



HEALTH SECTOR



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SUMMARY

- The Indian health sector will grow rapidly out to 2035, with increased availability of medical infrastructure and more government spending, albeit off a low base.
- But this improvement is unlikely to bridge the current gulf between supply and demand.
- Many of the strengths of the Australian health sector complement India's needs and the objectives of India's National Health Mission.
- The importance of the health sector imbues the whole economy. It is central to the well-being and progress of the nation, an employment generator, a productivity enhancer and a driver of innovation and entrepreneurship.
- Australia could significantly grow its health relationship with key Indian states out to 2035, especially if it can commercialise its expertise and integrate value chains.
- Sustained engagement with the Central Government will be important. In the short term, ministerial-led government engagement can provide the basis for greater trade, investment and interoperability in the future.

1.0 THE MACRO STORY

KEY JUDGEMENT

Demand in the Indian health sector will continue to dwarf India's domestic supply capabilities out to 2035. Australia has strengths that align with India's priorities for improving the sector, though the reality is we will be a niche provider in a large market. Technological and systemic changes, along with the rise of non-communicable diseases, will radically transform how India delivers healthcare and the nature of our engagement.

1.1 The scale and key structural drivers of the sector

INDIAN DEMAND

Demand in India's healthcare market will keep growing out to 2035, driven by:

- a large and growing population, accounting for almost one-fifth of the global population
- the double burden of infectious diseases and rising non-communicable diseases
 - over 250,000 Indians die from tuberculosis each year⁸⁰
 - non-communicable diseases (NCDs) such as heart disease, diabetes and obesity account for 60 per cent of deaths in India currently
 - urbanisation and lifestyle changes will fuel NCDs
 - by 2035, 109 million people in India are expected to suffer from diabetes⁸¹
- a growing consumer class, able to spend on healthcare
- a growing penetration of insurance supporting greater spending
- the proportion of elderly (over 65), which will rise from the current 6 per cent to 13 per cent by 2050⁸², will increase the number of age-related ailments and demand for aged care
- under-provision of medical goods (technologies, devices, pharmaceuticals)

- India's medical device market is growing at 15 per cent annually and stands at \$7.5 billion, of which 77 per cent is imported¹²
- India is likely to be the second largest driver of growth in the global nutraceutical market to the 2030s⁸³ (after China), driven by rising incomes and consumer awareness.

There is a nexus between health, energy and agribusiness

- air pollution results in more than one million premature deaths in India each year⁸⁴ highlighting a need for cleaner energy sources and conservation agriculture
- for example, Delhi's extreme air pollution in its winter months is the result of a combination of weather conditions, vehicular and industrial emissions and the burning of chaff in neighbouring states.

INDIAN SUPPLY

India's health sector is also growing and modernising but cannot keep pace with rising demand

- the sector is growing at 16 per cent CAGR⁸⁵
- spending on health in India is only 4 per cent of GDP (sum of public and private spending) while the global average is 9.9 per cent
- government spending is 1.4 per cent of GDP (sum of central and state spending)⁸⁶ while the global average is 6 per cent

- this percentage has remained roughly constant for a decade
- weak public healthcare facilities result in reliance on expensive private care
 - low levels of public expenditure shift the burden of financing healthcare to out-of-pocket expenses at the point of care, which accounts for 62 per cent of total health spending and without any widespread financial protection scheme⁸⁷
 - a workable coding framework, under a holistic health financing system, is required for after-fact payment systems
 - the private sector has fostered pockets of efficiency, but is fragmented
 - an inadequate filtering and referral system
- medical infrastructure, while growing, does not cater to the market
 - India has 1 hospital bed per 1,000 people against the world median of 2.9
 - India has 0.7 physicians per 1,000 people against the world median of 2.5.¹²

AUSTRALIA'S COMPETITIVE ADVANTAGE

Australia's engagement with India's health sector has been longstanding but ad hoc.

Our bilateral commercial health relationship is modest

- in 2017, Australia imported \$335 million of medicaments (including veterinary) from India (7 per cent of our total imports) and exported \$16 million.

The Commonwealth Government is committed to a range of funding mechanisms for the Medtech, biotech and pharmaceutical (MTP) sector including MTPConnect (≈\$30 million), the Biomedical Translation Fund (≈\$250 million, with another \$250 million from industry) and the Medical Research Future Fund (≈\$1 billion per annum at maturity). This funding and activity is intended to drive a step change in the economic contribution of the sector.

But there is clear alignment between Indian policy priorities and Australian experience. Australia's offerings are based on comparative strengths such as:

- a strong health system,^{xxiii} including a world-leading publicly funded universal healthcare system and a growing private sector (health is our fifth largest contributor to GDP⁸⁸)
- provision of healthcare in a federated system at relatively low cost
- a reputation for quality (for example, Therapeutic Goods Administration [TGA] standards on medical technologies and pharmaceuticals)
- geography and familiarity with remote-care delivery – we are a leader in remote care practices which are being enhanced by digital platforms
- established export channels for complementary medicines and niche devices
 - medical technologies and pharmaceuticals remain Australia's largest commodities export sector to global markets not directly linked to primary industries such as mining and agriculture⁸⁹
- a vibrant medical research environment
 - albeit with a patchy record of commercialisation and tendency to see research drained offshore for development
- expertise in developing medical coding frameworks
- expertise in chronic disease management.

^{xxiii} The MTP sector is a significant contributor to the Australian economy, generating \$4.4 billion in gross value add (GVA) (4.5 per cent of Australia's total manufacturing GVA), \$4.6 billion in annual exports from manufacturing (10th largest) export sector) and employing 48,000 people across Medtech (10,000) biotechnology, and pharmaceuticals (22,000), and health and medical research (16,000).

CASE STUDY: GLOBAL PATIENT PORTAL: PROVIDING DIGITAL HEALTH SOLUTIONS FOR LOW AND MIDDLE INCOME POPULATIONS

Noting the lack of access to health records and preventative care in India and much of the developing world, Global Patient Portal (GPP) was launched in India in 2015 as a free, online health resource that allows users to build and maintain their own electronic health records; a service designed to expedite the information flow for healthcare professionals and individuals.

Before launching this product, a year and a half of market research was conducted in the north, south, east and west of India. It quickly became evident to GPP that India would not adopt an American style consumer culture like other emerging markets. Instead, CEO Michael Koss underlines the importance of heritage and culture in India, emphasising that those who take the time to understand this, find it a wonderful place to do business. He also shares two key rules on doing business in India:

1. Commit to India and she will commit to you; go often, build relationships and learn how to do business there.....We have won awards in India, given speeches around the country

and sit in senior positions in industry bodies. However, that all pales in comparison to the strength of the relationships we have built on the ground. Their importance cannot be overstated in whatever success we enjoy.

2. Know your India; it is not a market of 1.3 billion people. However, if you can distil the market down to an actionable group who need your product, then the opportunity is superb.

Mr Koss also underlined the benefit of the State Government business offices in India, the High Commission and Austrade, which can contribute greatly to achieving traction in India by opening opportunities, though he stresses “it is incumbent on the Australians to go back and turn those introductions into meaningful relationships”.

GPP are now seen as leaders in digital health for low and middle income populations. Their team are frequently involved in discussions with government, policy formation and are regular speakers at conferences in India and abroad.



1.2 How the sector will likely evolve out to 2035

WHAT AUSTRALIA WOULD LIKE THE HEALTH RELATIONSHIP IN 2035 TO LOOK LIKE

To have deeper integration (joint research and development, investment, co-development of goods).

To be considered a close international partner for healthcare in target states

- including through common delivery methods like eHealth and digital health with strong focus on cybersecurity and privacy issues.

To have captured a greater share of Indian health commodity imports, as the size of India's imports has grown

- especially value-added commodities such as medical devices and complementary medicines, including co-development of such products
- having tapped into growing Indian urban centres as established markets with mature export paths
- and having greater interoperability of our healthcare standards.

To have Australian companies delivering professional services in India's health sector.

To be cooperating closely with India in regional and global forums on health security.

GLOBAL TRENDS IN HEALTHCARE

Whether systemic changes or technical disruptions, global trends will re-shape the Indian and Australian sectors:

- Digitisation and automation: of appointment systems, of remote monitoring and analysis, of clinical decision support systems and of device and medicine manufacturing and supply chains
 - will change the game for providing affordable quality healthcare services to remote areas, including low-cost consultation and diagnosis facilities

- will improve efficiency and change the employment mix of medical goods manufacturing and transport.

- Improved data systems: will lead to better health records and measurement of outcomes, greater healthcare delivery efficiency and more effective research
 - the downside is cybersecurity and privacy risks around personal information.
- Shifting care out of hospitals: will be driven by high capital costs associated with hospitals and better technology-enabled solutions.
- Greater consumer control: with technology empowering patients to manage their health more proactively, including through wearable devices and portable monitors.
- Increased focus on genomics and revolutionary treatment technologies: could improve assessments of susceptibility to diseases and the side effects of drugs and enable more personalised treatments.
- Global biosecurity: with more frequent travel and interconnectedness, and with increasing antimicrobial resistance, infectious disease outbreaks are becoming more common.
- Increased chronic disease burden: in low and middle income countries like India there will be a big shift from acute episodic care to lifelong chronic disease prevention and management.

INDIA HAS POLICY AMBITIONS TO SIGNIFICANTLY IMPROVE ITS HEALTH SECTOR

The extent to which India's health policy aspirations will be implemented will depend on how much political and financial capital India's leaders are able and willing to spend on health.

The National Health Policy 2017 focuses on 2025 as a marker year, but points to the direction the Indian Government might try to take out to 2035

- increase health expenditure as a percentage of GDP from 1.15 to 2.5 by 2025

- increase state health spending to at least 8 per cent of their budgets by 2020
- increase use of public health facilities by 50 per cent by 2025
- achieve universal health coverage and deliver quality and affordable services
- provide free drugs, diagnostics and emergency care services in all public hospitals
- develop mid-level service providers, such as nurse practitioners and public health personnel
- reform medical education
- ease the manufacture of drugs and Medtech
- align Indian standards and regulatory regimes with the norms of key trading partners, leading to more trade and investment opportunities
- attract greater level of private investment.

AUSTRALIA'S HEALTH SECTOR WILL NEED TO IMPROVE TO KEEP PACE WITH CHANGES OUT TO 2035

Without improved rates of commercialisation and improved pathways from research to market, Australia will not be able to compete in the international market.

Onshore Australian manufacturing of medical devices and pharmaceuticals is not assured

- the number of companies in the sector has remained broadly constant over the last decade but onshore manufacturing has declined in recent years
- a substantial increase in research funding and improved pathways to commercialisation will be needed to turn this around.

Australia's health financing and business systems will be stressed by

- an ageing population – the number of people over 85 years old will increase from 0.4 million now to 1.8 million in 2050
- risk factors for chronic diseases like diabetes are increasing, as are community expectations of ever higher health standards.

2.0 OPPORTUNITIES FOR PARTNERSHIP

KEY JUDGEMENT

Opportunities for Australian exports exist across a diverse range of goods and services and can grow in line with Indian demand. Co-development of products, value chain integration and regulatory alignment could substantially turn the dial. Globally, significant official development assistance (ODA) and philanthropic money is spent seeking to address India's communicable disease burden. The Australian Government can focus on the gap: targeting our engagement on working with India to combat NCDs and to develop health delivery systems.

2.1 Export opportunities

Trusted collaboration between governments and private sector health players could realise these prospective opportunities (Table 5).

TABLE 5: HEALTH EXPORT OPPORTUNITIES OUT TO 2035

		Near term	Long term
Goods	Complementary medicines	Export to India	Export to India, potentially with manufacturing facilities in India or working in ecosystems and supply chains
	Medical devices	Export to India, including joint production for third markets	Export to India, including joint production for third markets
	Pharmaceuticals	Import generics	Co-development for Indian manufacturing
Services	Digital Health	Consultancy services as India establishes its digital health system	Providing commercial services – including telehealth in rural communities
	Hospital Management	Business Process Outsourcing	As operators/advisors Hospital partnerships
	Training and Skill Development	Delivering training	Recognition of qualifications and accreditations
	Medical Tourism	In both directions, but particularly to India	In both directions, but particularly to India in hospitals with Australian affiliation
	Research and development or clinical trials	Research partners in clinical trials Bring trials from India	Mature joint clinical trial systems
	India as a source of skilled labour	India is the largest foreign source of qualified medical practitioners in Australia (6 per cent) ⁹⁰	India remains a major source of workers in Australia's healthcare sector

OPPORTUNITIES IN MERCHANDISE GOODS

Complementary medicines (also known as traditional or alternative medicines): India could become a major market for Australia if trade is supported by strong regulatory regimes

- Australia's complementary medicines sector gets 26 per cent of its income from exports, a proportion forecast to grow strongly; in 2015, 14.3 per cent of China's complementary medicine market share was delivered by Australia¹²
- Indian demand is projected to grow in line with the urban consumer class
- Australian companies could target specific segments like vitamins, minerals and milk-based supplements and strengthen distribution channels by partnering with locals
 - for example, malted milk drink Horlicks is consumed in 38 million Indian homes
- in the longer term, once Indian market demand is established, Australian players could consider establishing joint research, development and manufacturing facilities in India.

Medical devices: India could become a market and partner for the export of Australian medical devices, including to third markets

- Australia exports \$2.7 billion of medical devices annually¹²
- Australian companies could leverage India's lower manufacturing costs, concessions for domestic manufacturing and medical device zones to pursue licenced manufacturing deals and joint research and development, with manufacturing in India and final assembly in Australia to get TGA accreditation (to get this, Indian manufacturing would need to be to Australian standard).

Pharmaceuticals: Australia could increase imports of Indian generic drugs and pharmaceuticals which meet our safety and quality standards.

OPPORTUNITIES IN SERVICES

Digital health: Commercially sustainable partnerships will hinge on developing business models which can package Australian intellectual property and expertise, including through:

- consulting on establishing digital health services, facilitating better connectivity and comparing notes on data analytics
- leveraging Australian expertise in remote care delivery to provide rural healthcare services to State Governments (consultative/software/system provision)
 - telehealth, telemedicine (for example, online consultations, online appointment scheduling, including for home calls).

Hospital management: India is attracted to Australia's world leading hospital management services. Australian companies could provide services and hospital system design in India, including billing and payment management solutions, clinical support systems and diagnostic technologies

- as operators/advisors (commercialisation of model is still at nascent stage)
- Australian medical administrators to use India for quality and cost competitive business process outsourcing (such as clinical coding and transcriptions).

In the long term

- as investors delivering aged care services in India
- hospital partnerships covering quality, facility and leadership development (either on a not-for-profit basis or via consultancy fees and shared revenue)
 - Australian public hospitals could develop non-subsidised commercial trading arms to pursue opportunities in education, research, chronic disease management, primary care, elder care and pharma life sciences.

Training and skill development: The Indian domestic system faces a shortage in its healthcare workforce, with doctors and nurses per 1,000 people falling 35 per cent and 48 per cent short of World Health Organization recommendations respectively.

There is a shortage of 6.4 million workers in the Allied Health Professionals category across segments like anaesthetists, technicians trained to run an operation theatre, dental staff, pharmacy education, optometrists and medical laboratory technicians and radiographers.¹²

India's 'exports' of medical professionals contributes to this shortfall with India being the world's largest supplier of physicians⁹¹

- potential therefore exists to leverage Australian materials and standards to deliver training models to upskill existing healthcare workers in geriatric care, aged care, community care, emergency medicine, wound care and infection control
- India has developed successful models of non-physician healthcare workforce development. Australia's expertise in vocational training is highly relevant
- targeted training and skill development can also increase women's workforce participation, which is currently at 38 per cent in the Indian health sector.

Medical Tourism: Cheap drugs and healthcare services will make India an attractive destination for medical tourism. The market is growing at over 20 per cent per annum¹²

- India could become a major destination for Australian medical tourism over the long term
- Australia could also become a quality medical tourism destination for a small, elite segment of the Indian market over the long term, especially if there are more hospital partnerships.

2.2 Collaboration

That India and Australia have complementary capacities in a range of healthcare segments means there is the potential for enduring collaborations and partnerships.

Sector-specific standard and regulatory harmonisation can lead to greater interoperability, supporting trade in complementary medicines, pharmaceuticals and medical devices and aligning health education and professional accreditation. As an importer of India's pharmaceutical and generic medicines, this could also increase imports and reduce the cost burden to Australia's Pharmaceutical Benefits Scheme.

Research and development: Australian institutions could pursue:

- partnerships (with major pharma companies or small tech groups) to pursue drug or technology development
- joint research, commercialisation and licencing partnerships, including for biomedical and genomic capabilities
- Indian research partners in clinical trials, leveraging India's large population and the possibility for cost effective, large-scale roll out
 - Indian Government regulations regarding the compensation rules and approval times can hamper its clinical trial market. On the other hand, research-oriented Indian pharmaceutical companies are looking to run trials

overseas and could seek to partner with Australian organisations.

India as a source of skilled labour: Australia's health sector can continue to draw on Indian talent to provide needed skills such as data scientists, software developers, biotechnology workers and hospital and aged-care workers

- hospitals (5.8 per cent) and aged care services (3.8 per cent) are already the second and third most common occupations in Australia for people born in India.^{xxiv, 92}

Data analytics: Australian institutions can work with India to:

- understand what data exists (and collected by whom) in both countries which is central to evolving new business systems
- develop approaches to making sense of unstructured data sources, incorporating economic analysis and tapping into new technologies to improve security
 - for example blockchain technology
- learn from India's advancements in biometric data.

Regional health security: With rapidly increasing connectivity between Australia and India (students, diaspora, tourism, business) and the broader Indo-Pacific, India will need to be increasingly front-of-mind for efforts to combat the spread of infectious diseases. Australia and India can combine competencies to pursue:

- effective policy coordination, including with third parties
- planning for health security including through implementation of the International Health Regulations in the region
- opportunities in joint research and development
 - globally, governments and venture capitalists are investing in Product Development Partnerships to tackle infectious diseases including with India's low cost pharma industry

^{xxiv} 'Computer system design and related services' is the highest at 6.9 per cent.

- » India is the largest provider of generic pharmaceuticals and a major source of vaccine production
- as well as translational research, for example through partnerships/consortia involving Australian and Indian research institutions
- encouraging India's engagement with the Asia-Pacific Leaders Malaria Alliance – which is funded by DFAT and Gates Foundation.

Conversion of India's traditional knowledge base into modern medical technologies

- there is renewed interest in India's Ayurvedic medicinal regimen, which is largely based on natural products
- scope for Australian companies to work with India and play an auxiliary role in applying scientific tests as India establishes leadership in this area
 - this could lead to partnerships which could benefit both our nutraceutical industries.

2.3 Investment

The Indian healthcare system is relatively open to investment in comparison to other sectors

- allows 100 per cent FDI in the hospital sector and in the manufacture of medical devices (including for-profit players)
- in the pharmaceutical sector, 100 per cent FDI is allowed in greenfield projects and 74 per cent in brownfield projects
 - to go beyond 74 per cent, brownfield projects require approval from the Foreign Investment Promotion Board.

The rate of growth in the Indian health sector presents opportunities for portfolio investment, as well as FDI

- two way investment in the health sector is currently small, but Australian investment opportunities could be supported by growing goods and services trade as companies look to get a presence in supply chains and ecosystems
- to ensure healthcare delivery through traditional methods, India requires investments of \$327 billion by 2034 which includes 3.5 million additional beds¹²
 - this number could be reduced by \$120 billion by shifting the point of care, introducing technology-enabled solutions, which reduce stress on hospital infrastructure, and increasing adoption of preventative care.

Others are already investing. Over the past few years many private equity firms, venture capitalists and foreign players have invested in the Indian health sector

- transaction values have increased from \$125 million in 2011 to \$1.7 billion in 2016
 - a slew of investments by global health players, including the Parkway group, and a host of Middle East players have been completed.¹²

3.0 CONSTRAINTS AND CHALLENGES

KEY JUDGEMENT

Opportunities notwithstanding, India's health sector is poorly regulated, highly price-sensitive and culturally different to the Australian sector. It is a complex, context-specific and conservative sector which makes it hard to determine where to engage, due in part to a difficult public sector; a fragmented and poorly regulated private sector; and low quality hospital data systems and records management. India tends to have a larger focus on curative than preventative healthcare.

Whilst Australia is typically a high-value, low-volume supplier, the Indian health system is very price-sensitive. Some segments of the Indian market are seeing an increased willingness to pay for better services, but in most instances cost remains a primary driver. The market for expensive equipment is relatively small.

3.1 The policy and regulatory environment

Indian price control policies disincentivise professional profit-motivated players

- in an effort to support affordability, the government keeps a number of drugs and equipment (such as coronary stents) under price control
- it is possible that procedures and protocols will also fall under this umbrella.

Approvals and licences become bottlenecks, even where FDI is allowed

- India is still developing regulations for complementary medicines and medical devices meaning, for example, many complementary medicine ingredients are not recognised in the Indian regulatory framework.

While the government is trying to regulate the medical devices sector, it also wants to make it less import-dependent and bring in foreign investment

- to reduce import dependence, in 2018 the government hiked the duty for the import of 78 devices¹²
- proposed policies have included interest subsidies, concessional power tariffs, seed capital, tax benefits, minimum or zero duty on raw materials and incentives for export.

Intellectual Property protection is often weak and ineffective, particularly with regard to patent protection: the sector needs stable and internationally-aligned IP protections to attract joint ventures.

Digital medical data and health records require reliable security systems and protocols. A shift to electronic medical records has not been matched with a legal framework on data collection and use, or on breaches.

CASE STUDY: SYNAPSE: A SUCCESSFUL MODEL OF INTEGRATED SERVICE DELIVERY FOR AUSTRALIA AND INDIA

Australian company Synapse Medical Services has found an opportunity to provide Australian hospitals and clinics with the services they need, making the most of what workers in both countries can offer.

Synapse provides administrative support for clinical services in Australia, with an integrated delivery centre for medical billing, clinical coding and transcriptions in India. Synapse set up an office in the southern Indian city of Chennai four years ago and now employs 100 people. It has developed Australia's first medical billing app, to save time and reduce costs associated with clinical service delivery.

Synapse services help improve the efficiency and productivity of their Australian clients. Australian staff work at the customer interface; Synapse India works at the data interface.

Having a service centre in India has boosted the company's capacity and capability to deliver services and has led to new contracts in India and overseas.

Synapse has also identified expectations and protocols of Indian business culture and sought to work within them. Margaret Faux, Synapse Medical's founder and Chief Executive Officer, visited Chennai as a backpacking teenager and formed an attachment to the city. Years later, when she was looking to establish her business in India, Chennai was the obvious choice, not only because of her familiarity with the city but because she was able to tap into a skilled workforce and the relative ease of doing business. She cites forming personal relationships with staff and clients and having close communication between Synapse's Australian and Indian offices, as central to the company's success.

"Now that India has committed to Universal Health Coverage, there are real opportunities to engage, but very few Australians are in the race. I think they are missing out."



OFFICIAL OPENING OF THE SYNAPSE OFFICE IN INDIA. [SYNAPSE MEDICAL SERVICES AUSTRALIAN PTY LTD]

3.2 Skills, infrastructure and other constraints

India lacks resources in key ministries and regulatory bodies, limiting the prospects for productive engagement

- for example, in the Ministry of Health and Family Welfare four staff manage all bilateral MoUs, World Health Organization and donor engagement.

The Indian health sector has a severe shortage of qualified practitioners

- many informal health workers have little to no training
- there are 462 medical colleges that teach 56,748 doctors and 3,123 institutions that prepare 125,764 nurses each year, but with India's population increasing annually by 26 million, the numbers are too small.⁹³

Australia delivers world-class healthcare domestically but is not a big player in global markets

- Australia is not competitive with the United States and others in commercialising medical research
- Australia has a reputation for quality but represents only 1 per cent of global pharmaceutical and medical device sales
- competitors have a head start
 - the United States has over 60 officers in its Delhi Embassy who are working on the health relationship, from a range of agencies such as the Center for Disease Control, USAid and Department of Health and Human Services; Japan is making significant development-led health investments
 - the Australian High Commission does not have one dedicated full-time officer on health; this responsibility is shared across DFAT, Austrade and other government agencies.

4.0 WHERE TO FOCUS

Opportunities are most prospective for Australia by focusing on progressive states with a commitment to healthcare reform and where we can apply our relative strengths in NCDs. Indian regions with the greatest need for health sector improvement are unlikely to be where the best prospects of commercial partnership are. Wherever we do focus, as in education, our partnership with India on health cannot be seen to rest on a profit-first mode of engagement.

state health spending has increased marginally in many states since and this is expected to continue.

- a targeted approach is therefore needed and clarity is required around the relevant decision-making authority
 - for example, to scale-up proven solutions, Central Government support is needed, but pilot projects need state backing.

4.1 The Centre and the states

While the Central Government is responsible for establishing the regulatory framework and insurance policy, health is a state subject in India's federal structure and the majority of public spending on health comes from state budgets.

- State governments, in addition to spending grants received from the centre, spend directly out of their own resources
 - as a result of greater allocation of funds from the Centre in 2015, the share of

URBAN VERSUS RURAL

Urban versus rural disparities also affect where to focus

- inequalities in the quality of care and access to health vary widely between urban and rural areas; these are compounded by gender inequality
 - most Indians live in rural areas which have limited access to hospitals and clinics
 - » only 33 per cent of doctors work in rural areas¹²

- the increase of lifestyle diseases and NCDs is concentrated in urban areas in more developed states
- more accessible digital technologies and social entrepreneurship can deliver cost effective solutions and bridge the gap between providers and end-users
- primary healthcare centres in rural areas are the main focus of the public healthcare system
- the private sector is concentrated in metros, tier one and tier two cities
- urban areas would be the natural focus for engagement on NCDs and developing health systems – even if they are designed to deliver services to rural communities.

4.2 Key states

Australia should focus on states with demonstrated commitment to improve their health outcomes and the frameworks to use their funds effectively.

States with the most developed economies and business-friendly environments also tend to have the most progressive healthcare systems and highest NCD burden.

ANDHRA PRADESH

- State budget expenditure on health: 4.7 per cent
- Proportion of disease burden⁹⁴:
 - Communicable, maternal and nutritional diseases (CMND): 27 per cent
 - NCD: 60 per cent
 - Injuries: 13 per cent

Andhra Pradesh has medical device zones to support domestic manufacturing, offering commercial facilities and strategic support to healthcare manufacturing. Andhra Pradesh has one of India's most expansive universal healthcare regimes.

KARNATAKA

- State budget expenditure on health: 4.1 per cent
- Proportion of disease burden:
 - CMND: 25 per cent
 - NCD: 62 per cent
 - Injuries: 13 per cent

Karnataka has a relatively advanced health sector and is home to public sector enterprises in health and pharmaceuticals. Karnataka's innovation ecosystem supports startups in biotech and healthcare.

KERALA

- State budget expenditure on health: 5.1 per cent
- Proportion of disease burden:
 - CMND: 14 per cent
 - NCD: 74 per cent
 - Injuries: 12 per cent

Kerala has a relatively strong health sector supported by state investment. Kerala is developing medical device manufacturing zones (including a possible industrial park). Kerala has a growing demand for aged care and is a source of healthcare workers.

MAHARASHTRA

- State budget expenditure on health: 3.9 per cent
- Proportion of disease burden:
 - CMND: 25 per cent
 - NCD: 63 per cent
 - Injuries: 12 per cent

Maharashtra runs the highest number of clinical trials (16 per cent⁹⁵) in India and produces the most clinical research.

TAMIL NADU

- State budget expenditure on health: 4.5 per cent
- Proportion of disease burden:
 - CMND: 20 per cent
 - NCD: 65 per cent
 - Injuries: 14 per cent

With medical device zones to support domestic manufacturing, Tamil Nadu has some of the best health indicators in India and a universal healthcare system.

TELANGANA

- State budget expenditure on health: 4.8 per cent
- Proportion of disease burden:
 - CMND: 28 per cent
 - NCD: 59 per cent
 - Injuries: 13 per cent

Telangana has a large number of private healthcare organisations and India's largest pharmaceutical cluster.

CASE STUDY: WORLD MOSQUITO PROGRAM: AUSTRALIAN RESEARCHERS SET OUT TO STOP DENGUE FEVER

In India, it is estimated there are between 20–40 million cases of dengue fever each year. It is an enormous public health burden, among the highest in the world. Current forms of control alone are unable to stop the spread of the virus.

Australian researchers hope to have a solution. The World Mosquito Program, a not-for-profit, global initiative led from Monash University in Melbourne, is pioneering the use of a safe and naturally-occurring bacteria to reduce the ability of mosquitoes to transmit the dengue virus.

Pilot studies have shown when a high proportion of mosquitoes in an area carry the Wolbachia bacteria, there has been no evidence of local transmission of dengue. The program has projects in 12 countries so far, working on introducing the bacteria to local mosquito populations, and is expanding to 20 countries by 2020.

In 2017, the World Mosquito Program joined forces with a highly respected partner in India, the Indian Council of Medical Research (ICMR). It is conducting initial research at the Council's Vector Control Research Centre in Puducherry, South India.

Initial laboratory studies are examining the impact of Wolbachia on dengue, along with another mosquito-borne virus, chikungunya.

India needs affordable long term solutions, and the Australian team is partnering with ICMR to help find one. If successful it has the potential to significantly reduce the number of dengue cases in India and elsewhere around the world.

RECOMMENDATIONS

In the short term, sustained and targeted ministerial-led government engagement can provide the basis for broader and deeper commercial engagement. This could require some reprioritisation at home.

49. Promote regulatory convergence and standards harmonisation to improve market interoperability

- 49.1 Empower the TGA to play a larger role in leading and influencing the development of regulatory capability across regional markets, and with India in particular
- the TGA differs from many other regulators in that it operates on a full cost recovery model and does not receive government funding for the bulk of its work
 - there is scope for a more partnership-based approach with industry: for example, establish mechanisms to enable industry (export-oriented Australian companies) to choose to sponsor specific TGA activities
 - a strategic decision by government to prioritise engagement with India should result in increased TGA interaction with India, including through the World Health Organization, International Coalition of Medicine Regulatory Authorities, International Medical Devices Regulators' Forum and the International Pharmaceuticals Regulators Programme
 - as well as continuing to align TGA processes and evidence requirements with those of international regulators.
- 49.2 Increase information exchange and collaboration between TGA and the Central Drugs Standard Control Organisation on medicines inspections and regulatory systems for medical devices
- providing technical support, including by offering secondments, to build the capacity of India's Central Drugs Standard Control Organisation
 - consider work sharing, information sharing and regulatory convergence activities with Indian regulators and the Ministry of Health and Family Welfare
 - this can be operationalised through exchanges and secondments.

49.3 Facilitate further engagement between Standards Australia and the Bureau of Indian Standards

- including on data standards and eHealth record security through the Australian Digital Health Authority.

49.4 Support India to develop its registration and accreditation standards for medical practitioners and allied health professionals through collaboration with the Australian Health Practitioner Regulation Agency and the Australian Medical Council.

50. Make health a ministerial priority and overtly align engagement with Indian needs

50.1 Maintain regular ministerial engagement at federal level and at state level with target states.

50.2 Agree a schedule of meetings in the margins of multilateral health fora.

50.3 With ministerial imprimatur, the Joint Working Group under the Australia-India Health MoU should strengthen efforts to draw together partnerships and programs in health between federal and state governments, academia and industry.

- under this framework, Australian activities would gain Indian political support by aligning efforts with Indian policy priorities
- the table below gives examples of national policies, but Australian engagement could also be with target states.

Example of Indian priority (as per NHP17)	Point of Australian collaboration
Combating NCDs	Sharing information and collaborating on management of NCDs, both domestically and in development contexts
Digital Health	<p>The Australian Digital Health Authority working with India as it establishes a National eHealth Authority and National Digital Health Authority to digitise health information</p> <p>This could lay the foundation for private sector engagement</p> <p>Learn from India's biometric data experience</p> <p>An opportunity to engage with India directly on its Aadhaar experience</p> <p>Continue to seek Indian engagement with the Global Digital Health Partnership</p>
Improve public hospitals management	<p>Supporting India to establish clinical risk management systems</p> <p>Sharing information on Australia's Activity Based Funding Model (for example, the Independent Hospital Pricing Authority has commercially available software)</p>
Progressively achieve Universal Health Care	<p>Cost containment is a key consideration for India. Australia can share experience from related projects and processes, including in relation to healthcare financing and a blended healthcare model</p> <p>Share experiences from roll out of the National Disability Insurance Scheme</p>
Mental healthcare programs	Australian initiatives like Black Dog Institute and products like iBobby
Develop a health card that links to a defined package of primary health services	Leverage possible synergies with Medicare
Reduce tobacco use by 30 per cent by 2025	Share experiences on tobacco control interventions
Reform medical education	<p>Provide technical assistance to develop national competency examinations</p> <p>Provide more fellowship opportunities</p> <p>Forge partnerships with key Indian universities and research institutes</p>
Trauma management	Work with India to apply Australia's world-leading trauma management systems

51. Consolidate engagement mechanisms (state and business level) to help unify Australian branding, improve knowledge sharing and coordinate lobby efforts

- 51.1 Establish an industry body to package Australian health sector offerings specifically for India
- similar to the Water Industry Alliance or the Australian Water Partnership, perhaps affiliated with an existing health sector peak body
 - this initiative would support public and private partnerships for sharing Australia's health sector expertise with India, open opportunities for Australia to learn from India's approaches and seek co-investment collaborations.
- 51.2 Organise 'whole-of-Australia' presentations at events and conferences, rather than the current state-based presentations.
- 51.3 The Industry Growth Centre *MTPConnect* and Austrade should continue to provide resources and connections between companies and overseas regulators
- encourage clusters of Australian health SMEs to work with non-government organisations to establish 'social innovation hubs'.

52. Increase Australia-India medical research, development and commercialisation

- 52.1 Channel existing funds to support more research grants, fellowships and exchanges with India, focused on the key services and states. This would include:
- enhancing the priority on collaboration with India through existing funds
 - for example, via specific health research funding like the National Health and Medical Research Council, the Medical Research Future Fund or Australia's Biomedical Translation Fund
 - » or via non-health specific funds such as CSIRO's Main Sequence Ventures
 - seeking to draw on Indian venture capital or funding from large conglomerates.
- 52.2 Explore options for co-investment with India in health development programs in third countries to build collaboration on public health capability transfer
- for example combining our technical expertise with India's frugal innovation.
- 52.3 Foster formal agreements between leading health research institutions, including to tap international funding pools.
- 52.4 Look to increase domestic research funding and improve pathways to commercialisation.

53. Strengthen efforts to bring India into global and regional regimes on health security issues

- 53.1 Australia should continue to build up partnership cooperation with India on regional health security initiatives to help prevent avoidable epidemics, strengthen early detection capacity, address gender inequality in health outcomes and support rapid, effective national and international outbreak responses (for example, epidemics, anti-microbial resistance, malaria and tuberculosis).
- 53.2 Expand partnerships to strengthen human and animal health systems, including through improved access to vaccines, and deepen people to people linkages that build health security capability.
- 53.3 Facilitate exchanges in Field Epidemiology Training Programs.
- 53.4 Consider placing Australian health professionals in non-clinical, capacity-building roles in India under the Health Security Corps, building people-people and institutional links.
- 53.5 Support high quality and collaborative health systems and policy research (translational research) through consortia or partnerships with Australian institutions.
- 53.6 Continue to encourage India's engagement in malaria elimination and health security through the Asia Pacific Leaders Malaria Alliance.