

Radiotherapy Guideline for Breast Cancer

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(2023.10 第八版)
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本版與上一版的差異：

(2025.12 第十版)	(2024.09 第九版)
超低分次 WBI：5 Gy × 5 fx (總劑量 25 Gy，約 1 週完成) / 26 Gy × 5 fx (FAST-Forward)；明列「不建議」族群 (廣泛 RNI、立即/一期重建、OAR 不易達標等)	WBI 分割 中度低分割為主；未明列 5 分次之適用族群與限制
術前放射治療 (Neo-RT) 探索性策略：SBRT 8 Gy × 3 fx (總劑量 24 Gy)，建議以臨床試驗/研究型治療為主	Neo-RT 未收錄
補強與 NCCN 相容之優先順序：可行時優先採中度低分割；超低分次僅限選擇性族群；並補強參考文獻	OAR/規劃重點 原則性限制值
補齊 5-fraction WBI 實證與臨床實作、Neo-CheckRay/Neo-RT 相關文獻；更新 ASTRO PBI Guideline (2024)	References NCCN 2024 + 部分經典文獻

RT indication

- 1. Whole breast irradiation (WBI)
 - DCIS s/p lumpectomy
 - Invasive breast cancer s/p breast-conserving surgery (BCS), non-metastatic
- 2. Chest wall irradiation (CWI)
 - Post-mastectomy with pathologic high-risk features (e.g., T3/T4 and/or node-positive)
- 3. Regional nodal irradiation (RNI)
 - Node-positive disease (pathologic or clinically suspected) and/or high-risk features per multidisciplinary discussion (SCV/Level III ± IMN; consider axillary levels per surgical management)
- 4. Tumor bed boost (selected patients)
 - Age < 50 years
 - High-grade histology and/or close/positive margins
 - Triple-negative or HER2-positive subtype (selected cases)

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- T2–T3 tumor size, extensive LVI, EIC (selected cases)

Simulation and immobilization

- CT-based simulation is required; slice thickness ≤ 5 mm (≤ 3 mm preferred for complex anatomy).
- Supine position is standard; prone position may be considered for large/pendulous breast to reduce skin fold and lung dose.
- Consider DIBH for left-sided breast/chest wall to reduce heart/LAD dose.
- Mark surgical scar and lumpectomy cavity markers (clips) when available.
- Immobilization: breast board and/or vacuum cushion; arm support with reproducible setup.

Field design and treatment volume

- Technique: 3D-CRT or IMRT/VMAT. IMRT/VMAT is preferred when OAR constraints are challenging (e.g., left-sided, IMN, complex anatomy).
- WBI target: cover the entire breast tissue; pectoralis/intercostal muscles are not routinely included.
- Chest wall target: include chest wall (skin/subcutaneous tissue to pectoralis/intercostal interface) per institutional contouring standard.
- Regional nodal targets: SCV/level III $\pm$ infraclavicular; consider axillary levels and IMN based on risk and surgery.
- IGRT: daily image guidance recommended for IMRT/VMAT and for ultra-hypofractionation.

Dose prescriptions

Whole breast / Chest wall / RNI

- Moderate hypofractionation (preferred when feasible): 40 Gy / 15 fx or 42.5 Gy / 16 fx for WBI/CW/RNI.
- Conventional fractionation: 45–50.4 Gy in 25–28 fx (e.g., 50 Gy / 25 fx) when hypofractionation is not suitable (e.g., immediate/stage I reconstruction, re-irradiation, need for frequent bolus, or OAR constraints).
- 【2025 新增】 Ultra-hypofractionation (selected patients): 5 Gy $\times$ 5 fx (total 25 Gy, $\sim$ 1 week) or 26 Gy $\times$ 5 fx (FAST-Forward). Avoid routine use for broad RNI, immediate/stage I reconstruction, or when OAR constraints are difficult to meet.

Boost

- Sequential boost (selected higher local recurrence risk): 10–16 Gy in 4–8 fx (1.8–2.0 Gy/fx), tailored to fractionation scheme and OAR.

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Neoadjuvant Radiotherapy (Neo-RT)

- **【2025 新增】** Neo-RT is investigational/exploratory and should preferentially be performed in a clinical trial setting.
- Technique/volume: image-guided SBRT (iSBRT) to the primary breast tumor only; intent is to spare tumor-draining lymph nodes.
- Common trial dose schedule: 8 Gy × 3 fx (total 24 Gy).
- Long-term local control, cosmetic outcomes, and optimal sequencing with systemic therapy require mature evidence.

Constraints for organs at risk (planning goals)

- Total lung: V20 < 15% (WBI only); V20 < 25% (WBI/CW + RNI) when feasible.
- Heart (left-sided): aim mean heart dose as low as reasonably achievable; consider DIBH when needed.
- For ultra-hypofractionation, apply biologically appropriate constraints and prioritize heart/LAD sparing.

Intra-operative radiotherapy (IORT)

Patient selection (institutional criteria)

- Age > 45 years
- Tumor < 3 cm and clinically node-negative

Dose/technical notes

- Single dose 20 Gy (electron IORT, institutional protocol).
- Maintain ≥ 1 cm distance from skin when feasible.
- If positive lymph node is diagnosed intra-operatively, IORT alone is generally insufficient; adjuvant whole breast RT should be reconsidered.

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