RESPONDING TO THE ABSI–BISI JOINT POSITION STATEMENT OF 24 AUGUST 2026

What's best for the Women of India?

On 24 August 2026 the **Association of Breast Surgeons of India (ABSI)** and the **Breast Imaging Society, India (BISI)** published a joint position statement advising India's health system to avoid **iBreastExam** — a handheld, radiation-free screening device used by trained health workers in community settings. The statement cites no evidence. This page sets out what the device is, what the published evidence says, and where each of its claims stands against the public record. **Every source below is linked, so you can check it yourself.**

Published by **UE LifeSciences**, the developer of iBreastExam Last updated **18 September 2026**

START HERE

The gap this device was built for

India's national policy has named clinical breast examination as its population screening method since 2016. Mammography has never been the national screening modality. In practice, almost no woman receives either.

1.3%

of Indian women aged 45 and above have ever had a mammogram — 1.7% at 45–59, 0.9% at 60 and above

Peer-reviewed prevalence estimate, 2025

<1%

receive clinical breast examination at national level — the method the statement calls the gold standard

Peer-reviewed estimate, 2024

~3,000

mammography units in the whole country, fewer than 10% of them full-field digital

NAMS Task Force, 2025

~20,500

radiologists in all of India across every subspecialty — against roughly 21,000 needed each year to read a national mammography programme

Workforce figures and capacity arithmetic

India's own National Academy of Medical Sciences put it plainly in 2025: there is *"no structured population-based mammography screening program in the country and it is unlikely to be feasible in the foreseeable future due to its resource-intensive nature."* The World Health Organization makes a strong recommendation *against* population mammography screening in limited-resource settings at ages 40–49 and 70–75, and against it at all ages where health systems are weak.

Sources. NAMS Task Force Report on Breast Cancer in India, 2025 · WHO Position Paper on Mammography Screening, 2014 · MoHFW Operational Framework: Management of Common Cancers, 2016

Population-Based Mammographic Screening in India

Our assessment of the clinical performance, health-system feasibility and cost-effectiveness of a national mammography programme — the trial evidence, the capacity arithmetic, the Government of India's own cost-effectiveness ranking, and the strongest counter-arguments. Twenty-nine cited sources. An extract; the complete document is available on request.

Read the assessment →

IN PLAIN LANGUAGE

What iBreastExam is — and what it is not

iBreastExam is a handheld device a trained health worker moves across the breast. Its sensors measure stiffness, because tumours are typically harder than the tissue around them — the same physical principle as the manual breast examination a doctor performs. It is battery-powered, uses no radiation, and takes a few minutes.

WHAT IT IS

- A **screening and triage tool**, used where women already are — health sub-centres, camps, workplaces — rather than where imaging equipment happens to be
- Operable by **nurses and community health workers** after short training, not only by doctors

WHAT IT IS NOT

- × It is **not a mammogram**, and UE LifeSciences has never marketed it as a replacement for one
- × It is **not a diagnosis**. It cannot tell a woman whether she has cancer — only a biopsy can do that

or radiologists

- **Radiation-free and painless**, with a recorded, standardised output rather than a subjective manual judgement
- A step that ends in a **referral**: women with findings go into the existing pathway for mammography, ultrasound, biopsy and specialist care
- A device with **two US FDA 510(k) clearances** — K142926 (2015) and K190575 (2019) — manufactured under ISO 13485

- ✕ It is **not a replacement for the imaging pathway**. In the programmes where it runs, it feeds that pathway rather than standing in for it
- ✕ It is **not thermography**, the modality the statement groups it with. See claim 3

CLAIM BY CLAIM

Six statements, and where each stands against the record

The ABSI–BISI joint position statement of 24 August 2026 makes six distinct assertions bearing on this device. It is an image-only PDF. It carries no references, no methodology, no declaration of interests, and no DOI; it was not peer-reviewed, and the manufacturer was never contacted before publication. It also does not state the product's name correctly — it refers throughout to "iBreast". Each assertion is set out below in its own words, with the public record beside it.

CLAIM 1 ON PATIENT HARM

"Risk of false reassurance, delayed diagnosis and adverse treatment outcomes."

No report, no safety signal and no published case is cited in support of this.

This is an assertion of fact about a regulator-cleared device in active clinical use — that it has caused, or will cause, harm to women. The statement cites nothing for it: no adverse event report, no signal under the Materiovigilance Programme of India, no complaint, and no documented case. No such material was published with the statement, and none appears in the public record.

The specific harm alleged — false reassurance, meaning a missed cancer — is a question of **sensitivity**. On sensitivity, measured directly against clinical breast examination in the same women, the published head-to-head studies run the other

way. Those comparisons are set out under claim 2.

CLAIM 2 ON PERFORMANCE AGAINST CBE

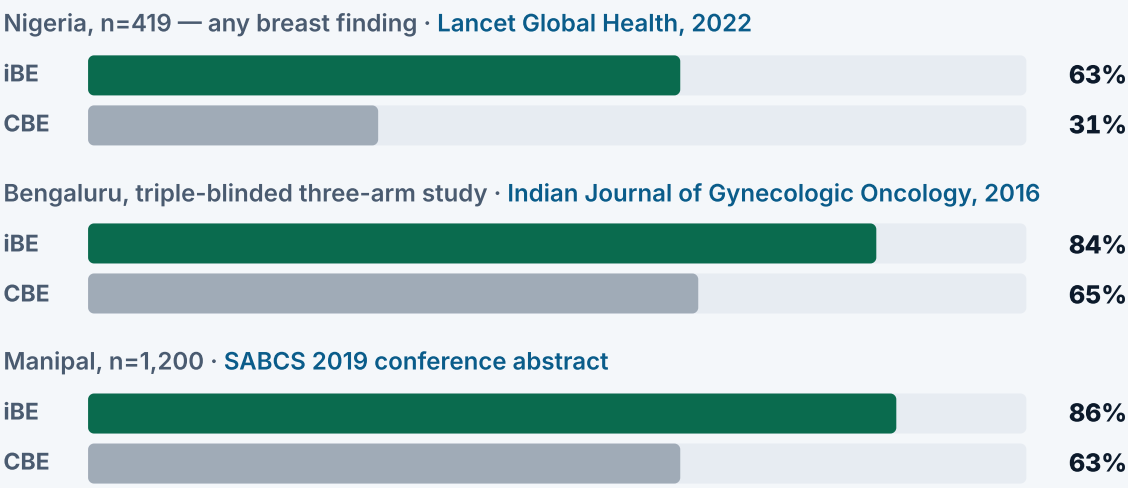
"Do not demonstrate equivalent value to CBE or mammography."

In three prospective studies comparing the two in the same women, the device detected more findings than unaided clinical breast examination.

Clinical breast examination is the method the statement names as the gold standard for population screening in India. Where the two have been compared directly — same women, same study — these are the published sensitivity figures.

Sensitivity: iBreastExam versus clinical breast examination

Three prospective head-to-head studies. Higher is better — it means fewer findings missed.



The 2022 Nigeria comparison was funded by the US National Cancer Institute (P30 CA008748) and the Prevent Cancer Foundation and conducted with Memorial Sloan Kettering Cancer Center; its comparator was surgeon-performed examination, not community-level examination. Difference $p<0.0001$; negative predictive value 98%. The 2019 Manipal figures come from a conference abstract, which is not peer-reviewed in the way a full paper is.

There is also a question of what "equivalent value" means for a method that is not delivered. Clinical breast examination has been India's stated national screening modality since 2016, and fewer than 1% of Indian women receive it. A test with good properties that almost no one gets produces almost no detection.

One piece of history worth knowing. The 2016 Bengaluru study was judged the best research paper at ABSICON 2016 — the Association of Breast Surgeons of India's own annual congress — selected from 120 submissions by a 12-member jury of Indian breast specialists, on stated criteria of research rigour and scientific merit. We cite this as ABSI's own institutional assessment of the evidence, not as a personal endorsement by any individual; the paper's first author was at that time an office-bearer of the Association.

CLAIM 3 ON GROUPING WITH THERMOGRAPHY

"Accordingly, neither thermography nor iBreast should be used for population-based breast cancer screening in India..."

Thermography and iBreastExam are in different regulatory positions, and work on entirely different principles.

The statement places the two under a single prohibition, in a single graphic, with a single shared conclusion. In February 2019 the US FDA issued a warning letter and a public safety communication about thermography for breast cancer detection. iBreastExam holds two FDA clearances. The two are not interchangeable, and readers of the statement were given no basis on which they were assessed as one class.

	BREAST THERMOGRAPHY	IBREASTEXAM
How it works	Infrared mapping of skin surface temperature; infers blood-vessel activity indirectly.	Capacitive tactile sensors measure tissue stiffness directly — the same physical principle as the clinical brea examination the statement recommends.
US FDA position	Warning letter and public safety communication, 25 February 2019: "no valid scientific data to show that thermographic devices are an effective screening tool for any medical condition."	Two 510(k) clearances — K142926 (April 2015) and K190575 (16 July 201 under 21 CFR 884.2990.
Manufacturing and distribution in India	—	Manufactured under ISO 13485. Distributed in India by HLL Lifecare Limited, a Government of India publi sector undertaking, and by Molbio Diagnostics.

	BREAST THERMOGRAPHY	IBREASTEXAM
Use in an Indian public programme	—	In use in the Government of Goa's st screening programme since Octobe 2021 — see the Goa record.

CLAIM 4 ON USE IN INDIA

"...should not be used for population-based breast cancer screening in India."

It has been in use in an Indian state government programme since October 2021, and the state publishes the numbers.

This is not a proposed or theoretical use. The Government of Goa launched *Swasth Mahila, Swasth Goa* on **26 October 2021**, putting iBreastExam devices into health centres across both districts, operated by nurses and community health workers, with women who screened positive referred on to Goa Medical College and district hospitals. The programme's figures are set out under the Goa record below.

India's Department of Health Research has also modelled the device directly. Its Health Technology Assessment of Strategies for Breast Cancer Screening in India (Policy Brief No. 64, 7 March 2024) compared five screening strategies at three intervals. **iBreastExam produced the highest modelled number of breast-cancer deaths averted at every interval studied** — 59.57 at three years, 44.03 at five, 21.47 at ten — and the lowest modelled number of incident cases at the three-year interval. The same assessment recommends clinical breast examination on cost-effectiveness grounds; it is a public document and readers should consult it directly.

Read the primary documents. National Health Mission Goa programme note · HTAIn Policy Brief No. 64 (PDF)

CLAIM 5 ON REPLACING EXISTING PATHWAYS

"...or as a replacement for CBE or established breast-imaging pathways."

This is not a claim UE LifeSciences has made.

iBreastExam has never been marketed by UE LifeSciences or its distributors as a replacement for mammography or for established imaging pathways. It was built for the women those pathways do not reach, and its function is to move the ones who need imaging *into* them.

The Goa programme is the working example. A trained health worker screens in a community setting. Women with findings are referred to Goa Medical College, district and sub-district hospitals for mammography, ultrasound, biopsy and specialist management. The diagnostic pathway is unchanged; what changes is how many women reach it. By identifying women who need investigation among a population that was previously never examined at all, the device increases demand for diagnostic imaging rather than displacing it.

CLAIM 6 ON THE STANDARD FOR NEW TECHNOLOGY

"Any emerging technology proposed for population-level screening should undergo rigorous, independent evaluation in representative Indian populations, with demonstrated diagnostic performance, safety, feasibility, cost-effectiveness and meaningful clinical benefit before incorporation into a national programme."

We agree with this without reservation — and we invite it.

This is the right standard, and we accept it without reservation. UE LifeSciences will submit iBreastExam to any structured independent evaluation either society cares to specify — their choice of design, endpoints, population and investigators — and will publish the result whatever it shows. That offer stands, publicly, from the date of this page.

The same standard is worth applying to the statement that invokes it. It cites no references; it says references are "enclosed", and none were published with it. It discloses no methodology — no search strategy, no inclusion criteria, no stated threshold for "insufficient evidence". It was not peer-reviewed and carries no DOI. It declares no interests, though one of the two co-signing societies is India's professional body for breast imaging. It did not contact the manufacturer. And it does not name the product correctly.

What has already been independently assessed. The device has been through US FDA review twice (2015, 2019); published in The Lancet Global Health from a US National Cancer Institute–funded study run with Memorial Sloan Kettering Cancer Center; modelled by India's own Health Technology Assessment body; and deployed at scale in a state government programme. The full literature, including studies less favourable to the device, is listed under sources.

THE REAL-WORLD RECORD

Goa: what happened when a state actually ran the programme

Goa is the largest published account of iBreastExam used the way it is meant to be used — in government health services, by frontline staff, with referral into the existing diagnostic system. These are the state's own figures.

2021

Programme launched 26 October, through the state Directorate of Health Services, with 20 devices across 35 health centres

National Health Mission Goa

169,348

women screened, as reported by the state Health Minister in July 2025 — against an original target of 100,000

Reported July 2025

3,429

women identified as suspected cases and referred into the diagnostic pathway for further investigation

Reported July 2025

74

breast cancers confirmed and taken into treatment, in a population where most of these women had never been screened before

Reported July 2025

Step 1 · In the community

A trained nurse or health worker performs the screening examination where the woman already is — no radiation, no referral needed to attend, no radiologist required.

Step 2 · Triage

Findings are identified on the spot. Women with suspected findings enter the referral pathway; the rest continue in routine follow-up.

Step 3 · Established imaging

Referral to Goa Medical College, district and sub-district hospitals for mammography, ultrasound, biopsy and specialist management — the existing pathway, unchanged.

The programme was run with the Government of Goa's Directorate of Health Services alongside the YouWeCan Foundation and SBI Foundation. Screening is free to the woman, as is treatment for those who are diagnosed.

IF YOU ARE READING THIS AS A PATIENT

What this means for you

A statement about screening technology should not leave a woman unsure what to do about her own health. Whatever view anyone takes of the rest of this page, the practical position below is not in question.

THE PRACTICAL POSITION

1. **A new lump or change needs a doctor, not a screening test.** If you have noticed a lump, a change in shape, skin dimpling, or discharge from the nipple, see a clinician now. Screening tests are for women without symptoms. Do not wait for a camp or a programme.
2. **A screening result is not a diagnosis.** If an iBreastExam screening — or a clinical breast examination, or a screening mammogram — flags something, it means you need further investigation, usually a diagnostic ultrasound or mammography and sometimes a biopsy. Most women who are referred do not turn out to have cancer.
3. **A clear screening result is not a guarantee.** No screening test finds every cancer — this is true of mammography too. If something changes in your breast after a normal result, get it looked at anyway. Do not let a past clear result delay you.
4. **If a mammogram is available and affordable to you, that pathway is well established.** iBreastExam was designed for the majority of Indian women for whom it is not. The two are not in competition for the same woman.
5. **If you are offered screening in a government programme, taking it is reasonable.** Being examined is better than not being examined. Make sure you understand what to do if you are referred, and follow the referral up.

CHECK IT YOURSELF

Sources

Everything asserted on this page is linked below, including the studies that are less favourable to the device. Where a document is behind a paywall, the DOI link is given so it can be requested or read through an institution.

POLICY AND HEALTH TECHNOLOGY ASSESSMENT

WHO Position Paper on Mammography Screening (2014)
World Health Organization. Strong recommendation against population mammography screening in limited-resource settings at ages 40–49 and 70–75.

STUDIES COMPARING IBREASTEXAM AND CBE

The iBreastExam versus clinical breast examination in high risk and symptomatic Nigerian women (2022)
Mango VL, Olasehinde O, Omisore AD, et al. Lancet Glob Health 2022;10(4):e555–e563. NCI-funded, with Memorial Sloan Kettering Cancer Center.

Operational Framework: Management of Common Cancers (2016)
Ministry of Health and Family Welfare, Government of India. Specifies clinical breast examination, women 30–65, five-yearly.

HTAIn Policy Brief No. 64 (7 March 2024)
Health Technology Assessment in India, Department of Health Research. Models five screening strategies including iBreastExam; recommends clinical breast examination on cost-effectiveness grounds.

NAMS Task Force Report on Breast Cancer in India (2025)
Gupta S, Batra A, Prinja S, et al. Ann Natl Acad Med Sci (India) 2025;61(2):132–170.

Noninvasive and low-cost technique for early detection of clinically relevant breast lesions (2016)
Somashekhar SP, Vijay R, Ananthasivan R, Prasanna G. Indian J Gynecol Oncol 2016;14:26. Prospective three-arm triple-blinded study.

Clinical efficacy evaluation of a novel palpation imaging device (2019)
Nair S, Kathrikolly T, Saxena PUP. SABCS 2019; Cancer Res 2020;80(4 Suppl):P1-01-01. Conference abstract.

Comparison of iBreastExam with clinical breast examination in community outreach clinics in Pune (2026)
Joshi SN, Dharpawar TS, Kulkarni SR, et al. Int J Cancer 2026;158(5):1204–1214. The largest Indian study, n=9,994; calls for refinement of sensitivity before programme deployment.

Detection of breast lesions utilizing iBreast Exam: a pilot study (2026)
Mango VL, Sales M, Ortiz C, et al. Cancers 2026;18(2):281. 300 asymptomatic women, Memorial Sloan Kettering Harlem. Open access.

Low clinical efficacy, but good acceptability of a point-of-care electronic palpation device (2022)
Valdez D, Cruz T, Rania S, et al. Med Phys 2022;49(4):2663–2671. Independent evaluation, University of Hawai'i.

Can the clinical utility of iBreastExam aid in optimizing breast cancer diagnosis? A systematic review (2023)
Bhimani F, Zhang J, Shah L, et al. JCO Glob Oncol 2023;9:e2300149. Eleven studies, 16,052 breasts.

REGULATORY

US FDA 510(k) K142926
iBreastExam, UE LifeSciences Inc. Decision 23 April 2015, substantially equivalent. 21 CFR 884.2990.

US FDA 510(k) K190575
iBreastExam, UE LifeSciences Inc. Decision 16 July 2019, substantially equivalent.

FDA warning on breast thermography (25 February 2019)
US Food and Drug Administration press announcement and consumer warning.

THE GOA PROGRAMME

Swasth Mahila, Swasth Goa — programme note
National Health Mission, Government of Goa. Launch 26 October 2021; device description; early programme figures.

Over 1.6 lakh women screened under breast cancer programme (July 2025)
Figures attributed to the Goa Health Minister: 169,348 screened, 3,429 suspected, 74 confirmed cancers.

Goa govt launches initiative for free breast cancer screening (October 2021)

Launch reporting: 20 devices across 35 health centres, target 100,000 women over two years.

EDITORIAL COMMENT

Breast cancer screening: one size does not fit all (2023)

The Lancet Oncology 2023;24(12):1287. An unsigned editorial, not a study or a guideline. It observes that until the required infrastructure and quality control measures are established, breast cancer screening in low- and middle-income countries might require focusing on affordable, easy-to-use alternative solutions, and names iBreastExam as such an example.

About this page

Published by UE LifeSciences Inc. and UE LifeSciences (India) Pvt. Ltd., the developer and manufacturer of iBreastExam. We have an obvious interest in this subject. That is why every factual claim here is linked to a source you can open and read for yourself, including the studies that are less favourable to our device.

Corrections and questions

If you believe anything on this page is inaccurate, tell us and we will correct it. Journalists, clinicians and public health officials are welcome to request the underlying documents, including the clinical evaluation report and the regulatory file.

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This page is about breast cancer screening policy in India and the published evidence behind a medical device. It is not medical advice and is not a substitute for consulting a clinician. Any woman with a breast symptom should see a doctor rather than wait for a screening programme. Last updated 18 September 2026.

Population-Based Mammographic Screening in India

An assessment of clinical performance, health-system feasibility and cost-effectiveness

Extract · September 2026 · Sections 1–4, the conclusion and the source list of a longer assessment. The complete document is available on request from info@uelifesciences.com.

Scope. This assessment addresses a single question: should India adopt organized, publicly funded, invitation-based mammographic screening of asymptomatic women at population scale? It does not address diagnostic mammography in symptomatic women, which is essential and should be expanded, nor opportunistic mammography chosen by informed individuals in well-resourced urban settings — which is what India's own radiological professional body recommends [1].

Summary judgment. The evidence does not support population-based mammographic screening in India. The conclusion is not that mammography does not work: in high-income systems with complete diagnostic and treatment infrastructure it produces a modest mortality benefit. It is that (a) the benefit is smallest in precisely the age band where most Indian breast cancer occurs; (b) the delivery requirements exceed India's imaging and radiology capacity by more than an order of magnitude; (c) India's own health technology assessment ranks it materially less cost-effective than the modality already in national policy; and (d) the harms of screening scale with the number of women screened, which at Indian population scale is very large. This conclusion aligns with the WHO position paper [2], the Government of India's Operational Framework [3], the Government's own health technology assessment [4], and the 2025 NAMS Task Force Report [5].

1. CLINICAL PERFORMANCE

The evidence base is external and contested. No randomised trial of mammographic screening has been conducted in any low- or middle-income country. The entire mortality evidence derives from trials run in Europe and North America between 1963 and 1997, and their pooled effect is disputed. The UK Independent Panel found a 20% relative reduction in breast-cancer mortality (RR 0.80, 95% CI 0.73–

0.89) [6]. The Cochrane review, restricting analysis to the three trials with adequate individual randomisation, found RR 0.90 (95% CI 0.79–1.02) — not statistically significant — and no reduction in all-cause mortality (RR 0.99, 95% CI 0.95–1.03) [7].

The age profile of Indian disease sits where mammography performs worst. Median age at diagnosis in India is 47 years [5]; in published Mumbai data, 52% of cases fall between 40 and 49 [8]. Western screening evidence is strongest at ages 50–69. The one randomised trial designed to test screening from age 40 — the UK Age trial, 160,921 women, 22.8 years of follow-up — was null overall (RR 0.88, 95% CI 0.74–1.03), with benefit confined to the first decade and roughly 1,667 women invited per death prevented [9].

Sensitivity falls as breast density rises, and density rises as age falls. Across 111,898 screening examinations, sensitivity fell from 85.7% in fatty breasts to 61.0% in extremely dense breasts, while interval cancers rose six-fold, from 0.7 to 4.4 per 1,000 [10]; in DMIST, digital mammography sensitivity in dense breasts was 70% [11]. Most directly: among women aged 40–49, 52.1% of cancers arising within 24 months of a mammogram had not been detected by that mammogram, against 24.7% in women aged 50 and over [12].

Harms scale with the denominator. Over ten years of screening, the cumulative probability of at least one false-positive mammogram is 61% with annual and 42% with biennial screening; 7–9% and 5–6% of women respectively receive a false-positive biopsy recommendation [13]. Overdiagnosis is estimated at 11–22% within trials [14], and the UK Panel's figures imply roughly three overdiagnosed cancers for every death prevented [6]. Radiation harm is real, modest and quantifiable: modelling estimates 125 radiation-induced cancers and 16 deaths per 100,000 women screened annually from 40 to 74 [15]. At a denominator approaching 200 million women, these percentages become programme-defining absolute numbers.

2. HEALTH-SYSTEM FEASIBILITY

Biennial screening of Indian women aged 40–69 — approximately 205–215 million [16] — implies on the order of 105 million mammograms per year.

REQUIREMENT TO SCREEN WOMEN 40–69 BIENNIALLY	NEEDED	INDIA HAS
Mammography units (at ~6,000 exams/unit/year)	**~17,500**	~3,000; <10% full-field digital [5]
Radiologist FTE at the European minimum reading volume of 5,000/year, single reading	**~21,000**	~20,500 radiologists in total, all subspecialties combined [17]
Same, with the double reading European guidance recommends — especially where readers are low-volume [18]	**~42,000**	~2× the entire national radiology workforce

India has roughly 2 mammography units per million population against approximately 81 in the United States [5,19], and roughly 14 radiologists per million against about 146 [17,20]. Meeting even the single-reading requirement would consume the entire national radiology workforce reading nothing else — and would still leave the quality-assurance apparatus unbuilt: annual medical physicist survey, annual medical outcomes audit, facility accreditation and reader-volume floors. India has no statutory equivalent of the US Mammography Quality Standards Act or the European EUREF guidelines [21,22]. Downstream, a recall rate of 8.5%, as observed in an Indian community mammography cohort [23], would generate some 9 million diagnostic work-ups annually, against 954 radiotherapy machines nationally [5] and constrained pathology capacity. The practical test is instructive: the far simpler CBE-based programme already in national policy had reached 0.9% of women aged 30–49 as of NFHS-5 [24].

3. COST-EFFECTIVENESS

The Government of India's own health technology assessment, comparing five modalities in women over 30, found mammography at ₹131,686 per QALY against ₹90,889 for clinical breast examination at five-year intervals — roughly 45% more per QALY — and recommended CBE [4]. The reference modelling study for India reached the same ranking, estimating biennial mammography at approximately Int$3,468 per life-year gained and finding annual CBE nearly as effective at about half the total programme cost [25]. For context, government health expenditure is ₹2,786 per capita per year, or 1.43% of GDP [26]; a single screening mammogram in the Indian private sector lists at ₹2,200–12,700 [27].

4. THE STRONGEST COUNTER-ARGUMENTS, AND WHY THEY DO NOT CHANGE THE CONCLUSION

USPSTF 2024 (Grade B, biennial, ages 40–74) [28]. The extension to age 40 rests on CISNET modelling rather than new trial data, and its own figures give, per 1,000 women, 8.2 deaths averted against 1,376 false positives and 14 overdiagnoses — in a system with complete downstream capacity. It is a recommendation for the United States and presupposes precisely the infrastructure that is the binding constraint in India.

AI-assisted reading. The MASAI trial is the strongest evidence available: in more than 100,000 women, AI support raised sensitivity from 73.8% to 80.5% and cut screen-reading workload by 44% [29]. But it reduced radiologist workload inside an existing double-reading programme rather than replacing radiologists; its interval-cancer reduction was not statistically significant (ratio 0.88, 95% CI 0.65–1.18); and no mammography AI has been prospectively validated on an Indian screening population. Reading is not India's binding cost — units, technologists, quality assurance, biopsy and pathology are.

The Breast Imaging Society, India recommends mammography from age 40 [1]. It does — for opportunistic screening of interested women, and it states plainly that “there are no large credible Indian data to formulate these guidelines.” On the population-programme question this assessment is

not in conflict with BISI.

CONCLUSION

Population-based mammographic screening is not clinically indicated, operationally deliverable, or financially justifiable in India at present. The higher-value priorities are closing the diagnosis-and-treatment gap for women who already have symptoms, delivering the CBE-based pathway that national policy already specifies at genuine population coverage, and expanding diagnostic mammography and ultrasound capacity at district level to serve the women those pathways refer.

REFERENCES

Cited in this extract, in order of first appearance. All sources were retrieved and checked in September 2026.

1. Chakrabarthi S, Panwar S, Singh T, et al. *Best Practice Guidelines for Breast Imaging, Breast Imaging Society, India — Parts 1 and 2.* Annals of the National Academy of Medical Sciences (India). 2022;58. doi:10.1055/s-0042-1742586. — Recommends annual opportunistic mammography from age 40; states that "there are no large credible Indian data to formulate these guidelines."

2. World Health Organization. *WHO Position Paper on Mammography Screening.* Geneva: WHO; 2014. ISBN 978-92-4-150793-6. who.int — Recommends against population-based mammography screening for ages 40–49 and 70–75 in limited-resource settings (strong recommendation, moderate-quality evidence).

3. Ministry of Health and Family Welfare, Government of India. *Operational Framework: Management of Common Cancers.* New Delhi; 2016. — Specifies clinical breast examination for women aged 30–65, once every five years, performed by ANMs at sub-centre and PHC level.

4. Kalyan Singh Super Specialty Cancer Institute, Lucknow. *Health Technology Assessment of Strategies for Breast Cancer Screening in India.* HTAIn Policy Brief No. 64, Department of Health Research, Government of India; 7 March 2024. — ICERs per QALY: CBE 5-yearly ₹90,889; CBE 3-yearly ₹103,693; mammography 5-yearly ₹131,686; ultrasonography 5-yearly ₹143,146; breast self-examination 5-yearly ₹162,036; iBreastExam 5-yearly ₹166,076.

5. Gupta S, Batra A, Prinja S, Malhotra H, Mohanapriya T, Thomas S, et al. *NAMS Task Force Report on Breast Cancer in India.* Annals of the National Academy of Medical Sciences (India). 2025;61:132–170. doi:10.25259/ANAMS_TFR_14_2024 — "Currently, there is no structured population-based mammography screening program in the country and it is unlikely to be feasible in the foreseeable future." ~3,000 mammography units, <10% full-field digital; median age at diagnosis 47 years; 954 radiotherapy machines as of September 2023.

6. Marmot MG, Altman DG, Cameron DA, Dewar JA, Thompson SG, Wilcox M (Independent UK Panel on Breast Cancer Screening). *The benefits and harms of breast cancer screening: an independent review.* Lancet. 2012;380(9855):1778–1786. — RR 0.80 (95% CI 0.73–0.89); per 10,000 women invited, 43 deaths prevented and 129 cancers overdiagnosed.

7. Gøtzsche PC, Jørgensen KJ. *Screening for breast cancer with mammography.* Cochrane Database of Systematic Reviews. 2013;(6):CD001877. — Adequately randomised trials: RR 0.90 (95% CI 0.79–1.02); all-cause mortality RR 0.99 (95% CI 0.95–1.03).

8. Rangarajan B, Shet T, Wadasadawala T, et al. *Breast cancer: an overview of published Indian data.* South Asian Journal of Cancer. 2016;5(3):86–92. doi:10.4103/2278-330X.187561

9. Duffy SW, Vulkan D, Cuckle H, et al. *Effect of mammographic screening from age 40 years on breast cancer mortality (UK Age trial): final results of a randomised, controlled trial.* Lancet Oncology. 2020;21(9):1165–1172. — 160,921 women; overall RR 0.88 (95% CI 0.74–1.03); ≤10 years RR 0.75 (0.58–0.97); >10 years RR 0.98 (0.79–1.22).

10. Wanders JOP, Holland K, Veldhuis WB, et al. *Volumetric breast density affects performance of digital screening mammography.* Breast Cancer Research and Treatment. 2017;162:95–103. — Sensitivity 85.7% (VDG1) to 61.0% (VDG4); interval cancer rate 0.7 to 4.4 per 1,000.

11. Pisano ED, Gatsonis C, Hendrick E, et al. *Diagnostic performance of digital versus film mammography for breast-cancer screening (DMIST).* New England Journal of Medicine. 2005;353(17):1773–1783. — Digital sensitivity in dense breasts 0.70; note that the widely quoted “52% accuracy” figure refers to area under the ROC curve, not sensitivity.

12. Buist DSM, Porter PL, Lehman C, Taplin SH, White E. *Factors contributing to mammography failure in women aged 40–49 years.* Journal of the National Cancer Institute. 2004;96(19):1432–1440. — 52.1% of cancers within 24 months undetected in women 40–49, versus 24.7% at age ≥50; OR 3.58 (95% CI 2.15–5.97).

13. Hubbard RA, Kerlikowske K, Flowers CI, Yankaskas BC, Zhu W, Miglioretti DL. *Cumulative probability of false-positive recall or biopsy recommendation after 10 years of screening mammography.* Annals of Internal Medicine. 2011;155(8):481–492. — 61% annual, 42% biennial, in a cohort of over 169,000 women.

14. Nelson HD, Cantor A, Humphrey L, Fu R, Pappas M, Daeges M, Griffin J. *Screening for Breast Cancer: A Systematic Review to Update the 2009 U.S. Preventive Services Task Force Recommendation.* AHRQ Evidence Synthesis No. 124; 2016. — Overdiagnosis 11–22% in trials, 1–10% in observational studies.

15. Miglioretti DL, Lange J, van den Broek JJ, et al. *Radiation-induced breast cancer incidence and mortality from digital mammography screening: a modeling study.* Annals of Internal Medicine. 2016;164(4):205–214. — Annual screening ages 40–74: 125 radiation-induced cancers and 16 deaths per 100,000 women; 266 and 35 respectively among women with large breasts requiring additional views.

16. Derived estimate. Female age distribution from Ministry of Statistics and Programme Implementation, *Women and Men in India 2023* (Report of the Technical Group on Population Projections, 2020), applied to the India total from the UNFPA World Population Dashboard (1,463.9 million, 2025). Women aged 40–69 constitute approximately 30.4% of the female population.

17. Indian Radiological and Imaging Association: membership of more than 20,500 radiologists (2025). The ratio is widely reported as approximately one radiologist per 100,000 population, i.e. ~10–14 per million. See also Arora R. *The training and practice of radiology in India: current trends.* Quantitative Imaging in Medicine and Surgery. 2014;4(6):449–450.

18. European Commission Initiative on Breast Cancer (ECIBC). *Evidence-to-Decision framework: double reading in mammography screening.* Joint Research Centre. — Recommends double reading over single reading; notes greater benefit where readers are not highly experienced. On reading volume see Hoff SR, Myklebust TÅ, Lee CI, Hofvind S. *Influence of mammography volume on radiologists' performance: results from BreastScreen Norway.* Radiology. 2019;292(2):289–296 (121 radiologists, 2,373,433 readings); and Michalopoulou E, et al. European Radiology. 2023;33:8103–8111 (recommended annual reading volume 3,500–11,000).

19. US Food and Drug Administration. *MQSA National Statistics*, 1 September 2026. — 9,128 certified facilities and 27,793 accredited mammography units in the United States.

20. Collective Minds Radiology. *How Many Radiologists Are There in the World?* 2025. — United States 49,070 practising radiologists (2023), approximately 146 per million; high-income country average 97.9 per million; global average 45 per million.

21. US Food and Drug Administration. *Mammography Quality Standards Act*, 21 CFR 900.12. — Requires annual medical physicist survey, annual medical outcomes audit, facility accreditation, and minimum interpreting-physician volume of 960 examinations per 24 months.

22. European Commission. *European Guidelines for Quality Assurance in Breast Cancer Screening and Diagnosis*, 4th edition (EUREF); and the European Commission Initiative on Breast Cancer guidelines.

23. Pande S, Dakhore S, Arora D, Juvekar S. *Effectiveness of community-based breast cancer screening using full-field digital mammography with digital breast tomosynthesis in an urban population in Central India: an observational study.* Cureus. 2026;18(5):e108117. doi:10.7759/cureus.108117 — 1,275 women; recall rate 8.5%; cancer detection rate 1.6 per 1,000; 31.0% BI-RADS C/D.

24. National Family Health Survey 5 (2019–21), Government of India. Published analyses of NFHS-5 report that 0.9% of women aged 30–49 had ever been screened for breast cancer, ranging from 0.31% in the poorest wealth quintile to 0.75% in the richest.

25. Okonkwo QL, Draisma G, der Kinderen A, Brown ML, de Koning HJ. *Breast cancer screening policies in developing countries: a cost-effectiveness analysis for India.* Journal of the National Cancer Institute. 2008;100(18):1290–1300. — MISCAN model; biennial mammography approximately Int$3,468 per life-year gained; annual CBE from 40 to 60 nearly as effective at about half the total programme cost. See also Zhang L, et al. *Economic evaluations of mammography to screen for breast cancer in low- and middle-income countries: a systematic review.* Journal of Global Health. 2022;12:04048, which records that for India mammography "was not shown to be cost-effective."

26. Ministry of Health and Family Welfare, Government of India. *National Health Accounts Estimates for India 2022–23*, released 27 May 2026. — Government health expenditure 1.43% of GDP; ₹2,786 per capita; out-of-pocket expenditure 43.4% of total health expenditure.

27. Indian private-sector list prices for screening mammography, 2026 (illustrative range ₹2,200–12,700). Public-sector unit costs would be lower; the HTAIn model in [4] contains the costing used for the Indian ICER estimates.

28. US Preventive Services Task Force. *Screening for breast cancer: US Preventive Services Task Force recommendation statement.* JAMA. 2024;331(22):1918–1930. doi:10.1001/jama.2024.5534 — Grade B for biennial screening ages 40–74. Modelled outcomes per 1,000 women: 8.2 breast cancer deaths averted, 1,376 false-positive results, 14 overdiagnosed cases.

29. Lång K, Josefsson V, Larsson A-M, et al. *Artificial intelligence-supported screen reading versus standard double reading in the Mammography Screening with Artificial Intelligence trial (MASAI): a clinical safety analysis.* Lancet Oncology. 2023;24(8):936–944; final results, Lancet. 2026. — Sensitivity 80.5% versus 73.8% (P=0.031); specificity 98.5% in both arms; 44.3% reduction in screen readings; interval cancer proportion ratio 0.88 (95% CI 0.65–1.18, P=0.41).

ADDITIONAL SOURCES

Not cited directly above, but reviewed in forming the assessment and useful to anyone examining it.

A. Miller AB, Wall C, Baines CJ, Sun P, To T, Narod SA. *Twenty five year follow-up for breast cancer incidence and mortality of the Canadian National Breast Screening Study: randomised screening trial.* BMJ. 2014;348:g366. — 89,835 women aged 40–59; 25-year mortality HR 0.99 (95% CI 0.88–1.12); overdiagnosis 22% of screen-detected cancers.

B. Ngan TT, Nguyen NTQ, Van Minh H, Donnelly M, O'Neill C. *Effectiveness of clinical breast examination as a "stand-alone" screening modality: an overview of systematic reviews.* BMC Cancer. 2020;20:1070. — Pooled CBE sensitivity 54.1%, specificity 93–97%; performance is strongly training-dependent.

C. Raghavan N, Jatoi I. *Prioritizing mammography screening in developing countries: are we putting the cart before the horse?* Annals of Surgical Oncology. 2024;31(3):1430–1432. doi:10.1245/s10434-023-14785-6

D. Bleyer A, Welch HG. *Effect of three decades of screening mammography on breast-cancer incidence.* New England Journal of Medicine. 2012;367(21):1998–2005.

E. Kulothungan V, Ramamoorthy T, Sathishkumar K, et al. *Burden of female breast cancer in India: estimates of YLDs, YLLs and DALYs at national and subnational levels based on the National Cancer Registry Programme.* Breast Cancer Research and Treatment. 2024;205:323–332. — Note that this analysis places more than three quarters of the national burden after age 49, peaking at 50–69; the defensible claim is that Indian disease occurs younger than Western disease, not that most of it occurs under 50.

F. Chen Y, Dan Q, Zheng T, Liu L, Sun D. *Ultrasound for breast cancer screening in resource-limited settings: current practice and future directions.* Cancers. 2023;15(7):2112. — Pooled sensitivity 89.2%, specificity 99.1%; no mortality evidence exists for ultrasound screening.

G. Adapa K, Gupta A, Singh S, et al. *A real-world evaluation of an innovative artificial intelligence tool for population-level breast cancer screening.* npj Digital Medicine. 2025;8:2. — AI thermography, Punjab, 15,069 women, 27 cancers, 3.1% recall; 41.1% of screen-positive women were lost to follow-up. Manufacturer was an implementation partner.

H. US Food and Drug Administration. *FDA warns consumers to avoid using thermography devices to detect breast cancer.* Press announcement, 25 February 2019. — "There is no valid scientific data to show that thermographic devices… are an effective screening tool for any medical condition."

I. Tabár L, Vitak B, Chen TH-H, et al. *Swedish two-county trial: impact of mammographic screening on breast cancer mortality during 3 decades.* Radiology. 2011;260(3):658–663. — RR 0.69 (95% CI 0.56–0.84); note that this trial is among those the Cochrane review classifies as suboptimally randomised.

J. Ministry of Health and Family Welfare, Government of India. *Year-End Review 2025* and National Programme for Prevention and Control of Non-Communicable Diseases reporting on Ayushman Arogya Mandir screening volumes. — Reported programme screening totals are difficult to reconcile year on year and should be treated with caution alongside the NFHS-5 coverage estimate in [24].