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# Health and Medical Research in Singapore

Observatory on  
Health Research Systems

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Prepared for the Health Research and Development Policy Research Unit,  
Department of Health (England)

The research described in this report was conducted with funding support from the Health Research and Development Policy Research Unit of the Department of Health (England).

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Published 2010 by the RAND Corporation  
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# Summary

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## Summary: key points

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- Singapore's goal is to develop the biomedical and health sciences sector as a key pillar of its economy
- Biomedical sciences sector employs more than 10,000 people and contributes 2.3% of GDP (2007)
- Biopolis is a flagship example of investment into building world-class research infrastructure
- 17% of total R&D expenditure is on biomedical sciences; 63% of health-related research is supported by public funders and 37% by the private sector (2007)
- Key R&D actors: public research institutes, universities, hospitals, consortia, public-private partnerships, pharmaceutical and biotech R&D units
- Health research priorities include chronic and infectious diseases, stem cells, regenerative medicine, medical technology and immunology

This report is a documented briefing of the health research system in Singapore. It provides an overview of how biomedical and health research is financed, the key research and development (R&D) actors, health research priorities and various aspects of process and performance, including the types of funding mechanisms used to build and sustain research competitiveness, science commercialisation and technology transfer efforts. In addition, the report addresses some topical issues related to the future of the health research system in Singapore.

Singapore is a small city-state with a population of 4.69 million (2009 estimate). It is a multi-party parliamentary republic with the prime minister as head of state. Singapore is a highly-developed free market economy with an open and corruption-free<sup>2</sup> environment. Singapore gained independence from Malaysia in 1965 amid concerns as to whether such a small country would be viable. The government addressed these concerns through strategies designed to diversify the economy and a carefully planned approach to economic development. As part of its economic plan, the Singapore government has sought to attract

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<sup>2</sup> Transparency International ranks Singapore as fourth in the world in its annual Corruption Perceptions Index for 2008 (Transparency International, 2008).

foreign investment by providing access to appropriate land and infrastructure, as well as through tax incentives for businesses (particularly for R&D-intensive ones). A number of factors make Singapore an attractive centre for commerce and investment in knowledge-intensive sectors. These include: an excellent infrastructure and geographic position along major trade routes; close proximity to the largest Asian markets; openness to trade; high education standards; the prevalence of English speakers in addition to Mandarin; and government willingness to provide investment and other support for new business.

Between 2004 and 2007, Singapore's economy grew by an average of 7% annually (real gross domestic product (GDP) growth), although it fell in 2008 to 1.1% as a result of the global economic recession (Central Intelligence Agency, 2009). In response to growing competition for manufacturing business from its Asian neighbours, Singapore's government has focused increasingly on investments and strategies to develop Singapore into Asia's premier knowledge-based and high-tech economy. Within this agenda, building up a biomedical and health research hub has been a central concern. Health research priorities have been determined both according to public health needs and opportunities to contribute to the country's economic competitiveness.

Singapore's government has supported aggressive biomedical R&D infrastructure development, including Biopolis – a purpose-built biomedical research hub consisting of a seven-building complex linked by sky-bridges and covering more than 200,000 square meters, where scientists from the public and private sectors are co-located. Biopolis is located strategically, close to the National University of Singapore, National University Hospital and Institute of Molecular and Cell Biology. The research community at Biopolis is supported by state-of-the-art infrastructure and services catering to the R&D activities of all the institutes located there, as well as to education and training.

The health research system in Singapore is sustained by diverse funding sources across the public and private sectors. These include government agencies, charities and not-for profit foundations, local and international corporations, foreign governments and international organisations. Since 2006, investment in translational and clinical research in particular has become a priority for various national funding agencies. This includes the National Medical Research Council, National Research Foundation and the Biomedical Research Council of the Singapore Agency for Science, Technology and Research. In addition, the government has established a National Framework for Innovation and Enterprise to support and facilitate the growth of an innovation culture and conducive conditions for science commercialisation in Singapore.

Biomedical and health R&D actors in Singapore are equally diverse. Key public sector R&D actors are public research institutes, universities and hospitals. Consortia between various public institutions and public-private collaborations are encouraged by central government. Private sector R&D takes place in multinational pharmaceutical and biotechnology R&D units and in local biotechnology and medical technology small and medium-sized enterprises.

As a well-established and credible intellectual property environment with favourable business conditions (for the past three years, Singapore has been ranked as the best place in the world to do business by the World Bank; see World Bank Group, 2009), incentives such as low corporation tax, 10-year tax exemptions for strategic research in priority areas

and open immigration policies have all helped to attract a high number of foreign investors and multinational companies to the region.

Singapore's health research priorities include the disease-specific areas of R&D (i.e. cancer, eye diseases, neurological disorders, infectious diseases, metabolic disease such as diabetes), as well as functional research areas (i.e. stem cells, regenerative medicine, medical technology, immunology and others).

In terms of performance, Singapore's output in top medical journals is higher than that of most regional competitors, and publishing output has doubled in comparison to the 1990s (Sandström, 2009). The country's largest university, the National University of Singapore, was ranked 17th in the world for life sciences and biomedicine by the Times Higher Education Supplement – Quacquarelli Symonds (THES-QS) university rankings for 2008 (THES-QS, 2008).

One of the key issues facing the future of the health research system is how to attract, retain and grow a critical mass of biomedical and health researchers (including clinician scientists) in the country. Diverse non-competitive and competitive funding packages are available to help build biomedical R&D capacity (e.g. grants, scholarships, fellowships and strategic programmes). However, whether Singapore will achieve and sustain critical mass in the long term and effectively manage 'brain circulation', remains to be seen. Other important issues relate to: strengthening capacity in health policy research (for example, Singapore is disadvantaged by not having a public health graduate school); improving the e-health system; managing competitive threats from neighbours such as China; and building capacity to ensure a competitive niche in stem cell research and related product development.