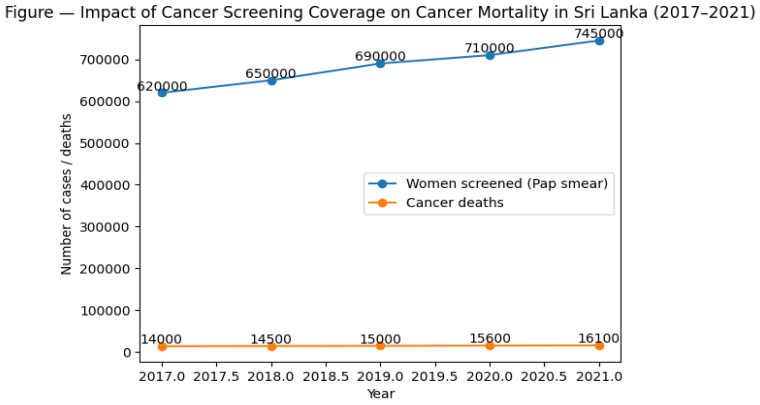


*Figure 3 – Impact of cancer screening on Mortality in Sri Lanka*

### *Conclusions*

The study demonstrates an increasing trend in cancer incidence and mortality in Sri Lanka, indicating a growing public health burden. Breast, lung, colorectal, and cervical cancers remain major contributors to cancer morbidity and mortality. The expansion of screening programmes has improved early detection; however, long-term improvements in mortality require sustained screening coverage, early diagnosis, and effective treatment strategies.

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## TRENDS AND PUBLIC HEALTH IMPACT OF CANCER SCREENING IN IRAN (2015–2025)

### *Introduction*

Cancer represents one of the most significant public health challenges worldwide and is currently the second leading cause of death globally. According to estimates from the Global Cancer Observatory (GLOBOCAN), approximately 19.3 million new cancer cases and nearly 10 million cancer-related deaths occurred worldwide in 2020 [1]. The global cancer burden is expected to increase substantially, with projections indicating more than 28 million new cases annually by 2040, mainly due to population ageing, demographic expansion, and increasing exposure to lifestyle-related risk factors [2].

In Iran, cancer has become an increasingly important health concern during the past two decades. National cancer registry reports indicate that the incidence of several major malignancies – including breast, colorectal, prostate, and cervical cancers – has steadily increased [3]. Breast cancer remains the most common cancer among Iranian women, accounting for nearly one quarter of all female malignancies, while colorectal and prostate cancers represent an increasing proportion of cancers among men.

Despite the growing cancer burden, population-based screening programs in Iran remain largely opportunistic rather than systematically organized [3,4], resulting in considerable variation in screening participation across regions and population groups. Limited access to screening services, differences in healthcare infrastructure, and insufficient public awareness contribute to suboptimal screening coverage. Consequently, a significant proportion of cancers are diagnosed at relatively advanced stages, which negatively affects treatment outcomes and survival rates. Evaluating the current status of cancer screening programs and understanding their impact on early detection are therefore essential for improving national cancer control strategies.

This study examines the trends and public health impact of screening for four major cancers in Iran between 2015 and 2025, with particular attention to screening participation, program outcomes, and stage at diagnosis.

***Goal***

The aim of this study is to analyze trends in cancer screening programs in Iran between 2015 and 2025 for breast, cervical, colorectal, and prostate cancers, and to evaluate screening participation, program outcomes, and their relationship with stage at diagnosis.

***Material and methods of research***

This study was designed as a retrospective descriptive epidemiological analysis to evaluate cancer screening practices in Iran over the period 2015–2025. Data were obtained from national health reports, published epidemiological studies, and publicly available cancer registry information. The analysis focused on screening indicators for breast, cervical, colorectal, and prostate cancers, including participation rates, age-specific eligibility groups, and regional variations where data were available. The collected information was analyzed using descriptive statistical methods, and the findings were summarized in tables to illustrate screening coverage and trends in early detection. Since the study utilized aggregated and publicly available data, no individual patient identifiers were involved.

***The results of the research and their discussion***

Cancer screening indicators in Iran show considerable variation among different cancer types. Screening coverage, diagnostic outcomes, and stage distribution provide important insights into the effectiveness of early detection programs.

Table 1 – Estimated national screening coverage and recommended targets

| Cancer Type | Primary Screening Method | Estimated National Screening Coverage (%) | Recommended Target Coverage (%) |
|---|---|---|---|
| Breast | Mammography / CBE | 32 | 70 |
| Cervical | Pap smear | 42 | 70 |
| Colorectal | FIT / Colonoscopy | 25 | 65 |
| Prostate | PSA test | 18 | 60 |

To assess whether current screening coverage translates into earlier detection, stage at diagnosis is compared between screened and non-screened groups in Table 2.

Table 2 – Stage distribution at diagnosis among screened and non-screened populations

| Stage at Diagnosis | Screened Population (%) | Non-Screened Population (%) |
|---|---|---|
| Stage I | 42 | 18 |
| Stage II | 33 | 27 |
| Stage III | 18 | 34 |
| Stage IV | 7 | 21 |

As shown in Table 2, screening participation is associated with a shift toward earlier stage diagnosis (Stage I–II), which is consistent with improved clinical prognosis and treatment options. However, stage patterns alone do not capture program performance. Table 3 therefore summarizes cancer-specific screening trends and outcome indicators (e.g., positivity rates and detection yields) to describe implementation strength and gaps across cancer types.

Table 3 – Trends and program indicators of cancer screening in Iran (2015–2025)

| Cancer type | Primary screening test(s) | Trend in screening (2015/2025) | Screening outcome indicators (yield) |
|---|---|---|---|
| Breast | Mammography ± CBE | Gradual increase; uptake heterogeneous (reported mammography 1.3–45%) | Ranges reported; national detection yield not consistently published |
| Cervical | Pap smear (± HPV where available) | Moderate uptake; strong provincial disparity (30–59: 52.1% ever screened; 7.6–61.2% by province) | Coverage reported; abnormal cytology/ HPV positivity not consolidated nationally |
| Colorectal | FIT/FOBT → Colonoscopy | Programmatic rollout in some provinces; example program participation ≈40% (Isfahan 2016–2019) | FIT positivity 6.1%; among colonoscopies: polyps 24%, CRC 3% (program example) |
| Prostate | PSA ± DRE | Mostly opportunistic; limited population-level reporting; low uptake in published surveys | PSA positivity/biopsy yield not consistently reported nationally |

Across 2015–2025, screening activity in Iran shows incremental expansion; however, synthesis of available indicators demonstrates that coverage remains well below population-level targets for effective cancer control (Table 1). The largest participation was observed for cervical cancer screening (Pap smear), with 52.1% of women aged 30–59 years reporting at least one lifetime test [4], but with pronounced provincial inequity (7.6%–61.2%) suggesting unequal access to preventive services. Breast cancer screening indicators show substantial heterogeneity across studies and settings, with mammography uptake reported between 1.3% and 45% [4], consistent with variability in service availability, referral patterns, and awareness. Stage distribution analysis (Table 2) indicates a clinically meaningful stage-shift associated with screening. Among screened populations, early-stage disease (Stage I–II) accounted for 75% of diagnoses (42% Stage I and 33% Stage II), whereas non-screened populations demonstrated a predominance of advanced-stage disease (Stage III–IV) (55% combined). This pattern supports the central public health value of screening: increasing the likelihood of diagnosis at a stage where curative treatment is more feasible, morbidity is lower, and survival outcomes are improved.

Programmatic outcome indicators further highlight differences in implementation strength across cancers (Table 3). Where organized colorectal cancer screening was implemented, measurable yield indicators were reported (e.g., FIT positivity 6.1%, and among completed colonoscopies, polyp detection ~24% and colorectal cancer ~3%) [5]. These findings suggest that structured screening

pathways can identify precancerous lesions and malignancy; however, screening effectiveness is highly dependent on completion of diagnostic follow-up, particularly timely colonoscopy after a positive FIT. In contrast, prostate cancer screening remains predominantly opportunistic with limited consolidated national reporting of screening yield and linkage to staging outcomes, restricting robust evaluation of program impact.

Overall, the combined evidence across breast, cervical, colorectal, and prostate cancers indicates that Iran's current screening landscape is characterized by partial coverage, regional inequity, and incomplete outcome linkage. Strengthening organized screening delivery–along with standardized reporting of test results, diagnostic confirmation, and stage at diagnosis–represents a priority pathway to improve early detection and to generate measurable reductions in avoidable cancer morbidity and mortality.

***Conclusions***

Cancer screening in Iran (2015–2025) has expanded but remains insufficient and inequitable, with coverage below recommended targets. Screening is associated with earlier-stage diagnosis, yet program impact is limited by lack of registry linkage and incomplete diagnostic follow-up. Implementing organized, registry-based screening with equitable access and standardized follow-up is essential to improve early detection and reduce avoidable cancer mortality.

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## CORRELATION BETWEEN LUMINAL SUBTYPES, IMMUNOHISTOCHEMICAL BIOMARKERS, AND NOTTINGHOM GRADING SYSTEM IN BREAST CANCER

***Introduction***

Breast cancer, a malignant neoplasm originating from the epithelial cells of the mammary ducts or lobules, remains the most prevalent oncological pathology among the female population worldwide, serving as a primary indicator of the systemic challenges facing modern medicine [1]. Clinically, the disease is classified primarily through the TNM system and molecular subtyping – encompassing Luminal A/B, HER2-enriched, and Triple-Negative phenotypes – which dictates the therapeutic strategy [2]. While current clinical practice in Belarus relies heavily on standardized protocols – incorporating surgical resection, radiotherapy, and systemic therapy based on traditional staging – there remains a critical gap in refining prognostic accuracy. This research posits that the integration of the Nottingham Grading System with specific immunohistochemical (IHC) biomarkers and molecular luminal subtyping is essential for overcoming these diagnostic