YOUNG WOMEN'S BREAST CANCER RESEARCH INSTITUTE

EMERGING ADVANCES IN BREAST CANCER SURGERY FOR YOUNG WOMEN

A 2026 Evidence Digest on Breast Cancer in Young Women

Selected Highlights • Emerging Evidence • Future Directions

EDITORS

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An Educational Science Series from
The Breast Cancer in Young Women Foundation
The Young Women's Breast Cancer Research Institute

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ABOUT

The Foundation

The Breast Cancer in Young Women Foundation is a United States–based nonprofit international organization dedicated to saving young women's lives from breast cancer. It brings together clinicians, scientists, nurses, survivors, advocates, NGOs, and partners from 35 countries. It advances targeted awareness and scientific research and highlights emerging advances in BCYW through its peer-reviewed, open-access journal, Young Women's Breast Cancer and Health (YWBC). One of the foundation's programs, the Youth Council for Breast Health (YCBH), promotes targeted awareness on educational campuses. Through evidence-based analysis, the Foundation works to improve outcomes and long-term survivorship for young women diagnosed with breast cancer.

The Institute

The Young Women's Breast Cancer Research Institute (YWBCRI), a research initiative of the BCYW Foundation, advances collaborative research into the earliest biological changes that precede breast cancer. It focuses on early breast biology, metabolic drivers, and opportunities to predict risk, prevent disease, and enable early intervention. The Institute aims to connect discoveries about how disease begins with approaches that could help identify and intercept risk earlier.

The Series

Surgery for breast cancer in young women involves decisions with consequences that reach far beyond the operation. Cancer control, inherited risk, reconstruction, sensation, recovery, and long-term quality of life all matter.

This educational series from the Young Women's Breast Cancer Research Institute and the Breast Cancer in Young Women Foundation reviews selected original patient studies, emerging surgical technologies, and clinical trials that address unanswered questions. Each highlighted study outlines the question, population, core findings, limitations, and relevance to young women.

The digest distinguishes findings drawn directly from young women from broader-age evidence that may inform their care. It aims to support informed discussion, put promising advances in perspective, and identify where stronger evidence is needed to guide individualized surgical decisions.

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EDITORIAL

For a young woman diagnosed with breast cancer, surgery is both a treatment and a choice with lasting personal consequences. Its extent can shape recovery, body image, sensation, relationships, and future healthcare. Evaluating surgical progress therefore means considering cancer control alongside the physical and emotional burden of treatment.

This digest examines how recent evidence informs these decisions. Several studies revisit a persistent question: does young age warrant more extensive breast surgery? The selected cohorts do not support using age alone to determine surgical extent. Still, observational findings cannot prove that different procedures are equivalent. Clinical suitability, tumor characteristics, inherited susceptibility, radiiation requirements, and patient preferences remain central.

A second theme is the changing management of the axilla. National trends show that axillary dissection is declining, even as breast conservation becomes less common. This contrast highlights the need to assess the entire treatment pathway. Removing fewer lymph nodes does not necessarily reduce overall treatment when breast surgery, radiation, reconstruction, and repeat procedures are considered together.

Genetic information adds another dimension. Testing can inform surgical discussions, but its timing, interpretation, and implications require careful counseling. Evidence on preventive surgery for unaffected BRCA carriers can be distinguished from evidence on additional risk-reducing procedures after breast cancer.

Emerging technologies pose new questions. Fluorescence guidance and confocal microscopy seek to improve intraoperative assessment, while robotic approaches, neurotization, and lymphatic reconstruction address access, sensation, or postoperative morbidity. Each approach serves a different purpose, and technical feasibility should not be confused with proven long-term benefit.

Throughout this collection, it remains essential to distinguish direct evidence from young women from findings based on broader populations. Progress will depend on research that measures outcomes young women value and follows them long enough to understand lasting consequences.

LOOKING AHEAD

The next set of advances is expected to address current gaps by not only controlling the disease but also improving quality of life after treatment. Trials will likely assess outcomes in young women separately, explicitly address biological vs. chronological age, incorporate their priorities, and evaluate repeat surgery, sensation, arm function, reconstruction burden, and quality of life. Stronger evidence can support surgical choices that are both clinically appropriate and personally informed. – *Editors*

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SELECTED HIGHLIGHTS AT A GLANCE

01 · Axillary Surgery Is De-escalating—but Breast Conservation Is Declining

A large national study reports divergent trends among young women: axillary dissection is declining, while breast conservation is also less common. Surgical de-escalation should be evaluated across breast surgery, axillary treatment, and radiation.

02 · Mastectomy Was Not Associated with Better Survival in Young Women

A single-center cohort study found no significant association between surgical approach and recurrence or overall survival after adjustment. These findings support individualized discussions, though the observational design does not establish equivalence.

03 · After Neoadjuvant Therapy, Young Age Alone Does Not Warrant Mastectomy

An I-SPY2 analysis examines surgical outcomes after systemic treatment in younger patients with high-risk disease. Treatment response and clinical suitability should guide planning, along with individual risks and preferences.

04 · After Neoadjuvant Chemotherapy, Does Removing More Lymph Nodes Improve Outcomes?

A cohort of young women examines node counts, residual nodal burden, and recurrence. The findings underscore the limitations of relying on node counts alone and do not support omitting indicated axillary treatment.

05 · Timing of Genetic Testing Is Linked to Surgical Choices in Young BRCA Carriers

An international cohort examines how the timing of genetic testing relates to bilateral mastectomy use. The study describes surgical patterns but does not demonstrate that more extensive surgery improves outcomes.

06 · Risk-Reducing Mastectomy: Very Low Incidence of Subsequent Breast Cancer in BRCA Carriers

A Swedish cohort of previously unaffected carriers reported a very low incidence of breast cancer after surgery. Remaining risks and surgical consequences need to be discussed; the outcomes were not specific to women under 40.

07 · Ten-Year Local Recurrence Outcomes among Young Women With Breast Cancer

A prospective cohort provides long-term locoregional outcomes across different treatment approaches. These outcomes could be interpreted in light of radiation, patient selection, and how recurrence is defined—not breast surgery alone.

SELECTED HIGHLIGHTS AT A GLANCE

08 • Risk-Reducing Surgery Was Associated with Improved Survival Among Young BRCA Carriers After Breast Cancer

An international cohort study found an association between survival and risk-reducing procedures performed after diagnosis. These observational findings apply to young BRCA carriers with breast cancer but do not establish causation.

09 • Fat Grafting After Breast Cancer: Examining Prognosis in Young Women

A study using a French insurance database examines outcomes following reconstructive fat grafting. It is relevant because it considers reconstructive procedures alongside oncologic outcomes and carefully addresses treatment selection and database limitations.

10 • Younger Women Have More Mastectomies, with Few Early Complications

A national surgical database shows that younger women undergo more extensive procedures and are more likely to require reoperation, despite similar overall rates of early complications. Thirty-day outcomes do not capture the full burden of treatment.

11 • Younger Age Was Not Linked to a Higher Risk of Early Surgical Complications

A Military Health System study found that younger age was not independently associated with an increased risk of overall early complications. These findings should be interpreted in the context of the treatment era studied and do not include immediate reconstruction.

12 • Emerging Surgical Technologies Relevant to Young Women

Fluorescence guidance, robotic nipple-sparing mastectomy, and breast neurotization each address distinct surgical goals. However, most supporting evidence comes from broader age groups, so their benefits for young women remain uncertain.

13 • Tailoring Axillary Treatment in Young Women After Systemic Therapy

The MARI protocol may safely personalize axillary management and reduce treatment-related morbidity in young patients with node-positive breast cancer. The authors emphasize preoperative risk stratification and systemic therapy to optimize outcomes.

14 • What's Next: Clinical Trials Addressing Unanswered Surgical Questions

CONSYDER focuses specifically on surgical decision-making in young women. Trials involving broader age groups examine axillary de-escalation, selective omission of breast surgery, restoration of sensation, and lymphedema prevention. These entries outline research questions for which primary outcome reports are still pending.

01 Axillary Surgery Is De-escalating—but Breast Conservation Is Declining

The Evidence Gap

An important question remains: Has surgical de-escalation extended to young women, and have breast and axillary operations changed in tandem?

Population and Design

This retrospective National Cancer Database study examined 96,722 women aged ≤40 years with stage I–III breast cancer. Investigators compared operations during 2005–2009 versus 2015–2019. Median age was 36.5 years.

Interpretation and Limitations

Treatment patterns do not demonstrate comparative safety, a survival benefit, or a lower overall treatment burden. The retrospective comparison also reflects changes in disease characteristics and clinical practice over time, and its treatment data extend only through 2019.

Results and BCYW Relevance

All eligible patients (N = 96,722)

Axillary lymph node dissection declined from 37.5% to 19.4%, while partial mastectomy declined from 40.8% to 30.2%.

Nipple-sparing mastectomy increased from 0.3% to 9.5%.

Node-positive mastectomy patients (N = 29,062)

Among 29,062 node-positive mastectomy patients, axillary dissection decreased from 72.4% to 37.1%, while radiation use increased from 59.0% to 75.5%.

These findings point to divergent trends: less extensive axillary surgery, but declining breast conservation.

Key Takeaway **For young women, surgical de-escalation should be assessed in the context of breast surgery and radiation, rather than axillary surgery alone.**

Source: Boyle MK, Attiyeh MA, et al. Trends in Breast and Axillary Operations in Young Patients with Operable Breast Cancer from the National Cancer Database (NCDB): De-escalation of Axillary Surgery and Increased Use of Radiation. Ann Surg Oncol. 2026;33(10):9063–9079. doi: 10.1245/s10434-026-19993-4.

02 No Survival Advantage for Mastectomy in the Study Cohort of Young Women

The Evidence Gap

Does more extensive breast surgery improve outcomes for young women, or can breast conservation remain an appropriate option for them?

Population and Design

This retrospective, single-center study included 588 women aged ≤40 years with nonmetastatic invasive breast cancer treated during 2010–2019. The median age was 37 years, and the median follow-up was 5.9 years.

Interpretation and Limitations

The observational design cannot establish that the procedures are equivalent. Treatment selection, the single-center population, and short follow-up limit interpretation, particularly regarding later recurrences. Subtype analyses were small and imprecise.

Results and BCYW Relevance

380 women underwent mastectomy; 208 underwent breast-conserving surgery.

Almost all women receiving breast conservation also received radiation.

After adjustment, surgical approach was not significantly associated with recurrence (p=0.51) or overall survival (p=0.62).

These findings did not show better survival with mastectomy in this cohort.

Key Takeaway **Young age alone should not dictate the extent of surgery. When clinically appropriate, discuss breast conservation while considering radiation requirements, individual risk, and the patient's preferences.**

Source: Pestana CV, Trufan SJ, Sha W, et al. Assessment of Surgical Approach and Overall Survival in Young Women With Breast Cancer. Eur J Breast Health. 2026;22(2):171-183. doi: 10.4274/ejbh.galenos.2026.2025-8-7.

03 After Neoadjuvant Therapy, Young Age Alone Does Not Warrant Mastectomy

The Evidence Gap

Does more extensive breast surgery improve outcomes for young women with high-risk breast cancer following neoadjuvant systemic therapy?

Population and Design

This secondary analysis of the multicenter I-SPY2 trial included 1,737 patients treated for high-risk stage II–III breast cancer between 2010 and 2022. Of these, 698 were aged ≤45 years, including 444 aged ≤40. Median follow-up was 5.2 years.

Interpretation and Limitations

The surgical approach was not randomized, and incomplete data on genetics, radiation, and postoperative systemic treatment limit interpretation. Longer follow-up is needed, as the absence of a significant difference does not establish equivalence.

Results and BCYW Relevance

Breast-conserving surgery was less common among women aged ≤45 than among older women (36.8% vs. 48.5%).

Among younger women, adjusted analyses found no significant association between surgical approach and overall survival or locoregional recurrence-free interval.

The findings were consistent in the ≤40 subgroup, in which 32.4% underwent breast-conserving surgery.

Key Takeaway **Age alone should not guide the decision to proceed with mastectomy after neoadjuvant therapy. Surgical planning should also account for treatment response, clinical suitability, individual risk, and patient preferences.**

Source: Tseng J, Dimitroff K, Sauder CAM, et al. Surgical Management of Young Women with High-Risk Breast Cancer Receiving Neoadjuvant Systemic Therapy on the I-SPY2 Trial. Ann Surg Oncol. 2026 Oct;33(11):9642-9655. doi: 10.1245/s10434-026-20153-x.

04 After Neoadjuvant Chemotherapy, Does Removing More Lymph Nodes Improve Outcomes?

The Evidence Gap

Is the number of lymph nodes removed associated with recurrence after accounting for the proportion of nodes containing cancer?

Population and Design

This retrospective, single-center study included 274 women aged ≤45 years with clinical T1–3, N1–3, M0 breast cancer diagnosed between 2010 and 2023, all of whom received neoadjuvant chemotherapy before surgery. The median age was 37 years, and the median follow-up was 60 months.

Interpretation and Limitations

Small subgroups, treatment selection, and retrospective comparisons limit what we can conclude. These findings do not show that removing fewer nodes is equally safe or that indicated axillary treatment can be omitted.

Results and BCYW Relevance

The lymph node ratio analysis included 120 women with at least one positive node and at least three nodes examined.

Across the low, intermediate, and high lymph node ratio groups, the total number of nodes removed did not differ significantly between women with and without recurrence (p=0.39, 0.47, and 0.67, respectively).

Recurrence was associated with more advanced disease at diagnosis and with greater residual breast and nodal disease.

Key Takeaway **Node counts alone don't capture recurrence risk. Also consider residual disease and treatment response when assessing axillary management.**

Source: Zhang L, Birla S, Tang SX, et al. Impact of Total and Positive Lymph Node Count on Recurrence in Young Women with Node-Positive Breast Cancer Undergoing Neoadjuvant Chemotherapy. Ann Surg Oncol. 2026;33(11):9888-9895. doi: 10.1245/s10434-026-20154-w.

05 Timing of Genetic Testing Is Linked to Surgical Choices in Young BRCA Carriers

The Evidence Gap

How are the timing of genetic testing and geographic region related to bilateral mastectomy rates among young BRCA carriers with breast cancer?

Population and Design

This international retrospective study included 4,715 women aged ≤40 years with pathogenic or likely pathogenic BRCA1/2 variants who were diagnosed with stage I–III breast cancer between 2000 and 2020 at 109 centers across five continents. The median age was 35 years.

Interpretation and Limitations

This study examined surgical patterns rather than comparative survival benefits. Because exact surgery dates were unavailable, we could not confirm that testing occurred before surgery. Limited information about recommendations and preferences also constrains interpretation.

Results and BCYW Relevance

Bilateral mastectomy rates increased from 8.0% in 2000 to 44.4% in 2020.

Among women tested, rates were 57.0% before diagnosis, 38.5% within six months, and 5.1% later.

Testing timing remained the strongest associated factor after adjustment.

Key Takeaway **Early genetic testing can inform surgical discussions. The increased use of bilateral mastectomy does not mean it is the best choice for every young carrier.**

Source: Wong SM, Blondeaux E, Delucchi V, et al. Surgical Management of Early-Onset Breast Cancer Among Young BRCA1 and BRCA2 Carriers. JAMA Netw Open. 2026 Aug 3;9(8):e2630856. doi: 10.1001/jamanetworkopen.2026.30856.

06 Risk-Reducing Mastectomy: Very Low Incidence of Subsequent Breast Cancer in BRCA Carriers

The Evidence Gap

How often does breast cancer develop after a preventive mastectomy, and what are the early surgical risks?

Population and Design

This nationwide Swedish cohort comprised 1,208 BRCA1/2 carriers without a history of breast cancer. Of these, 507 underwent risk-reducing mastectomy at a median age of 39.7 years. The median postoperative follow-up was 8.6 years. The cohort included older women.

Interpretation and Limitations

This observational study cannot eliminate selection bias or establish comparative safety across surgical techniques. Recorded complications excluded those managed without surgery. Outcomes were not specific to women under 40.

Results and BCYW Relevance

Breast cancer incidence was 2 per 10,000 person-years after surgery, compared with 162 without surgery.

One woman developed breast cancer after mastectomy. Additionally, previously unsuspected cancer was found during surgery in 17 women (3.4%).

Complications requiring reoperation within 30 days occurred in 19 women (3.7%).

Key Takeaway **Risk-reducing mastectomy was associated with a very low subsequent incidence of breast cancer, but risk remained. Counseling should address inherited risk, alternatives, surgical consequences, and personal preferences.**

Source: Wiberg R, Hägglund S, Numan Hellquist B, et al.; Surgical Outcomes After Risk-Reducing Mastectomy Among BRCA1 and BRCA2 Carriers. JAMA Netw Open. 2026;9(4):e262574. doi: 10.1001/jamanetworkopen.2026.2574.

07 Ten-Year Local Recurrence Outcomes among Young Women With Breast Cancer

The Evidence Gap

Among young women receiving contemporary treatment, what is the long-term risk of locoregional recurrence, and how does it differ by surgical approach or tumor subtype?

Population and Design

This prospective, multicenter cohort analysis included 1,135 women diagnosed with stage I–III breast cancer at age 40 or younger between 2006 and 2016. The median follow-up was 10.1 years.

Interpretation and Limitations

Treatment was not randomized, and differences in patient selection and small subtype groups limit comparisons. The endpoint excluded locoregional events that occurred alongside distant recurrence, so it does not capture all recurrences.

Results and BCYW Relevance

Isolated locoregional recurrence occurred in 5.6% of women.

At approximately ten years, estimated recurrence rates were 6.7% after breast-conserving therapy, 6.5% after mastectomy without radiation, and 2.4% after mastectomy with radiation.

In adjusted analysis, mastectomy with radiation was associated with lower recurrence. However, treatment differences were not statistically significant within any individual molecular subtype.

Key Takeaway **Long-term local control was reassuring in this cohort. Surgical discussions should address the full treatment plan, including radiation, rather than assume that mastectomy alone offers better local control.**

Source: Dominici LS, Zheng Y, King TA, et al. Long-Term Locoregional Outcomes in a Contemporary Cohort of Young Women with Breast Cancer. JAMA Surg. 2025 Jul 23;160(9):964–71. doi: 10.1001/jamasurg.2025.2324.

08 Risk-Reducing Surgery Was Associated with Improved Survival Among Young BRCA Carriers After Breast Cancer

The Evidence Gap

Is risk-reducing surgery associated with improved survival among young BRCA carriers who have already developed breast cancer?

Population and Design

This international retrospective cohort comprised 5,290 BRCA1/2 carriers diagnosed with stage I–III invasive breast cancer by age 40 between 2000 and 2020 at 109 centers across five continents. Median follow-up was 8.2 years.

Interpretation and Limitations

Because surgery was not randomized, selection differences and residual confounding mean these findings cannot establish causation. They apply to BRCA carriers with a history of breast cancer, not to unaffected carriers or average-risk women.

Results and BCYW Relevance

A total of 2,910 women underwent risk-reducing mastectomy, while 2,782 underwent risk-reducing salpingo-oophorectomy, which involves removing the fallopian tubes and ovaries.

After adjustment, both procedures were associated with improved overall survival: hazard ratios were 0.65 (95% CI 0.53–0.78) for mastectomy and 0.58 (95% CI 0.48–0.71) for salpingo-oophorectomy.

Key Takeaway **After breast cancer, young BRCA carriers should discuss risk-reducing surgery on an individual basis. Counseling should address future cancer risk, reproductive plans, surgical menopause, quality of life, and the patient's preferences.**

Source: Blondeaux E, Sonnenblick A, Agostinetto E, et al. Association between risk-reducing surgeries and survival in young BRCA carriers with breast cancer: an international cohort study. Lancet Oncol. 2025 Jun;26(6):759-770. doi: 10.1016/S1470-2045(25)00152-4.

09 Fat Grafting After Breast Cancer: Reassuring Outcomes in Young Women

The Evidence Gap

Does fat grafting for breast reconstruction lead to worse cancer outcomes in young women?

Population and Design

This retrospective study of a French national database included 50,178 women aged 18–45 who were treated for nonmetastatic breast cancer between 2010 and 2018. Comparisons with other reconstruction techniques matched patients for tumor subtype, chemotherapy, radiation, and reconstruction timing.

Interpretation and Limitations

Observational associations cannot establish a survival benefit, and patient selection and residual confounding may bias the results. The cohort included women aged 41–45, so the findings do not apply specifically to those ≤40.

Results and BCYW Relevance

Fat grafting was performed in 7,333 women after mastectomy and 883 women after lumpectomy.

After mastectomy, fat grafting was associated with better disease-free survival than other reconstruction techniques (hazard ratio, 0.76; 95% CI, 0.65–0.88). Overall survival also favored fat grafting.

After lumpectomy, there were no significant differences in disease-free or overall survival.

Key Takeaway **These findings support fat grafting as a reconstructive option, but they do not show that it improves cancer survival. Decisions should be based on individual circumstances and reconstructive goals.**

Source: Laas E, Gaillard T, Couturaud B, et al. The Impact of Fat Graft Reconstructive Surgery on Prognosis in Young Women with Breast Cancer: A Study from the French Insurance Databases. Plast Reconstr Surg. 2025;156(5):691–701. doi: 10.1097/PRS.0000000000012120.

10 Younger Women Have More Mastectomies, with Few Early Complications

The Evidence Gap

How do surgical procedures and short-term postoperative outcomes differ between younger women and older patients with breast cancer?

Population and Design

This retrospective ACS-NSQIP database study examined 241,885 women undergoing breast cancer surgery from 2013 to 2023, including 11,544 aged 18–39 years, compared with women aged ≥40.

Interpretation and Limitations

These observational comparisons reflect differences in patients' health, diseases, and procedures. Thirty-day outcomes do not capture long-term complications, cancer control, reconstruction burden, or quality of life. Low rates of early complications do not demonstrate a benefit from more extensive surgery.

Results and BCYW Relevance

Mastectomy was more common among younger women (72.1% vs. 42.5%), and their mean operative time was longer (177 vs. 110 minutes).

Thirty-day complication rates were similar (4.0% vs. 3.9%). However, younger women underwent reoperation more often (4.0% vs. 2.8%). Mortality was below 0.1% in both groups.

Key Takeaway **Young women experienced few early complications despite undergoing more extensive operations, but their higher reoperation rates deserve attention. Counseling should cover both immediate recovery and longer-term consequences.**

Source: Harrison LE, Scutari T, et al. Trends in surgical management and postoperative outcomes in adolescent and young adult breast cancer. Surgery. 2026 Oct;198:110467. doi: 10.1016/j.surg.2026.110467.

11 Younger Age Was Not Linked to a Higher Risk of Early Surgical Complications

The Evidence Gap

When healthcare access is more consistent, does younger age independently predict complications after breast cancer surgery?

Population and Design

This retrospective study of the U.S. Military Health System included 7,835 women diagnosed with stage I–III breast cancer between 2001 and 2014 who underwent surgery without immediate reconstruction. Women aged 18–39 made up 9.2% of the cohort. Outcomes were assessed within 30 days.

Interpretation and Limitations

The observational design cannot establish causation. Older treatment-era data, the exclusion of immediate reconstruction, and the military healthcare setting limit generalizability. A 30-day follow-up does not capture long-term surgical morbidity.

Results and BCYW Relevance

After adjustment for demographic, tumor, and treatment factors, overall risks of general and breast-specific complications were comparable across age groups.

After adjustment, no significant age-related differences in reoperation or hospital readmission remained.

These findings did not identify young age as an independent marker of increased early postoperative risk.

Key Takeaway **Assess perioperative risk based on comorbidities, tumor characteristics, and the planned procedure. Age alone is an insufficient basis for counseling young women about surgical complications.**

Source: Falco G, Darmon S, Nealeigh M, et al. Age at Breast Cancer Diagnosis and Short-Term Postoperative Outcomes for Women Treated in a Universal Health System. Cancer Control. 2026 Jan-Dec;33:10732748261423266. doi: 10.1177/10732748261423266.

12 Emerging Surgical Technologies Relevant to Young Women

The Evidence Gap

Can new technologies improve surgical precision, preserve sensation, and reduce the treatment burden? Most procedural studies include broader age groups, leaving the benefits for young women uncertain.

Illuminating Residual Breast Cancer During Lumpectomy

Fluorescence-guided surgery uses an injected imaging agent and a handheld device to locate potentially cancerous tissue left behind after a standard lumpectomy. In the pivotal study, fluorescence imaging detected and removed additional cancer in 27 of 357 patients (7.6%).

This foundational 2023 study included participants with a median age of 64 years, so it does not establish benefits specifically for women ≤40. False-positive signals may lead to additional tissue removal, while negative imaging cannot rule out residual cancer.

Other Emerging Approaches

A 2026 randomized trial comparing robotic with open nipple-sparing mastectomy showed the procedure was technically feasible. However, longer operative times and short follow-up limit the conclusions. Participants' mean ages were approximately 46–50 years.

Breast neurotization aims to restore sensation after reconstruction. A 2025 prospective cohort reported improved sensory and quality-of-life outcomes, but it remains unclear whether these benefits apply specifically to young women.

Interpretation and Limitations

These technologies serve different surgical goals. Early technical success does not necessarily translate into better long-term cancer control or prove superiority over established procedures.

Key Takeaway **Emerging technologies may broaden surgical options, but counseling should distinguish promising procedural evidence from benefits demonstrated in young women.**

Sources: Smith BL, et al. NEJM Evid. 2023;2(7). doi: 10.1056/EVIDoa2200333.
Kopkash K, et al. Ann Surg Oncol. 2026;33:9662–9673. doi: 10.1245/s10434-026-20201-6.
Shyu S, et al. Int J Surg. 2025;111(5):3235–3247. doi: 10.1097/JS9.0000000000002331.

13 Tailoring Axillary Treatment in Young Women After Systemic Therapy

The Evidence Gap

Can axillary treatment be safely de-escalated in young women with node-positive breast cancer at diagnosis, guided by their response to treatment?

Population and Design

Fentener van Vlissingen and colleagues evaluated young patients with node-positive breast cancer who underwent the MARI protocol to balance oncologic safety with reduced morbidity. Patients received primary systemic therapy (chemotherapy, with or without targeted therapy), followed by individualized axillary surgery—ranging from sentinel lymph node biopsy to axillary dissection.

The study included young patients (≤40 years) with node-positive breast cancer who met the MARI protocol's inclusion criteria. The primary endpoint was oncologic outcome, assessed at the time of analysis using disease-free survival (DFS) and overall survival (OS).

Key Observations

High-risk features (large tumors, high grade, lymphovascular invasion) were associated with more extensive axillary surgery, whereas lower-risk patients often underwent sentinel node biopsy alone.

Tailored treatment maintained oncologic control, with DFS and OS comparable to historical controls who underwent standard axillary dissection.

Less extensive surgery significantly reduced morbidity, including lymphedema and sensory changes.

Benefits were greatest for patients with favorable tumor biology and low nodal burden after systemic therapy.

Key Takeaway

The MARI protocol may safely personalize axillary management and reduce treatment-related morbidity in young patients with node-positive breast cancer. The authors emphasize preoperative risk stratification and systemic therapy to optimize outcomes.

Source: Fentener van Vlissingen E, Beerthuizen A, van Duijnhoven F, Vrancken Peeters MJ. Oncologic outcome of tailored axillary treatment after primary systemic treatment in young node positive breast cancer patients using the MARI protocol. Eur J Cancer. 2026;237(Suppl 1):116473. **Conference abstract,** EBCC-15, poster 208 (PB-116). doi: 10.1016/j.ejca.2026.116473.

WHAT'S NEXT

Clinical Trials Informing Surgery for Young Women

Questions awaiting primary outcome reports • Direct BCYW focus first, followed by relevant broader-age trials

01 CONSYDER

DIRECT YOUNG-WOMEN FOCUS | AGES 18–44

Can a web-based decision-support tool improve informed surgical choices and reduce decisional conflict? This study addresses communication, understanding of options, and decisions aligned with patients' preferences.

NCT06275126 • Recruiting

BCYW-RELEVANT TRIALS ENROLLING BROADER AGE GROUPS

02 ATNEC

After neoadjuvant therapy clears the nodes

Can further axillary surgery or radiation be omitted when initially involved nodes have no residual cancer after neoadjuvant chemotherapy?

NCT04109079

03 Alliance A011202

When positive nodes remain after treatment

Can axillary radiation replace lymph node dissection when sentinel nodes remain positive after neoadjuvant chemotherapy?

NCT01901094

04 POSNOC

One or two positive sentinel nodes

Can adjuvant therapy alone provide adequate control without additional axillary surgery or axillary radiation?

NCT02401685

05 OPTIMIST

Exceptional response to neoadjuvant therapy

Can breast surgery be omitted after MRI and vacuum-assisted biopsy indicate no residual cancer? BRCA1/2 carriers are excluded.

NCT05505357

06 Nipple–Areolar Neurotization

Restoring sensation after mastectomy

Can nerve grafting during nipple-sparing mastectomy improve sensation and quality of life? Primary focus: feasibility of randomized enrollment.

NCT06153836

07 Immediate Lymphatic Reconstruction

Preventing lasting arm morbidity

Can lymphatic bypass during axillary dissection reduce lymphedema and improve quality of life? A randomized trial assesses prevention and safety.

NCT07127003

BCYW relevance does not establish age-specific benefit. These trials test questions; they do not establish new standards of care.

Sources: ClinicalTrials.gov; Dana-Farber Cancer Institute; NCI; trial protocols. Evidence check: 16 October 2026.

WHAT THE EVIDENCE COLLECTIVELY REVEALS

Young Age Is a Context, not a Surgical Prescription

Across the selected studies, age alone does not determine the extent of surgery. Young women vary in tumor biology, disease distribution, inherited susceptibility, treatment response, and personal priorities. The evidence supports weighing these factors together rather than assuming that every young woman needs the most extensive operation.

De-escalation Must Be Evaluated Across the Treatment Pathway

Avoiding axillary dissection is an important change, but it doesn't reflect the full treatment experience. Breast surgery, radiation, reconstruction, and repeat procedures can create burdens elsewhere. Meaningful de-escalation should maintain cancer control while reducing the overall impact of treatment.

Inherited Risk Changes the Discussion

Genetic findings can inform surgical decisions, but clinicians should interpret them in the clinical context. Preventive mastectomy for an unaffected carrier, risk-reducing surgery after breast cancer, and surgery for an average-risk patient address distinct risks. Evidence from one setting should not be automatically applied to another.

Early Recovery and Long-Term Outcomes Answer Different Questions

Low 30-day complication rates reassure us about immediate recovery, but they do not demonstrate better survival, fewer subsequent procedures, preserved sensation, or improved quality of life. Likewise, long-term recurrence comparisons must account for differences in radiation, systemic treatment, and patient populations across approaches.

Technology Is Expanding Possibilities Faster Than Young-Women Evidence

New approaches may improve margin assessment, surgical access, sensation, or lymphatic function. However, a device's ability to detect tissue or a procedure's technical feasibility does not establish that it leads to better outcomes. Much of the evidence comes from older or mixed-age populations.

The Shared Message

It might be better to measure progress in surgery for young women by the quality of the entire care experience: appropriate cancer treatment, informed decision-making, preserved function, and outcomes that remain meaningful over time. Ongoing trials help identify unanswered questions.

CONTINUING GAPS - EXAMPLES

Too Little Evidence Specifically in Young Women

Many procedural and technology studies include relatively few women under 40 or do not report their outcomes separately. Allowing younger patients to participate does not show that an approach has been adequately evaluated in this group.

Consistency in Age Definitions?

Studies use chronological thresholds, such as ≤40 and ≤45, and include broader adult populations. These groups differ biologically, clinically, and reproductively. Clear definitions of biological age and context, along with separately reported outcomes for those under 40, would improve interpretation and comparison.

Incomplete Assessment of Total Treatment Burden

Studies often examine breast surgery, axillary procedures, radiation, and reconstruction separately. Fewer studies assess how these treatments collectively affect repeat operations, recovery time, chronic symptoms, financial burden, and quality of life.

Need for Long-Term Functional Outcomes

Thirty-day complications provide only an early snapshot. Longer follow-up might be needed for young women to assess sensation, pain, arm function, implant or flap complications, additional procedures, body image, and sexual well-being.

Benefits of Emerging Technologies

Margin-assessment devices and newer reconstructive techniques require larger comparative studies. Additional research could determine whether they improve outcomes beyond technical performance, including rates of repeat surgery, preservation of healthy tissue, patient experience, and long-term cancer control.

Gaps in Genetic Counseling and Decision Support

The link between testing and surgical choices is better documented than the evidence that counseling consistently leads to informed decisions aligned with patients' preferences. Further study is needed on the timing of counseling, understanding of absolute risk, and access to other options.

Priorities for Future Research

Future studies are likely to distinguish unaffected carriers from patients already diagnosed with cancer, improve representation across healthcare settings, inform decision-making for asymptomatic genetic carriers, and involve young women in outcome selection. Researchers should assess cancer control and long-term treatment consequences together.

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