The economic burden of late diagnosis and barriers associated with early detection of breast cancer in the USA: A systematic literature review (SLR)

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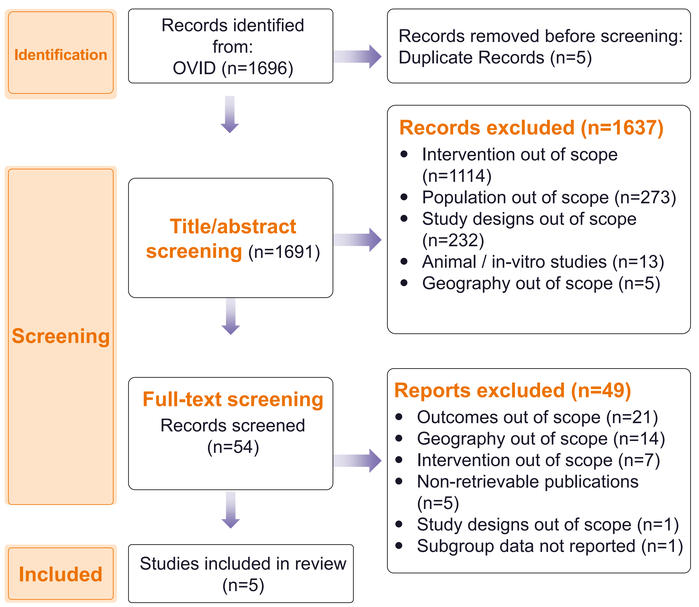
Background & Objectives

- Breast cancer is the most commonly diagnosed cancer among women in the USA and the second leading cause of cancer-related death, contributing substantially to the national disease burden despite advances in screening and treatment.[1]
- Delayed diagnosis of breast cancer is associated with progression to advanced-stage disease, resulting in higher mortality and poorer clinical outcomes.
- Early-stage detection significantly improves survival, whereas late-stage disease requires more intensive and prolonged treatment. Late detection leads to substantially higher healthcare costs, driven by increased treatment complexity and resource utilization.
- Together, delayed diagnosis contributes to a significant clinical and economic burden, emphasizing the importance of timely detection.[2]
- This Systematic Literature Review (SLR) aimed to evaluate the economic impact of early breast cancer diagnosis in the USA and to identify key economic and health-care related barriers associated with early detection

Methods

- An SLR was conducted in accordance with Cochrane guidelines using Embase and MEDLINE databases, supplemented with a bibliographic search.
- The search targeted USA-based studies published between 2020 and 2025 that assessed the economic burden of breast cancer and/or barriers to early screening among adult women (≥18 years) with or at risk of the disease.

Fig 1: PRISMA



Results

- Five studies met the inclusion criteria. These comprised one claims-based analysis[3] assessing the economic burden associated with breast cancer and four studies[4-7] focused on barriers to early breast cancer screening
- The economic evidence was derived from one retrospective claims-based study using linked Medicaid and cancer registry data (n=1,388 cases and 3,840 controls)[3]. Sample sizes across barrier studies ranged from 18 to 21,022 participants[4-7].
- Across studies, populations primarily included underserved groups such as low-income, uninsured, minority, and homeless women, reflecting real-world screening and care settings[3-7].
- Of the four studies assessing barriers to early breast cancer screening, two were database analyses,[6-7] one was survey-based,[3] and one employed qualitative focus group methodology[5].

Economic Burden

Study design and population

- A study by Homan et al. conducted a retrospective observational study using Missouri Medicaid claims linked with the Missouri Cancer Registry.[3]
- The analysis included 1,388 women aged 18–64 years diagnosed with breast cancer (2008–2012), matched to 3,840 non-cancer controls.
- Service years: 2008–2014 (patients diagnosed 2008–2012, with up to 24-month follow-up) (Table 1).

Unadjusted healthcare costs by stage at diagnosis

- Unadjusted healthcare costs increased consistently with later stage at diagnosis at all timepoints (Figure 1).
  - 6 months: $32,522 (in situ) to $46,361 (distant)
  - 12 months: $40,493 (in situ) to $79,906 (distant)
  - 24 months: $50,245 (in situ) to $152,431 (distant)
- Across all follow-up periods, patients diagnosed at regional or distant stages incurred substantially higher costs than those diagnosed at earlier stages.

Incremental costs versus non-cancer controls

- After adjustment and comparison with matched non-cancer controls, breast cancer was associated with substantial incremental costs that increased by stage and over time.
  - 6 months: $7,346 (in situ) to $20,235 (distant)
  - 24 months: $9,728 (in situ), $17,056 (localized), $38,840 (regional), $44,409 (distant)
- Outpatient services and medications were the largest contributors to incremental costs, particularly for regional and distant disease.

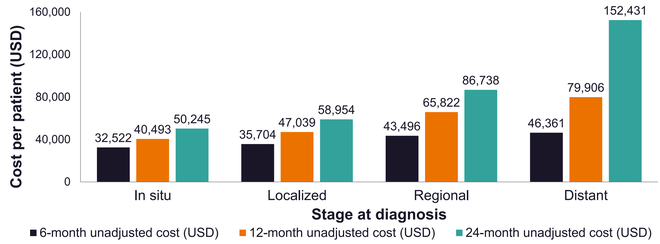
Impact of early detection on costs

- Participation in the Show Me Healthy Women screening program was associated with a significantly higher proportion of early-stage (in situ or localized) diagnoses ($p < 0.01$). This stage shift resulted in lower average costs and meaningful savings.
- At 24 months, estimated savings among program participants were:
  - $2.1 million in unadjusted costs
  - $0.86 million in incremental costs

Table 1: Economic burden by stage at diagnosis and impact of early detection

Study	Data source / design	Population	Perspective/ time horizon	Economic outcomes
Homan et al., 2021	Missouri Medicaid (MO HealthNet) claims linked with Missouri Cancer Registry; matched non-cancer control group; costs assessed at 6, 12, and 24 months post-diagnosis.	Female Medicaid beneficiaries aged 18–64 years diagnosed with breast cancer 2008–2012 (N=1,388) matched to noncancer controls (N=3,840).	Payer perspective (Medicaid); 6-, 12-, and 24-month follow-up from diagnosis.	Unadjusted treatment and follow-up expenditures by stage; incremental costs versus noncancer controls; estimated cost savings from early-stage diagnosis.

Fig 2: Unadjusted 24-month cost per patient across stages of diagnosis



Barriers to early breast cancer screening

- Across four studies, multiple barriers to early breast cancer screening were identified (Table 2).
- Patient-level barriers included out-of-pocket cost of $250, anxiety related to testing, and treatment delays, as well as lack of awareness, competing priorities, and financial constraints.
  - For example,70.6% of low-income women (<$800/month) were diagnosed with cancer vs 29.4% in higher-income groups[4,6]
  - System- and access-related barriers included limited screening uptake despite free programs, logistical challenges, and guideline-related gaps.
  - Notably, women aged 40–49 years accounted for 28.6% of cancers despite limited eligibility under screening guidelines, and false-positive rates were 11.8% (40–49 years) and 9.6% (50–64 years) in underserved populations (Nair et al. 2022; Jensen et al. 2022).

  These barriers disproportionately affected underserved populations, including uninsured, low-income, and homeless women.

Table 2: Key Barriers to Early Breast Cancer Screening (n=4 studies)

Study	Population	Barrier Domains	Key Data-Driven Insights
Mishkin 2025[4]	HER2− early BC women (n=359)	Financial, Emotional	• $250 OOP cost • Anxiety • 3–4-week treatment delay
Brzoza 2025 *[5]	Women experiencing homelessness (n=18)	Knowledge, Financial, Logistical	• Barriers included finances, accessibility, time, education, and emotional concerns
Jensen 2022[6]	Low-income, uninsured women (n=1519 screenings)	Socioeconomic, Policy-related	• 70.6% vs 29.4% cancer diagnosis (<$800 household income vs higher income) • 40–49 yrs: 28.6% of cancers, impacted by guideline limits
Nair 2022[7]	Underserved minority women (n=21,022)	Access, System-level	• False-positive rates: 11.8% (40–49 yrs), 9.6% (50–64 yrs); highlights screening challenges in outreach settings

BC: Breast cancer; HER2: Human epidermal growth factor receptor 2; OOP: Out-of-pocket; NR: Not reported.*study reported qualitative results

Conclusions

- Delayed diagnosis of breast cancer is associated with substantially higher healthcare costs, with expenditures increasing markedly by stage at diagnosis.
- Evidence indicated that early detection through screening programs can lead to significant cost savings for payers.
- However, persistent patient-, access-, and system-level barriers particularly among underserved populations continue to limit timely screening uptake.
- Addressing these barriers is critical to improving early diagnosis and reducing avoidable economic burden in the USA.
- Given limited recent USA data, further research is needed to better inform screening and policy decisions.

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