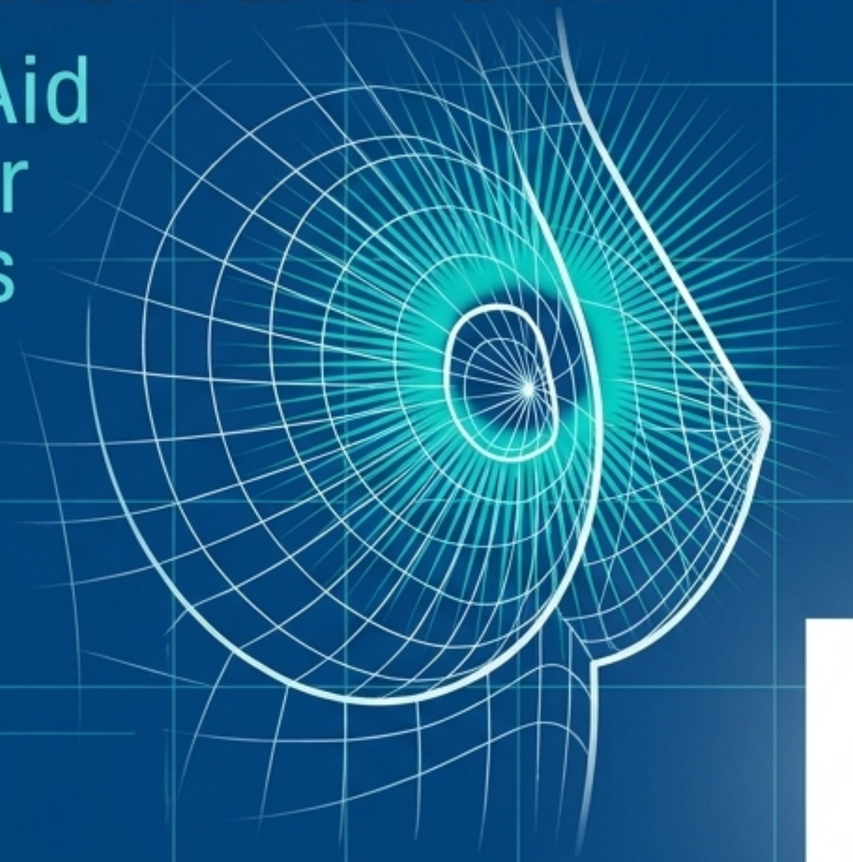
Accelerated Partial Breast Irradiation

A Clinical Decision Aid & Evidence Explainer for ASBrS Guidelines



THE AMERICAN SOCIETY OF Breast Surgeons

PARADIGM SHIFT

Era 1 (Pre-1990): Maximum Intervention

Radical Mastectomy

Characterized by high surgical and physiological burden.

Era 2 (1990–Present): BCS + WBI

NSABP B-06 proves equivalence to mastectomy

Requires 3–6 weeks of daily travel for whole-breast radiation.

Era 3 (Modern): BCS + APBI

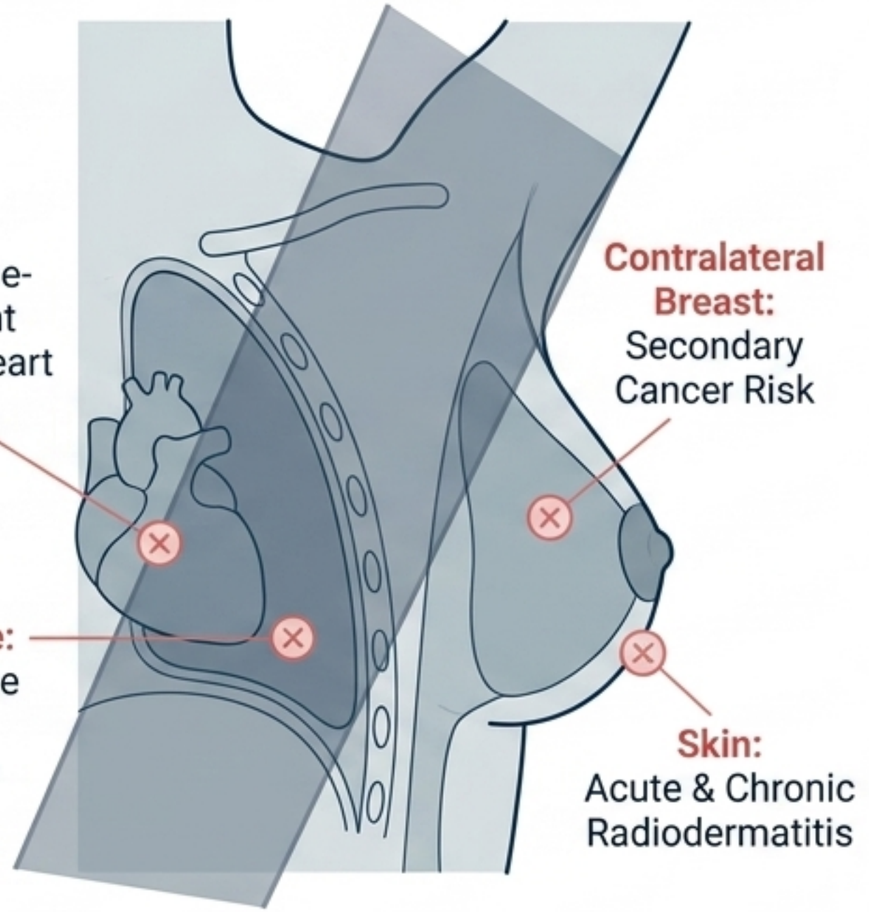
Targeted localized therapy

Condenses treatment duration to a week or less.

The overarching trajectory of breast cancer treatment is maximum efficacy with minimal physiological and logistical burden.

THE BURDEN OF WHOLE BREAST IRRADIATION (WBI)

THE ANATOMICAL BURDEN



THE COMPLIANCE DROP-OFF

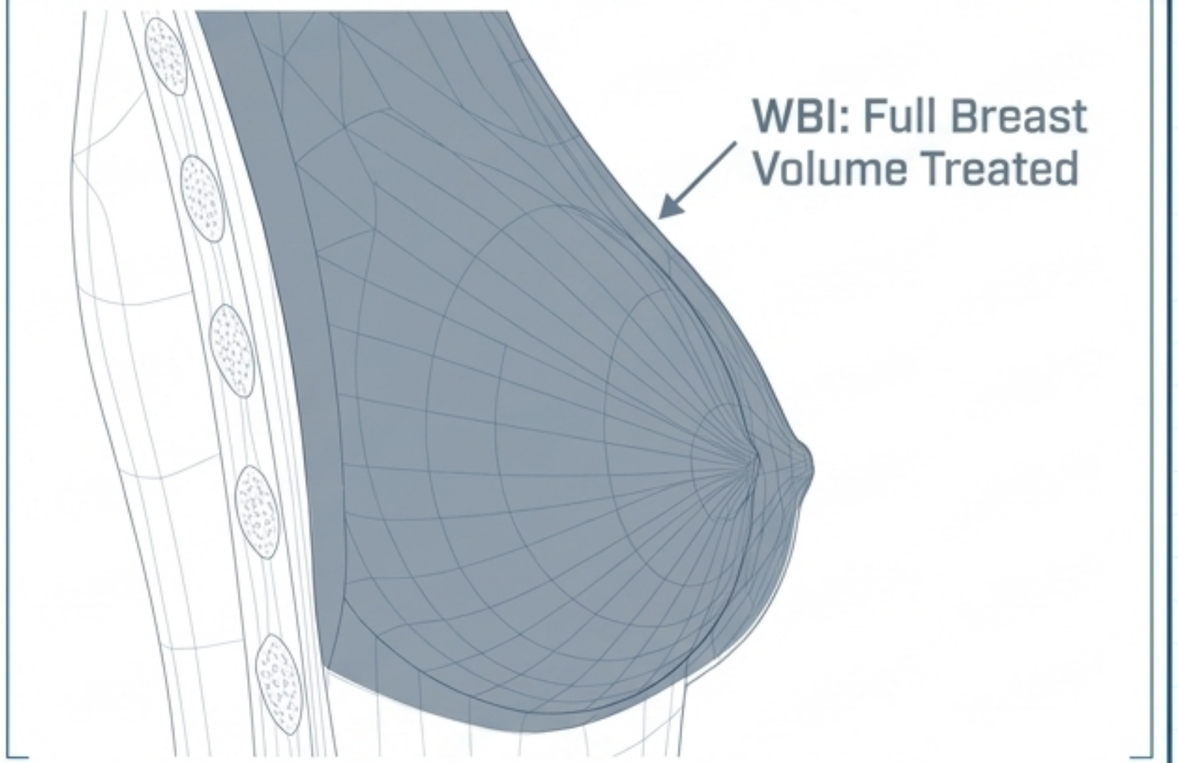
10-30%

of women treated with breast-conserving surgery never receive radiation.

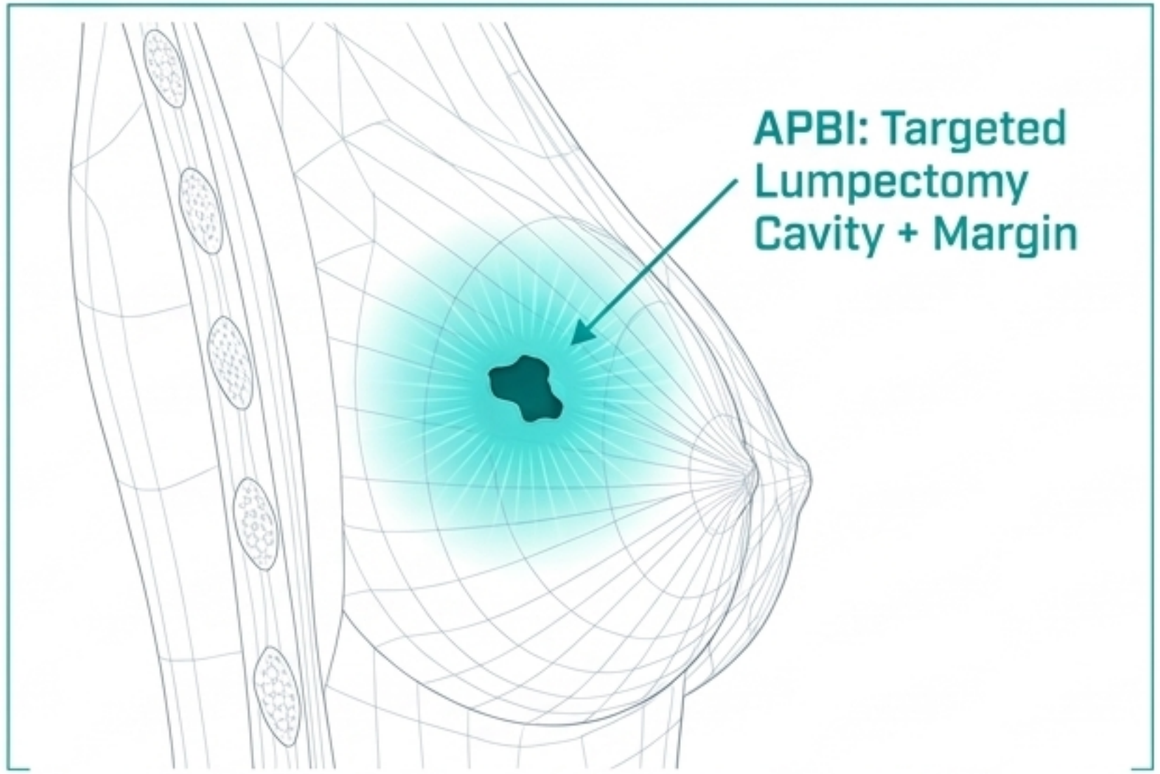
- Specific Tumor Characteristics
- Distance to Treatment Facility
- 3-6 Week Daily Treatment Burden
- High Out-of-Pocket Costs

TARGETING SCHEMATIC: WBI VS. APBI

WBI (Whole Breast Irradiation)



APBI (Accelerated Partial Breast Irradiation)



THE CLINICAL RATIONALE

The vast majority of ipsilateral breast tumor recurrences (IBTR) after BCS and WBI occur within the index quadrant.

THE APBI HYPOTHESIS

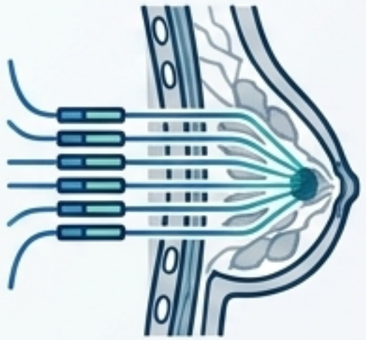
Irradiating only the immediate vicinity of the primary tumor is sufficient to achieve local control of early-stage breast cancer, fundamentally reducing toxicity.

MODALITY ICONOGRAPHY

EXTERNAL BEAM RADIOTHERAPY (EBRT)

Includes 3D Conformal (3DCRT) and Intensity Modulated Radiation Therapy (IMRT).

INTERSTITIAL BRACHYTHERAPY (MIB)



Multi-catheter approach delivering targeted radiation directly from within the tissue.

INTRACAVITARY BRACHYTHERAPY

Utilizes a balloon-based applicator placed directly into the lumpectomy cavity.

INTRAOPERATIVE RADIATION (IORT)

Administered in the surgical suite. Subject to explicit society warnings and limitations.

CLINICAL TRIAL MATRIX: WBI VS. APBI EQUIVALENCE DATA

Trial	N	Modality	Follow-Up	IBTR: WBI	IBTR: APBI
NSABP-B39 / RTOG 0413	4216	3DCRT/Brachy	10-yr	3.9%	4.6%
APBI-IMRT Florence	520	IMRT	10-yr	2.5%	3.7%
RAPID	2135	3DCRT/IMRT	8-yr	2.8%	3.0%
GEC-ESTRO	1184	MIB	10-yr	1.58%	3.51%
UK IMPORT LOW	2018	Non-accel PBI	5-yr	0.5%	1.1%
Danish Breast Cancer Group	865	Non-accel PBI	7.6-yr	1.4%	2.3%

Across all major modalities, absolute differences in long-term local recurrence are minimal (<1.5%), establishing undeniable clinical equivalence.

TOXICITY PROFILE

The RAPID Trial Caution

Noted increased late toxicity (32% vs 13%) and worse cosmesis.

Crucial Context
Thought to be related to the twice-daily fractionation schedule

The Florence Success

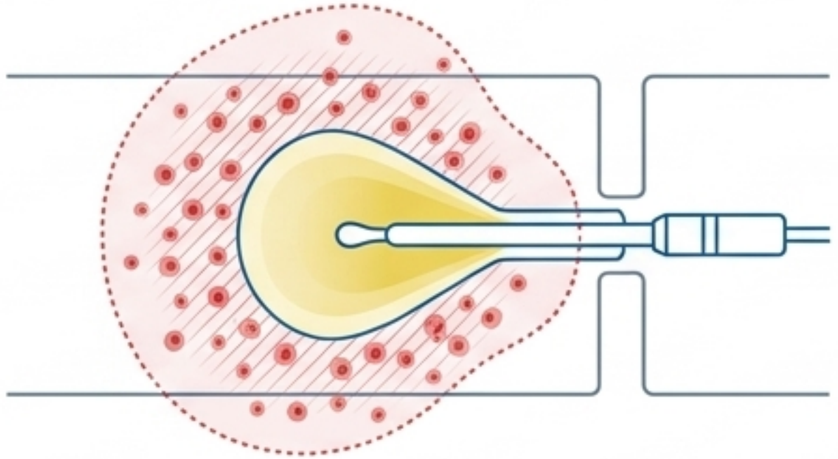
APBI demonstrated better acute/late toxicities and superior 5-year cosmesis.

Optimal Schedule
Supports the preferred schedule of 30 Gy in 5 once-daily fractions

Brachytherapy Insight

At 10 years, the GEC-ESTRO trial showed APBI had LESS grade 3 late side effects (1% vs 4%) than WBI, attributed to significantly smaller treated volumes.

CAUTIONARY WARNING: INTRAOPERATIVE RADIOTHERAPY (IORT)



Theory of Higher Recurrence: Limited penetration depth and dose distribution of IORT may not adequately treat residual microscopic disease at the cavity margins, as depicted by the red-dotted zone.

The Data

ELIOT and TARGIT-A trials reported higher rates of local recurrence compared with WBI (though no difference in survival in TARGIT-A).

ASTRO 2024 & ABS 2022 Guidelines

Electron and kilovoltage (kV) IORT alone are **NOT recommended** outside of a clinical trial or multi-multi-institutional registry.

Actionable Advice

Utilization requires multidisciplinary tumor board review and explicit shared decision-making with the patient.

CLINICAL NUANCE FLOWCHART

The Modern Trend

Choosing Wisely, ASCO, and the SOUND Trial support omitting Sentinel Lymph Node Biopsy (SLNB) in select older patients (e.g., >50, HR+, small tumors, negative pre-op axillary US).

The Guideline Conflict

Historical APBI trials strictly required pathologically negative sentinel nodes for eligibility.

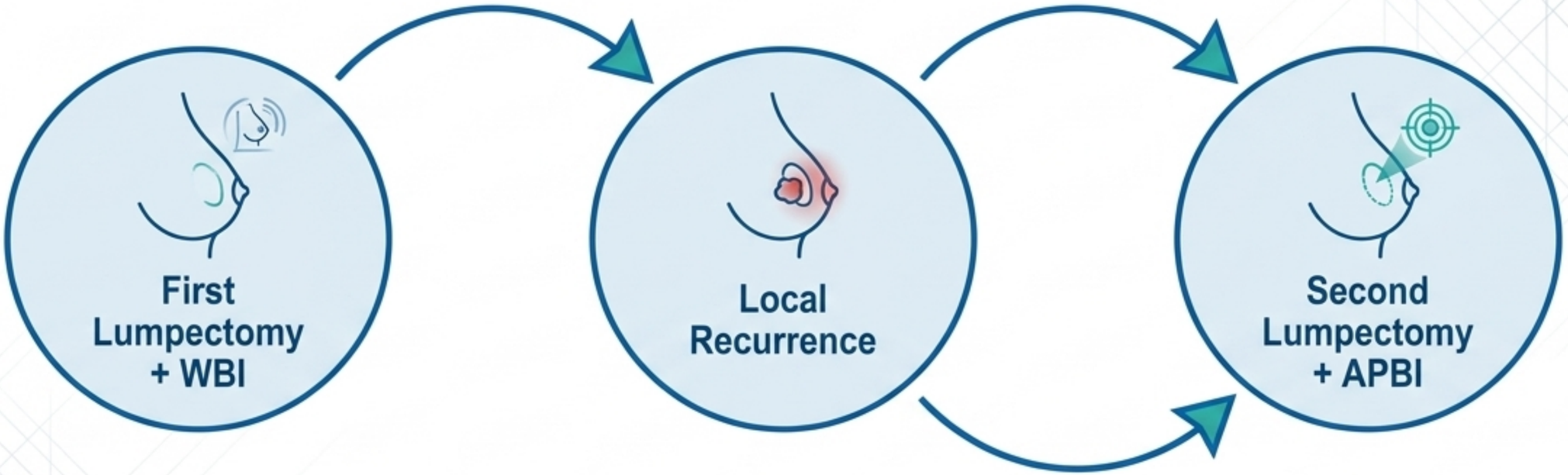
The Unintended Escalation

Omitting SLNB risks forcing patients into 3–6 weeks of whole-breast irradiation simply because they lack the definitive node pathology previously required for APBI.

The ASBrS Resolution

Do not escalate to WBI routinely following SLNB omission. Most candidates for SLNB omission have a very low risk of positive nodes and logically qualify for APBI. Multidisciplinary discussion required.

APBI & Re-Irradiation: A Path to Salvaging Breast Conservation



NRG/RTOG 1104 Trial

3DCRT partial breast re-irradiation. At 5 years, cumulative incidence of ipsilateral breast recurrence was only 5%, with 0% grade 4+ adverse events.

GEC-ESTRO Propensity Match

No difference in 5-year overall survival (88% vs 87%) between mastectomy and lumpectomy + MIB for a second ipsilateral cancer.

ASBrS Guideline Resolution

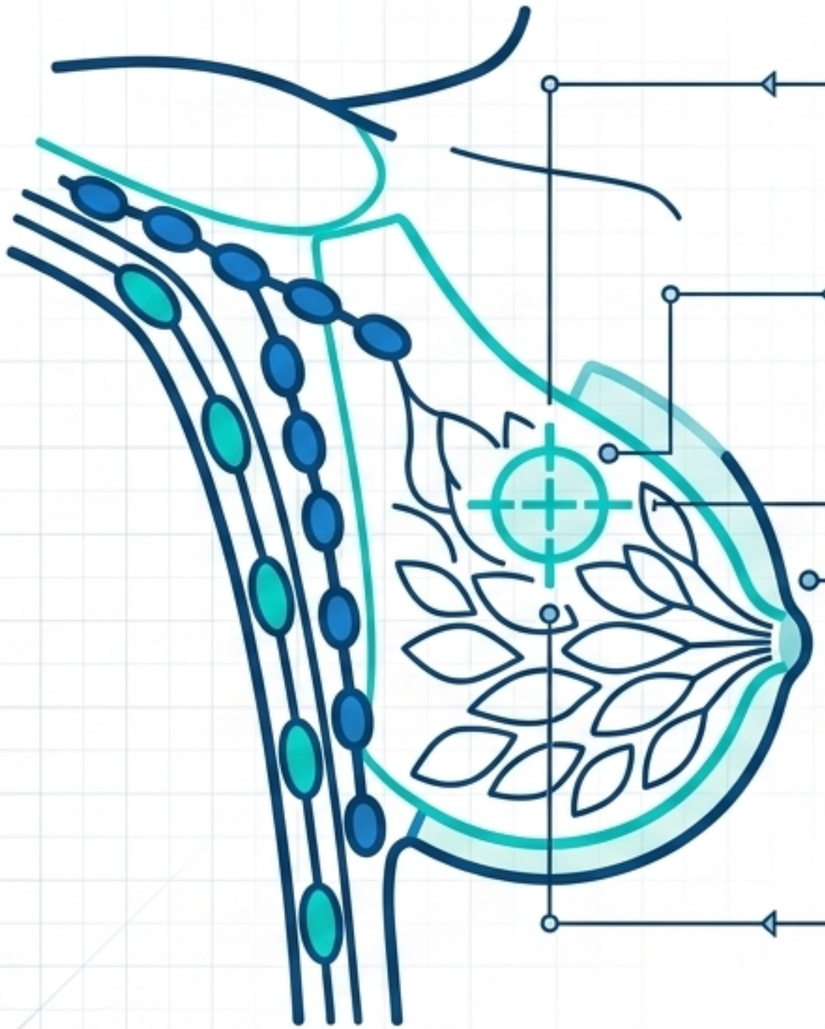
Repeat BCS with APBI may be considered for unifocal IBTRs (<= 3 cm) with no prior radiation toxicity and a sufficient time interval.

GUIDELINE CONVERGENCE DIAGNOSTIC TABLE

Criterion	ABS Guidelines (Permissive)	ASTRO Guidelines (Conditional/Strict)
Age	>= 45 (or <45 with luminal A)	>= 40
Histology	All invasive + DCIS	Non-lobular + DCIS
Size	<= 3cm	<= 2cm (conditional for >2 - <=3cm)
Margins	No tumor on ink (invasive), >= 2mm (DCIS)	Positive margins are an absolute contraindication
LVI	Allowed if not extensive	Conditionally NOT recommended

Synthesis: The ASBrS unifies these overlapping parameters into a single, practical framework for the surgical clinic.

The Pre-Flight Checklist



- **Age:** Minimum 40 years.
- **Histology:** All invasive subtypes + DCIS.
- **Tumor Size:** Total size (invasive + DCIS) <= 3 cm. (T-Stage: Tis, T1, T2).
- **Margins:** No tumor on ink (Invasive) | >= 2mm (DCIS)
- **Nodal Status:** Negative

Microscopic Analysis

Multifocality

Allowed by ASBrS, provided the combined area of all tumors remains <= 3cm in total size.

Receptor Status

Both ER-positive and ER-negative tumors are eligible for APBI.

Lobular Histology

Fully allowed by ASBrS (aligning with ABS guidelines). The ASTRO conditional non-recommendation is explicitly noted to be due to poor clinical trial representation, rather than proven inferior clinical outcomes.

Red Flag / Conditional Alert Dashboard: Contraindications

Absolute Exclusions

Genetics: Known BRCA1/2 mutation or other genetic mutations conferring increased risk.

High-Caution Factors

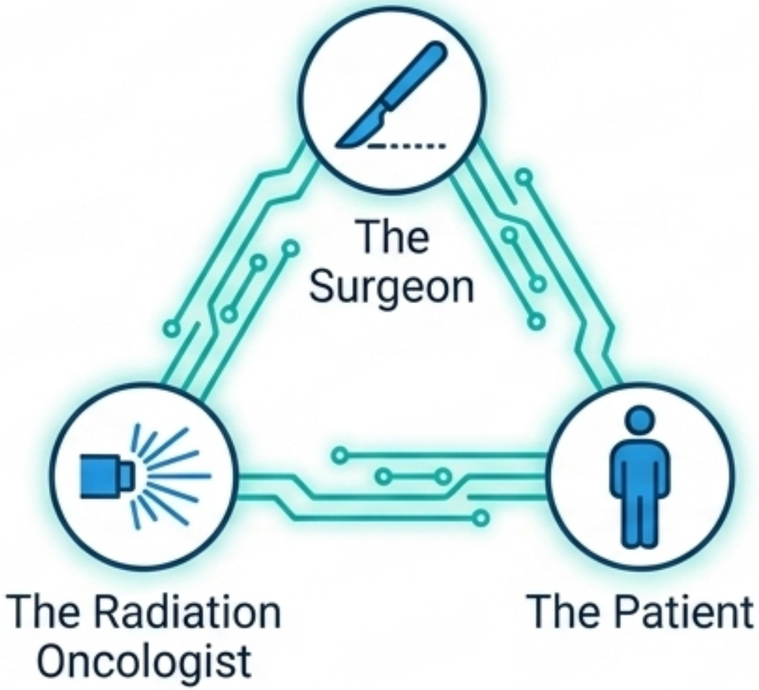
Lymphovascular Invasion (LVI): Consider with high caution due to potential increased local recurrence. ASTRO conditionally does not recommend.

Male Breast Cancer: No evidence to support use due to underrepresentation in trials, though ABS allows offering it if clinical features align.

Not A Contraindication

A history of contralateral breast cancer is explicitly NOT a contraindication for APBI.

The Multidisciplinary Blueprint



Patient selection must be collaborative between surgical and radiation oncology.

There is no “one-size-fits-all” APBI modality; selection depends on effectiveness, side effect profiles, facility access, and patient preference.

These ASBrS parameters are a strict guide, but individual treatment decisions outside these parameters are viable through robust shared decision-making.

Approved by the ASBrS Board of Directors (July 12, 2025).