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Short Communication

Picture my heart: Reflections on cardiovascular care in developing countries

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China, India and Indonesia, three of the four most populous countries in the world, now account for over 40% of the world's population [1]. Advancement in communication technology in the last decade of the 20th Century allowed for the emergence of a virtual global village, accelerating the socioeconomic development in these and other developing countries, particularly those in South and East Asia. Malaysia, with its balanced, multiethnic population (predominantly Chinese, Indian and Malay), is no stranger to this phenomenon — it envisages a developed country status by the year 2020, and has taken aggressive steps to achieving this target.

Within the healthcare sector in developing countries, new challenges are emerging: improvement in infrastructure and *per capita* income has allowed more ready access of ever greater numbers of citizens to healthcare professionals. A gradual shift from a predominant agriculture based industry and adoption of more high-income industries, for example manufacturing and financial services, have resulted in proportionately more citizens adopting a more 'urbanised' lifestyle. Recently published studies have shown a high prevalence of cardiovascular risk factors in Asia: 9.7% with diabetes in China and 7.1% in India [2], 32.3% with hypertension and 20.7% with hypercholesterolaemia in Malaysia [3].

The alarming growth of cardiovascular risk factors is likely to be mirrored by a corresponding rise in cardiovascular events, principally acute coronary syndrome and stroke. Both short- and long-term outcomes of acute cardiovascular disease are directly related to speed of treatment and availability of tertiary level specialist medical services [4,5]. Many of the large, multicentre, outcome studies are conducted in developed countries, where mature healthcare systems can rapidly adapt to new treatment strategies. However, translation of these treatment strategies in developing countries can be challenging when economic, infrastructure and human capital factors are taken into consideration. Geographic and cultural factors are other factors that can limit the rapid expansion of new treatment modalities in developing countries [6].

Implementing evidence-based therapeutic strategies for cardiovascular disease only addresses one end of the spectrum. The cost of delivering such cutting-edge treatments in developing countries often leads to a two-tier healthcare system — healthcare delivered by a near- or fully-subsidised public access system, and that delivered by the private sector. In Malaysia, substantial funding into the public healthcare system, approximately 7.3% of the 2008 National Budget provided for the Ministry of Health [7], has led to a steady upgrading of facilities and services. Public sector healthcare providers in developing countries now have regional tertiary referral centres, many of whom provide world-class cardiovascular care. On the other hand, with the ever growing numbers of patients with cardiovascular disease, and the relative lack of skilled healthcare professionals in the public sector, the demand for quality cardiovascular care now far outstrips the supply. Hence, private sector healthcare providers constantly pursue new, evidence-based, services to maintain a competitive edge. Healthcare tourism retains its place as an important component for consideration in the contemporary Asian economic model. The recent Association of South East Asian Nations (ASEAN) Free Trade Agreement (AFTA) will inevitably pro-

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vide new opportunities for all associated with the healthcare industry [8].

While it is critical that the primary focus in developing countries is control of modifiable cardiovascular risk factors, we believe the greatest demand for cardiovascular care is in diagnostics: identifying the high risk patient. Cardiac computed tomography (CT) and magnetic resonance (MR) imaging to identify and characterise coronary atherosclerosis, molecular imaging to identify the vulnerable plaque and biomarkers that improve our understanding of vascular disease are now the next frontier. The advent of combination imaging technology, for example PET-MR and PET-CT, has enabled clinicians to study cardiovascular anatomy and function simultaneously. Evolving hardware to improve spatial and temporal resolution, software to enable more user-friendly interfaces, and amalgation of data from biomarkers (soluble serum and genetic), will lead to wider availability of these instruments. Vendors can, soon, each provide a complete 'bio-imaging'' diagnostics solution to improve cardiovascular care. Novel therapeutic approaches to 'cool' the (now identifiable) 'vulnerable plaque', over and above current treatment strategies [9], will soon drive the demand for improved diagnostics mechanisms that identify the 'vulnerable patient'. Research into Asian cardiovascular risk stratification models is already in progress; these will provide new data into the epidemiology, as well as pathophysiology, of cardiovascular disease in developing countries [10]. There remains a question on the cost of providing these cutting edge diagnostics services. However, ubiquitous Cardiac CT, which has seen an expansive rise over the last decade, has been shown to be more cost-effective than standard practice to diagnose coronary artery disease [11]. Due to the relatively high start-up cost, health technology assessments will be applied to this and other emerging technologies, with their subsequent findings most crucial in the healthcare arena of developing countries.

The accessibility of rural patients to urban areas, where most tertiary cardiovascular healthcare services are available, means that certain aspects of cardiovascular diseases are still prevalent in developing compared to developed countries, notably rheumatic heart disease and late presentations of coronary artery disease. It is notable that approximately 80% of our patients with chronic rheumatic heart disease are women, usually diagnosed during clinical examination at the early stages of pregnancy. Percutenous mitral valve commisurotomy is a skill still much valued in developing countries, as is excellence in echocardiography to ascertain the diagnosis and/or monitoring rheumatic heart disease. Late presentations of coronary artery disease, and resultant heart failure, provide clinicians in developing countries a different challenge. There is little argument that cardiac resynchronisation therapy for patients with systolic heart failure and widened QRS complexes improves outcomes [12], and perhaps the novel cardiac contractility modulation therapy also will [13]. However, these devices are relatively costly in the context of cardiovascular therapeutics in developing countries, therefore more outcomes research results are eagerly awaited. Undeterred, with device companies well aware the positive impact cardiac MR has in contemporary management of patients with heart failure, MR-safe leads and pacemakers are being carefully introduced into Asian markets [14].

Now into the second decade of the 21st century, the challenge to deliver world-class cardiovascular care in the emerging market, that of developing countries, is substantial [15]. The projected increase in the burden of cardiovascular disease requires a concerted effort from both healthcare professionals and policy makers. Technological advancements will continue to provide better tools to diagnose and treat the burgeoning epidemic of cardiovascular disease. Hence, more research is mandated to investigate the impact of new treatments at each aspect of the disease continuum. We acknowledge the majority of patients in landmark clinical trials are of non-Asian origin, but appreciate more efforts are made to include this in current and future trial designs. Meanwhile, there must be processes to initiate and sustain existing registries of cardiovascular disease — we believe these will guide local clinical practice and provide vital data for comparative effectiveness research.

Conflict of interest

None declared.

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