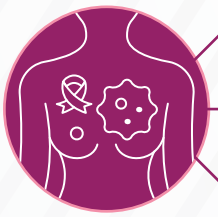
WILEY

# Breast Cancer Epidemiology and Clinical Considerations in the Asia-Pacific Region

## Comprehensive insights into the incidence, risk factor detection, and preventive measures

## Epidemiology of breast cancer



### Breast cancer[1]

- Occurs when a mutation causes uncontrollable growth of breast cells
- Broadly classified into different types depending on the affected cell
- Often originates in the ducts or lobules and may metastasise through blood vessels and the lymphatic system

### Global breast cancer incidence and mortality

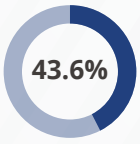
**In 2018[2]** >2.1 million new cases ~626,000 deaths

**In 2020[3]** ~2.3 million new cases ~685,000 deaths

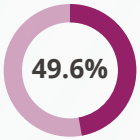
**Affects 1 in 20 globally and 1 in 8 in high-income countries[4]**

## Varying global burden of breast cancer among countries

### Prevalence of breast cancer in the Asia-Pacific region[2–4]




- The incidence of breast cancer is increasing in Asia
  **>43.6%** of new breast cancer cases reported worldwide in 2018




- Close to half of the 2.3 million cases diagnosed in 2020 were from Asia
  **>49.6%** of breast cancer deaths worldwide

- Australia had lower incidence (0.9%) and mortality rates (0.5%) (as of 2020)
- High-income countries have higher breast cancer incidence and lower mortality rates
- Disease burden is lower than that in South Asia

### Comparison of global age-standardised incidence rates (ASIR)[3,4]

As of 2020, Asia has the lowest ASIR (36.8 per 100,000 women), while North America has the highest (89.4)

Developed countries such as Belgium, Australia, Denmark, the USA, Italy, and the UK have higher incidence rates

Developing countries such as Iran, Mexico, China, Costa Rica, and Cameroon have lower incidence rates

### Global age-specific incidence rates for breast cancer[3]

- Low for females <25 years
- Increased drastically in women >25 years

### Ethnic or racial differences in biology[3]

The peak age of breast cancer diagnosis in a few Asian and African countries was >10 years earlier than in European or American countries

### Age-specific incidence rates[3]

- In South Korea, a significant increase was seen in the 70–79 years age group (AAPC* 8.4%, $p < 0.001$)
- In China and the UK, an increase was observed in the 60–69 age group (AAPC 3.8%, $p < 0.001$ vs 1.7%, $p < 0.001$)
- A significant decrease was seen in the 50–59 years age group (AAPC 1.8%, $p < 0.001$) in the USA

*AAPC: Average annual percent change

Visit https://breastcancer.apac.knowledgehub.wiley.com for additional resources

# Factors affecting the incidence of breast cancer

## Genetic[5]

Breast cancer 1 (*BRCA1*) and 2 (*BRCA2*)

- Most common breast cancer susceptibility genes
- Involved in the repair of DNA

## Other susceptibility genes associated with breast cancer[5]

- *CDH1*: Cadherin-1
- *PTEN*: Phosphatase and tensin homolog
- *TK11*: Serine/threonine kinase 11
- *P53*: Tumour protein p53
- *CHEK2*: Checkpoint kinase 2
- *ATM*: Ataxia telangiectasia mutated
- *NBN*: Nibrin
- *PALB2*: Partner and localizer of BRCA2

## Single-nucleotide polymorphisms (SNPs)[5]

- The individual risks due to SNPs are low
- The combined effect of multiple SNPs referred to as polygenic risk scores (PRS) can be significant
- SNP-based PRS can be used together with other risk factors to predict the incidence of breast cancer

## Non-genetic[5]

### Age of menarche and menopause

- Increased relative risk (RR) at an early age of menarche
- Older age in menopause is linked to an increased RR

### Childbearing

- Giving birth to fewer children increases the risk
- Having children prior to the age of 35 provides long-term protection against breast cancer

### Breastfeeding

- RR reduction by ~4% for every 12 months of breastfeeding

### Mammographic density (MD)

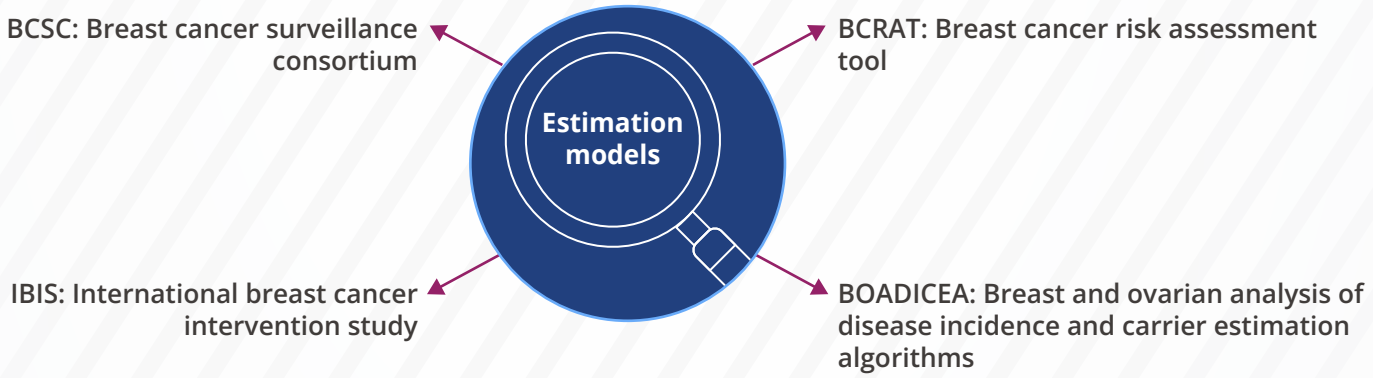
- MD is an independent indicator of risk for breast cancer
- MD can be developed as a preventive biomarker

### Lifestyle-linked factors

- Obesity, physical inactivity, and alcohol consumption are associated with an increased risk of breast cancer

## Prediction of breast cancer risk

**The accurate estimation of a woman's breast cancer risk is important[5]**




### Advantages[5]

- The estimation models provide evidence-based prevention interventions according to personal risk levels
- They also enable the calculation of absolute risk reduction due to preventive interventions

### Limitations[5]

- Lack of clear guidelines for the selection of the most appropriate risk model
- Lack of discriminatory accuracy in estimating risks for women of different ethnicities
- Lack of a personalised cancer treatment strategy
- Usage is often affected by complicated user interfaces
- Lack of inclusion of modifiable risk factors (such as alcohol, hormonal contraception use, physical activity, or time since the last pregnancy) in the commonly used risk prediction models

## Why early detection of breast cancer is imperative[4,6]

**Early cancer detection and diagnosis, followed by treatment, effectively reduce breast cancer deaths[6]**

## Common screening approaches[4]

Breast self-examination, clinical breast examination, magnetic resonance imaging, ultrasound, and mammography

The gold standard for breast screening is mammography, a low-dose X-ray of the breast

### Mammography[4]

- High sensitivity (77% to 95%) and high specificity (94% to 97%) in detecting breast abnormalities
- In women with dense breasts, sensitivity is low
- Ethnicity and age can affect the accuracy of mammography screening
- Mammographic evaluation in Asian women is difficult due to higher breast density

### Downsides of mammography screening[4]

- Low accuracy levels
- False positive findings
- Overtreatment of small tumours
- Missed cancers
- Overdiagnosis
- Lead time bias

### Barriers to breast cancer screening in Asia[4]

- Personal beliefs
- Fatalism
- Religion
- Financial constraints
- Fear of pain and embarrassment
- Lack of support from loved ones
- Sociodemographic factors

### Common challenges to early diagnosis[6]

- Lack of understanding of the biology and behaviour of early disease
- Determining the risk of developing cancer
- Identifying and validating biomarkers of early cancer
- Technological barriers such as the lack of powerful molecular analytical, imaging, and histopathological methods
- Evaluating early detection approaches

**Sustained and interdisciplinary research efforts, funding programs, and business initiatives by pharmaceutical industries can help address the challenges in the early diagnosis of cancer[6]**

### Clinical considerations for the Asia-Pacific region[4]

- Tailored screening for Asian populations
- Improving the cost-effectiveness of mammography
- Ensuring high-quality screening examination
- Using genetic and non-genetic risk factors for a comprehensive risk classification

## Key messages

- Early diagnosis of breast cancer can significantly improve patient survival
- Stratified screening can help identify high-risk patients and overcome barriers to early detection of the disease

## References:


1. Breast Cancer. Factsheet. (2024). World Health Organization.
2. Park, Y. H., Senkus-Konefka, E., Im, S. A., Pentheroudakis, G., Saji, S., Gupta, S., ... & Douillard, J. Y. (2020). Pan-Asian adapted ESMO Clinical Practice Guidelines for the management of patients with early breast cancer: A KSMO-ESMO initiative endorsed by CSCO, ISMPO, JSMO, MOS, SSO and TOS. *Annals of Oncology, 31*(4), 451–469.
3. Lei, S., Zheng, R., Zhang, S., Wang, S., Chen, R., Sun, K., ... & Wei, W. (2021). Global patterns of breast cancer incidence and mortality: A population-based cancer registry data analysis from 2000 to 2020. *Cancer Communications, 41*(11), 1183–1194.
4. Lim, Y. X., Lim, Z. L., Ho, P. J., & Li, J. (2022). Breast cancer in Asia: incidence, mortality, early detection, mammography programs, and risk-based screening initiatives. *Cancers, 14*(17), 4218.
5. Britt, K. L., Cuzick, J., & Phillips, K. A. (2020). Key steps for effective breast cancer prevention. *Nature Reviews Cancer, 20*(8), 417–436.
6. Crosby, D., Bhatia, S., Brindle, K. M., Coussens, L. M., Dive, C., Emberton, M., ... & Balasubramanian, S. (2022). Early detection of cancer. *Science, 375*(6586), eaay9040.



Published by WILEY


Visit https://breastcancer.apac.knowledgehub.wiley.com for additional resources