

Recent advances in breast cancer screening and treatment in the Western Pacific: challenges and opportunities

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Breast cancer remains the most common malignancy among women in the Western Pacific region and the third leading cause of cancer-related mortality.¹ The Western Pacific region has seen the largest increase in breast cancer incidence over the past few decades compared to any other region in the world,² highlighting the continued importance of breast cancer research in this region.

The importance of breast cancer research in the Western Pacific is further underscored by studies that have found significant differences in the biology and clinical presentation of breast cancer in the Western Pacific. Regional studies have shown that breast cancer in East Asia tends to present at a younger age,³ with a higher prevalence of certain subtypes,⁴ and a more active immune microenvironment relative to Western cohorts.⁴ Researchers have also found unique genetic risk factors and differently distributed lifestyle risk factor in Asian women, highlighting the need for population-specific calibration to improve the precision of risk assessment tools.^{5,6} Similarly, the unique economic, cultural, and psychosocial conditions in the Western Pacific have led to demonstrable differences in health seeking behavior as well as decisions on screening and treatment.⁷ These differences emphasize the need for population-specific breast cancer research to enable the translation of basic research into meaningful progress in breast cancer management in the Western Pacific.

This Special Collection on Breast Cancer in Western Pacific highlights recent advances in breast cancer screening and treatment in the Western Pacific region. This special collection provides the groundwork and identify gaps in the research that is needed to develop population-specific interventions that can improve and optimize breast cancer screening and treatment for patients across the Western Pacific.

The first review article is a narrative review by Xu et al.⁸ on the current state of breast cancer immunotherapy research in Asia, summarizing key molecular and clinical studies in the region, highlighting the

recent proliferation of new immunotherapy drugs and immunotherapy clinical trials for breast cancer in China. The second paper is a review by Lin et al.⁹ of artificial intelligence (AI) models that analyze MRI outputs to support clinicians in making personalized surgical decisions following neoadjuvant therapy, focusing on studies conducted in the Western Pacific region. The authors' review of the literature found that AI models developed in the region have demonstrated the ability to predict the outcome of neoadjuvant therapy from patients MRIs with moderate to high sensitivity and specificity. This review highlights how AI-based predictive tools for medical imaging are rapidly maturing, and advocates for rigorous methodological standards in their evaluation as they approach clinical implementation. The viewpoint article by Nickson et al.¹⁰ focuses on the Roadmap to Optimizing Screening in Australia (ROSA) Project. ROSA, which concluded in 2023, evaluated options for risk-adjusted breast cancer screening through cost-benefit analyses, feasibility assessment and equity consideration across Australia's diverse and remote populations. Beyond the Australian context, the article also discusses the broader applicability of ROSA's finding in other Western Pacific settings and suggests that risk-stratified and risk-targeted screening approaches can enhance screening uptake, optimize resource allocation and strengthen national breast screening programs.

Together, these three papers highlight some common challenges to breast cancer research within the Western Pacific. First, the limited adoption of advanced technologies remains a major barrier to effective implementation. Advanced tools must be calibrated for specific populations; for example, risk classification requires population-specific calibration, and MRI-based AI models need regional validation. Second, significant disparities in healthcare access exist across the region, driven by socio-economic, geographic, and cultural barriers, not only between countries but also within countries. Underserved populations often face limited access to advanced imaging, biomarker testing for targeted therapy, and personalized treatments, further widening health inequities. These disparities may also limit the generalizability of findings from single-center studies. Finally, all three articles also emphasize the need for more local and regional clinical trials to generate population-specific evidence, as international findings may not fully translate to regional and local



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health systems and populations, both in terms of efficacy as well as implementation.

However, the state of the field also presents opportunities for breast cancer researchers in the Western Pacific region. As the limitations of small single-center studies become more apparent, the opportunity now exists for the formation of national and regional frameworks for centralized data collection and sharing to power larger, multi-center studies that can consolidate research findings and recalibrate existing models to be generalizable across diverse populations in the region. Additionally, the availability of new homegrown products (i.e., immunotherapy drugs, AI models, and risk assessment tools) that were developed from and validated in local and regional cohorts are also likely to increase access to the latest therapeutic advances to both patients and researchers in the region, providing new opportunities for collaboration. Last but not least, the maturing of AI tools for predicting outcomes in cancer screening and treatment provides new opportunities for AI-guided precision medicine across the spectrum of breast cancer research.

Contributors

Jia-Wern Pan: Conceptualization, Writing—original draft. Mei-Chee Tai: Conceptualization, Writing—review & editing.

Declaration of interests

Jia-Wern Pan and Mei-Chee Tai declare no conflict of interest related to the content of this manuscript.

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