

Australia-China healthcare opportunities



THE UNIVERSITY OF
SYDNEY
China Studies
Centre



THE GEORGE INSTITUTE
for Global Health



National
Australia
Bank

This report was authored by Kerry Brown, Professor of Chinese Politics and Director of the China Studies Centre, University of Sydney and Simone van Nieuwenhuizen, Special Project Officer at the China Studies Centre.

The authors wish to acknowledge the contributions of John Knight and the George Institute for Global Health in the drafting of this report.

China Studies Centre

The University of Sydney NSW 2006
Room 313, Old Teachers' College (A22)
Manning Road
Tel: +61 2 9114 0837
chinastudies.centre@sydney.edu.au
sydney.edu.au/china_studies_centre

National Australia Bank

Healthcare & Ageing
Australia
Level 18 NAB House, 255 George Street,
Sydney, NSW 2000
Tel: +61 (2) 9237 9427
Laura.C.Sampson@nab.com.au

Asia

Level 27 One Pacific Place
88 Queensway, Hong Kong
Tel: +852 2822 9830
michael.ball@nabasia.com

www.nab.com.au

The George Institute for Global Health

Level 10, King George V Building
Royal Prince Alfred Hospital
Missenden Rd Camperdown
NSW 2050 Australia
PO Box M201, Missenden Road,
Sydney, NSW 2050
Tel: +61 2 9993 4500
info@georgeinstitute.org
www.georgeinstitute.org

Executive Summary

One of China's two millennial goals, which mark the hundredth anniversary of the establishment of the Communist Party, is to complete a transition to what it calls a 'middle income' country by 2020-21.



A key challenge will be to achieve a good, all round living standard for its population. Even in the space of a few years, Chinese people will be wealthier, have higher expectations for public goods, and will increasingly live in cities and work in the service sector. Keeping this all-important emerging middle class – which could amount to 750 million people by the end of this decade – happy and healthy will be politically and economically crucial for the government and country as a whole.

Nevertheless, China faces some formidable challenges over this period. Health and wellbeing are among the largest of these. Firstly, despite increasing investment in the healthcare sector and rising longevity, it also has the largest number of smokers in the world, as well as rising levels of obesity due to dietary and lifestyle changes. Secondly, as demographer and National People's Congress (NPC) standing committee member Cai Fang has noted, China runs the risk of growing old before it gets rich due to its ageing population.¹ Thirdly, serious environmental problems, which are intimately linked to public health, will need to be addressed.

This paper sets out the opportunities for Australia to collaborate with Chinese organisations as China works towards fulfilling one of the key aspects of its project of modernity: a universal, affordable healthcare system for the largest population in history. China has an immense interest in Australian experience, intellectual resources and inventions, and with the China Australia Free Trade Agreement (ChAFTA) signed in 2015, there is a pathway for Australian companies to engage with the opportunities in the healthcare sector.

Through this report, the National Australia Bank, the University of Sydney's China Studies Centre and The George Institute for Global Health aim to start a conversation in the context of China's recent healthcare reforms and ChAFTA. These organisations represent different areas of specialisation within the sector, allowing both Australian and Chinese businesses to consider the opportunities from different perspectives. Their recommendations include: examining healthcare opportunities presented by ChAFTA; enhancing dialogue between Chinese and Australian experts; careful consideration of the location of business operations in China; concentrating in areas of strength, and exploring enhanced collaboration in the field of Traditional Chinese Medicine.

While this report is comprehensive in many respects, it does not explore legal or regulatory matters, and it is recommended that businesses consult with specialists on specific issues related to ChAFTA and its implementation.

¹ 'China will grow old before it gets rich', *Macrobusiness*, 24 July 2012, <http://www.macrobusiness.com.au/2012/07/china-will-grow-old-before-it-gets-rich/>, viewed 1 September 2015.

China's Health Challenge

Since the founding of the People's Republic of China (PRC) in 1949, the country has experienced dramatic change and immense achievements in its healthcare system. In 1949, the average life expectancy in China was 32 years, and the system was not equipped to deal with the health problems of its large population. However, with the start of the Reform and Opening Up Period in 1978, China's development path changed and the country saw the dramatic improvement of many indicators, from levels of malnutrition to life expectancy. In 1990, average life expectancy stood at 69 years; in 2010, this rose to 75.15 years.² Over the same period, the government was able to deliver basic levels of healthcare and education to the largest number of people ever. These are enormous and globally significant transformations. Over the last seven decades, China has achieved almost continuous improvement in basic human development. No generation has lived as long, and as well, as those living in the PRC today.

Nevertheless, almost four decades since the start of its reforms China still faces a range of challenges, some of which are results of its economic success. Chinese people eat more meat than ever before and live more sedentary lives. The global challenge of obesity, almost unheard of before, now afflicts 4.6% of men and 6.5% of women in China according to OECD figures. While lower than the OECD average, these rates are higher than those observed in Japan or South Korea.³ China's rapid industrialisation has burdened its environment with highly toxic levels of pollution, much of it afflicting the country's air. Cities like Beijing and Shanghai have been blighted by smog since 2010, and the central government is continuing to develop policies and action plans to address this. Up to 70% of China's water, a precious resource in a country which includes so many arid regions, is also believed to be polluted.⁴

1/3

Beyond the physical environment, there are social and lifestyle changes. China's people now smoke a third of all cigarettes consumed in the world, coming to a staggering 1711 per capita in 2012.⁵

The one child policy rolled out across the country from 1980 has led to the breakdown of the traditional family-centred model of caring for the rising number of elderly, with smaller families and only one child to care for two parents and in some cases, four grandparents. This is further exacerbated by the trend of migrant labour, which sees many working age adults move from the countryside to more developed cities in order to support their families, who usually remain behind in their non-urban homes.

Despite significant advances, China still spends less than the global average on healthcare. In 2012 it set aside 5.4% of GDP on this sector, less than the OECD average of 9.3% and under a third of the 16.9% spent by the United States. On a per capita basis, the shortfall is quite dramatic, with national expenditure of US\$480 per annum, considerably below the OECD average level of US\$3484 per annum. The country has 1.6 physicians per thousand people, which is half the OECD average. The situation is even more evident for nurses, with only 1.8 per thousand, compared to the OECD's average of 8.8.⁶

China has recognised the size and importance of this task, and developed policies to address the challenges it presents.

A Lancet editorial from 2008 summarised China's challenges as follows:

The population demographics are uneven, exaggerated by rapid ageing, as a result of the single child policy, and by the large number of highly mobile workers within the country. The health infrastructure is variable, with world leading medical centres in the populous east of the country, whereas more rural areas lack basic sanitation. Despite better control, infectious diseases still account for considerable morbidity with an ever-present danger of new outbreaks. Alongside communicable diseases are the increasing burdens caused by the diseases of affluence and changing lifestyles. Meanwhile the ability to deliver care is compromised by an uneven distribution of human resources and the loss of doctors to other professions. In addition to the breadth of the challenges, the size of the task is enormous.⁷

2 Global Health Observatory Data Repository, World Bank, 2015, <http://apps.who.int/gho/data/node.main.688>, viewed 8 October 2015.

3 A good, accessible overview of China's obesity issues can be found in Paul French and Matthew Crabbe, *Fat China: How expanding waistlines are changing a nation*, London: Anthem Press 2010.

4 '70% of rivers, lakes polluted in China', China Internet Information Centre, 2005, <http://www.china.org.cn/english/environment/149791.htm>, viewed 8 October 2015.

5 'Tobacco atlas: country by country', The Guardian, 24 March 2012, <http://www.theguardian.com/news/datablog/2012/mar/23/tobacco-industry-atlas-smoking#data>, viewed 17 September 2015.

6 'OECD health statistics 2014: How does China compare?' OECD, 2014, <http://www.oecd.org/els/health-systems/Briefing-Note-CHINA-2014.pdf>, viewed 20 August 2015.

7 'Health-system reform in China', *The Lancet*, vol. 372, 25 October 2008, p. 1437.

Problems from the air:

China's environmental challenges

China's march towards developed economy status has been one of the most remarkable stories of the modern era, but it has also come at a cost.

Anyone visiting Beijing or Shanghai during the winter of 2013 or 2014 would have had trouble seeing even a few feet in front of them on some days. A huge, thick smog covered large areas of the most industrialised parts of the country. While the pollution of London once represented the side effects of huge manufacturing industries and coal-fired power, it is now the major cities of China.

The context of this is very simple. Since 2009, China has become the biggest energy consumer in the world. Its energy consumption as a share of its GDP is 1.4 times the world average. It uses 50% of the world's coal, which contributes 67% towards its total energy use. This reliance on fossil fuels is an immense structural problem – not one that China faces alone, but certainly something that is unique in scale.

In addition to this, lifestyle changes have contributed to the production of air pollution.



The health impact of this is clear enough. According to the 2010 Global Burden of Disease Study, particulate matter had become the fourth most significant threat to Chinese people's wellbeing.⁸



Rates of lung cancer shot up. And while the figures are contested, institutions like the World Bank and the World Health Organisation estimated that 350,000 to 500,000 deaths a year occurred prematurely as a result of air quality issues. An August 2015 study by Berkeley Earth claims that as many as 4,000 people die every day due to health problems caused by pollution in China. This is equivalent to 17% of all deaths.

The Chinese government is very aware of this, and a 2012 National Plan for Air Pollution in Key Regions, derived from the 2011-2015 Five Year Plan, stipulates tougher targets for emissions and for the management of air pollution.⁹ These targets were consolidated in a 2013 National Action Plan, which focussed on reducing particulate matter. China's fight to keep its air clear and manage the impact of pollution on people's health is ongoing. But it is one with global significance, and one in which Australia, through technology and intellectual partnership, will continue to play a role.

Statistics cited from Zhu Chen, Jin-Nan Wang, Guo-Xia Ma, Yan-Shen Zhang, 'China Tackles the Health Effects of Air Pollution', *The Lancet*, Vol 382, December 2013.

⁸ Global burden of diseases, injuries, and risk factors study 2013, *The Lancet*, 13 December 2012. See <http://www.thelancet.com/global-burden-of-disease>. For more detailed information, see 'Outdoor air pollution among top global health risks', Health Effects Institute, 31 March 2013, <http://www.healtheffects.org/International/HEI-China-GBD-PressRelease033113.pdf>, viewed 2 September 2015.

⁹ '12th Five-Year Plan on Air Pollution Prevention and Control in Key Regions', Clean Air Alliance of China, 22 April 2014, <http://en.cleanairchina.org/product/6285.html>, viewed 2 September 2015.

What is the Chinese government Planning?

China remains today, even under what it calls ‘market socialism’, an economy with attributes of central planning. This means that the central government has taken ownership over attempting to grapple with the country’s health challenges. These are broadly articulated in documents including the National Five Year Plans (the 12th and current one runs from 2011 to 2015, with the 13th due to be launched next year); statements from the Ministry of Health (replaced by the National Health and Family Planning Commission (NHFPC) in 2013), and speeches of leaders responsible for macro-political and economic issues (such as current Premier Li Keqiang).

The consensus in China is that the main issues these central government policies need to address are, broadly, to achieve health reform in such a way that “all people can access basic healthcare through an equitable, efficient, affordable and effective healthcare system.”¹⁰ Each of these attributes is important. In terms of equitability, divisions often remain stark between urban and rural standards.

The nationwide lack of local, community-based primary healthcare systems has resulted in major issues with the efficiency of healthcare delivery. The widespread practice of providing primary healthcare services in a hospital setting has created pricing models for services that prevent cost-effective care.

The funding of hospitals through a surcharge on drug sales has caused systemic issues and created inappropriate incentives to over-prescribe, and in some instances encouraged corrupt practices.

Affordability is a major priority for a country which in aggregate may look wealthy, but in per capita terms ranks below Tunisia and Ecuador at 90th out of 184 on the IMF list of the world’s richest and poorest countries in 2013.¹¹

Finally, there is the issue of effectiveness. Many wonder whether the country is really prepared to deal with the shift from communicable diseases – the key problem in most of the decades after 1949 – to the rise of non-communicable diseases today.

In 1990 alone, death from non-communicable diseases stood at 5.9 million, or 74% of all mortalities that year. Two decades later, this figure had risen to 7 million, or 84%.¹²

China remains vulnerable to pandemics, even though it has undertaken effective campaigns of semi-eradication for tuberculosis, malaria and other communicable diseases.

The government’s responses to China’s healthcare challenges can be categorised as they appear in the 12th Five Year Plan:

- 1. Strengthening the building of a public health service system**
- 2. Strengthening the building of an urban and rural medical service system**
- 3. Improving the medical insurance system by rolling out a basic medical insurance scheme**
- 4. Improving the medicine supply system**
- 5. Advancing the reform of public hospitals, which includes the improvement of training standards for general practitioners and greater application of information technology**
- 6. Supporting the development of Traditional Chinese Medicine**

The ‘China 2030’ report, jointly issued in 2012 by the World Bank and the Development Research Commission of the State Council, characterised the country’s main challenge as striking “the best balance between the quality of healthcare and costs,” which would require “medical innovation that is accompanied by effective innovation.”¹³ This provides the basis for a good quality dialogue, and for targeted cooperation between Chinese and international partners.

¹⁰ Qingyue Meng and Ling Xu, ‘Monitoring and evaluating progress towards universal health coverage in China. *PLOS Medicine*, vol. 11, no. 9, 22 September 2014, <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001694>, viewed 2 September 2015.

¹¹ Denise Bedell, ‘The world’s richest and poorest countries’, *Global Finance*, 13 June 2013, <https://www.gfmag.com/global-data/economic-data/worlds-richest-and-poorest-countries>, viewed 15 September 2015.

¹² Yang, *The road to effective Tobacco Control in China*, New York: Lexington Books, 2010, p 176.

¹³ ‘China 2030: Building a modern, harmonious and creative society’, World Bank and Development Research Center of the State Council, the People’s Republic of China, 2013, <http://www.worldbank.org/content/dam/Worldbank/document/China-2030-complete.pdf>, p 202, viewed 17 September 2015.

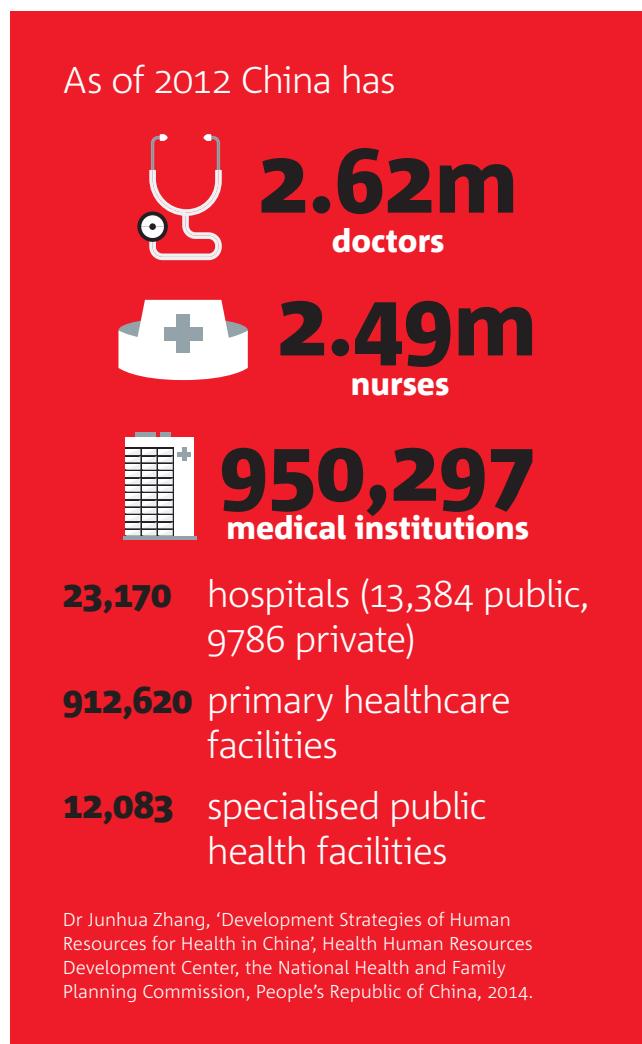
How is the Plan Doing?

While China's healthcare is a fundamental part of a broad reform program, the language of the 12th Five Year Plan is quite sweeping. In which areas is the government currently seeing success?

Some of the achievements Chinese leaders in their speeches have drawn attention to are as follows:

- By 2011, more than 1.3 billion people had joined the three basic medical insurance schemes that cover both urban and rural residents... with their total coverage being extended from 87% in 2008 to 95% in 2011.¹⁴
- From 2009 to 2011, the central government invested RMB47.15 billion (approximately AU\$10 billion) to support the building and development of grassroots level medical institutions.¹⁵
- Medical and healthcare services at the grassroots level have improved. More than 2,000 county-level hospitals and over 30,000 grassroots medical and health institutions have been constructed or reconstructed. A campaign to train grassroots medical workers, especially general practitioners, has been launched. Through this campaign, around 10,000 medical students have been trained for grassroots medical and health institutions in central and western regions free of charge; over 20,000 medical practitioners have been recruited for town and township medical centres; and millions of practicing medical workers have been provided with training. Third, new progress has been made in our effort to provide equitable access to basic public health services for all people.¹⁶
- Trials of serious illness insurance for rural and non-working urban residents were extended to all provincial-level administrative areas, and a framework of the system for providing assistance for emergency medical treatment was established. The comprehensive reform of community medical and healthcare centres was deepened, and the networks of medical and healthcare services for counties, townships, and villages have been steadily improved. The number of counties and county-level cities carrying out trial public hospital reforms reached over 1,300.¹⁷

- China launched a pilot medical reform on public hospitals in 17 cities in 2010, and the guideline stipulates the reform should cover all of the country's public hospitals by 2017. The reform is aimed to change public hospitals' reliance on medicine sales to supplement their income.¹⁸



14 'Reform of Medical and Healthcare Systems', The State Council Information Office of the People's Republic of China, 27 December 2012, http://www.scio.gov.cn/zfbps/gqbps/Document/1435497/1435497_2.htm, viewed 8 October 2015.

15 Chinese Government, 'White Paper: Medical and Health Services in China', 2012, http://www.china.org.cn/chinese/2012-12/27/content_27526876_4.htm, viewed 6 July 2015.

16 Li, K, 'Deepening the Reform of Health Care', *Qiushi Journal* (English edition), vol. 4, no. 1, 2012, http://english.qstheory.cn/leaders/201204/t20120401_149156.htm, viewed 6 July 2015.

17 Li, K, 'Report on the Work of the Government', 5 March 2015, http://english.qstheory.cn/2015-03/17/c_1114671641.htm, viewed 6 July 2015.

18 'China to further improve public hospital services', *China Daily*, 17 May 2015, http://www.chinadaily.com.cn/china/2015-05/17/content_20742040.htm, viewed 8 October 2015.

Australia:

A Health Partner for China

China and Australia are two countries which differ markedly in size of population and wealth, but they do share some interesting similarities, outlined in the table below, particularly in the area of demographics and healthcare.¹⁹

These similarities mean that China and Australia have much to learn from each other as they seek to provide affordable, effective healthcare to 100% of their citizens. In this regard, Australia stands out as a competitive role model compared to other developed economies such as the USA, which still has significant problems associated with access to and equity of healthcare.

It is not reasonable, or necessary to reach the sort of healthcare spending as a proportion of GDP observed in the USA (17.4%) in order to achieve excellent healthcare. Australia has significantly better health outcomes than the USA with half that expenditure, equal to the OECD average, and in line with the targets which the Chinese government has set.

	Australia	China
Population	23 million	1.4 billion
GNP per capita (PPP 2013)	42,000	11,000
Expenditure on health per capita 2013 (Intl \$)	4,191	646
Expenditure on health as % of GDP 2013 (Intl \$)	9.4	5.6
Population aged 15y and older	81%	82%
Population in urban areas	89%	47%
Fertility rate per woman	1.9	1.7
Life expectancy at birth (m/f)	80/85	74/77
Probability of dying before age 15 (m/f) %	3/2	7/6
Probability of dying before age 70 (m/f) %	26/17	46/36
Population proportion over 60y 2013 %	20	14
Population median age	37	37.4
Maternal mortality ratio ^a	7	32
Under five mortality rate ^b	9	54
Alcohol consumption (litres 2010 m/f)	19.7/9.0	18.7/7.6
Deaths due to HIV/AIDS ^c	0.3	2.8
Deaths due to malaria ^c	0	0
Deaths due to tuberculosis ^c	0.19	3

a. per 100,000 live births 2013

b. per 1,000 live births

c. per 100,000 population

(Source: World Health Organisation, 2015, <http://www.who.int/countries>, viewed 2 September 2015).

19 'Mirror, mirror on the wall, 2014 Update: How the U.S. health care system compares internationally', The Commonwealth Fund, 2014, <http://www.commonwealthfund.org/publications/fund-reports/2014/jun/mirror-mirror>, viewed 18 September 2015.

The George Institute for Global Health

The George Institute for Global Health was founded in Sydney in 1999, in affiliation with the University of Sydney, to address the leading causes of death and disability, chronic disease and injury – particularly in disadvantaged populations in the developed and developing world. From modest beginnings, the Institute now has a team of more than 500 staff with centres in Australia, India, China and the United Kingdom, and its affiliations now extend from the University of Sydney, to include Peking University Health Science Center, University of Hyderabad in India and University of Oxford in the United Kingdom. The Institute's projects span more than 50 countries. It has raised over \$500 million for global health research and has been ranked among the top 10 research institutions in the world for scientific impact over the past four years.

Given the global scope of the Institute's mission, a strong presence in China was recognised as imperative. The George Institute China opened in 2007, with the support and partnership of Peking University Health Sciences Center, the premier medical school in China. The China research team now numbers 90 people, in two divisions – an academic research group focused on diabetes, heart disease, injury, stroke, air pollution and food policy, and a contract research division which performs randomised controlled trials and epidemiological studies for academic and commercial

clients in over 200 centres across China.

George Clinical, the commercial research arm, operates as an independently managed, full service Contract Research Organization (CRO) a wholly owned corporate subsidiary, competing successfully with other CROs across Asia. In China it has experienced strong growth in size and profitability since it was established in 2013. George Clinical returns its surpluses to the parent organization each year to fund the growth of the not-for-profit George Institute. George Clinical ranks with the other examples in this paper of an Australian health research export industry success story in China. The publications of the Institute appear in the top ranked international medical journals and influence global and national health policy and decision-making.

The senior leadership of the Institute pursues an active program of engagement with decision makers and thought leaders around the world to encourage and facilitate the direct implementation of its key findings in healthcare delivery to people and patients everywhere. The publications of The George Institute for Global Health appear in the top ranked international medical journals and influence global and national health policy and decision-making.

Collaborating with China to offer solutions to their rubric of equitable, efficient, affordable and effective healthcare

The Australian healthcare system is generally recognised to have achieved a successful blend of best practice approaches to provision of cost effective, equitable and high quality healthcare for its citizens, making use of a judicious mix of public and private care.

The Australian model of healthcare service provision is ideal for adaptation by a centrally planned economy such as China's with a willingness to embrace private sector involvement in partnership with government-funded services. The best features of the Australian system include²⁰:

- One hundred percent of Australian citizens are guaranteed free healthcare in a public hospital for all illnesses, including the most expensive, funded by a specific surcharge on income tax and by general taxation revenue. In this basic universal service, the doctor and timing of care are chosen by the Medicare system according to clinical need and medical priority.
- Approximately half the population choose to also take out private health insurance, which allows access to personal choice of doctor, flexibility as to timing of procedures, and comfortable private hospital accommodation.

- Community general practice forms the cornerstone of primary care – the initial contact with the health system – and is increasingly offered in corporatised multidisciplinary polyclinics, which include pharmacy, imaging, pathology, physiotherapy, psychology, dentistry, community nursing and other allied health services. In the majority of cases, the costs of these consultations are billed directly to a publicly owned health insurance corporation without the need for a co-payment by the patient through the Medical Benefits Scheme (MBS).

The costs of visits to specialist doctors out of the hospital setting are reimbursed by the state, usually with a gap payment. Specialists can choose to 'bulk bill' poor or elderly patients directly to the MBS at their discretion.

- The costs of most prescription drugs are subsidised by a Pharmaceutical Benefits Scheme (PBS) which caps payment at affordable levels, with reduced rates for the poor and the elderly. Eligibility of new drugs for the PBS is determined by a rigorous cost effectiveness assessment using innovative health economic analysis.
- Mental health outreach and preventative community services are world leading in their structure and effectiveness and have delivered measurable benefits to the wellbeing of the community.

²⁰ Australian Institute of Health and Welfare, 'Australia's health system', 2014, <http://www.aihw.gov.au/australias-health/2014/health-system/>, viewed 23 July 2015.

National Australia Bank (NAB)

One of Australia's top banks¹ and largest listed institutions², NAB manages relationships with retail, corporate and institutional clients, and financial organisations internationally.

A strong balance sheet has helped rank NAB as the #1 safest bank in Australia and New Zealand, and #17 overall in Global Finance Magazine's World's 50 Safest Banks³, for the third consecutive year.

After 150 years, NAB Group's operations in Asia, Australia, New Zealand, the United Kingdom and the United States serve over 12.7 million banking and wealth management clients, providing access to international financial markets and an extensive range of specialised funding, liquidity, investment, asset services and risk management capabilities.

NAB established a specialised industry for the Healthcare & Ageing sector within its Global Institutional Banking (H&A GIB) business in 2004. Michael Ball was appointed Head of H&A GIB when it was established.

H&A GIB has provided cornerstone support assisting the execution of our client's expansion strategies over the past 11 years. Whilst these strategies focussed initially on the Australian domestic market, there has been increasing expansion in global markets.

In 2014, Michael Ball was appointed Global Head of H&A GIB based in Hong Kong and Laura Sampson was appointed Head of H&A GIB Australia, Sydney. Our strategy is to support investment and trade finance between Asia and Australia, with a particular focus on supporting our Healthcare and Ageing clients with their expansion aspirations in the Asia region.

¹ 74th overall in The World's Biggest Public Companies (*Forbes*, May 2014).

² By market capitalisation (ASX) and #40 in total assets (*Forbes*, May 2014).

³ Comparison of long-term credit ratings and total assets of the 500 largest banks worldwide (Global Finance Magazine 2014).

Australia's healthcare advantage

Australia is home to some of the world's leading scientists, physicians and healthcare professionals. It has world-class medical research and healthcare infrastructure, a stable socio-economic environment, an ethnically diverse population and a strong intellectual property regime.²¹

Australia's universal health system is a global benchmark, with Medicare (government health coverage) working in tandem with private health insurance to provide comprehensive healthcare for all Australians.²² The Australian government and private sector organisations work collaboratively to develop a broad range of innovations across the entire healthcare system.

Specific areas of strength include private sector aged care and private hospitals; diagnostics; general practice; health IT, and Research and Development.

Private sector aged care

The Australian aged care system is a global benchmark for best practice, due to strong government funding, a robust framework for accreditation, quality and regulation, and a long history of cooperation between government, service providers and the community. Key Australian capabilities in aged care include infrastructure, services, products, technologies, research and development, education and training. The Australian aged care sector has also developed services and resources to meet the demands of a growing number of older people with dementia. Aged care services are funded by government subsidies and grants, user contributions and volunteer care. Currently, 70 to 85% of the costs associated

with formal aged care are funded by the Australian government from general taxation revenue.

The Australian system has been designed to provide multiple levels of care for its ageing population. For example, community care, residential care, short-term respite and day care, depending on the needs of the individual. Many retirement villages and communities offer multiple levels of care, so residents can transition from individual units to higher-level care as their needs change.²³ Given the significant challenges associated with caring for China's ageing population, this is an area in which Australian companies could make an important contribution.

Private hospitals

Australia's healthcare system is sometimes described as a 'mixed system' due to the strong link between public and private healthcare providers. In addition to its world-class public hospital system, Australia has a strong private hospital industry that is underlined by high levels of private health insurance coverage in the general population. According to most recent statistics (2013), 10.8 million people, or 47% of the population, have some form of private hospital cover and 12.7 million or 55% have some form of general treatment cover.²⁴

Nearly half (44%) of Australian hospitals are private, with 40% of all patients being treated at a private hospital. As well as covering all costs for public hospital procedures, Medicare also covers 75% of schedule fees for services and procedures for private patients.²⁵

²¹ Australian Trade Commission Clinical Trials Capability Report, 2015, <http://www.austrade.gov.au/Buy/Australian-Industry-Capability/Health-and-Wellbeing/default.aspx>, viewed 23 July 2015.

²² Department of Health and Ageing, 'Strategic review of health and medical research in Australia: Better health through research', 2015, Commonwealth of Australia.

²³ Australian Trade Commission, 'Aged care capability report', 2015, <http://www.austrade.gov.au/Buy/Australian-Industry-Capability/Health-and-Wellbeing/default.aspx>, viewed 23 July 2015.

²⁴ Australian Institute of Health and Welfare, 'Australia's health system', 2014.

²⁵ Ibid.

The Australian government offers a number of incentives to purchase private health insurance. It offers an income-tested rebate to most Australians with private health insurance, and has a strong system for regulation of private health insurance providers.

Approximately **AU\$11 billion**, or **8%** of all health spending, was funded through private health insurance in 2011-12.

8%
of all health
spending

Furthermore, there is also a Medicare levy, age loading and policies in place to encourage Australians to take out private health insurance when they are younger. Developing countries such as China could gain significant knowledge from Australia's experience with the private health industry.

The Australian private hospital system provides a complementary service to the extensive government-funded network of public hospitals.

While urgent patients such as multiple trauma and medical patients with rare diseases are still usually cared for in the public sector by leading medical academics based at universities, the private sector provides a high quality, profitable alternative for routine care such as elective surgery, obstetrics, chronic illness and diseases of ageing. Therefore, high levels of care are available to all patients, both public and private. Newly built private hospitals often include surgical intensive care wards and offer open heart surgery, neurosurgery and other high tech semi-elective interventions. Standards of care are high and carefully benchmarked and there is a rigorous national system of external hospital inspection and certification.

The Chinese government's decision to offload **7,500 public hospitals** to the private sector over the next decade creates a significant business opportunity for Australian private hospital operators.

Diagnostics

The provision of diagnostic services such as pathology (blood tests) imaging (including X-rays, nuclear medicine and other visual modalities) and histopathology (examination of tissue samples under a microscope) is now commoditised around the world with provision by large, highly specialized, very high quality organisations, often but not always for-profit companies. Quality Assurance (QA), Quality Control (QC) and benchmarking are rigorously applied and the machines used tend to be sold by a few large vendors into all markets and provide similar quality results everywhere. In Australia, high up-front purchase prices for diagnostic equipment create a significant barrier to market entry and play a dominant role in the structure and dynamics of the diagnostics marketplace.

In China, public hospitals and health services provide the overwhelming majority of diagnostic services, even in the largest cities. Purchase of hardware and infrastructure are funded by the government health care budget. Visitors regularly observe that the large teaching hospitals in the larger cities seem just as well if not better equipped with late model diagnostics hardware as any in the west. As with all health services, the availability and quality of these fall away in more remote areas of the country.

In recent years an opportunity has arisen for private sector involvement in diagnostics in China in the performance and interpretation of highly specialised and new tests, for example for very rare diseases, or tests which involved DNA testing, the polymerase chain reaction (PCR), whole genome sequencing and other advanced molecular methods. These joint ventures principally take the form of partnerships between Chinese centres of excellence and entrepreneurial academic health centres such as the Mayo Clinic and others. Some large for-profit contract research organisations also offer diagnostic testing services in the context of standardised outcome reporting for multi-centre clinical trials.

International partners are also involved in China in QA/QC activities. The College of American Pathologists, for example, currently accredits 16 laboratory organisations in China.²⁶ Australia is at the international forefront of hospital and health services accreditation processes and could play a part in this rapidly developing and critically important function.

Australia is also a world leader in the economic evaluation of the cost effectiveness of health care, not only in pharmaceuticals through the Pharmaceutical Benefits Advisory Committee (PBAC), but also in Health Technology Assessment.²⁷ Australia's expertise in this area has much to offer China, where this type of evaluation is still in the early stages.²⁸

26 Robert Michel, 'Anatomic Pathology in China Is a Booming Growth Industry', Dark Daily, 24 October 2011, <http://www.darkdaily.com/anatomic-pathology-in-china-is-a-booming-growth-industry-102411#ixzz3miOtBmpf>, viewed 25 September 2015.

27 Australian Government Department of Health's Health Technology Assessment (HTA) Website, 16 June 2014, <http://www.health.gov.au/hta>, viewed 25 September 2015.

28 Zhang et al, Health economic evaluations of medical devices in the People's Republic of China: A systematic literature review, *ClinicoEconomics and Outcomes Research*, vol.7, April 2015, pp. 195-204.

The sources of Australia's competitive advantage in the diagnostics sector are twofold. The first lies in IT and seamless transfer of information: results need to be available as soon as possible in a standard format readable on all devices in all locations, including full images (not just reports). Turnaround at completion or within hours will win over turnaround in days.

The second source of competitive advantage is the quality of the medical commentary on the test results, particularly in the case of reporting of images and of visual examination of tissue samples (for example for breast cancer). Here a highly qualified team of experts will win over poorly trained or inconsistent reporting staff, and benchmarking is again essential.

General practice

Australia's general practitioners (GPs) are the cornerstone of the country's primary healthcare system. After obtaining a referral from their GP, patients can then seek the advice of a specialist if necessary. This is very different from the Chinese system, in which patients tend to select what kind of specialist they would like to treat them, in large numbers at large public hospitals. The Australian model of general practice operates with measurable success and significant benefits in affordability, efficiency and holistic care. The evidence is there to support the superiority of first contact by a GP over first contact by a hospital, and this approach, when properly understood and implemented, has the potential to offer significant improvements in China.

Australia's programs and processes of GP training are rigorous by international standards. The curricula are comprehensive, and accreditation can only be gained after meeting strict criteria. Patients express high levels of satisfaction with GP care in Australia, as well as high levels of access to GPs.²⁹ There is a growing medical workforce, and according to 2012 figures, Australia is above the OECD average for practicing physicians per 1,000 population.³⁰

Australia can offer significant expertise in the area of GP training, especially in developing countries where there are inadequate training programs. Australia's contribution could go a long way towards resolving some of the problems associated with lacking primary healthcare in China.

Health Information Technology

Australia's geographic challenges have driven advances in technology for delivering health services across diverse areas. As a result, Australia is a global leader in areas such as health messaging and electronic health record architecture.

Health IT has been largely led by the private sector, however the Australian government's National Health Reform Agreement launched in 2011 made eHealth a key area of focus. A number of national government programs work to consolidate and coordinate patient, practice and clinical management systems operated by state and territory governments to support information flow nationally.³¹



Health IT is a challenge in many places around the world, particularly in China, where underinvestment, obsolete hardware and a lack of connectivity limit communications between hospitals, the community health sector and government health offices.

Even in Australia this is a challenging area. In Sydney there are two medical schools, at the University of Sydney and University of New South Wales, about six kilometres apart, both affiliated with many public hospitals, including the state's leading teaching hospitals. Transfer of standard medical information such as discharge summaries, clinic letters, blood test results and imaging studies between the two hospital systems is currently challenging. Simple information – blood test results and letters – must be sent as PDF email attachments, so numerical values are lost and must be manually re-entered.

For complex information such as images, a CD ROM is burnt and transferred by hand or mail. A New South Wales (NSW) government initiative is urgently addressing this challenge, but the solution will be limited to NSW – similar incompatible systems exist in all of Australia's states and territories.

Private sector healthcare information providers are further ahead than the public sector, usually with prompt and seamless transfer of information, including images and lab data, to private sector practitioners such as GP clinics. But these systems are generally not compatible with those in use in the public sector.

The ideal solution is that health information should be available globally in standard formats, just as banking and news information is now, with appropriate privacy and security constraints.

Rich rewards await companies that can create and deliver universally readable IT systems for use in hospital and community health settings around the world. Given Australia has a thorough understanding of contemporary health IT systems and a strong technology and software development, there are opportunities for Australian firms to export these technologies offshore.

29 AMA, 2013, General Practice in primary care: Responding to patient needs', http://www.amawa.com.au/wp-content/uploads/2013/04/General_Practice_in_Primary_Care-1.pdf, viewed 23 July 2015.

30 OECD, 2014, 'Health Statistics 2014 How does Australia compare?', <http://www.oecd.org/els/health-systems/Briefing-Note-AUSTRALIA-2014.pdf>, viewed 23 July 2013.

31 Australian Trade Commission, 'Health IT capability report', 2015, <http://www.austrade.gov.au/Buy/Australian-Industry-Capability/Health-and-Wellbeing/default.aspx>, viewed 23 July 2015.

The 2015 China-Australia Free Trade Agreement:

A new framework for healthcare engagement between the two countries

Medical Devices

Australia is the home to two of the world's leading medical device companies, ResMed and Cochlear, both of which are active and successful in China. Australia has a strong history of innovation in medical devices but has not always been successful in commercialising these or bringing them to the global market place. These two companies are groundbreaking pioneers, providing a shining example to smaller and more recently established Australian medical device companies as to how a smart idea which has real benefit for human health can become a thriving global business.

Research and Development

The Australian government invests around AU\$3 billion³² each year on supporting medical research projects and building and enhancing Australia's medical research infrastructure. Major recipients of this funding include public hospitals, public universities and independent medical research institutes.

Australia is also regarded as one of the best places in the world to conduct clinical trials, with more than 1,000 trials commenced each year by biotechnology, pharmaceutical and medical device companies. Key benefits include Australia's efficient regulatory system, including a rapid clinical trials approval system, a strong mechanism of support services and globally competitive tax incentives for research and development investment. Success stories of collaboration between global pharmaceutical companies and Australian entities include the development and distribution of Gardasil®, a vaccine to help protect women from cervical cancer, as well as Relenza®, a new type of antiviral drug used to treat influenza.³³

The China-Australia Free Trade Agreement (ChAFTA) was finalised in July 2015. Free Trade Agreements create a framework, or a common conceptual space between trading partners, which promotes greater cooperation in the commercial sphere. They aspire to create a level playing field, leaving it up to enterprises from each party to try to gain more market access or market share.

ChAFTA covers a range of different goods and services, and can primarily be read as an attempt to create a more diverse, mutually beneficial and simplified economic relationship than the one that has prevailed over the last 10 years. The emphasis on goods and services rather than resources and commodities is critical, as is the widespread removal of tariffs, quotas and trade barriers.

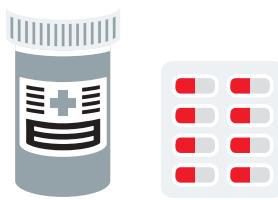
Falling Chinese demand for resources from 2013 has exposed the Australian economy to vulnerability from being so dependent on core pillars of business. ChAFTA will figure as the main instrument by which Australian enterprises can explore new areas with China. While it does not neglect export industries and manufacturing, it does devote considerable space to the services sector overall.³⁴ In terms of highlights for the healthcare sector broadly, linking them with the strengths of the Australian system already covered in this paper, the key areas are:



32 Commonwealth of Australia, 'Strategic review of health and medical research, final report', 2013.

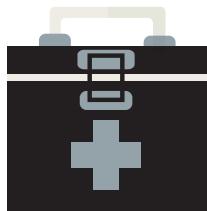
33 Australian Trade Commission, 'Clinical trials capability report', 2015, <http://www.austrade.gov.au/Buy/Australian-Industry-Capability/Health-and-Wellbeing/default.aspx>, viewed 23 July 2015.

34 An overview of ChAFTA is available from the Department of Foreign Affairs and Trade at <http://dfat.gov.au/trade/agreements/chafta/fact-sheets/Pages/key-outcomes.aspx>. The full text of the agreement and its various annexes can be viewed at <http://dfat.gov.au/trade/agreements/chafta/official-documents/Pages/official-documents.aspx>.



- **Pharmaceuticals:**

China is Australia's second largest market for pharmaceuticals, with exports worth AU\$381 million in 2013-14, including vitamins and health products. ChAFTA stipulates the elimination of tariffs up to 10%, either immediately on entry into force or within 4 years, on goods in this sector. The Chinese pharmaceutical market has an estimated potential value of US\$250 billion by 2020, so having tariff-free access into this in itself gives considerable competitive advantage to Australian companies.



- **Medical technology:**

In 2014, in terms of medical technology, orthopaedic appliances alone comprised AU\$56m of Australian exports, and centrifuges accounted for over AU\$9 million.³⁵ A report by Boston Consulting Group released in late 2014 estimated that the global medical technology market would grow by a rate of 14% between 2013 and 2020 and have a market value of US\$55 billion by 2020.³⁶

- **Health and Aged Care:**

ChAFTA permits Australian service suppliers to establish profit-making aged care institutions throughout China. This extends to operating wholly Australian-owned hospitals in certain provinces. It also enables certain qualified foreign physicians to offer services in China, and promotes cooperation in Traditional Chinese Medicine (TCM) services.

- **Hospitals:**

In theory, the ChAFTA agreement builds on new opportunities provided by the National Health and Family Planning Commission (NHFPC) and the Ministry of Commerce (MOFCOM) through the official Circular on Carrying out the Pilot Programs of Establishing Wholly Foreign-Owned Hospitals issued in 2014. Under this, foreign investors can establish wholly-owned hospitals in Beijing, Tianjin and Shanghai Municipalities, and in the provinces of Guangdong, Jiangsu, Fujian and Hainan. In practice, however, the Chinese government

still regards hospital investment and ownership as a protected area, necessitating a local partner through a joint venture or equity partnership.

ChAFTA allows Australian qualified service providers to wholly acquire and manage hospitals in the three municipalities and four provinces listed above. Whatever Australian companies do, they have to observe specific regulations relevant in each of the places they are looking to operate in; China is not uniform here. In addition, there may be limitations on the number of such hospitals Australian companies can run, as well as the number of non-Chinese personnel employed. Even with this restriction, this is still more access to a non-Chinese partner than has been granted in the past. ChAFTA also allows qualified Australian companies to establish wholly foreign-owned for-profit aged care institutions.³⁷

- **Research and Development (R&D):**

Australian companies will be permitted to carry out Research and Development and provide R&D services through Australian owned subsidiaries based in China.

- **Traditional Chinese Medicine (TCM):**

Traditional Chinese Medicine (TCM) is the subject of a separate side letter added to the main ChAFTA agreement. In this, the Australian government commits to:

- (a) exchange information and discuss policies, regulations and actions related to TCM services in order to find opportunities for further cooperation;
- (b) encourage and support engagement between relevant professional bodies and registration authorities for TCM practitioners in both countries, with a view to clarifying and providing advice on the recognition and accreditation of qualifications of TCM practitioners; and
- (c) encourage and support cooperation on TCM research and development.³⁸

The side letter specifically mentions promoting acknowledgement of TCM practitioners' qualifications. Australia and China will encourage and support engagement between relevant professional bodies and registration authorities for TCM practitioners in both countries, clarify the acknowledgement and accreditation of TCM practitioners' qualifications, and provide relevant advice.

On the whole, ChAFTA relaxes some of the restrictions on Australia's investment into China's healthcare sector, particularly in health and aged care and hospitals. It should stimulate pharmaceutical opportunities for Australian companies in China, and for medical technology. It will also encourage more cooperation on TCM services.

³⁵ King & Wood Mallesons' 'ChAFTA is here – are you ready?', 2015, <http://www.kwm.com/en/au/knowledge/insights/chafta-china-australia-free-trade-agreement-fpa-20150617>, viewed 20 July 2015.

³⁶ Austrade, 'Medical mission highlights opportunities in China', 2015, <http://www.austrade.gov.au/about-austrade/news/latest-from-austrade/2015/medical-mission-highlights-opportunities-in-china>, viewed 20 July 2015.

³⁷ Huang, J, 'China-Australia FTA: Implications on the Chinese health industry', King & Wood Mallesons, 2015, <http://www.chinalawinsight.com/2015/06/articles/healthcare/china-australia-fta-implications-on-the-chinese-health-industry/>. viewed 20 July 2015.

³⁸ Letter from The Hon Andrew Robb MP, Australian Minister for Trade and Investment, to Minister Gao Hucheng, Chinese Minister for Trade, 17 June 2015, <http://dfat.gov.au/trade/agreements/chafta/official-documents/Documents/chafta-tcm-side-letters.pdf>, viewed 17 September 2015.

Opportunities for Medical Technology Companies: The Australian government View

China's healthcare system is undergoing significant reform. China's population is ageing rapidly, and poor air quality, high smoking rates, increasing obesity and an ageing population have contributed to growing rates of chronic disease and respiratory illnesses such as Chronic Obstructive Pulmonary Disease (COPD).

These factors have contributed to increased demand for government investment in healthcare.

The National Health and Family Planning Commission (NHFPC)'s 'Health China 2020 Strategy' states that AU\$62 billion should be invested in China's health system. The priorities of China's current Five-Year Plan (2011-15) include the improvement of the healthcare system and greater access to quality healthcare for its rural population. The plans' initiatives include the development of insurance schemes and increasing reimbursement for critical illness, as well as fostering 40 to 50 innovative high-tech medical device companies. Hospitals are being upgraded, and people who were previously unable to afford quality healthcare are gaining access. This means that the medical device market will no longer be limited to first-tier cities. Currently, however, hospitals in lower-tier cities are still unable to purchase expensive technologies, meaning that competition is still mainly determined by price.

China has the
4th largest
medical technology market in
the world, with a value of
US\$17 billion.

It is only expected to grow. While medical device use is still relatively limited, growing household income, coupled with government policy, is expected to lead to growth in this area.

The Shanghai Free Trade Zone (FTZ) includes an emphasis on medical industry development by wholly-owned foreign medical groups, in order to increase the participation of the private sector in the import and production of medical devices, as well as the delivery of hospital services. In the FTZ, reduced and waived tariffs are expected to significantly reduce the cost of importing medical devices and leasing equipment.

Another incentive for the medical devices and diagnostics industries is the reimbursement program offered in China, which is not available in Australia. Being listed on the reimbursement catalogue assures the sale of a medical device within the country.

Almost half of China's hospitals are private, but they suffer from poor social insurance coverage, talent shortages and low utilisation. Private hospitals are also a key target of government reforms: the aim is to increase the proportion of patients treated in private hospitals by 20% by the end of 2015. Furthermore, in July 2014 it was announced that full foreign ownership of hospitals would be permitted under a pilot program in the cities of Beijing, Tianjin, and Shanghai, and Jiangsu, Fujian, Guangdong and Hainan provinces.

There are a number of support programs available for Australian companies pursuing partnerships in China, including the Export Market Development Grant, R&D Tax Incentive, Australia-China Science and Research Fund, and Chinese local government grants and incentives.

From 'Guide for Australian medical technology companies seeking to engage in China', AusBiotech, April 2015.

Recommendations

This report has given an overview of the challenges faced by China's healthcare system and the reforms it has introduced to tackle them.

It has also described some of the strengths of Australia's healthcare system, particularly in terms of hospitals, aged care, diagnostics, general practice, health IT and medical devices. But how can Australian and Chinese businesses take advantage of the unique opportunities presented by this exciting time of change and development in China?

Businesses should focus on five key areas.

1. Examining opportunities presented by ChAFTA

ChAFTA presents significant opportunities for Australia-China partnership in pharmaceuticals, medical technology, health and aged care, hospitals, R&D, and TCM. As ChAFTA is set to become the primary vehicle through which enterprises in Australia can explore new areas of cooperation with China, it is important for Australian businesses to examine the agreement to determine where the potential lies, and develop long-term plans for engagement with China accordingly.

2. Enhancing dialogue between Chinese and Australian experts

In order to achieve effective, lasting and mutually beneficial Australia-China partnerships, businesses need to establish pragmatic frameworks for mutual engagement. In both countries, businesspeople, specialists and experts in their respective fields should engage in dialogue focused on the outcomes of planned projects. As outlined in this report, the healthcare systems in Australia and China are different in many ways, but both countries ultimately have the same goal: to provide the best possible care to their people. By building on the complementary strengths of experts in both Australia and China, businesses will place themselves in the ideal position to take advantage of the opportunities in healthcare.



3. Location, location, location

While Chinese healthcare reforms do include provisions for improvements in lower-tier cities and rural areas, there are still significant limitations for businesses considering entering in these markets. Conditions will undoubtedly improve in the longer-term, but resources are currently limited and the challenges presented by this are difficult to navigate. Therefore, businesses should be pragmatic when deciding their locations. As noted in this report, the cities of Beijing, Tianjin, and Shanghai, and Jiangsu, Fujian, Guangdong and Hainan provinces were included in pilot programs for establishing wholly foreign-owned hospitals in 2014. Furthermore, the Shanghai Free Trade Zone offers a number of unique incentives for foreign investment in medical technology. Australian businesses should consider these factors.

4. Concentrating on areas of strength

Australia is globally recognised for its strength in health and medical care, particularly in aged care. The challenges of China's ageing population, exacerbated by the trends of migrant labour and the legacy of the one child policy, will only become greater if it does not adequately address them. Australia's experience and knowledge make it well placed to become stronger partners with China as it continues to tackle the complexities of its changing demography.

5. Reciprocity in TCM

For centuries, Traditional Chinese Medicine (TCM) has been the foundation of China's medical inquiry and health practice. A significant portion of the general public seeks advice from TCM specialists or over-the-counter traditional remedies before approaching a doctor of western medicine. As mentioned in this report, ChAFTA specifically supports engagement between professional bodies and practitioners of TCM in both countries on TCM research and development. As a familiar field for Chinese partners, as well as an area in which Australia has developing strength and one that holds immense opportunities for outreach to the general Chinese public, Australian and Chinese businesses should explore prospects for collaboration in TCM.

Important Notices

Disclaimer: This document has been prepared by National Australia Bank Limited ABN 12 004 044 937 AFSL 230686 ("NAB"). Any advice contained in this document has been prepared without taking into account your objectives, financial situation or needs. Before acting on any advice in this document, NAB recommends that you consider whether the advice is appropriate for your circumstances. NAB recommends that you obtain and consider the relevant Product Disclosure Statement or other disclosure document, before making any decision about a product including whether to acquire or to continue to hold it. Products are issued by NAB unless otherwise specified.

So far as laws and regulatory requirements permit, NAB, its related companies, associated entities and any officer, employee, agent, adviser or contractor thereof (the "NAB Group") does not warrant or represent that the information, recommendations, opinions or conclusions contained in this document ("Information") is accurate, reliable, complete or current. The Information is indicative and prepared for information purposes only and does not purport to contain all matters relevant to any particular investment or financial instrument. The Information is not intended to be relied upon and in all cases anyone proposing to use the Information should independently verify and check its accuracy, completeness, reliability and suitability obtain appropriate professional advice. The Information is not intended to create any legal or fiduciary relationship and nothing contained in this document will be considered an invitation to engage in business, a recommendation, guidance, invitation, inducement, proposal, advice or solicitation to provide investment, financial or banking services or an invitation to engage in business or invest, buy, sell or deal in any securities or other financial instruments.

The Information is subject to change without notice, but the NAB Group shall not be under any duty to update or correct it. All statements as to future matters are not guaranteed to be accurate and any statements as to past performance do not represent future performance.

The NAB Group takes various positions and/or roles in relation to financial products and services, and (subject to NAB policies) may hold a position or act as a price-maker in the financial instruments of any company or issuer discussed within this document, or act and receive fees as an underwriter, placement agent, adviser, broker or lender to such company or issuer. The NAB Group may transact, for its own account or for the account of any client(s), the securities of or other financial instruments relating to any company or issuer described in the Information, including in a manner that is inconsistent with or contrary to the Information.

Subject to any terms implied by law and which cannot be excluded, the NAB Group shall not be liable for any errors, omissions, defects or misrepresentations in the Information (including by reasons of negligence, negligent misstatement or otherwise) or for any loss or damage (whether direct or indirect) suffered by persons who use or rely on the Information. If any law prohibits the exclusion of such liability, the NAB Group limits its liability to the re-supply of the Information, provided that such limitation is permitted by law and is fair and reasonable.

This document is intended for clients of the NAB Group only and may not be reproduced or distributed without the consent of NAB. The Information is governed by, and is to be construed in accordance with, the laws in force in the State of Victoria, Australia.

Analyst Disclaimer: The Information accurately reflects the personal views of the author(s) about the securities, issuers and other subject matters discussed, and is based upon sources reasonably believed to be reliable and accurate. The views of the author(s) do not necessarily reflect the views of the NAB Group. No part of the compensation of the author(s) was, is, or will be, directly or indirectly, related to any specific recommendations or views expressed. Research analysts responsible for this report receive compensation based upon, among other factors, the overall profitability of the Global Markets Division of NAB.

For distribution by WealthHub Securities: Where you have received this document via the nabtrade service (nabtrade), it is distributed to you by WealthHub Securities Limited ABN 83 089 718 249 AFSL No. 230704 ("WealthHub Securities"). WealthHub Securities is a Participant of the Australia Securities Exchange and a wholly owned subsidiary of National Australia Bank Limited ABN 12 004 044 937 AFSL No. 230686 ("NAB"). NAB doesn't guarantee the obligations or performance its subsidiaries, or the products or services its subsidiaries offer. Any material provided to you by WealthHub Securities will contain factual information or general advice. This factual information or general advice does not take into account your particular objectives, financial situation and needs, and a statement of advice will not be provided. WealthHub Securities will not give you any legal, tax, financial or accounting advice or any advice or recommendation regarding the suitability or profitability about your transactions. Before you make a decision about whether to acquire a financial product, you should obtain and read the Product Disclosure Statement available at nabtrade.com.au and consider the appropriateness of the information having regard to your particular circumstances. You agree that you will not solely rely on the information provided by WealthHub Securities or elsewhere on nabtrade.com.au when making investment and/or financial decisions. WealthHub Securities does not provide personal advice to online retail clients. WealthHub Securities receives commission from dealing in securities and from its authorised representatives. Introducers of business may directly share in this commission. WealthHub Securities and its associates may hold shares in the companies that it distributes research/information on.

The value of investments and future returns may rise or fall and, at times, returns may be negative. Past performance is not a guarantee of future performance. Please note, this material has not been verified by WealthHub Securities. WealthHub Securities does not make any representation or warranty as to the timeliness, reliability, accuracy or completeness of the material, nor does it accept any responsibility arising in any way for errors in, or omissions from, that material.

United Kingdom: If this document is distributed in the United Kingdom, such distribution is by National Australia Bank Limited, 88 Wood Street, London EC2V 7QQ. Registered in England BR1924. Head Office: 800 Bourke Street, Docklands, Victoria, 3008. Incorporated with limited liability in the State of Victoria, Australia. Authorised and regulated by the Australian Prudential Regulation Authority. Authorised in the UK by the Prudential Regulation Authority. Subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from us on request.

USA: If this document is distributed in the United States, such distribution is by nabSecurities, LLC. This document is not intended as an offer or solicitation for the purchase or sale of any securities, financial instrument or product or to provide financial services. It is not the intention of nabSecurities to create legal relations on the basis of information provided herein.

Hong Kong: By accepting this document, you represent and warrant that you are a "professional investor" within the meaning of the definition of that term in Part 1 of Schedule 1 to the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong). If you think you have received this document in error, please contact NAB at Level 27, One Pacific Place, 88 Queensway, Hong Kong Ph: +852 2826 8111

If this document is distributed in Hong Kong, such distribution is by National Australia Bank Limited, Hong Kong Branch, which is licensed by the Hong Kong Monetary Authority and registered (CE Number AAO169) under the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong) for Type 1 (dealing in securities) and Type 4 (advising on securities) regulated activities. Its main business address is Level 27, One Pacific Place, 88 Queensway, Hong Kong.

The contents of this document have not been reviewed by any regulatory authority in Hong Kong. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice.

New Zealand: This publication has been provided for general information only. Although every effort has been made to ensure this publication is accurate the contents should not be relied upon or used as a basis for entering into any products described in this publication. To the extent that any information or recommendations in this publication constitute financial advice, they do not take into account any person's particular financial situation or goals. Bank of New Zealand strongly recommends readers seek independent legal/financial advice prior to acting in relation to any of the matters discussed in this publication. Neither Bank of New Zealand nor any person involved in this publication accepts any liability for any loss or damage whatsoever may directly or indirectly result from any advice, opinion, information, representation or omission, whether negligent or otherwise, contained in this publication. National Australia Bank Limited is not a registered bank in New Zealand.

Japan: National Australia Bank Ltd. has no licence of securities-related business in Japan. Therefore, this document is only for your information purpose and is not intended as an offer or solicitation for the purchase or sale of the securities described herein or for any other action.

Singapore: This document is distributed in Singapore to institutional investors (as defined under the Financial Advisers Regulations) only.

OR

People's Republic of China: In the PRC, the Materials are directed solely at persons who would be constituted as (i) Qualified Domestic Institutional Investors in accordance with the applicable PRC laws and regulations promulgated by China Banking Regulatory Commission, China Securities Regulatory Commission or China Insurance Regulatory Commission or (ii) other eligible investors in accordance with the applicable PRC laws and regulations.

Further, the information on the Materials does not constitute "marketing or production and business activities in the PRC" as defined in the Administrative Measures on the Registration of Production and Operation Activities of Foreign Enterprises in the PRC promulgated by the State Administration of Industry and Commerce.

This publication has been provided for general information only. NAB has no licence for foreign exchange, securities-related, derivative or other capital market products in China.

© National Australia Bank Limited, ABN 12 004 044 937, 88 Wood Street, London EC2V 7QQ. Registered in England BR1924. Head Office: 800 Bourke Street, Docklands, Victoria. Incorporated with limited liability in the State of Victoria, Australia. Authorised and regulated by the Australian Prudential Regulation Authority. Authorised by the Prudential Regulation Authority. Subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about the extent of our regulation by the Prudential Regulation Authority are available from us on request. A117986-0715