R, Ellis PM, Ung YC. Radiotherapy With Curative Intent in Patients With Early-stage, Medically Inoperable, Non-Small-cell Lung Cancer: A Systematic Review. *Clin Lung Cancer.* 2017 Mar;18(2):105-121.e5. doi: 10.1016/j.clcc.2016.10.008.

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Radiotherapy with Curative Intent in Patients with Early Stage, Medically Inoperable, Non-Small Cell Lung Cancer

Section 1: Recommendations

This is a quick reference guide and provides the guideline recommendations only. For key evidence associated with each recommendation, the systematic review, and the guideline development process, see the Full Report.

GUIDELINE OBJECTIVES

To investigate the effectiveness of radiotherapy with curative intent in patients with early stage non-small cell lung cancer (NSCLC) who are medically inoperable.

TARGET POPULATION

Adult patients with potentially curable, early stage (Stage I or II) NSCLC (without nodal involvement or metastases), and who are deemed medically inoperable or refuse surgery.

INTENDED USERS

Radiation planning and treatment providers, oncologists, thoracic surgeons, respirologists, diagnostic assessment groups, and other healthcare providers involved with lung cancer.

NOTE: Stereotactic body radiation therapy (SBRT) and stereotactic ablative radiation therapy are considered synonymous for the purposes of this guideline and will be referred to as SBRT from this point on.

RECOMMENDATIONS

Recommendation 1

SBRT with curative intent is an option that should be considered for patients with early stage, node-negative, medically inoperable NSCLC.

Qualifying Statements for Recommendation 1

- The planning process and treatment delivery for SBRT require the use of advanced technology to maintain an appropriate level of safety due to the high dose per fraction. Consistent patient positioning and four-dimensional analysis of tumour and critical structure motion during simulation and treatment delivery are essential.
- Preliminary results for proton beam therapy have been promising but require further clinical studies. More randomized controlled trials are required.

Recommendation 2

Recommended fractionation schemes for SBRT should have a $BED_{10(LQ)}$ of ≥ 100 .¹

Qualifying Statements for Recommendation 2

¹ BED = biological effective dose; LQ = linear quadratic

- Tumour size and proximity to critical central² structures [1] requires consideration when determining the dose fractionation due to increased risk of treatment-related adverse events associated with centrally located tumours.
- **Examples** of dose/fractionation schemes used in the studies included (see Table 4-2):

Location	Total dose (Gy)/# of fractions	BED ₁₀
Peripheral	60/3	180
	54/3	151.2
	55/5	115.5
	48/4	105.6
	66/3	211.2
	60/5	132
Central	50/5	100
	48/4	105.6
	60/8	105

- Evidence showed consistent tumour control and survival outcomes using the above schedules. Ongoing trials may yield new evidence regarding optimal stereotactic dosing schedules and recommended doses different than those listed above.
- Based on the current evidence and the opinion of the authors, radiation doses of BED_{10(LQ)} >146 may significantly increase toxicity and should be avoided.
- Although the use of radiation dosages expressed as a biological effective dose has been advocated, it is important to understand the limitations of determining radiation BED using the linear quadratic model for the extreme-hypofractionated schemes used in SBRT.

² Central tumours refer to tumours within a 2 cm radius of the distal trachea and proximal bronchial tree.