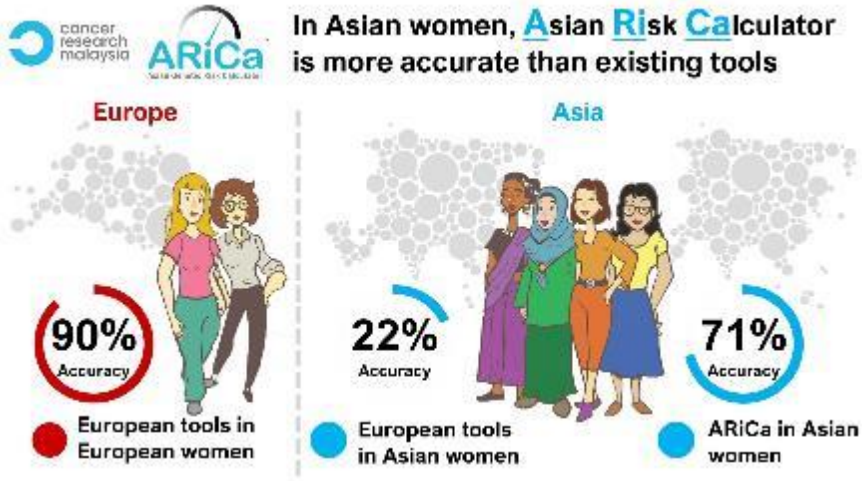
PRESS RELEASE
For immediate release

MALAYSIAN TEAM DEVELOPS NEW TOOL TO DETERMINE LIKELIHOOD OF INHERITING A FAULTY *BRCA* GENE AMONG ASIAN BREAST CANCER PATIENTS

ARiCa tool developed for Asian women enables more accurate identification of BRCA carriers for more precise treatment plans for cancer patients while enabling cancer prevention for their close relatives



KUALA LUMPUR, 3 MARCH 2022 – In line with this year's International Women's Day theme, *Break The Bias*, Cancer Research Malaysia joined the mission to assist women to be in a position of power to make informed decision about their health through the development of ARiCa - **A**sian Genetic **Ri**sk **Ca**lculator. This new tool enables women with a breast cancer diagnosis to determine their likelihood of inheriting a faulty *BRCA1* or *BRCA2* gene, tumour suppressor genes that help keep breast, ovarian, and other types of cells from growing and dividing too rapidly or in an uncontrolled way.

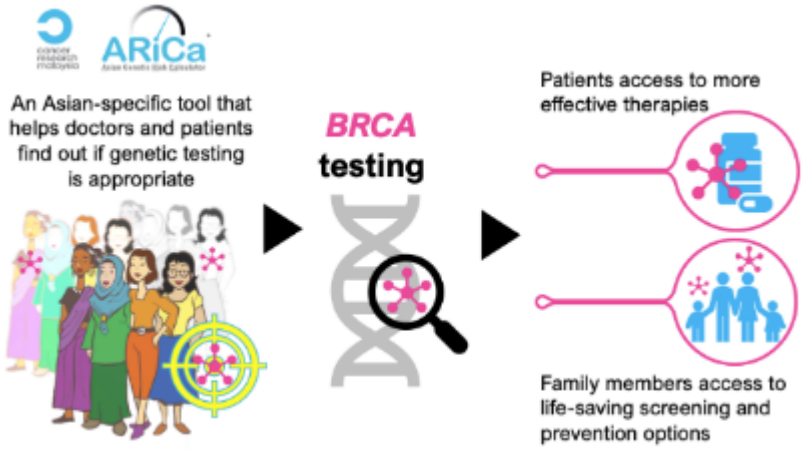
When it comes to breast cancer, data shows that 1 in 25 patients inherited a faulty *BRCA* gene. Prior to this research, breast cancer patients are only offered a test if they were diagnosed at a young age or have close relatives with breast or ovarian cancer. But because age and family history alone does not accurately predict the likelihood of carrying a faulty gene, many gene carriers are not offered the genetic test, missing the opportunity for life-saving treatments in patients and prevention strategies in close relatives.

To overcome this challenge, a number of mutation prediction tools have been developed, but the majority of them are built for European women and are less accurate for women of Asian descent. As a result, Asian patients and their family members miss out on the opportunity of being aware of their genetic risk status, thereby losing the possibility for cancer prevention and accurate treatment selection.

To tackle this challenge, Cancer Research Malaysia collaborated with the University of Cambridge, Universiti Malaya, Subang Jaya Medical Centre, the University of Nottingham, the Genome Institute

of Singapore, National University of Singapore, National University Hospital, KK Women's and Children's Hospital, Tan Tock Seng Hospital, National Cancer Centre Singapore, Singapore General Hospital, and Changi General Hospital, to analyse *BRCA1* and *BRCA2* in more than 8,000 breast cancer patients from Malaysia and Singapore. The results were then used to develop a tool to provide women with an individual likelihood of being a faulty *BRCA* carrier.

"Using criteria such as age and the presence of family history of breast cancer, we estimate that each year, nearly 4,000 newly diagnosed breast cancer patients in Malaysia would need genetic counselling and testing, but they often don't consider a genetic test because most assume that they are unlikely to have inherited a faulty gene. With ARiCa, we can now give each woman their individual likelihood of being a BRCA carrier so that they can be empowered to make informed choices about their health and healthcare practitioners can provide more accurate treatment plans for their patients," said Professor Datin Paduka Dr Teo Soo Hwang, OBE, Chief Scientific Officer at Cancer Research Malaysia, who led the study.



Dr Jingmei Li, co-principal investigator from the Genome Institute of Singapore commented, "This collaborative research that took place between Malaysia and Singapore hospitals, allowed us to gather test data from a multi-ethnic population of Malay, Chinese, and Indian breast cancer patients. This ensures that the tool developed performs equally well across Asian ethnic subgroups."

Professor Douglas Easton, Director of the Centre for Cancer Genetic Epidemiology, University of Cambridge and co-lead of the study explained, "Until recently more than 90% of genetic studies have been conducted in European women. In this study, we were able to develop a tool for predicting the chance of carrying a fault in *BRCA1* or *BRCA2* in Asian women. Our study highlights the importance of doing research in diverse populations in order to ensure that the discoveries made in Precision Medicine can benefit all populations equitably. We are delighted that through the collaboration with Cancer Research Malaysia and the funding from the Wellcome Trust and the European Commission, we have been able to widen the research to Asian populations."

Professor Antonis Antoniou, University of Cambridge, the lead developer of the BOADICEA and CanRisk tool in European women added, "Tools like CanRisk are now widely used in Europe, North America, Australia, and other countries. This research points the way on how we can adapt CanRisk for more accurate risk assessment in women from Asian countries. The information may be particularly important for adapting the tools for low- and middle-income countries where the funding and infrastructure may not be able to support screening for every woman."

Dato' Dr Yip Cheng Har, Consultant Breast Surgeon at Subang Jaya Medical Centre elaborated, "From the clinical perspective, knowing that a patient has a *BRCA* mutation may alter their surgical management. For instance, a patient with a *BRCA* mutation has a 50% likelihood of developing breast cancer on the opposite breast. An acceptable prevention strategy is to remove both breasts with an option of immediate breast reconstruction. But because a *BRCA* carrier also has a 30-40% risk of developing ovarian cancer, removal of the ovaries can be done at the same time. In addition to changing the available surgical options, medical practitioners can also prescribe the patient with a new class of drugs called PARP inhibitors that targets the *BRCA* mutation to improve survival in carriers with early and late stages of breast cancer. Since we cannot provide cancer genetics services for all patients, ARiCa can help us to identify patients that need to be referred for genetic counselling and testing."

"Prophylactic surgery and targeted therapy may not be routinely available in government-funded and public hospitals, but knowing the BRCA mutation status is important for patients and family members. This is in order for them to be aware of their individual risk that enables early detection of cancer and other risk management strategies. At University Malaya, we have set up a risk management clinic for more than 10 years to help affected and unaffected carriers get access to risk-reducing strategies and we hope tools like ARiCa will enable other hospitals to set up similar clinics," emphasised Professor Dr Nur Aishah Mohd Taib, Head of the University Malaya Cancer Research Institute.

"Currently, we refer patients for genetic counselling and testing based on age and family history of cancer due to the lower median age of cancer diagnosis among Asian women. These exacerbate the challenges in access to genetic testing even in developed Asian countries like Singapore. Therefore, a population-specific tool like ARiCa that enables more accurate identification of mutation carriers can help to meet the increased demand for cancer genetics services," added Associate Professor Mikael Hartman, Senior Consultant at the National University Hospital.

The study was published in the prestigious Journal of Clinical Oncology. Its findings will inform doctors, clinicians, and patients on better methods to enable women to understand their likelihood of inheriting a faulty *BRCA1* or *BRCA2* gene. For *BRCA* carriers like Angelina Jolie, knowing their lifetime risk could mean making different decisions about prevention in consultation with a specialist.

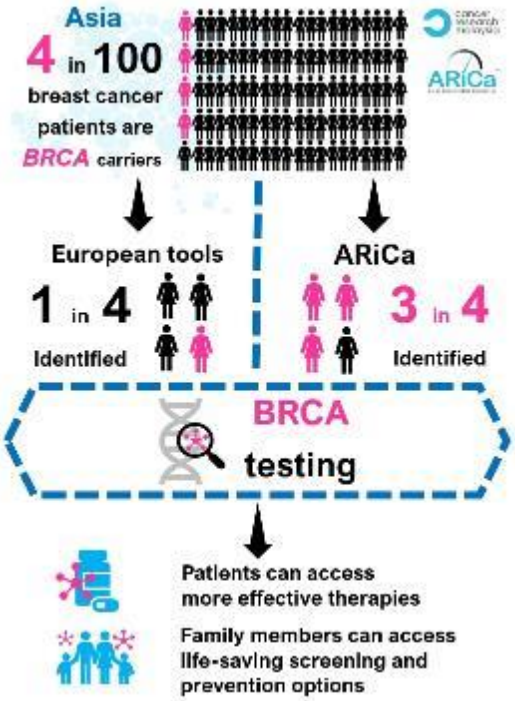
This was made possible thanks to the support of research grants and charitable funding from the Wellcome Trust, Yayasan Sime Darby, Yayasan PETRONAS, Estee Lauder Group of Companies, Khind Starfish Foundation, Malaysian Ministry of Higher Education High Impact Research Grant, National Research Foundation Singapore, National University of Singapore, National Medical Research Council, and Cancer Research UK.

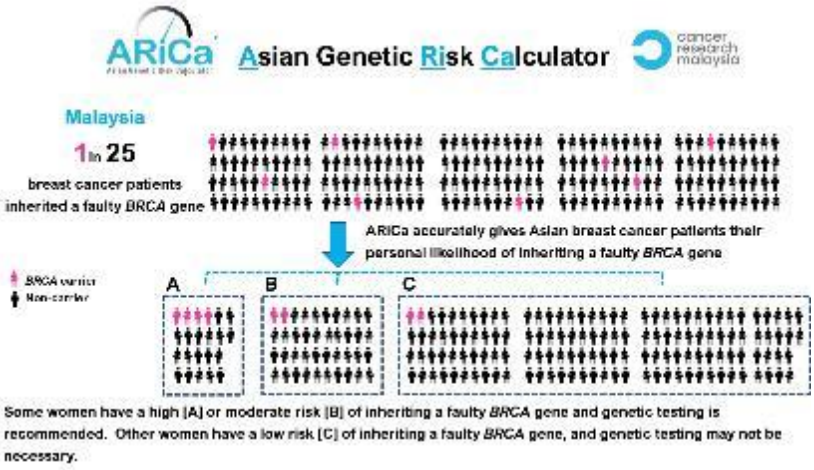
"As a first author of this study, I feel privileged to have this paper published in a high impact journal and this would not have been possible without The Malaysian Breast Cancer Genetic Study (MyBrCa), The Singapore Breast Cancer Cohort Study (SGBCC), and long-standing collaborations — at local and international levels," expressed Dr Ang Boon Hong, Postdoctoral Scientist at Cancer Research Malaysia.

Read the study: https://ascopubs.org/doi/abs/10.1200/JCO.21.01647

More information on BRCA testing: www.embracingbrca.cancerresearch.my

Get genetic counselling: http://www.embracingbrca.cancerresearch.my/ or call 012 374 7426 or 016 363 4742





Some women have a high [A] or moderate risk [B] of inheriting a faulty *BRCA* gene and genetic testing is recommended. Other women have a low risk [C] of inheriting a faulty *BRCA* gene, and genetic testing may not be necessary.

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About Cancer Research Malaysia

Cancer Research Malaysia is the only non-profit organisation in Malaysia dedicated to saving lives through impactful research focusing on the Malaysian population and communities across Asia. Our research has already led to the discovery and implementation of new and effective breast cancer prevention strategies and our priority is ensuring that Asians are not left out in the fight against cancer. Together with our partners and supporters, Cancer Research Malaysia's vision is a future free of the fear of cancer. Funding for our lifesaving research depends on donations and sponsorship from the public and corporations. For more information, please visit cancerresearch.my or follow us on Facebook, LinkedIn, Instagram or Twitter.

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About the University of Cambridge

The mission of the University of Cambridge is to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence. To date, 109 affiliates of the University have won the Nobel Prize.

Founded in 1209, the University comprises 31 autonomous Colleges, which admit undergraduates and provide small-group tuition, and 150 departments, faculties and institutions. Cambridge is a global university. Its 19, 000 student body includes 3,700 international students from 120 countries. Cambridge researchers collaborate with colleagues worldwide, and the University has established larger-scale partnerships in Asia, Africa and America.

The University sits at the heart of the 'Cambridge cluster', which employs 60,000 people and has in excess of £12 billion in turnover generated annually by the 4,700 knowledge-intensive firms in and around the city. The city publishes 341 patents per 100,000 residents.
www.cam.ac.uk

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About Universiti Malaya

Situated in the southwest of Kuala Lumpur, Universiti Malaya (UM) is the first university in Malaysia. UM is being supported by two academies, thirteen faculties, three institutes and three academic centres that comprehensively encompass medicine, science, technology, social sciences and humanities. UM also has the first and biggest teaching hospital in Malaysia, which is the University of Malaya Medical Centre (UMMC). The core of UM's contributions to the academia and society is through teaching, research, publication, innovation, and commercialisation.

UM has emerged among the world's top 60 universities and is ranked 59th on the Quacquarelli Symonds (QS) World University Rankings 2021. Since its establishment, UM has successfully produced approximately 200,000 graduates. For more information, please visit www.um.edu.my.

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About Subang Jaya Medical Centre

Subang Jaya Medical Centre is the flagship of Ramsay Sime Darby Health Care, a joint venture between Ramsay Health Care, Australia and Sime Darby. It is a licensed 444-bed multi-disciplinary and tertiary care private hospital nestled in the busting municipality of Subang Jaya, about 30 minutes' drive to Kuala Lumpur city centre and the Kuala Lumpur International Airport via major highways. The Hospital was established in 1985 and for decades, has provided comprehensive and complex care in all specialties. SJMC is also a tertiary referral hospital, receiving local patient referrals from within Malaysia as well as international patients from the Asia-Pacific region, in addition to serving as a major health care provider to a population catchment of an estimated 6.47 million.

About University of Nottingham

The University of Nottingham is a research-intensive university with a proud heritage, consistently ranked among the world's top 100. Studying at the University of Nottingham is a life-changing experience and we pride ourselves on unlocking the potential of our students. We have a pioneering spirit, expressed in the vision of our founder Sir Jesse Boot, which has seen us lead the way in establishing campuses in China and Malaysia - part of a globally connected network of education, research and industrial engagement. The University's state-of-the-art facilities and inclusive and disability sport provision is reflected in its status as The Times and Sunday Times Good University Guide 2021 Sports University of the Year. We are ranked eighth for research power in the UK according to REF 2014. We have six beacons of research excellence helping to transform lives and change the world; we are also a major employer and industry partner - locally and globally. Alongside Nottingham Trent University, we lead the Universities for Nottingham initiative, a pioneering collaboration which brings together the combined strength and civic missions of Nottingham's two world-class universities and is working with local communities and partners to aid recovery and renewal following the COVID-19 pandemic.

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About the National University Health System (NUHS)

The National University Health System (NUHS) aims to transform how illness is prevented and managed by discovering causes of disease, development of more effective treatments through collaborative multidisciplinary research and clinical trials, and creation of better technologies and care delivery systems in partnership with others who share the same values and vision.

Institutions in the NUHS Group include the National University Hospital, Ng Teng Fong General Hospital, Jurong Community Hospital and Alexandra Hospital; three National Specialty Centres - National University Cancer Institute, Singapore (NCIS), National University Heart Centre, Singapore (NUHCS) and National University Centre for Oral Health, Singapore (NUCOHS); the National University Polyclinics (NUP); Jurong Medical Centre; and three NUS health sciences schools – NUS Yong Loo Lin School of Medicine (including the Alice Lee Centre for Nursing Studies), NUS Faculty of Dentistry and NUS Saw Swee Hock School of Public Health.

With member institutions under a common governance structure, NUHS creates synergies for the advancement of health by integrating patient care, health science education and biomedical research.

As a Regional Health System, NUHS works closely with health and social care partners across Singapore to develop and implement programmes that contribute to a healthy and engaged population in the Western part of Singapore.

For more information, please visit http://www.nuhs.edu.sg.

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About A*STAR's Genome Institute of Singapore (GIS)

The Genome Institute of Singapore (GIS) is an institute of the Agency for Science, Technology and Research (A*STAR). It has a global vision that seeks to use genomic sciences to achieve extraordinary improvements in human health and public prosperity. Established in 2000 as a centre for genomic discovery, the GIS will pursue the integration of technology, genetics and biology towards academic, economic and societal impact.

The key research areas at the GIS include Human Genetics, Infectious Diseases, Cancer Therapeutics and Stratified Oncology, Stem Cell and Regenerative Biology, Cancer Stem Cell Biology, Computational and Systems Biology, and Translational Research.

The genomics infrastructure at the GIS is utilised to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

For more information about GIS, please visit www.a-star.edu.sg/gis.

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