

PREVENTION IS THE BEST MEDICINE: RETHINKING HEALTHCARE IN ASIA

June 2018

INTRODUCTION



The United Nations Sustainable Development Goals (SDGs) have built momentum towards a more resilient and inclusive world. As the countdown to 2030 begins, there is growing consensus on the importance of public-private sector collaboration to achieve the SDGs. Businesses are starting to seize the US\$12 trillion worth of opportunities in addressing our most pressing social and environmental challenges. Technology disruptions and demographic shifts will significantly change the way we learn, work, and live. The time is ripe to translate our collective action into impact and tangible outcomes for our future generations.

Ecosperity is a series of sustainability-focussed conferences presented by Singapore-based investment company Temasek. The conference brings together corporate leaders, innovators, policy-makers, and experts from around the world to explore the latest issues on sustainability growth. The name ‘Ecosperity’ twins ecology with prosperity – recognising that growth can and should take place in a sustainable manner.

The 5th Ecosperity Conference will be held on 5th June 2018 in conjunction with United Nations World Environment Day. Themed “Tomorrow Starts Today! From Ideas to Impact”, it will explore new approaches to education, food, and healthcare to achieve impact at scale and build resilient societies in an increasingly digital and urban future.

ACKNOWLEDGEMENT

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HEALTHCARE SPENDING IS NOT SUSTAINABLE GOING FORWARD...

EXAMPLES OF CHALLENGES



Asia will be home to **OVER 60%** of the world's population aged 65 and over by 2030
- OVER 500 MILLION PEOPLE

AGEING POPULATIONS...

Medical insurers expected the gross cost of healthcare benefits to

RISE BY 8.6% IN ASIA

in 2017 (higher than the global average of 7.8%), with

71% CITING THE HIGH COST OF MEDICAL TECHNOLOGY AS A SIGNIFICANT DRIVER



...EFFORTS TO IMPROVE ACCESS AND QUALITY OF CARE...

In 2015, non-communicable diseases were responsible for **40 MILLION (70%)** of the world's 56 million deaths



Prevalence of obesity has doubled since 1980, costing over **US\$2 TRILLION ANNUALLY**



...AND INCREASING NON-COMMUNICABLE DISEASES (NCDs)...

Growth in healthcare expenditure outstripped GDP growth between 2000-2015 for

13 OUT OF 14

Asia-Pacific-economies



Spending on healthcare for the elderly is expected to **RISE BY A MULTIPLE OF 9.3 AND BY 4.6** in Vietnam, and China and Singapore, between 2015-2030 respectively



...ARE PLACING PRESSURE ON GOVERNMENTS AND INDIVIDUALS

...AND WILL REQUIRE A SHIFT IN FOCUS FROM TREATMENT TO PREVENTION



TRANSFORMATION IS NEEDED IN 3 AREAS

LIFESTYLES



- This includes a range of levers, from encouraging citizens to engage in physical activity to broader lifestyle education
- Insufficient physical activity is one of the **10 LEADING RISK FACTORS** for global mortality

NUTRITION



- This includes a range of levers from parental and children education programmes, to imposing restrictions or taxes on the sale of high-sugar, high-fat food, and school meals
- Food fortification programmes can cost only **~US\$50 PER DISEASE Adjusted Life Year saved** (extremely cost effective)

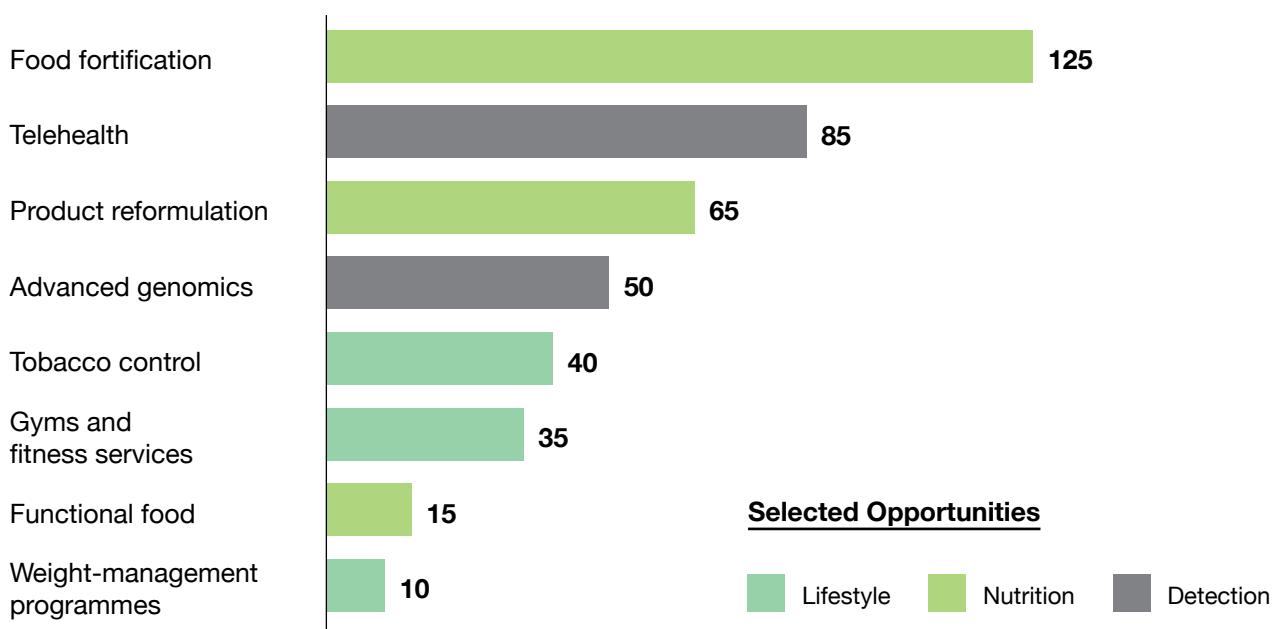
DETECTION



- Includes public-sponsored health screenings and community engagement programmes
- Estimated cost of prevention per life saved in China: **US\$1,200**

EXAMPLES OF NEW BUSINESS OPPORTUNITIES

SIZE OF BUSINESS OPPORTUNITY IN ASIA
(US\$ BILLIONS, 2030)







KEY MESSAGES

- 
- A “business as usual” approach to healthcare in Asia going forward is not feasible. Fuelled by an ageing population, a rise of non-communicable diseases (NCDs), efforts to increase access, and rising expectations on quality of care, global spending on health is forecasted to increase from below US\$8 trillion in 2013 to close to US\$20 trillion in 2040.¹ For many governments in Asia, such spending will be challenging to maintain – for instance, growth in healthcare expenditure (excluding indirect and capital costs) outstripped GDP growth between 2000-2015 for 13 out of 14 Asia-Pacific economies; and spending on healthcare for the elderly could increase by 9 times the current rates for some countries in Asia by 2030.²
 - A new approach is needed – shifting from treatment to prevention. Academic evidence from the United States (US) shows that every US\$1 invested in prevention in healthcare can save over US\$5 in treatment costs.³ There are three major shifts needed to support prevention of healthcare issues:
 1. **Lifestyles:** Shifting from sedentary and unhealthy lifestyles (e.g., smoking) to active and healthy lifestyles.
 2. **Nutrition:** Rethinking food intake, through exploring new sources of nutrition with greater health benefits (e.g. food fortification, functional foods, reformulated food, “free-from” foods).
 3. **Detection:** Shifting towards early screenings of individuals to detect NCDs and enable cost-effective treatment before diseases become more advanced.

1. Figures presented using 2010 PPP dollars. Joseph L Dieleman et al (2016), “National spending on health by source for 184 countries between 2013 and 2040”. *The Lancet*. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)30167-2/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)30167-2/abstract)

2. Marsh and McLennan and Asia-Pacific Risk Centre (2015), *Advancing into the golden years: cost of healthcare for Asia-Pacific’s elderly*. Available at: <https://www.mmc.com/content/dam/mmc-web/Files/APRC/APRC%20Ageing%20report%20FULL.pdf>

3. Trust for America’s Health found that with ever US\$1 spent on disease prevention strategies such as community-based programmes to increase physical activities, improve nutrition and reduce smoking, there was a saving of US\$5.6 in healthcare spending. See Robert Wood Johnson Foundation (2008), *New report: Investment in disease prevention could save America more than \$16 billion in five years*. Available at: <https://www.rwjf.org/en/library/articles-and-news/2008/07/new-report-investment-in-disease-prevention-could-save-america-m.html>



Chapter 1:

TRENDS IN HEALTHCARE IN ASIA

Changing population dynamics bring new challenges to Asia's healthcare systems. Even unlocking all the available efficiency gains in healthcare treatment may not be sufficient for limited resources to meet the demands of an ageing population, with greater expectations on healthcare quality and a rise in non-communicable diseases.

GLOBAL TRENDS WILL PLACE UNPRECEDENTED PRESSURE ON GLOBAL HEALTHCARE SYSTEMS

Global spending on health is forecasted to increase from below US\$8 trillion in 2013 to close to US\$20 trillion in 2040.⁴ Countries in Asia will be particularly impacted, with healthcare costs rising at unprecedented rates (Exhibit 1).

Some of the key drivers of this in Asia include:

- **Ageing populations.** An ageing population brings with it a severe strain on healthcare resources, given that the incidence of regular and chronic disease, and requirements for long-term care increase with age. This is compounded by increasing life expectancy, with a higher number of years where sustained medical care per capita is required. The Asia-Pacific Risk Centre reports that between 2015 to 2030, the Asia-Pacific region will see an increase of 71 percent or 200 million people in the elderly population (aged 65 and over), significantly faster than in North America (55 percent) and Europe (31 percent).⁵ During this period, China's share of elderly population is projected to rise from 11 percent to 18 percent of the population, while it took Germany 25 years to report similar growth. Similarly, Singapore's share of elderly is expected rise from 11 percent to 20 percent over the same period – in contrast, it took France 49 years to clock the same growth. A sustained decline in fertility rates, an increase in the ratio of working population to elderly population and structural changes to family support will place immense pressure on community and public resources to cover healthcare needs. Spending on

ASIA WILL BE HOME TO OVER 60 PERCENT OF THE WORLD'S POPULATION AGED 65 AND OVER BY 2030 – OVER 500 MILLION PEOPLE

healthcare for the elderly is expected to rise by a multiple of 9.3 in Vietnam, and by 4.6 in China and Singapore between 2015-2030.⁶ Singapore's Health Minister Mr. Gan Kim Yong reported in 2016 that Singapore will require over 30,000 additional health workers by 2020 alone to staff six new polyclinics, 2,100 public hospital beds, 9,100 beds in community hospitals and nursing homes, as well as 7,600 more places in day, home and palliative care.⁷

DUBBED “MODICARE”, INDIA’S NATIONAL HEALTH PROTECTION SCHEME ALLOCATED CLOSE TO US\$200 MILLION IN THE 2018-19 BUDGET

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- **Efforts to improve access and quality of care.** Ensuring universal access to healthcare is a key target under SDG3: Good Health and Well-being.⁸ Efforts to increase access to healthcare through new clinics and hospitals in impoverished communities is thus a key driver of increased spending, particularly in the public sector. The Indian government recently announced a national health protection scheme targeted at 100 million poor and vulnerable families, also offering reimbursements of up to US\$7,845 per family annually for secondary and tertiary care hospitalisation for up to 500 million beneficiaries.⁹ The plan, which has close to US\$200 million allocated in the 2018 to 2019 budget, involves the launch of 150,000 health and wellness centres providing free access to essential drugs and diagnostic services. Together with increasing access to healthcare, treatment costs are rising due to quality improvements and innovations in

4. Figures presented using 2010 PPP dollars. Joseph L Dieleman et al (2016), “National spending on health by source for 184 countries between 2013 and 2040”. *The Lancet*. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)30167-2/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)30167-2/abstract)

5. Societies in China and Singapore will be classified as “aged” (14-21 percent of population over 65) and India and Indonesia as “ageing” (7-14 percent of population over 65) in 2030. China and Singapore expect healthcare spending on the elderly alone to rise by 4.6 times between 2015-2030. See Marsh and McLennan and Asia-Pacific Risk Centre (2015), *Advancing into the golden years: cost of healthcare for Asia-Pacific’s elderly*. Available at: <https://www.mmc.com/content/dam/mmc-web/Files/APRC/APRC%20Ageing%20report%20FULL.pdf>

Deloitte reports that Asia will be home to over 60 percent of the world’s population aged 65 and over by 2030. Deloitte (2017), *Voice of Asia*. Vol. 3. Available at: https://www2.deloitte.com/content/dam/insights/us/articles/4202_VOA-3_Asias-growth-on-the-cusp/DI_VOA3.pdf

6. Marsh and McLennan and Asia-Pacific Risk Centre (2015), *Advancing into the golden years: cost of healthcare for Asia-Pacific’s elderly*. Available at: <https://www.mmc.com/content/dam/mmc-web/Files/APRC/APRC%20Ageing%20report%20FULL.pdf>

7. The Straits Times (2016), “30,000 more healthcare workers needed by 2020 to cater for Singapore’s ageing population: Health Ministry” Available at: <http://www.straitstimes.com/singapore/health/30000-more-healthcare-workers-needed-by-2020-to-cater-for-singapores-ageing>

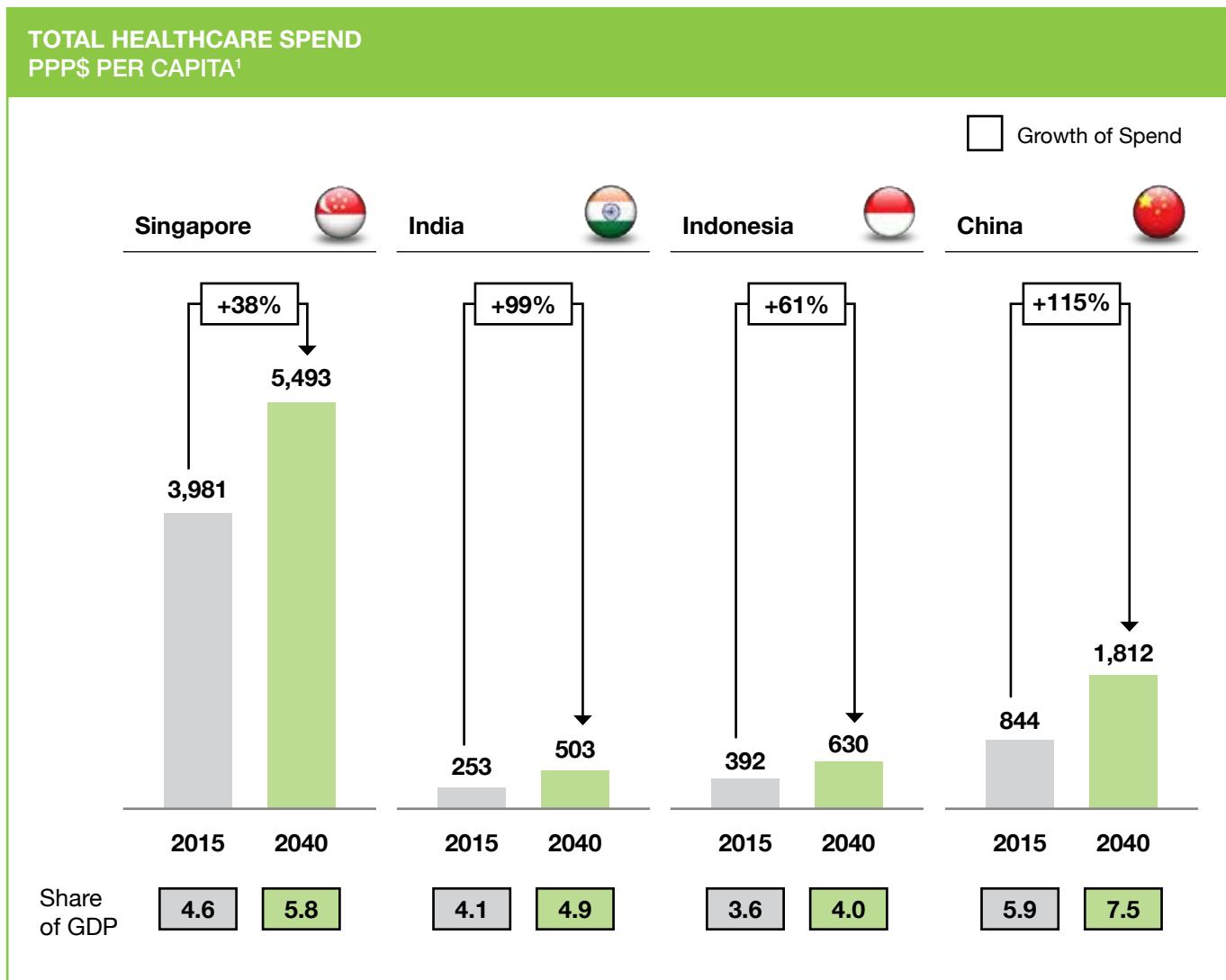
8. WHO (2018), Sustainable Development Goal 3: Health. Available at: <http://www.who.int/topics/sustainable-development-goals/targets/en/>

9. Quartz (2018), “India says it will fund the world’s largest national health programme”

Available at: <https://qz.com/1195302/budget-2018-india-says-it-will-fund-the-worlds-largest-national-health-programme/>

EXHIBIT 1:

HEALTHCARE COSTS ARE LIKELY TO RISE SIGNIFICANTLY IN ASIA



1. Total healthcare spending includes the following sources: domestic government, prepaid private, out-of-pocket and development assistance. Figures for 2015 taken as current health and health capital expenditure as a share of GDP (as reported by WHO) multiplied by the PPP-adjusted GDP per capita (consistent with Dieleman et. al.'s methodology). Figures for 2040 taken as the average value of lower and upper limit as reported by Dieleman et. al.

SOURCE: WHO, Dieleman et.al. (2016)

medical treatment. While technological innovations have the long-term potential to significantly reduce costs of diagnostics, healthcare delivery and disease treatment (in addition to enhancing medical outcomes),¹⁰ costs can often be higher in the short-run due to factors such as the initial high costs of introducing these technologies (until they achieve sufficient scale to support lower costs)¹¹ and patents initially deterring competition. For instance, there was outrage in the United States over the sharp intentional price hike between 2009 to 2016 for EpiPen, a life-saving treatment for anaphylactic reactions, by the company acquiring the original patent holder.¹²

A recent survey by Willis Towers Watson showed that medical insurers expected the gross cost of healthcare benefits to rise by 8.6 percent in Asia in 2017 (higher than the global average of 7.8 percent), with 71 percent of survey respondents citing the high cost of medical technology as a significant cost factor outside the doctor and patient's control.¹³ Striking a balance between soaring costs for patients and keeping up with new technologies (including the latest pharmaceutical advances) is a key issue.¹⁴ For instance, in 2015, global spending on cancer drugs rose by 11.5 percent to reach US\$107 billion – this is expected to rise to US\$150 billion by 2020 due to newer, high-quality treatment.¹⁵

- **Moral hazard.** Another key issue driving healthcare spending is the doctor- and patient-side moral hazard, where doctors overprescribe medical treatment and patients overuse medical facilities covered by insurance. Almost three-quarters of all insurers surveyed by Willis Towers Watson cited doctor-side moral hazard as a driving factor behind

increased spending.¹⁶ In Singapore, over 66 percent of people purchase additional insurance in the form of Integrated Shield Plans (IP). IPs cover most of the insurance claims, allowing the policyholder to pay the deductible and co-insurance of 10 percent of the rest of the bill.¹⁷ Of this group, approximately half also purchase 'riders' which cover the 10 percent component of the IPs i.e., providing nearly 100 percent cover for treatment. Riders have led to significant private healthcare cost inflation; a recent study by the Health Insurance Task Force found that individuals with riders incurred 20 to 25 percent higher medical bills than policyholders with IPs and without riders.¹⁸

- **Increase in chronic diseases.** Noncommunicable diseases (NCDs) represent a large share of the global burden on healthcare. NCDs, also known as chronic diseases, are not passed from person to person and include cardiovascular diseases (such as heart attacks and strokes), cancers, chronic respiratory diseases (including asthma; caused by pollution), and diabetes. NCDs represent the leading cause of death globally. According to the World Health Organisation (WHO), in 2015, four NCDs – cancer, diabetes, cardiovascular diseases and chronic lung diseases – were responsible for 40 million (70 percent) of the world's 56 million deaths.¹⁹ 27 percent (15 million) of these deaths for adults between the ages of 30 and 70 occurred prematurely; 47 percent of these premature deaths occurred in low- and lower-middle-income countries.²⁰ Cancer alone is the leading cause of death in India with over 2.5 million patients reported in 2015 and a five-fold increase expected by 2025. China reported four million new cancer cases in 2016 and over a million premature deaths due to smog during the winter. In many middle-income

10. MIT Technology Review (2013), "Technology: The cure for rising healthcare costs?".

Available at: <https://www.technologyreview.com/s/518946/technology-the-cure-for-rising-healthcare-costs/>

11. Sorenson et. al. (2013). Medical technology as a key driver of rising health expenditure: disentangling the relationship. *ClinicoEconomics and Outcomes Research*. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3686328/>

12. Seven Pillars Institute (2017), "Mylan's EpiPen pricing scandal" Available at: <https://sevenpillarsinstitute.org/mylans-epipen-pricing-scandal/>

13. Willis Towers Watson (2017), "Rising health care benefit costs show no sign of abating in Asia-Pacific, Willis Towers Watson survey finds"

Available at: <https://www.willistowerswatson.com/en/press/2017/08/rising-health-care-benefit-costs-show-no-sign-of-abating-in-asia-pacific>

14. Healthcare Asia (2017), "Thailand struggles to strike a balance between high cost, quality healthcare".

Available at: <http://healthcareasiamagazine.com/healthcare/in-focus/thailand-struggles-strike-balance-between-high-cost-quality-healthcare>

15. VOA (2017), "WHO, medical experts, warn of rising health costs in Asia".

Available at: <https://www.voanews.com/a/who-medical-experts-warn-of-rising-health-costs-in-asia/3707628.html>

16. Willis Towers Watson (2017), "Rising health care benefit costs show no sign of abating in Asia-Pacific, Willis Towers Watson survey finds".

Available at: <https://www.willistowerswatson.com/en/press/2017/08/rising-health-care-benefit-costs-show-no-sign-of-abating-in-asia-pacific>

17. MOH (2018), How MediShield Life Claims Work. Available at: https://www.moh.gov.sg/content/moh_web/medishield-life/about-medishield-life/how-medishield-and-medishield-life-claims-work.html; and Comparison of Integrated Shield Plans.

Available at: https://www.moh.gov.sg/content/moh_web/medishield-life/integrated-shield-plans/comparison--of-integrated-shield-plans.html

18. Health Insurance Task Force (2016), "Managing the cost of health insurance in Singapore".

Available at: http://www.lia.org.sg/system/files/news/2016/10/ManagingSingaporeHealthInsuranceCost_HITF_20161013.pdf

19. WHO statistics as reported by MIMS Today (2017), "Infographic: WHO says Asia's healthcare costs will rise starkly over the next 10 years".

Available at: <https://today.mims.com/infographic--who-says-asia-s-healthcare-costs-will-rise-starkly-over-next-10-years>

20. WHO (2017), Preparation for the third High-level meeting of the General Assembly on the prevention and control of non-communicable diseases, to be held in 2018. Available at: http://apps.who.int/gb/ebwha/pdf_files/EB142/B142_15-en.pdf

countries, the growing burden of NCDs is replacing gains made in the treatment of communicable diseases; for instance; tobacco now kills over 7 million people around the world annually.²¹ The main drivers of NCDs, including smoking, obesity, alcoholism, pollution, and poor nutrition, collectively create an economic cost of around 10 percent of global GDP (Exhibit 2).

Globally, the prevalence of obesity as of 2018 has tripled since 1975 with no recorded decrease in any region, increasing the burden of diabetes and heart disease.²² As a side effect of Asia's increased affluence, inactive lifestyles are becoming more prevalent leading to greater incidences of obesity. The ADB recently reported that nearly 41 percent of adults in Asia-Pacific were overweight or obese.²³

1. A study in 2014 showed that 17 percent of boys and 9 percent of girls under the age of 19 in rural **China** were obese, up from 1 percent of children and adolescents in 1985.²⁴
2. **India**, despite being home to 40 percent of the world's underweight population (over 200 million people), ranked among the top five countries globally for obese population in 2014 with over 30 million.²⁵
3. While malnutrition has decreased over the past two decades in **Indonesia**, adult overweight and obesity rates have risen to 19.7 percent in 2013, from 13.9 percent in 2007 for males, and to

GLOBALLY, MORE DEATHS ARE LINKED TO BEING OVERWEIGHT THAN UNDERWEIGHT

32.9 percent in 2013 from 13.9 percent in 2007 for females.²⁶

4. A recent study by the Health Promotion Board (HPB) in 2015 revealed that **Singapore** could reach obesity rates of 15 percent by 2024 – the threshold at which obesity rose rapidly in the United States.²⁷

Obesity has a significant number of negative impacts on people's health (Exhibit 3). According to new research by the Institute for Health Metrics and Evaluation at the University of Washington, overweight and obesity led to around four million deaths worldwide in 2015.²⁸ In fact, globally, more deaths are linked to being overweight than underweight.²⁹ Individual optimal caloric intake depends on a person's age, weight, and daily physical activity. Outside of the optimal BMI range, there are several health risks of increased body fat, including diabetes, hypertension, and dyslipidaemia.³⁰ For example, over 190 million people were diagnosed with Diabetes type 2 in 2010, with the global figure expected to nearly double to 366 million by 2030.³¹

21. WHO (2018), Factsheet: Tobacco. Available at: <http://www.who.int/mediacentre/factsheets/fs339/en/>

22. WHO (2018), Factsheet: Obesity and overweight. Available at: <http://www.who.int/mediacentre/factsheets/fs311/en/>

23. As reported by Nikkei Asian Review (2017), "Indonesia and Malaysia follow Singapore's lead in tackling obesity".

Available at: <https://asia.nikkei.com/Politics-Economy/Policy-Politics/Indonesia-and-Malaysia-follow-Singapore-s-lead-in-tackling-obesity>

24. European Society of Cardiology (2016), China pays price of western lifestyle with soaring childhood obesity.

Available at: <https://www.sciencedaily.com/releases/2016/04/160426215327.htm>

25. Times of India, "No. 1 in underweight population, India among top 5 in obesity".

Available at: <https://timesofindia.indiatimes.com/india/No-1-in-underweight-population-India-among-top-5-in-obesity/articleshow/51656193.cms>

26. ADB Institute (2018), The Economic Burden of Overweight and Obesity Reaches 3 percent of GDP in Indonesia.

Available at: <https://www.asiapathways-adbi.org/2018/02/the-economic-burden-of-overweight-and-obesity-in-indonesia/>

27. Health Promotion Board study as reported by the New Paper Online (2017), "Singapore at risk of becoming a fat nation".

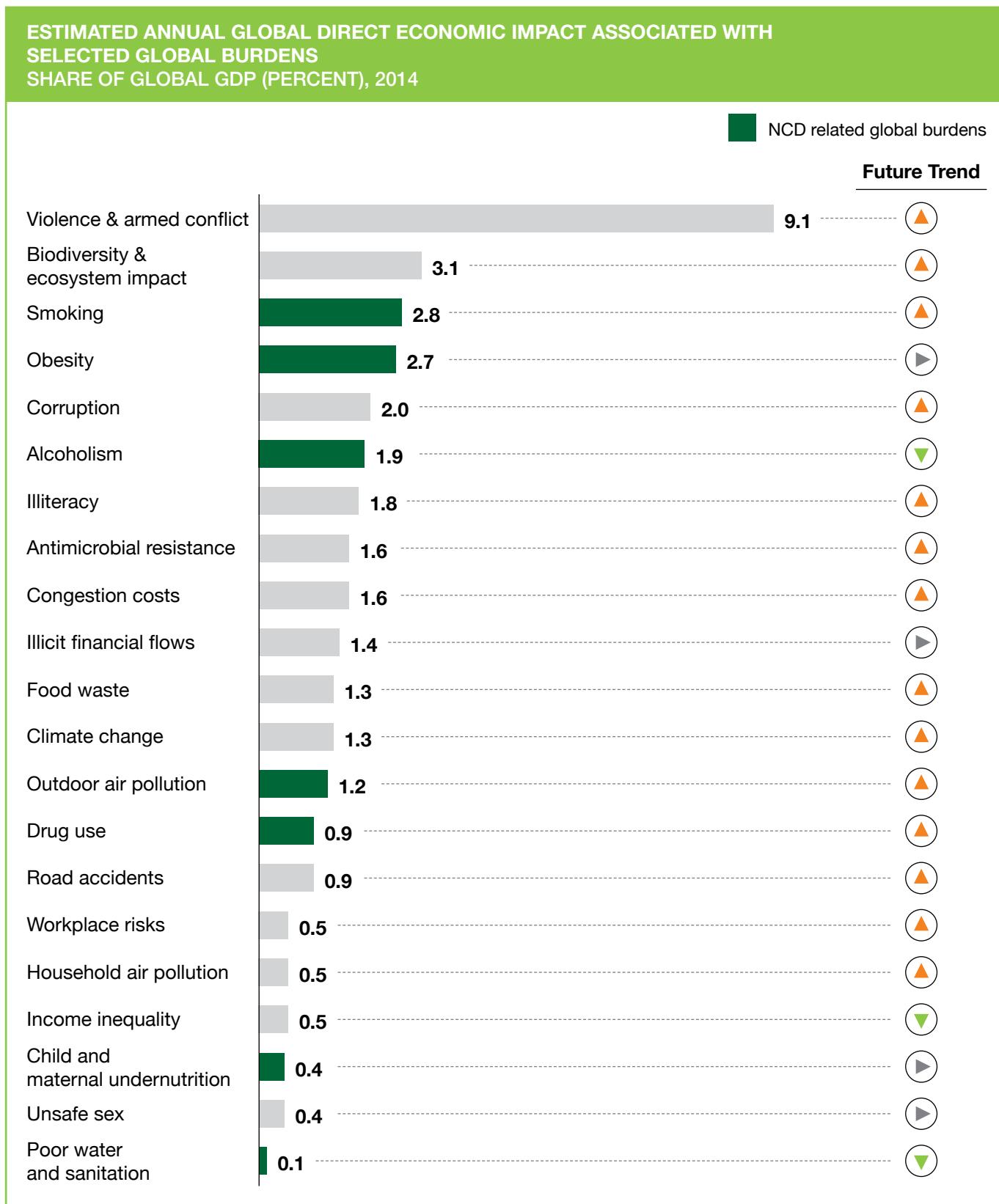
Available at: <http://www.tnp.sg/news/singapore/singapore-risk-becoming-fat-nation>

28. Diana Phillips (2017), Obesity-related deaths hit new high worldwide. Available at: <https://www.medscape.com/viewarticle/881428>

29. WHO (2018), Factsheet: Obesity and overweight. Available at: <http://www.who.int/mediacentre/factsheets/fs311/en/>

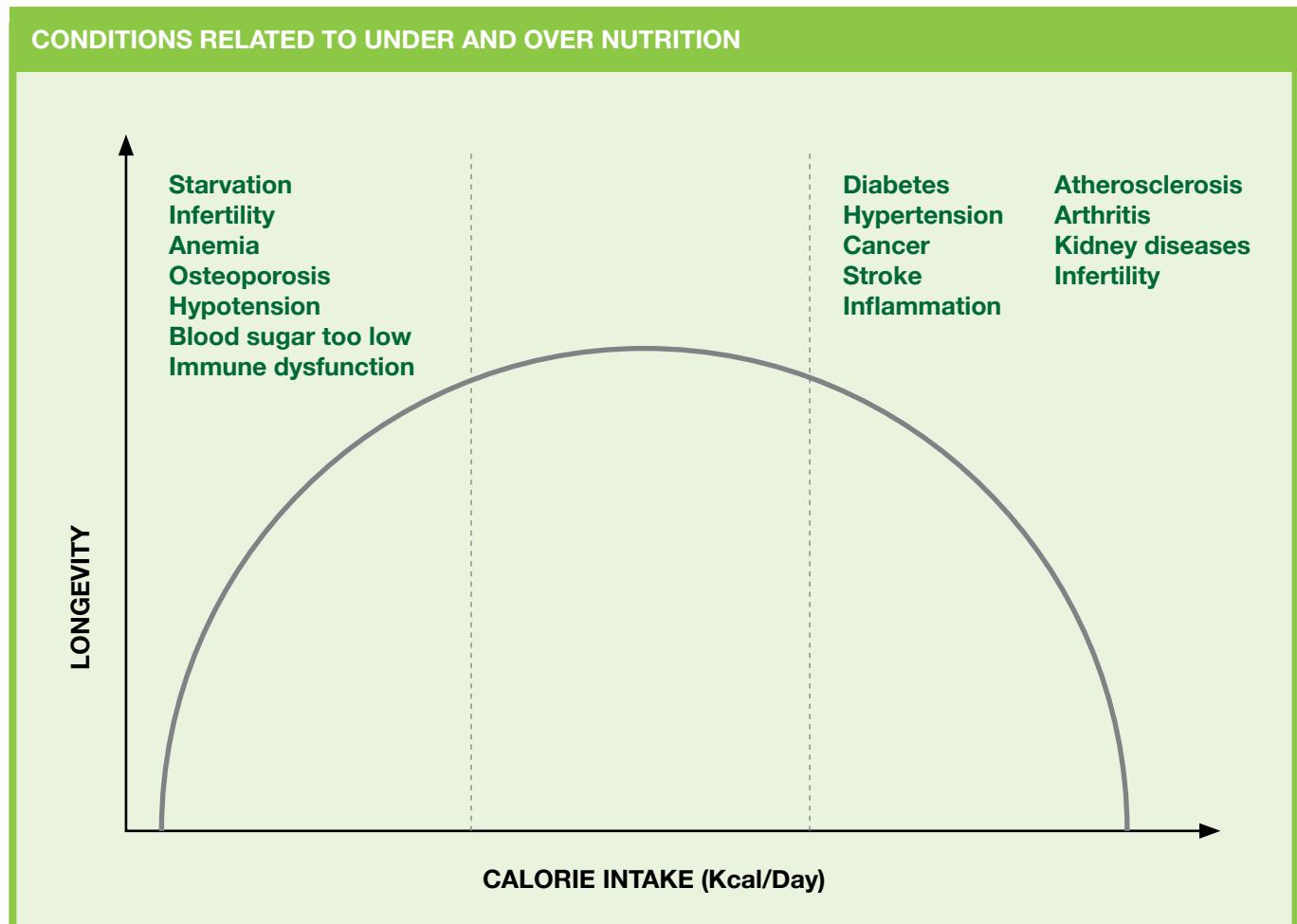
30. Bays et. al. (2007), The relationship of body mass index to diabetes mellitus, hypertension and dyslipidaemia: comparison of data from two national surveys. *International Journal of Clinic Practice*. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1890993/>

31. Type 2 Diabetes is the most prevalent form of diabetes and is developed in association with obesity. See Mohammed Shahidul Islam (2010), *The Islets of Langerhans. Advances in Experimental Medicine and Biology*, Vol. 654.

EXHIBIT 2:**NON-COMMUNICABLE DISEASE RELATED FACTORS ARE MAJOR DRIVERS OF GLOBAL BURDENS TODAY**

SOURCE: Literature review; WHO Global Burden of Disease database; McKinsey Global Institute; AlphaBeta analysis

EXHIBIT 3:
CONDITIONS RELATED TO UNDER AND OVER NUTRITION



SOURCE: Fontana L. et al, JAMA 2007



GOVERNMENTS AND INDIVIDUALS IN ASIA MAY STRUGGLE TO PAY FOR THESE RISING HEALTHCARE COSTS

Rising healthcare costs in Asia show no signs of abating. For many economies, such spending is unsustainable as economic growth struggles to keep pace – growth in healthcare expenditure (excluding indirect and capital costs) outstripped GDP growth between 2000 to 2015 for 13 out of 14 Asia-Pacific economies (Exhibit 4).³² If this trend is to continue, it will have serious implications for governments, businesses and private citizens as the expected increase in healthcare costs will not be offset by an increase in income levels.

India, a narrow exception in this sample, is still expected to face significant fiscal constraints to meet its modest healthcare spending target of 2.5 percent GDP share by 2025 (up from 1.15 percent in 2018). Due to slower than expected economic growth and tax collections, the requested “bare minimum” health budget of US\$10 billion for FY2018 to 2019 – 33 percent higher than FY2017 to 2018 – was not granted, with only US\$8.2 billion granted – 11 percent higher than the previous year.³³ India also

has one of the highest proportions of out-of-pocket expenditure for healthcare globally, with development assistance having stagnated over the past few years.³⁴ These developments together with continued efforts to increase access to healthcare such as “Modicare” will severely strain fiscal resources in the coming years.

Governments are likely to need to shoulder an increasing burden of healthcare spending over the next few decades.³⁵ As shown in Exhibit 5, governments’ share of overall healthcare expenditure as a share of GDP is expected to increase significantly in comparison to current spending levels. With GDP growth unable to keep pace with extensive budgetary requirements for healthcare, trade-offs are expected in funding for other critical sectors of the economy such as education, poverty alleviation, and digital innovation. For instance, Singapore Finance Minister Mr. Heng Swee Kiat reported that over the next decade, beginning 2018, government healthcare spending is expected to overtake public education spending.³⁶

32. Marsh and McLennan and Asia-Pacific Risk Centre (2015), *Advancing into the golden years: cost of healthcare for Asia-Pacific’s elderly*. Available at: <https://www.mmc.com/content/dam/mmc-web/Files/APRC/APRC%20Ageing%20report%20FULL.pdf>

33. Reuters (2018), “India plans to raise health spending by 11 percent in budget; less than requested” Available at: <https://www.reuters.com/article/us-india-budget-health-exclusive/india-plans-to-raise-health-spending-by-11-percent-in-budget-less-than-requested-idUSKBN1F711N>

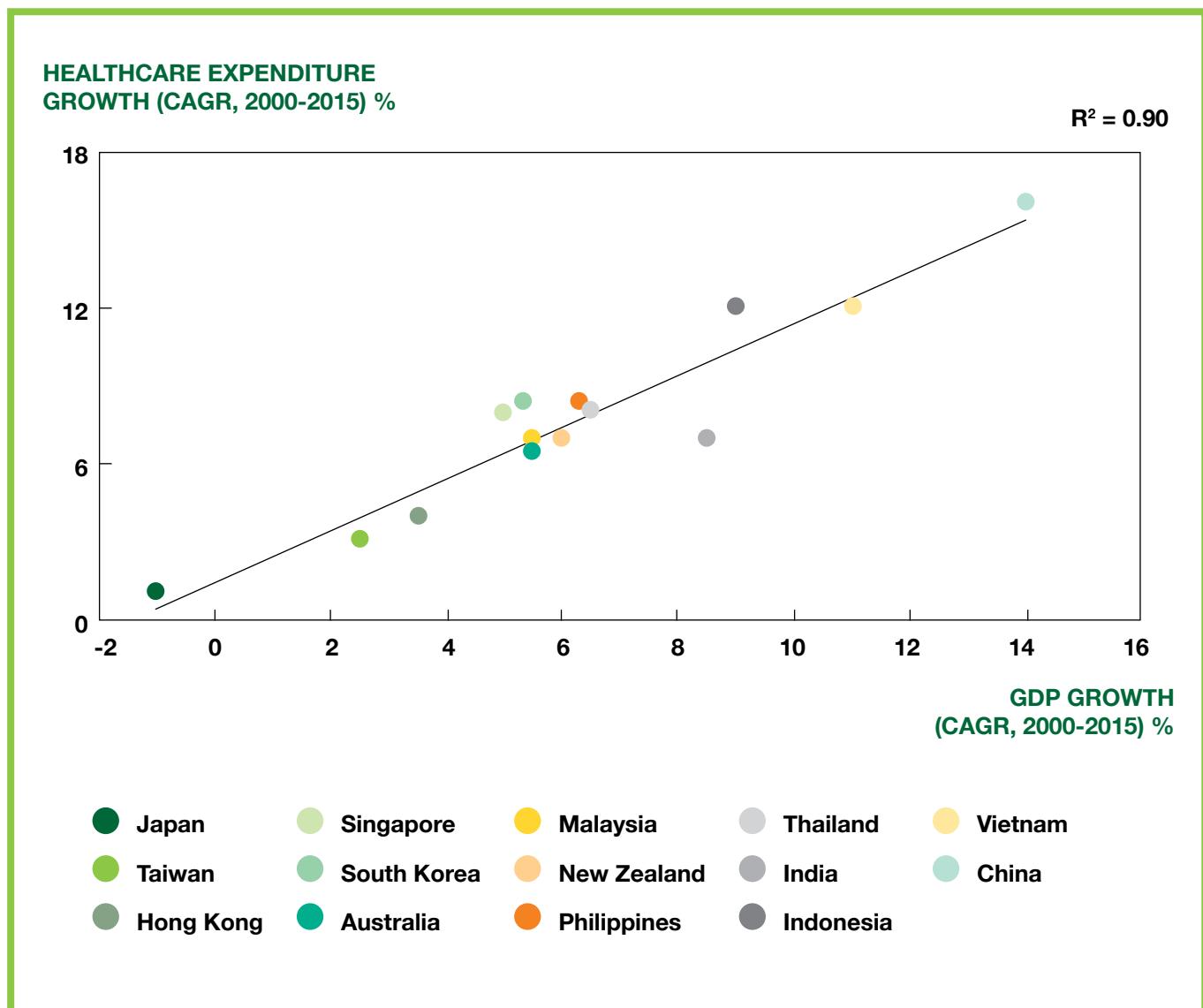
34. The Indian Express (2017), “Of India’s healthcare spend, 2/3 out of patients’ pockets: Study” Available at: <http://indianexpress.com/article/india/of-indias-healthcare-spend-23-out-of-patients-pockets-study/>

35. Figures presented using 2010 PPP dollars. Joseph L Dieleman et al (2016), “National spending on health by source for 184 countries between 2013 and 2040”. *The Lancet*. Available at: [http://www.thelancet.com/journals/lancet/article/PIS0140-6736\(16\)30167-2/abstract](http://www.thelancet.com/journals/lancet/article/PIS0140-6736(16)30167-2/abstract)

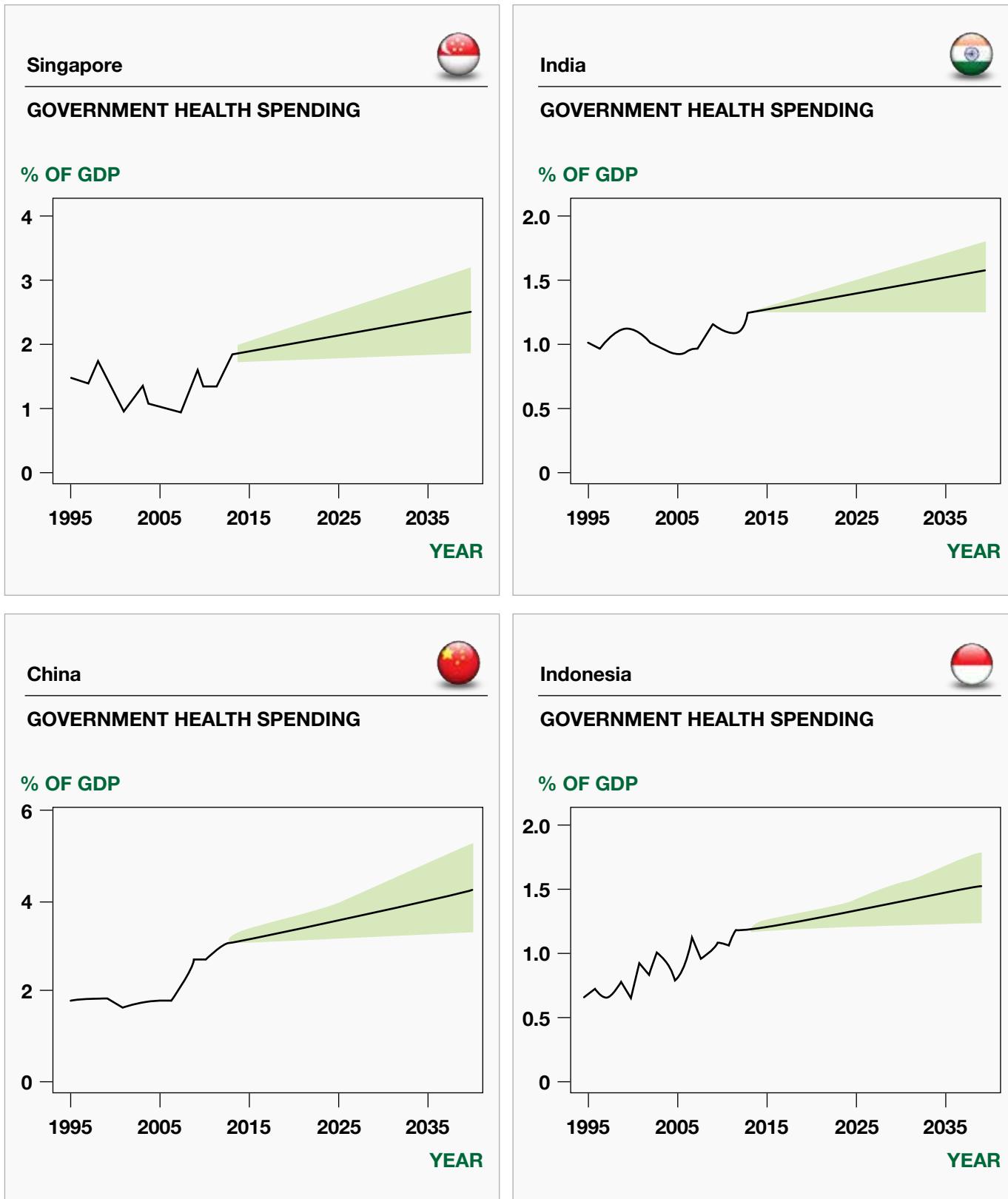
36. The Straits Times (2018), “Singapore Budget 2018: Spending needs to grow in healthcare, infrastructure, security and education”. Available at: <http://www.businesstimes.com.sg/government-economy/singapore-budget-2018/singapore-budget-2018-spending-needs-to-grow-in-healthcare>

EXHIBIT 4:

HEALTHCARE EXPENDITURE GROWTH OUTPACED GDP GROWTH IN NEARLY ALL MAJOR ASIA-PACIFIC ECONOMIES BETWEEN 2000-2015



SOURCE: ARPC analysis of EIU, WHO, BMI data (2015)

EXHIBIT 5:**GOVERNMENTS ARE LIKELY TO HAVE TO INCREASE THEIR SPENDING ON HEALTHCARE SIGNIFICANTLY IN THE FUTURE**

Note: The highlighted area in each graph can be considered the upper and lower bounds, based on the author's estimates.

SOURCE: Dieleman et.al. (2016)



Chapter 2:

A NEW APPROACH TO SHIFT FROM TREATMENT TO PREVENTION

Tackling the scale of healthcare challenges highlighted in Chapter 1 with the limited fiscal resources of governments and individuals will require a new approach. This chapter explores the policy levers available to governments to encourage a more prevention-led approach in healthcare.

THREE BROAD AREAS NEED TO BE ADDRESSED TO SHIFT FROM TREATMENT TO PREVENTION

Academic evidence shows that there are significant benefits in healthcare from switching from a focus on just treatment to also looking at prevention. For example, a World Bank study found that preventive measures – in the form of a global zoonotic diseases preparedness and control system – would have a high return on investment.³⁷ The study estimates that a US\$1.8 billion to US\$4.5 billion annual spending on prevention could yield a US\$30 billion to US\$60 billion in avoided cost annually.³⁸

There is also evidence that better management of NCDs in developing countries through low-cost interventions could reduce mortality by 3 million annually.³⁹ Such interventions are wide-ranging, including tax increases, health information warnings and advertisement bans for alcohol and tobacco; reduced salt, saturated fat and sugar content in food; early screening, counselling and multi-drug therapy for people with high risk of developing hereditary or environment-specific diseases; and media campaigns for improving lifestyle choices, diet and health check-ups.

LOW-COST INTERVENTIONS RELATED TO NCDS COULD **SAVE 3 MILLION LIVES ANNUALLY IN DEVELOPING COUNTRIES**

There are three areas that needed to be addressed to shift from a treatment to prevention approach in healthcare:

1. **Lifestyles:** From sedentary and unhealthy lifestyles (e.g. smoking) to active and healthy lifestyles.
2. **Nutrition:** Rethinking food intake, through exploring new sources of nutrition with greater health benefits (e.g. food fortification, functional foods, reformulated food, “free-from” foods).

37. Zoonotic diseases refer to those that were first prevalent in animals and then spread to humans.

38. World Bank (2012), *People, pathogens and our planet: the economics of one health*. Available at: <https://nam.edu/wp-content/uploads/2016/01/Neglected-Dimension-of-Global-Security.pdf> and Machalaba et. al (2017), *One Health Economics to confront disease threats*. Available at: <https://academic.oup.com/trstmh/article/111/6/235/4554987>

39. WHO and World Economic Forum (2011), *From Burden to “Best Buys”: Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries*. Available at: <http://apps.who.int/medicinedocs/documents/s18804en/s18804en.pdf>

40. We assess cost-effectiveness based on World Health Organisation definitions, which focuses on cost to save a disability-adjusted life year (DALY). Investing less than one times per capita GDP to save a disability-adjusted life year (DALY) is considered highly cost-effective, investing one to three times per capita GDP is cost-effective, and more than three times per capita GDP is not cost-effective.

41. Health promotion Board (2017), “New exercise campaign to encourage active living among seniors, including those with limited mobility”. Available at: <https://www.hpb.gov.sg/article/new-exercise-campaign-to-encourage-active-living-among-seniors-including-those-with-reduced-mobility> Stats on market penetration of gyms and fitness clubs: IHRSA (2017), THE IHRSA Global Report. Available at: <https://www.ihsra.org/publications/the-2017-ihsra-global-report>; and select data available at: <http://www.healthclubmanagement.co.uk/health-club-management-features/Findings-from-the-IHSRA-Global-Report-2017/31950>

3. **Detection:** Shifting towards early screenings of individuals to detect NCDs and enable cost-effective treatment before diseases become more advanced.

In each of these three areas, there is a range of policy-related levers that can support the shift to a prevention-led healthcare system which can be evaluated in terms of their cost-effectiveness (Exhibit 6).⁴⁰

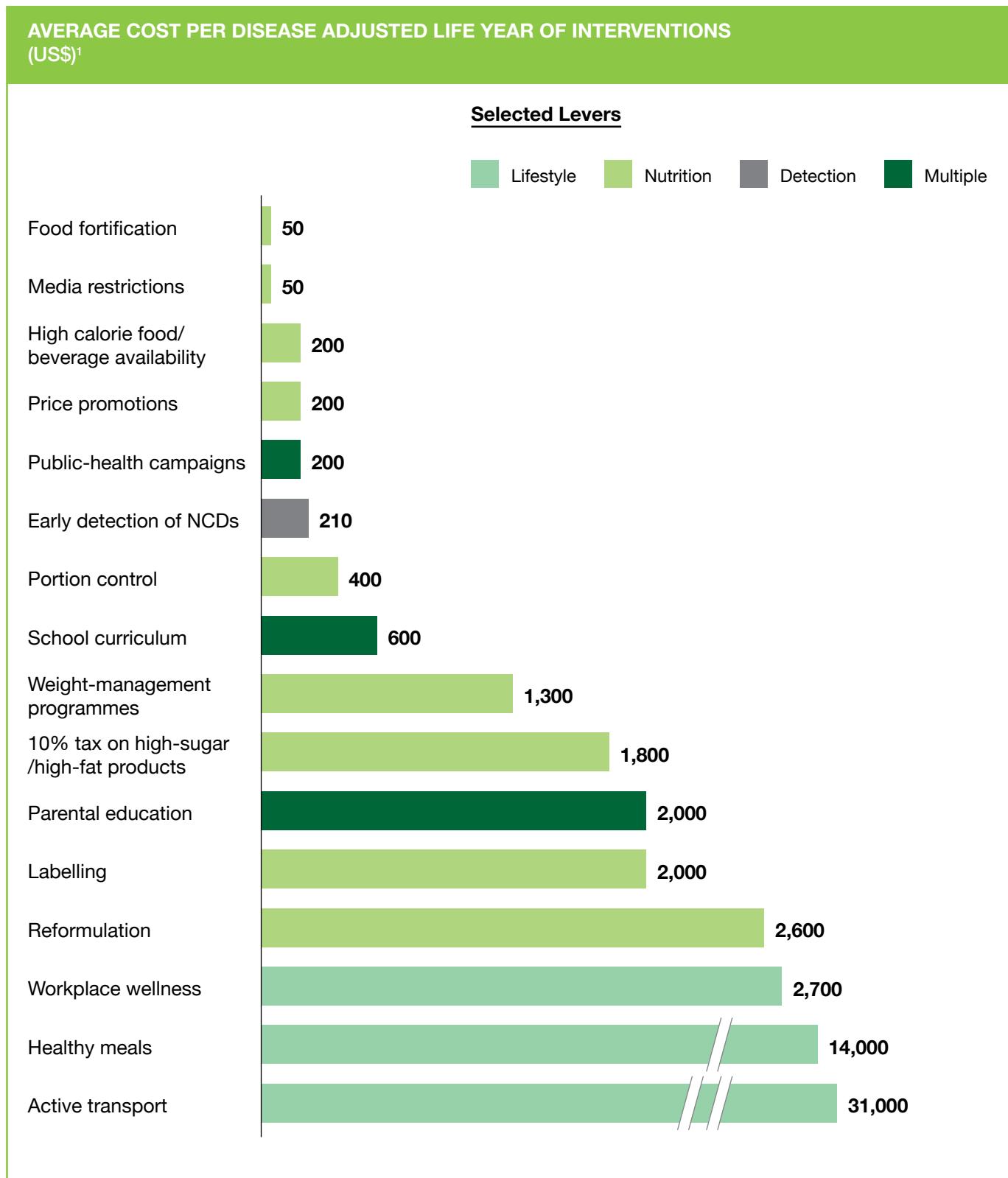
1. ACTIVE LIFESTYLES

This includes a range of levers, from encouraging citizens to engage in physical activity to broader lifestyle education. Examples include:

- **Government behavioural change programmes:** These can be effective in mobilising citizens to engage in physical activity, particularly the elderly. For instance, Singapore’s HPB promotes the “You Can Get Moving” programme under the National Seniors’ Health Programme to encourage those aged 50 and over to do seven home-based exercises twice a week to build strength, improve balance and flexibility, with video and poster messaging online and in open community gyms.⁴¹

MARKET PENETRATION OF GYMS AND FITNESS CLUBS IN CHINA AND INDIA IS BELOW 0.5 PERCENT, WHILE CLOSE TO 20 PERCENT IN THE US

- **Urban transport redesign:** Such plans discourage driving and encourage walking and cycling and can also be a significant driver of change. This

EXHIBIT 6:**MAJOR POLICY OPPORTUNITIES FOR TAKING A PREVENTION-LED APPROACH IN HEALTH**

¹. Impact and cost over lifetime of 2014 population; using World Health Organization methodology. Drawing on MGI Obesity report, with exception of "Food fortification" and "Early detection of NCDs", which come from WHO case studies.

could include making public transport services more frequent, reliable, convenient, and affordable; creating clear advantages over driving such as free Wi-Fi on public transport; making pleasant spaces for walking and cycling, and encouraging workplaces to provide appropriate shower and changing room facilities for those cycling or running to work. For instance, Singapore's Land Transport Authority (LTA) administers the Travel Smart Grant to incentivise commuters to use alternative modes of transport, by providing building developers and owners up to 80 percent or US\$60,000 for the cost of developing such facilities.⁴²

- **Lifestyle education:** Community engagement has proven to be a strong tool in encouraging healthy lifestyles, particularly when timed right. For instance, a trial in India called the Secondary Prevention of Coronary Events after Discharge (SPREAD) programme provided consultations with community health workers for discharged patients with acute cardiovascular problems. The goal was to identify strategies to overcome habits leading to such problems through calendar reminders, motivational messages, and contact information for local physicians. Studies showed that not only did participation in regular exercise rise to 89 percent versus the control group figure of 60 percent, adherence to advice on quitting smoking was at 85 percent versus the control group's 52 percent, and the same for alcohol consumption was 87 percent versus the control group's 46 percent.⁴³ These initiatives can be supported through financial incentives or disincentives to change behaviour. For example, a study by the WHO's Collaborating Centre for Tobacco and Economics at Beijing's University of International Business and Economics



TARGETED COMMUNITY HEALTH INTERVENTIONS INCREASED PARTICIPATION IN REGULAR EXERCISE BY 29 PERCENT IN INDIA

found that the 2015 tobacco reform in China led to a significant impact on cigarette consumption. The tax levied decreased cigarette sales by 2.4 percent between 2014 to 2015. This was the first decrease in consumption since 2001.⁴⁴

2. BETTER NUTRITION

A focus on healthier eating can tackle undernutrition, nutrient deficiency, and overweight and obesity problems. Undernutrition makes the body more susceptible to disease and causes preventable deaths from diarrhoea and pneumonia. 462 million adults worldwide are underweight; child undernutrition causes 45 percent of all deaths below the age of five, predominantly in low- and middle-income countries.⁴⁵ 36 million children under the age of five in Asia-Pacific are "wasting" with their lives in serious jeopardy.⁴⁶ Infant and maternal health are also significantly impacted by undernutrition, with the target to reduce maternal mortality ratio to less than 70 per 100,000 live births from the current 239 in developing countries.⁴⁷ At the same time, Asia faces the paradox of being impacted by both undernutrition and obesity issues, often in the same countries. Being overweight and obese is linked to heart disease, stroke, diabetes, and some cancers. Globally, 1.9 billion adults are overweight or obese, and over 20 million overweight children under the age of five live in Asia-Pacific.

There is a range of opportunities for governments to support better nutrition, ranging from parental and children education programmes to imposing restrictions or taxes on the sale of high-sugar, high-fat food. Examples include:

- **National nutrition plans:** China has introduced a national nutrition plan (2017-2030) which sets detailed goals for cutting anaemia, stunted growth, and obesity rates through developing nutritional standards under food safety regulation, research on ingredient intake and assessment of the local population, and training of community health professionals to promote healthy cooking and balanced catering.⁴⁸

42. The Straits Times (2017), "Keen to cycle to work? Here's good news".

Available at: <http://www.straitstimes.com/singapore/keen-to-cycle-to-work-heres-good-news>

43. Forbes (2018), "A Strategist's Perspective on Health Care Innovation in Asia".

Available at: <https://www.forbes.com/sites/leonardachan/2018/01/19/a-strategists-perspective-on-health-care-innovation-in-asia/#540141b8172d>

44. World Bank (2016), "Expanding the global tax base: taxing to promote public goods: tobacco taxes". Available at: <http://pubdocs.worldbank.org/en/799981480947591462/Taxing-to-Promote-Public-Goods-tobacco-taxation-chapter-conference-25-nov-2016-final-version-pmarquez-002.pdf>

45. WHO (2017), Malnutrition: Factsheet. Available at: <http://www.who.int/mediacentre/factsheets/malnutrition/en/>

46. "Wasting" refers to low weight-to-height and is a form of chronic undernutrition. See UNICEF / WHO / World Bank (2017), *Levels and trends in child malnutrition*. Available at: https://data.unicef.org/wp-content/uploads/2017/06/JME-2017_brochure_June-25.pdf

47. WHO (2016), Maternal mortality: Factsheet. Available at: <http://www.who.int/mediacentre/factsheets/fs348/en/>

48. The State Council, PRC (2017), "China issues national nutrition plan (2017-2030)".

Available at: http://english.gov.cn/policies/latest_releases/2017/07/13/content_281475725038850.htm

- **Regulatory requirements for packaging and labelling:** There is a range of government regulatory requirements that can support better nutrition. For instance, the Food Safety and Standards Authority of India (FSSAI) in India has moved to unify regulations on organic food certification, in a bid to standardise nutritional and labelling requirements.⁴⁹ Food Industry Asia has also advocated for harmonisation of nutritional labelling and packaging standards (both voluntary and mandatory) across ASEAN, in addition to increased voluntary information such as indicating products have high fibre content, reduced salt, etc.⁵⁰
- **School interventions to prevent child malnutrition:** This can take place in schools and through parental education. For instance, India's school lunch programme feeds millions of children, predominantly from families that cannot afford nutritious food at home.⁵¹ A school meals programme in Ho Chi Minh, Vietnam, managed to reduced incidence of obesity by over five percent (from 43.5 to 37.8 percent) after a six-month nutrition intervention.⁵²
- **Restricting access to high-calorie products:** Such restrictions could apply to a range of high sugar and fat content foods. An innovative approach is food zoning which controls the type of food sold in certain areas. For example, in January 2012, Malaysia's Ministry of Education and Ministry of Health announced new guidelines for food and beverages sold in school canteens, which thereafter had to display calorie contents.⁵³
- **Encouraging food servers to educate customers:** In Singapore, the HPB provides incentives for fast food workers to encourage customers to select healthier options.⁵⁴ The George Institute for Global Health has launched a mobile app called "FoodSwitch" which offers users options to switch to healthier versions of the food products they are looking for (e.g. foods with lower fat or energy content).⁵⁵
- **Imposing sugar taxes:** Sugar taxes have been proposed or implemented in many countries to tackle the consumption of high-sugar and high-fat food. Whilst the impact varies across geographies, and the taxes are still fairly nascent, so it is difficult to understand long-term effects on demand, there are signs that the consequences of sugar taxes could be significant. In Mexico for example, early studies indicate that after the introduction of a 10 percent sugar tax, annual sales of sodas declined 6 percent in 2014.⁵⁶

3. EARLY DETECTION

Early detection of disease not only greatly increases the chances for successful treatment, it also leads to significant healthcare cost savings compared to treating a disease in its later stages. For instance, the five-year survival rate for Stage I Colorectal Cancer (CRC) is 90 percent versus 10 percent for Stage IV; and Stage 1 can be treated with a minimally invasive endoscopy at a low cost whereas Stage IV would require multiple surgeries, chemotherapy, and radiation treatment to treat.⁵⁷

Regular health screenings are a cost-effective way for individuals and governments to increase the probability of early detection for critical illnesses such as heart disease, stroke, or cancer. The implementation of prevention, early

49. *The Economic Times* (2017), "Is the two-certification system harming India's organic food market?". Available at: <https://economictimes.indiatimes.com/industry/cons-products/food/is-the-two-certification-system-harming-indias-organic-food-market/articleshow/59826481.cms>

50. Food Industry Asia (n.d.). Case Study 1: Nutrition Labelling and Packaging Standards. Available at: <https://foodindustry.asia/documentdownload.aspx?documentresourceid=490>

51. PRI (2014), "India's school lunch programme may be imperfect, but it deserves credit for feeding millions".

Available at: <https://www.pri.org/stories/2014-07-16/indiass-school-lunch-program-may-be-imperfect-it-deserves-credit-feeding-millions>

52. The Economist Intelligence Unit (2017), "Tackling obesity in ASEAN Prevalence, impact, and guidance on interventions".

Available at: https://www.eiu.com/public/topical_report.aspx?campaignid=ObesityInASEAN

53. The Economist Intelligence Unit (2017), "Tackling obesity in ASEAN Prevalence, impact, and guidance on interventions".

Available at: https://www.eiu.com/public/topical_report.aspx?campaignid=ObesityInASEAN

54. Health Promotion Board (2017), "Healthier Dining Programme".

Available at: <https://www.hpb.gov.sg/healthy-living/food-beverage/healthier-dining-programme>

55. George Institute for Global Health (2015), *Food Reformulation: How to make it happen.*

Available at: <https://www.georgeinstitute.org/projects/foodswitch>

56. M Arantxa Colchero et al (2016), "Beverage purchases from stores in Mexico under the excise tax on sugar sweetened beverages: observational study", *BMJ*. Available at: <https://www.bmjjournals.org/content/352/bmj.h6704>

57. Kaiku Health (2018), "Value of early detection in healthcare". Available at: <https://kaikuhealth.com/value-early-detection-healthcare/>

INVESTMENT OF US\$11.4 BILLION IN CANCER PREVENTION COULD RESULT IN US\$100 BILLION SAVINGS IN DEVELOPING COUNTRIES

detection and treatment strategies taken together at a global level could save over US\$400 billion annually, as well as save up to 3.7 million lives.⁵⁸ It has been further estimated that with an investment of US\$11.4 billion in prevention strategies in developing countries, there can be savings of up to US\$100 billion in future treatment expenditure. Early detection of CRC is estimated to potentially result in gross savings of around US\$370 million in the United Kingdom alone, assuming the avoidance of 22,000 new cases per year and savings of around US\$14,000 per case.⁵⁹ A similar study from China on the cost-effectiveness of different CRC screening protocols showed that the cost per life saved in the lowest cost scenario would be around US\$1,200, which is significantly below costs for treatment.⁶⁰ Other estimates from the US conservatively forecast cost savings from early cancer diagnosis across a broad range of cancers to be US\$26 billion annually.⁶¹ It is important to adjust to country context when evaluating these savings estimates – the US, for instance, is reported to have the world's highest costs for healthcare services.⁶² High-income reasons continue to spend between 5 to 10 times more on cancer control per capita than in low- and middle-income countries.⁶³

Policy levers include:

- **Public-sponsored health screening:** Such programmes can have a significant impact on early detection of both communicable and non-communicable diseases. The WHO recommends mass screening interventions where disease incidence is high, effectiveness has been demonstrated (such as for breast and cervical cancer), resources (personnel, equipment, etc.) are sufficient to cover the majority of the target group and facilities are available for follow up and treatment.⁶⁴ For instance, the Indian government launched a national cancer screening plan in November 2016 in 100 pilot districts for people over the age of 30, with a key focus on early detection for breast, uterine cervix, and oral cavity cancers.⁶⁵ Singapore also subsidises health screening for its citizens – those aged 40 and older can be tested for common conditions for as little as US\$4.⁶⁶
- **Comprehensive national insurance with community engagement:** National insurance can help cover a country's most impoverished and vulnerable communities. Support from the community and peer-group helpers is key in ensuring success. Indonesia's former minister for health, Ms. Nafsiah Mboi, highlights the comprehensive nature of the national health insurance scheme where the government covers over 86 million people – including the value chain from prevention, promotion, treatment, and rehabilitation. The system relies heavily on "caters" – volunteers with religious organisations who find at-risk cases (e.g. for tuberculosis) in vulnerable communities and take patients through this value chain.⁶⁷

58. ASCO (2015), *Investing in Cancer Prevention and Control to Reduce Global Economic Burden*. Available at: <https://am.asco.org/investing-cancer-prevention-and-control-reduce-global-economic-burden>

59. The author assumes 40,000 new cases per year and per case annual spending of GBP10,200 as per data from the National Health Service (NHS). If we assume costs of early detection to include prices for one colonoscopy (US\$500) and one stool test (US\$5) to be US\$505, total costs of prevention would be US\$11.1 million, and net savings close to US\$360 million. This estimate is based on simple assumptions provided by the author and are not to convey precision. See Kaiku Health (2018), "Value of early detection in healthcare". Available at: <https://kaikuhealth.com/value-early-detection-healthcare/>

60. Huang et. al. (2014), *Cost-effectiveness of colorectal cancer screening protocols in urban Chinese populations*. Available at: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0109150>

61. Kakushadze et. al. (2017), *Estimating cost savings from early cancer diagnosis*. Available at: <https://arxiv.org/ftp/arxiv/papers/1709/1709.01484.pdf>

62. Figures presented using 2010 PPP dollars. Joseph L Dieleman et al (2016), "National spending on health by source for 184 countries between 2013 and 2040". *The Lancet*. Available at: [http://www.thelancet.com/journals/lancet/article/PIS0140-6736\(16\)30167-2/abstract](http://www.thelancet.com/journals/lancet/article/PIS0140-6736(16)30167-2/abstract)

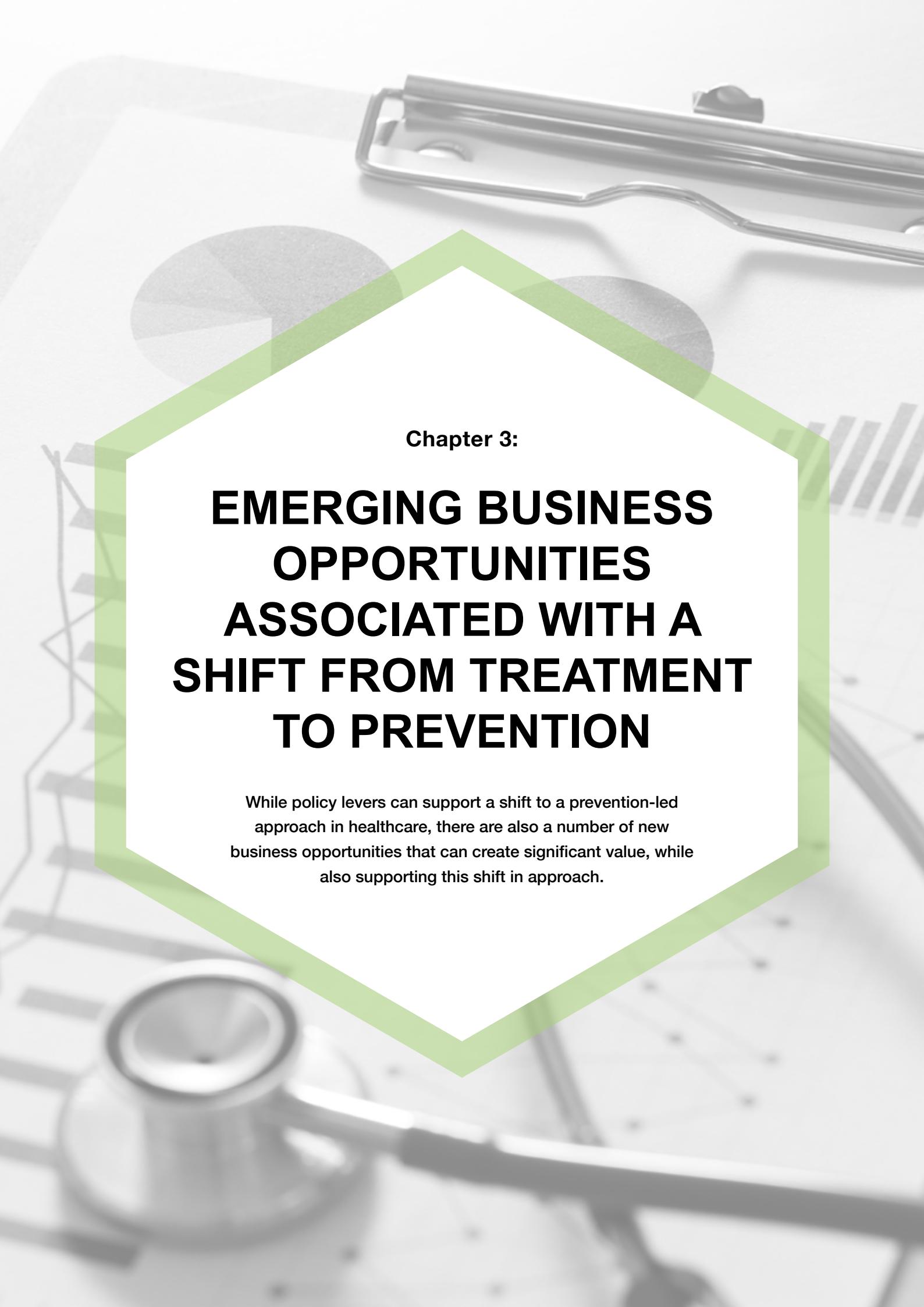
63. ASCO (2015), *Investing in Cancer Prevention and Control to Reduce Global Economic Burden*. Available at: <https://am.asco.org/investing-cancer-prevention-and-control-reduce-global-economic-burden>

64. WHO (2018), *Early detection of cancer*. Available at: <http://www.who.int/cancer/detection/en/>

65. BMJ (2016), "India launches pan for national cancer screening programme". Available at: <https://www.bmjjournals.org/content/355/bmj.i5574.long>

66. The Straits Times (2017), "Singaporeans to benefit from subsidised health screening". Available at: <http://www.straitstimes.com/singapore/health/singaporeans-to-benefit-from-subsidised-health-screening>

67. Euractiv (2016), "As EU scraps aid, Indonesia introduces health insurance for the poor". Available at: <https://www.euractiv.com/section/development-policy/news/as-eu-scaps-aid-indonesia-introduces-health-insurance-for-the-poor/>



Chapter 3:

EMERGING BUSINESS OPPORTUNITIES ASSOCIATED WITH A SHIFT FROM TREATMENT TO PREVENTION

While policy levers can support a shift to a prevention-led approach in healthcare, there are also a number of new business opportunities that can create significant value, while also supporting this shift in approach.

BUSINESS OPPORTUNITIES ASSOCIATED WITH A SHIFT IN FOCUS TOWARDS PREVENTION IN HEALTHCARE COULD BE SIGNIFICANT IN ASIA

Exhibit 7 provides data on the estimated business value of different opportunities in each of the three broad areas of lifestyles, nutrition, and detection (Exhibit 7).

1. ACTIVE LIFESTYLES

This includes gym and fitness services, tobacco control products (such as nicotine replacement), as well as new insurance models encouraging healthier living (in return for reduced premiums). Specific opportunities include:

- **Gym and fitness services.** The desire for healthier lifestyles and better management of NCDs could lead to increasing use of gyms, and personal fitness equipment and technology. As governments and private insurers invest more in prevention to stem the rising costs of treating NCDs, gyms, and fitness centres are likely to benefit from subsidies and incentives. The health and fitness club industry alone is currently worth around US\$83 billion globally as of 2016, with over 162 million members and 200,000 centres.⁶⁸ The value of the market in Asia-Pacific in 2016 was US\$14.5 billion. The market is still relatively nascent and fragmented with no one brand taking a large share of the market. In the US alone, there are over 36,000 fitness clubs and market penetration is still below 20 percent with 57.2 million members.⁶⁹ The largest growth opportunities are in Asia, where penetration is well below 10 percent, and lower than 0.5 percent in key markets like India (1 million members) and China (3.9 million members). In terms of number of centres per 100,000 persons in 2016, India had 0.3, China had 0.19, Indonesia had 0.67 and Singapore had 6.1.⁷⁰ As populations urbanise, lower activity levels and changing diets are driving faster growth of obesity – and an emerging interest in exercise and sport. For instance, a recent study revealed that 58 percent of consumers in urban Indonesia reported a desire to exercise more in 2017.⁷¹ There are some innovative models emerging within this broader opportunity space, including:

- i. **Mini-gyms:** Traditional gyms and fitness centres have large space requirements, which can be difficult to obtain in increasingly land-scarce urban centres. Mini-gyms are a business model that has begun to gain popularity in China and use a fraction of the space that traditional gyms use. For instance, ParkBox runs 24-hour gyms in three sizes – 8, 18 and 28 square metres in Shanghai and Hangzhou.⁷² Each of these gyms is equipped with one treadmill, a set of dumbbells, and AI-driven coaching systems. Mini-gyms are a viable business model, given that larger gyms face increasing costs, competition, and declining capacity usage.



MINI-GYMS IN CHINA CIRCUMVENT LAND SCARCITY AND CHARGE AS LITTLE AS US\$1 PER HOUR OF USAGE

- ii. **On-demand offerings:** An American chain, Exhale, has begun exploring the viability of on-demand video platforms that live-stream workout classes in partnership with a startup called Forte Fitness. This enables users to access trained instruction without having to pay for equipment and keep their schedules flexible. Other gyms in Asia are shifting to 24-hour access models, with no permanent staff.
- iii. **Virtual reality offerings:** Fitness centres have begun experimenting with connected equipment to encourage users to engage in exercise. For instance, Singapore-based Pure Fitness has an “Innovation Lab” at a local branch – where users can test out Virtual Reality (VR) goggles connected to treadmills and exercise bicycles to immerse in interactive exercise-based games such as racing through the streets of Hong Kong.⁷³

68. See data tables for Health & Fitness Clubs – Statistics and Facts, available at: <https://www.statista.com/topics/1141/health-and-fitness-clubs/>

69. IHRSA (2017), THE IHRSA Global Report. Available at: <https://www.ihsra.org/publications/the-2017-ihsra-global-report/>; and select data available at: <http://www.healthclubmanagement.co.uk/health-club-management-features/Findings-from-the-IHSRA-Global-Report-2017/31950>

70. See data tables for Number of health/fitness clubs in the Asia-Pacific region in 2016, by country, available at: <https://www.statista.com/statistics/308861/health-club-number-in-asia-pacific-countries/>

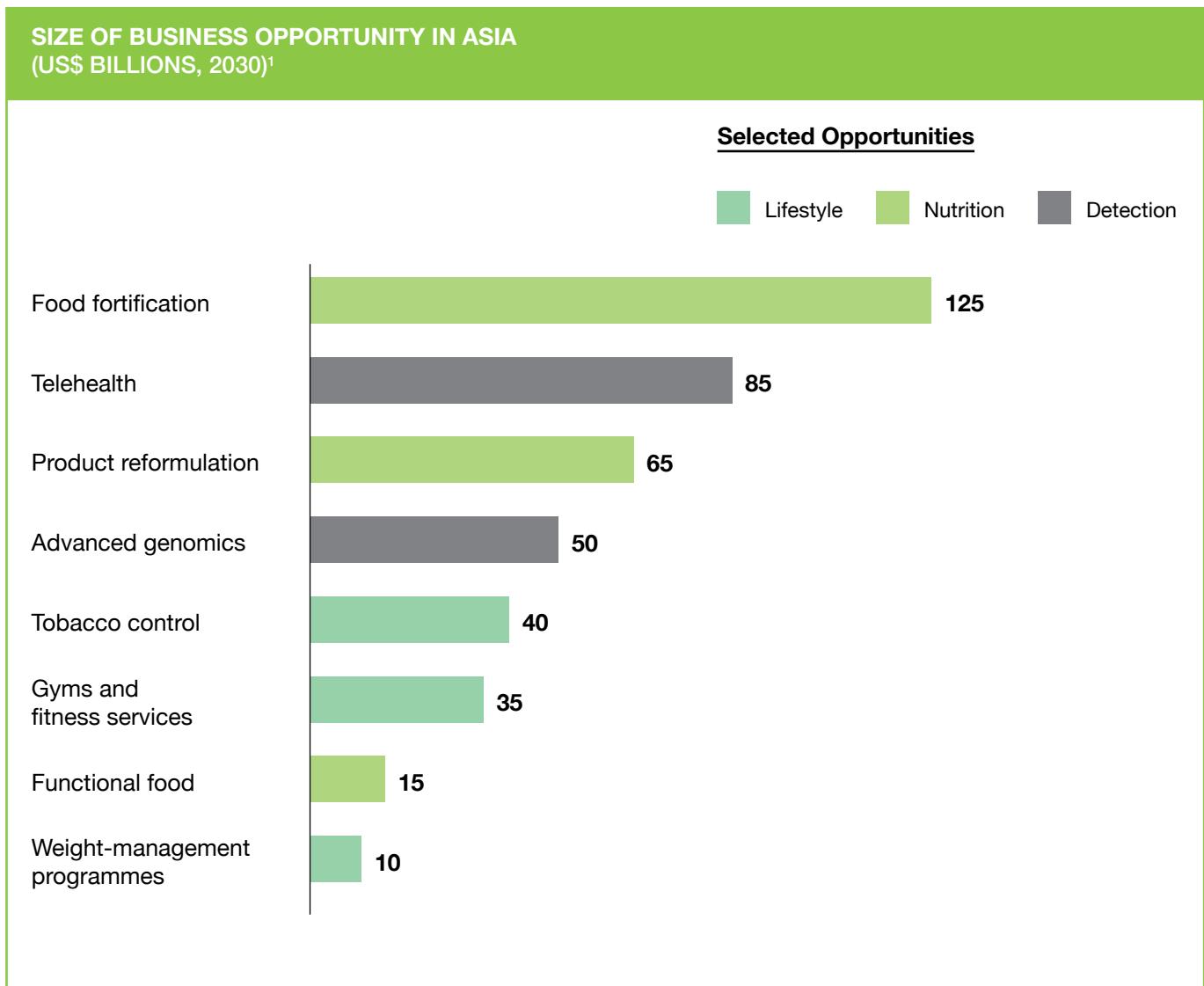
71. Mintel (2017), “75 percent of Indonesian consumers aim to have a healthier diet in 2017” Available at: <http://www.mintel.com/press-centre/social-and-lifestyle/healthy-lifestyles-growing-focus-for-southeast-asians>

72. Straits Times (2018), “China’s fitness buffs big on tiny gyms that are always open”. Available at: <http://www.straitstimes.com/asia/east-asia/chinas-fitness-buffs-big-on-tiny-gyms-that-are-always-open>

73. Channel News Asia (2017), “Motivating people to workout: do exercise innovations work?”. Available at: <https://www.channelnewsasia.com/news/health/motivating-people-to-workout-do-exercise-innovations-work-9429660>

EXHIBIT 7:

THERE ARE A RANGE OF BUSINESS OPPORTUNITIES ASSOCIATED WITH ACTIVE LIFESTYLES, BETTER NUTRITION, AND EARLY DETECTION



1. Business & Sustainable Development Commission (BSDC) methodology based on estimated savings or projected market sizings in each area for Asia in 2030 (relative to a "business-as-usual" scenario). Only the high case opportunity is shown here. Rounded to nearest US\$5 billion. Food fortification and functional food opportunities are based on current market sizing reports and 2030 market estimates based on forecasted CAGRs of each opportunity from analyst reports (relative to a business-as-usual scenario based on overall growth in food demand).

SOURCE: BSDC; Market reports; AlphaBeta analysis



- **New insurance models.** To help to manage healthcare costs, health-insurance companies are creating a range of new programmes focused on prevention, including online lifestyle assessments with cash incentives, telephone counselling and screenings offered within the workplace.⁷⁴ New medical insurance pricing models could also encourage healthier lifestyles. For example, the AIA Vitality Programme offers rewards to its customers such as cashback of up to 25 percent on “Healthy Food” items and up to 33 percent discounts on a range of fitness devices such as Fitbit that help them achieve their health goals.⁷⁵ Another example of an innovative insurance model which could encourage more focus on prevention is Friendsurance. It developed the first peer-to-peer insurance model worldwide, which rewards customers with a claims-free bonus if there are no insurance claims.
- **Tobacco control products.** 80 percent of the world’s 1.1 billion smokers live in low- and middle-income countries.⁷⁶ Many of these smokers are in Asia. For example, Indonesia has the highest male smoking percentage in Asia at 76 percent, and the annual cost of treating tobacco-related diseases in the country is estimated to be 0.29 percent of GDP.⁷⁷ There are sizable business opportunities associated with tobacco control. For example, the current global market size for nicotine replacement products is estimated at US\$7 billion.⁷⁸

Nicotine replacement therapy has been shown to increase the chance of quitting by 50 to 70 percent.⁷⁹ Products such as patches, chewing gum, and nasal sprays, combined with counselling, are already popular cessation strategies in the developed world. Accessing this opportunity will require continued product innovation, including drug development, and the education of consumers about the utility of nicotine replacement therapy and other tobacco control interventions.

74. Healthcare News (2013), “Promoting Good Health – Insurance Companies Put Increasing Emphasis on Wellness”.

Available at: <https://healthcarenews.com/promoting-good-health-insurance-companies-put-increasing-emphasis-on-wellness/>

75. Strait Times (2017), “Staying healthy can be a rewarding exercise”.

Available at: <http://www.straitstimes.com/singapore/health/every-step-counts-for-vitality-members>

76. WHO (2018), Factsheet: Tobacco. Available at: <http://www.who.int/mediacentre/factsheets/fs339/en/>

77. The Nation (2017), “Asia’s Smoking Addiction”. Available at: <http://www.nationmultimedia.com/detail/breakingnews/30325358>

78. AlphaBeta and the Business & Sustainable Development Commission (2017), Valuing the SDG prize: Unlocking business opportunities to accelerate sustainable and inclusive growth. Available at: <http://businesscommission.org/our-work/valuing-the-sdg-prize-unlocking-business-opportunities-to-accelerate-sustainable-and-inclusive-growth>

79. Cochrane Tobacco Addiction Group (2012), Nicotine replacement therapy for smoking cessation.

Available at: <http://cochranelibrary-wiley.com/doi/10.1002/14651858.CD000146.pub4/pdf/>

2. BETTER NUTRITION

- **Low-cost food fortification programmes.** The global estimated market size for food fortification has grown from US\$35 million in 2010 to US\$58 billion in 2015, with a 10.5 percent annualised growth rate.⁸⁰ Evidence from India shows that fortifying staple foods such as salt (with iodine), pearl millet (with iron) and wheat (with zinc) can help meet up to 80 percent of daily micronutrient needs.⁸¹ Studies from Pakistan also show that if the costs of fortified foods are passed on to consumers, it would constitute a lower than 1 percent increase in retail prices.⁸² The FSSAI has indicated that many companies have expressed interest in developing large-scale food fortification programmes due to the competitive cost structure and the perceived benefits.⁸³ Organisations such as HarvestPlus support farmers and consumers in India to adapt to fortified food production and learn about benefits in consumption.⁸⁴

FORTIFIED FOODS CAN RETAIL AT LESS THAN 1 PERCENT HIGHER PRICES THAN NON-FORTIFIED FOODS

- **Reformulated products.** The global reformulated food market is estimated to be between US\$72 billion to US\$85 billion in 2015.⁸⁵ Food companies can pursue product reformulation, introduce healthier options, and help educate consumers. For instance, McDonald's has recently revealed that it is removing artificial preservatives from some food items; and introducing new menu items that have lower sugar

content (e.g. buns that do not contain high fructose corn syrup).⁸⁶ Despite the potential for higher costs and prices for consumers, this model could be scaled to growing mid-tier cities as evidence shows that consumers are almost exactly as price inelastic for fast food with healthy ingredients as for “junk” food.⁸⁷ Coca-Cola has introduced the Balance Calories Initiative (BCI) in the US together with industry partners PepsiCo and Dr. Pepper Snapple Group to reduce beverage calories from sugar consumption per capita by 20 percent by 2025, through low- and no-sugar recipes, smaller volume products, prime product positioning for healthier products, bundling with healthy foods, and shopper communication at key touchpoints.⁸⁸

Companies such as Nutrition Innovation are using less intensive and more efficient refining processes to produce Nucane – a less processed, healthier, and low GI industrial sugar that can be substituted into any recipe and used by brands worldwide in their sugar replacement strategies.⁸⁹

Companies such as Alchemy Foodtech are producing rice-shaped grain called FibreGrain that lowers glycaemic index (GI) when added to traditional rice in small quantities.⁹⁰ Commercial scaling of such technology could improve excess GI intake in rice-dependent Asian societies.

- **Functional foods.** Functional foods are processed foods containing ingredients that aid specific bodily functions and support nutrient intakes in addition to meeting basic nutritional needs.⁹¹ They are essentially foods that have been heavily fortified and enhanced to provide substantial health benefits.⁹² This includes

80. Research Nester (2017), “Fortified Food Market: Global Demand Analysis & Opportunity Outlook 2021”.

Available at: <https://www.researchnester.com/reports/fortified-food-market-global-demand-analysis-opportunity-outlook-2021/53>

81. Harvest Plus (2015), India Country Brief. Available at: http://www.harvestplus.org/sites/default/files/HarvestPlus_CountryBrief_India_0.pdf

82. USAID and GAIN (2017), “Study on the fortification of wheat flour (atta) and edible oil in Pakistan”.

Available at: <http://www.gainhealth.org/wp-content/uploads/2014/07/Pakistan-FF-Costing-Report-Final-from-kg-and-jg-9-May-2017-3.pdf>

83. Money Control (2016), “Big food companies keen on food fortification: FSSAI”.

Available at: <https://www.moneycontrol.com/news/trends/current-affairs-trends/big-food-companies-keen-on-food-fortification-fssai-929492.html>

84. Harvest Plus (2015), India Country Brief. Available at: http://www.harvestplus.org/sites/default/files/HarvestPlus_CountryBrief_India_0.pdf

85. Sustainable Asset Management AG (2012), Healthy Living: Obesity – A Heavy Burden.

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CHAPTER 3: EMERGING BUSINESS OPPORTUNITIES ASSOCIATED WITH A SHIFT FROM TREATMENT TO PREVENTION

- food products containing probiotics, prebiotics, plant stanols, and folic acid. In Japan, some brands are Suntory-owned Brand's Essence of Chicken (which is the market leader in broths with more than US\$600 million in sales and presence in 19 countries), Yakult Honsha, and Meiji Group.⁹³ There will be rising demand for functional foods as the ageing population increases across the world. Furthermore, as more people are educated on the nutritional benefits of specific food ingredients such as turmeric, there will be new demand and markets for companies to enter. Functional foods have also been gaining traction in China, with high consumption of products containing probiotics in Beijing, as well as rapid growth in consumption of traditional Chinese cooling herbs in Guangzhou, and tonic herbs in Chengdu.⁹⁴ The interest in these products is partly being driven by married couples and households with children. Market research estimates that the market value for functional food is worth US\$44 billion in 2015.⁹⁵
- **Weight management programmes.** As the prevalence and social cost of obesity increase rapidly, the demand for provision of weight-management programmes, involving goal setting, counselling, and tracking, should also increase. At present, the industry is still small. To grow, it will need to educate consumers about the benefits of weight-management programmes and develop innovative products that better harness technology. For example, Nestle is piloting its "Nutritional Health Concept", a web-app based tool to create personalised weight management programmes for individuals.⁹⁶

3. EARLY DETECTION

A range of new business models are being developed to support early detection, drawing on telehealth technologies, as well as advanced genomics:

- **Telehealth.** A range of telehealth applications has supported low-cost and easier access to diagnostic services. These include:
 - i. **Consumer-focused applications (apps):** For example, Ping An Good Doctor, backed by insurance giant Ping An, is reported to have 77 million registered app users and 50,000 doctors on its medical service platform in China.⁹⁷ The app provides a full suite of services including free diagnostics, internet consultation, an appointment booking service and an online pharmacist and health store.⁹⁸ Another example is Baidu, which in 2016 launched a chatbot online that was pre-programmed onto their doctor app, which enabled customers to describe their symptoms, receive a preliminary diagnosis and obtain advice on next steps.⁹⁹
 - ii. **Technology-enablement of healthcare workers:** This can help significantly increase the rate of early detection, particularly in rural areas, and help to offset some of the manpower constraints in Asian countries. This includes the use of portable devices and cloud-based apps to improve patient diagnosis, treatment, and management. For example, GE has experimented with mobile ultrasounds, operated by trained midwives, to improve prenatal care in rural areas in Southeast Asia.¹⁰⁰ GE's Research

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98. South China Morning Post (2016), "Medical services app Ping An Good Doctor raises US\$500m".

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Centre in India has developed scanners and portable electrocardiograms.¹⁰¹

- iii. **Self-monitoring technology to collect vital patient data:** Such technology enables patients to track their vital signs on their own and reduces the need to visit healthcare facilities for regular check-ups. For instance, NTUC Income Insurance in Singapore lends mobile tablets, digital blood pressure monitors, and scales to patients that have recently been hospitalised for heart conditions.¹⁰² Nurses and doctors are able to monitor signs of danger effectively while simultaneously reducing the cost of care.
- iv. **Fall prevention technology:** In Singapore, an elderly person visited an emergency room



**LARGELY PREVENTABLE FALLS COST
US\$31 BILLION IN MEDICARE
FUNDING FOR THE ELDERLY IN 2014
IN THE UNITED STATES**

every 32 minutes in 2014 due to an injury from preventable falls.¹⁰³ In the US, during the same year, Americans over the age of 65 experienced a total of 19 million falls which cost an estimated US\$31 billion in annual Medicare costs.¹⁰⁴ Fall prevention technology takes advantage of motion sensors and video analytics technology that monitors at-risk people and their environments, particularly elders, and sends alerts to first

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responders when there is an increased risk of falling. This is particularly useful given capacity constraints in elder care in community centres and old age homes. For instance, Nokia's Bell Labs is trialling an app that leverages this technology in Singapore together with St. Luke's Eldercare.¹⁰⁵

- **Advanced genomics.** Genomic research has significant potential to transform healthcare delivery, including in the early detection of genetic risks for non-communicable and rare diseases. In Southeast Asia, over 45 million people, 9 percent of the region's total population, suffer from rare diseases.¹⁰⁶ 80 percent of rare diseases have a genetic component, according to research from the UK.¹⁰⁷ Advanced

genomics could detect those affected before they have symptoms and trigger mitigating treatment. Next-generation sequencing can allow entire DNA profiles to be created for citizens before they show symptoms. The business models in this area range from conducting diagnostic tests (especially for rare genetic disorders) to using genetic information for lifestyle management. This can take the form of integrated personal health planning to help users take preventive steps to protect their health or manage the effects of certain ailments better. An example in the diagnostic market is Prenetics, a Hong Kong-based startup which provides DNA tests which cost less than US\$500 per patient, generate results within 48 hours and deliver results via a mobile app.¹⁰⁸

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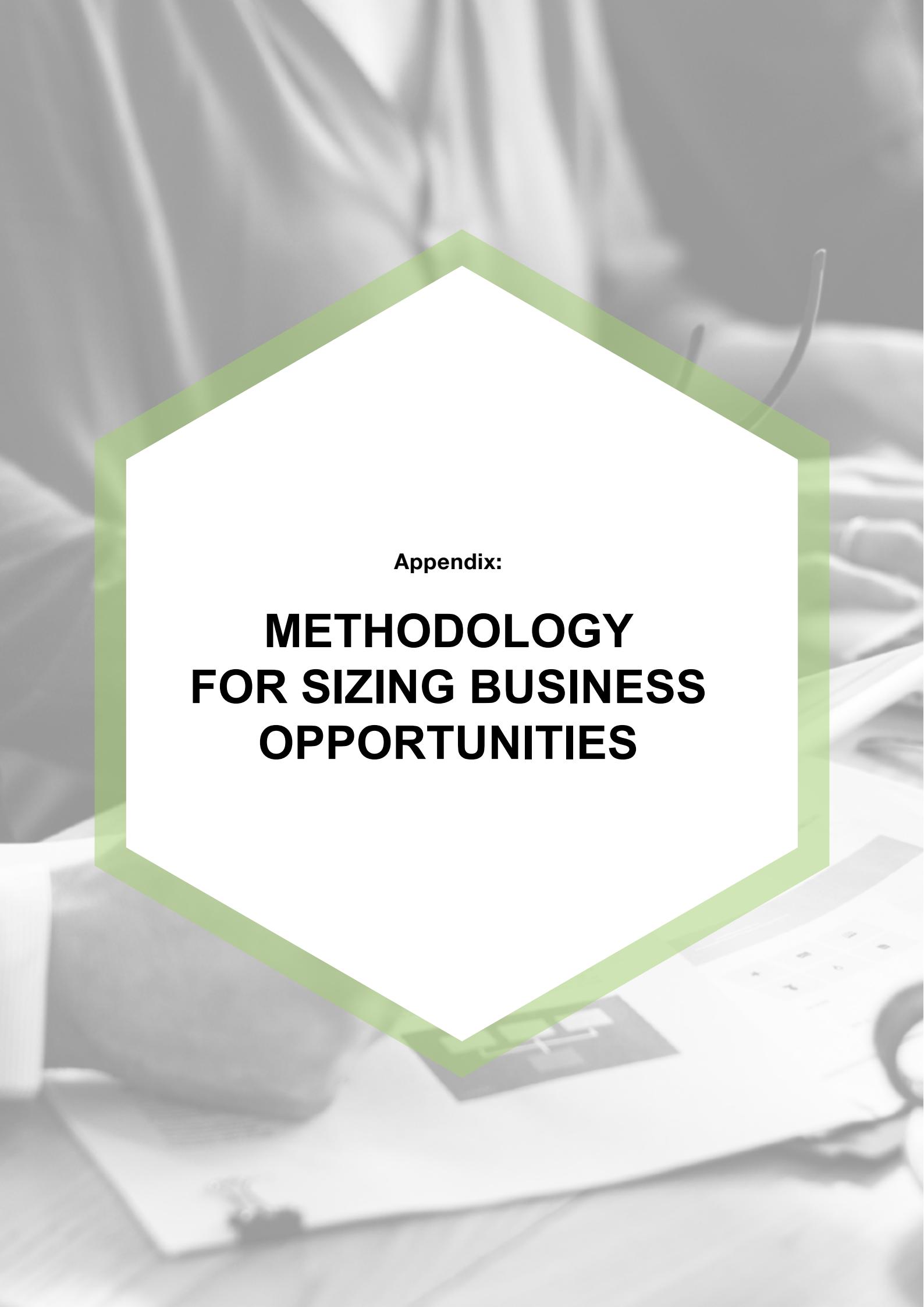
Available at: <https://ojs.biomedcentral.com/track/pdf/10.1186/s13023-016-0460-9>

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Appendix:

METHODOLOGY FOR SIZING BUSINESS OPPORTUNITIES

The dollar value of each opportunity represents the incremental annual value over “business-as-usual” (BAU) in 2030. Some of these estimates are taken from the Business & Sustainable Development Commission (BSDC) research on Asia, while others have been estimated based on market research reports. The detailed assumptions and sources for each opportunity are provided below.¹⁰⁹

DESCRIPTION	SIZING ASSUMPTIONS	SOURCES
FOOD FORTIFICATION (US\$125 BILLION IN ASIA)		
Opportunities related to food fortification to support nutrient intakes and address health concerns	<p>BAU: Estimated market size of US\$57.7 billion in 2015. We assume that the market today grows at the average rate of global food demand of 1.5 percent annually, resulting in a US\$72 billion market in 2030.</p> <p>High-side: We assume that the global fortified food market grows at a CAGR of 10.5 percent till 2030 (as forecasted by Research Nester), implying a market size of US\$257.8 billion.</p> <p>Regional breakdown: We consider the population living under the poverty line of US\$1.25 in each country to create country-level estimates as fortified foods are more prevalent in these locations.</p>	Research Nester ¹¹⁰
TELEHEALTH (US\$85 BILLION IN ASIA)		
Increasing use of internet and mobile technologies for medical consultations	<p>BAU: Goldman Sachs estimates that in the near term, telehealth could save the US healthcare system US\$104 billion annually. Scaled globally based on the US's share of global healthcare expenditure (39 percent), this is assumed to be achievable in 2020. This is grown to 2030 based on historical healthcare expenditure growth.</p> <p>High-side: The savings opportunity is instead grown based on various near-term forecasts for the CAGR of telemedicine utilising research from Grand View Research and Zion Research.</p> <p>Regional breakdown: This opportunity is split based on WHO share of total health spending.</p>	Goldman Sachs IoT in US Healthcare ¹¹¹ Grand View ¹¹² Zion ¹¹³

109. Business & Sustainable Development Commission (2017), *Better Business, Better World Asia*. Available at: <http://report.businesscommission.org/reports/better-business-better-world-asia>

110. Research Nester (2010), *Fortified food market global demand analysis opportunity outlook 2021*. Available at: <https://www.researchnester.com/reports/fortified-food-market-global-demand-analysis-opportunity-outlook-2021/53>

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113. Zion Research (2016). *Telemedicine market 2014-2020*. Available at: <http://www.marketresearchstore.com/news/global-telemedicine-market-set-for-rapid-growth-to-118>

DESCRIPTION	SIZING ASSUMPTIONS	SOURCES
PRODUCT REFORMULATION (US\$65 BILLION IN ASIA)		
Decreasing incidence of obesity by amending the composition of foods so they are healthier (e.g., sugar-free varieties)	<p>BAU: The reformulated food market, estimated by Sustainable Asset Management (SAM) to be worth US\$60 billion in 2009, grows at the lower end of the estimated 3 to 6 percent rate range, implying a US\$112 billion value in 2030.</p> <p>High-side: The global market is worth US\$204 billion, growing at the higher end of SAM's estimated range at 6 percent.</p> <p>Regional breakdown: We use the country's share of regional 2030 forecasted GDP estimates.</p>	Healthy Living, SAM AG ¹¹⁴ World Development Index ¹¹⁵
ADVANCED GENOMICS (US\$50 BILLION IN ASIA)		
Better diagnostic and treatment options based on the study of individual genetic patterns	<p>BAU: The 2020 market size of the advanced genomics industry (including diagnostics and personalised drugs) is estimated at US\$103 billion. We assume this grows to 2030 at the forecasted global GDP growth rate.</p> <p>High-side: We assume instead that the market grows at the high-end of forecasted CAGR levels estimated in market reports (11 percent).</p> <p>Regional breakdown: We split this based on the 2030 share of global GDP.</p>	KellySciPub ¹¹⁶ GrandView Research ¹¹⁷
TOBACCO CONTROL (US\$40 BILLION IN ASIA)		
Providing better access to nicotine replacement therapy and other tobacco control products	<p>BAU: The current market size for nicotine replacement products is estimated at US\$7 billion. We assume this grows to 2030 at the forecasted global GDP growth rate.</p> <p>High-side: We assume instead that the market grows at the high-end of forecasted CAGR levels estimated in market reports (18 percent).</p> <p>Regional breakdown: We split this opportunity using population statistics and the share of low and middle-income countries.</p>	WHO Tobacco Control ¹¹⁸ WHO Global Health ¹¹⁹ Transparency Market Research ¹²⁰ Grand View Research ¹²¹

114. Sustainable Asset Management AG (2012). *Healthy Living: Obesity – A Heavy Burden*. Available at: <http://docplayer.net/27548858-Healthy-living-obesity-a-heavy-burden.html>

115. World Bank (2016), "GDP growth". Available at: <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>

116. KellySciPub (2015), Personalised Medicine, Targeted Therapeutics and Companion Diagnostic Market to 2019.

Available at: <https://www.prnewswire.com/news-releases/personalized-medicine-targeted-therapeutics-and-companion-diagnostic-market-to-2019---strategic-analysis-of-industry-trends-technologies-participants-and-environment-300114875.html>

117. Grand View Research (2014), Genomics Market Analysis By Product, By Application, By Technology, And Segment Forecasts to 2020.

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118. WHO (2016), Tobacco Control. Available at: http://www.paho.org/hq/index.php?option=com_content&view=article&id=11965%3A2016-regional-report-tobacco-control&catid=1279%3Atobacco-control-publications&Itemid=1188&lang=fr

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Available at: <https://www.transparencymarketresearch.com/pressrelease/smoking-cessation-nicotine-de-addiction-products-market.htm>

DESCRIPTION	SIZING ASSUMPTIONS	SOURCES
ACTIVITY SERVICES – GYMS AND FITNESS CLUBS (US\$35 BILLION IN ASIA)		
Increasing penetration of gyms and fitness clubs	<p>BAU: Statista reports that the global health club market has grown from US\$67 billion in 2009 to US\$81 billion in 2015, an implied CAGR of 3 percent. Assume this continues to 2030.</p> <p>High-side: SAM forecasts potential growth in this market of up to 8 percent. Assume this higher growth rate is possible from 2015 to 2030.</p> <p>Regional breakdown: We consider the share of global obesity burden to obtain the regional breakdown.</p>	Statista ¹²² SAM AG ¹²³
FUNCTIONAL FOOD (US\$15 BILLION IN ASIA)		
Opportunities related to functional foods	<p>BAU: We apply the annualised food demand growth rate of 1.5 percent to the functional food market estimate by Sustainable Asset Management AG, resulting in a value of US\$49 billion in 2030.</p> <p>High-side: We apply a CAGR of 7 percent (forecasted by SAM AG) to obtain US\$120 billion in 2030.</p> <p>Regional breakdown: The regional breakdown is based on the share of people in the global consuming class by region in 2009 (according to OECD definitions), as these opportunities tend to be more relevant for higher income regions. For country breakdowns (within regions), we use the country's share of regional 2030 forecasted GDP estimates.</p>	SAM AG ¹²⁴ OECD ¹²⁵
WEIGHT MANAGEMENT PROGRAMS (US\$10 BILLION IN ASIA)		
Expansion of weight management programs to address growing prevalence of obesity	<p>BAU: No specific intervention occurs.</p> <p>High-side: In the UK, McKinsey Global Institute (MGI) forecasts that weight management programmes could save 967,000 DALYs annually, at an average cost of US\$1300 per DALY. This equates to a total intervention cost of US\$1.3 billion. Assume this is scaled based on UK's share of global obesity costs (4 percent) and grown to 2030 based on forecasted annual growth in obese populations worldwide (1.5 percent, from Kelly et al.).</p> <p>Regional breakdown: We consider the share of global obesity burden to obtain the regional breakdown.</p>	MGI Obesity Report ¹²⁶ Kelly et al. ¹²⁷

122. See charts for Market Size of Global Health Club Industry on Statista.

Available at: <https://www.statista.com/statistics/275035/global-market-size-of-the-health-club-industry/>

123. Sustainable Asset Management AG (2012). *Healthy Living: Obesity – A Heavy Burden*.

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125. OECD Development Centre (2010), *The Emerging Middle Class in Developing Countries*. Available at: <https://www.oecd.org/dev/44457738.pdf>

126. McKinsey Global Institute (2014). *Overcoming obesity: An initial economic analysis*.

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127. Kelly et. al. (2008). *Global burden of obesity in 2005 and projections to 2030*. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/18607383>

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