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Infectious and non-communicable diseases in Asia-Pacific: The need for integrated healthcare

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About this report

Infectious and non-communicable diseases in Asia-Pacific: The need for integrated healthcare is an Economist Impact report that is sponsored by Roche. The paper analyses the current state of policy and practice regarding infectious and non-communicable diseases in the Asia-Pacific region and advocates ways to better ensure that infectious and non-communicable diseases are tackled synergistically, given their linkages. The report brings together findings from a literature review, expert panel meetings, and interviews with health system officials, scientific leaders and policymakers. We would like to thank the following individuals who have generously contributed their views and insights (listed alphabetically):

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The views of interviewees are their own, and not necessarily those of their affiliated institutions.

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Executive summary

The Asia region, home to more than half of the world's population, bears much of the global infectious disease (ID) burden, especially in poorer countries.[1, 2] Alongside the continuing threat of prevalent infections like tuberculosis (TB), HIV, malaria, hepatitis and diarrhoeal diseases, the region is also witnessing a rise in non-communicable diseases (NCDs) as a result of ageing populations and lifestyle changes.[3, 4]

Changes to socioeconomic status in the Asia-Pacific region—all five of the countries covered in this report have become wealthier over the previous 30 years—increasing air pollution, population expansion and ageing have altered the distribution of the disease burden, with NCDs rising in prevalence alongside a still-high ID burden.[5, 6]

Infectious and non-communicable diseases represent distinct categories, but in reality, they are not separate. IDs can lead to chronic diseases, while NCDs can increase susceptibility to infections; for example, a bi-directional relationship exists between TB and diabetes, individuals with chronic kidney disease are more likely to die from respiratory tract infections, and infectious diseases such as HIV (and its treatment) can predispose individuals to cardiovascular disease, diabetes and various cancers.[7-9] Yet health systems, policies and funding streams are often siloed, and the impact of NCDs has been underestimated in the global discourse on health in developing countries.

A growing appreciation for the interconnectedness of IDs and NCDs is driving attempts to integrate health services, invest in innovative approaches and dismantle the existing silos between them.[7] Changing population and disease dynamics across the region, coupled with the increasing awareness of the importance of integrated care models, presents a potential paradigm shift in disease management. This report endeavours to identify the key challenges and success stories in the breaking down of divisions between these two sets of diseases, and presents recommendations for a more cohesive health system.

This report covers five study countries in the Asia-Pacific region (China, Indonesia, South Korea, Thailand and Vietnam). The country selection is designed to generate a representative sample of the region across parameters such as income level, population size, disease prevalence and so on. The selected countries span the World Health

Organization (WHO) South East and Western Pacific regions. Drawing from a wide-ranging interview programme, the report outlines the state of IDs in each country, the degree to which IDs and NCDs are linked, and the opportunities for more integrated planning. It analyses key data on the epidemiology and impact of, in particular, diarrhoeal diseases, lower respiratory tract infections, TB, HIV, hepatitis B virus and NCDs.

Key findings include:

- **Infectious and non-communicable diseases are dynamically linked, and both pose major challenges across Asia, yet they are often not managed in an integrated way.** Southeast Asia accounted for 43% and the Western Pacific for 18% of the global burden of TB in 2020.[10] The Western Pacific region has the largest burden of chronic hepatitis B globally, accounting for about 39% of all cases in 2019.[11] Simultaneously, NCD deaths are rising, and the highest number of deaths globally due to NCDs occur in the Western Pacific (followed by Southeast Asia).[4] Factors constraining better integration include bifurcated funding streams and organisational silos, and lack of awareness among both the public and healthcare workers about the linkages between IDs and NCDs.
- **Covid-19 could provide a turning point in public health strategy as the interactions between infectious and non-communicable diseases become more apparent to citizens and healthcare communities.** The pandemic has accelerated innovation that could aid more integrated planning, notably telemedicine consultation and digital health tools, and led to a more health-informed public that is aware of the risks of common conditions like such as obesity and high blood pressure. The crisis has shown the powerful role of community organisations as allies in the fight for public health. Examples include collaborations between health authorities, hospitals, community workers and volunteers in Thailand that have enabled NCD care to continue throughout the pandemic.[12] These could play a larger social role in the future in promoting public awareness of linkages between IDs and NCDs, tackling stigma that may prevent people seeking access to health services and providing information to empower citizens.
- **Screening programmes are a high-return intervention to detect IDs with NCD implications.** Relevant programmes include those screening women with HIV for cervical cancer, bi-directional TB and diabetes screening, and surveillance for liver cancer in patients with chronic hepatitis and cirrhosis.[13-15] Experts that we interviewed highlighted distinct areas for increasing the implementation of effective multi-disease screening approaches. This has become more important as health systems brace for a potential rise in NCD diagnoses or progression among people who may not have sought medical support during the worst phases of the covid-19 pandemic.[16]
- **Health stakeholders can improve the integration of ID and NCD management through investments in data, capacity-building, technology and public education.** Data is a powerful tool with which to reveal the costs of NCDs resulting from curable IDs and provide the evidence base for investment in preventive measures such as screening. Improving public awareness about the linkages between IDs and NCDs could ensure that patients take action sooner. Building primary care capacity to better identify related conditions (such as

TB and diabetes, HIV and cervical cancer, and lung infections and long-term chronic lung conditions) would ensure integrated diagnosis and treatment services in the long term. International donors could also explore ways to reduce the financial and technical silos that still exist between IDs and NCDs. Innovative financial instruments—such as social-impact bonds—could also be developed and refined, while greater investment in human capital relative to health infrastructure could greatly improve the quality of health services by empowering more staff with the necessary medical expertise to support citizens impacted by NCDs linked to IDs.[17]

As Asian countries look to a post-covid future, the lessons of the pandemic—from positive signals about the speed at which policies, technologies and medicines can be deployed to challenges such as social determinants of health risks—must be applied. In doing so, stakeholders in the healthcare sector can achieve synergies, tackle multiple conditions more efficiently, and help the region to overcome its historical ID burden and avoid or forestall the new and serious chronic conditions that risk replacing them.

Chapter 1.
Epidemiology: The status of infectious diseases in Asia

1.1 Burden of diseases: Episodic and long term

Asia, home to 60% of the world's population, bears much of the global ID burden.[2, 18] Although there has been significant global progress towards the elimination of IDs—covid-19 notwithstanding—the diseases analysed in this report continue to impact populations and healthcare systems on the continent.

Episodic disease

Infective diarrhoea can be triggered by a range of viral, bacterial and parasitic organisms.[19] In 2017, the death rates from diarrhoeal diseases in the countries in this report ranged from 0.54 per 100,000 in China to 46.02 per 100,000 in Indonesia.[20] Lower respiratory tract infections, defined as pneumonia or bronchiolitis, are mostly caused by bacteria but viruses such as influenza also play an important role.[21] As of 2019, lower respiratory tract infections were the fourth-highest cause of death globally.[22] In 2017, death rates due to influenza were about 0.8 per 100,000 individuals in China and 3 per 100,000 in Thailand.[23]

Longer-term infectious diseases

Tuberculosis

Forty-three percent of all global cases of TB occur in Southeast Asia, and 18% in the Western Pacific.[32] TB is unevenly distributed in the region, with South Korea and China showing lower incidence rates—59 per 100,000 people and 58 per 100,000 respectively—in comparison to Indonesia's rate of 312 per 100,000.[32] China shoulders approximately 10% of the global burden of multidrug-resistant TB.[33] As well as mortality, TB contributes to severe levels of morbidity—in 2019, disability-adjusted life-years (DALYs) lost to TB ranged from 37 per 100,000 population in South Korea to 4,985 per 100,000 in Indonesia.[34]

HIV/AIDS

HIV impairs immune system function and can progress to AIDS. In 2020, 3.7m people in Southeast Asia were living with HIV and 2.2m were receiving treatment for the virus. Approximately 100,000 new infections occurred, with 82,000 deaths. New infection rates were stable but mortality had declined compared to 2019.[35]

Hepatitis B

Hepatitis B virus infects the liver and leads to both acute and chronic liver diseases. Globally, 296m people are estimated to have chronic hepatitis B infection, of which 116m live in the Western Pacific and 18m in Southeast Asia. About 820,000 deaths were linked to chronic hepatitis B in 2019, most of which were attributable to the development of cirrhosis or liver cancer.[11]

Influenza – a growing challenge

Influenza (flu), a respiratory virus belonging to the Orthomyxoviridae family of viruses, is transmitted swiftly through droplets, typically causes seasonal epidemics and has the greatest impact on the elderly, immunocompromised or pregnant people, as well as those with chronic diseases.[24] Complications that can arise as a result of severe cases of flu include superimposed bacterial pneumonias and worsening of underlying chronic lung and heart conditions.[25] The World Health Organization (WHO) estimates that the virus infects 1bn people globally and causes between 290,000 and 650,000 deaths every year.[26] Southeast Asia has the second-highest influenza-related mortality rate globally, at 3.5-9.2 per 100,000 individuals.[27]

There have been significant achievements in flu prevention, control and preparedness. The Pandemic Influenza Preparedness (PIP) Framework for the sharing of influenza viruses and access to vaccines and other benefits provides key global guidance to WHO member states. The PIP Framework strengthens global pandemic influenza surveillance and response through private-sector industry contributions, benefiting low- and middle-income countries (LMICs) by increasing access to technologies and strengthening countries' capacities.[28] Other major initiatives include improved epidemiological surveillance through the Global Influenza Surveillance and Response System, the development of the Global Action Plan for Influenza Vaccines to help to reduce shortages and inequitable access of vaccines, and the establishment of the WHO Health Emergencies Programme to coordinate international responses to contain disease outbreaks.[29-31] Yet, there are ongoing challenges, such as lack of capacity to detect and test for novel viruses in some countries; lack of robust epidemiological data (especially in LMICs); and inconsistent use of non-pharmaceutical interventions (such as hand washing or facemask use), antiviral drugs and other treatments.[10, 26]

1.2 Infectious diseases and non-communicable diseases as comorbidities

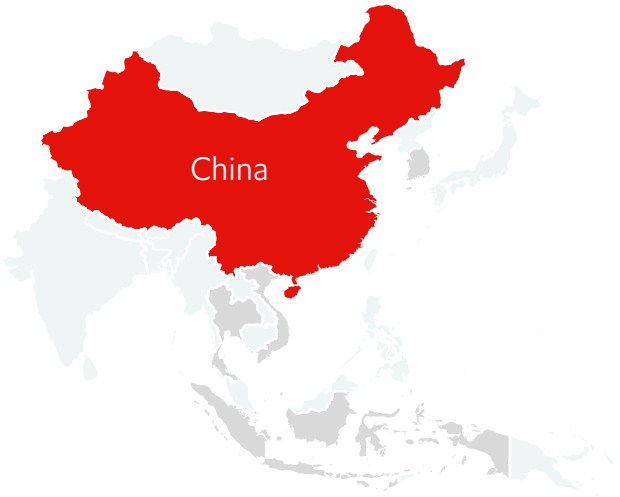
IDs are not just important in and of themselves. They are also dynamically linked to NCDs. Bi-directional relationships mean that people with pre-existing conditions are more vulnerable to some IDs, and IDs can increase the risk of individuals developing NCDs. This intersection of infectious and non-communicable diseases is often underestimated and requires integrated healthcare planning and policy.

Pneumonia, for instance, increases the risk of lung cancer by an estimated 43%.[36] Co-morbidities, such as cancers, in turn, increase the risk of mortality due to pneumonia.[37] In those with existing chronic kidney disease, the risk of death from a respiratory tract infection is almost doubled.[8] Diarrhoeal infections are a major cause of malnutrition and stunting in children, and poor nutrition is a risk factor for NCDs such as cardiovascular disease, metabolic disease and diabetes later in life.[38]

Among longer-term infections, similar interactions are evident. Hepatitis B virus is the leading cause of liver cirrhosis and cancer in the Asia-Pacific region.[39] Of patients with a history of TB, 50-70% develop chronic lung disease and the risk of lung cancer is increased sixfold.[7] In addition, treatments for lung cancer can reactivate TB.[40] The acute and chronic inflammation triggered by TB is also believed to contribute to the development of cardiovascular disease.[41] A previous Economist Impact analysis, the Index of Cancer Preparedness, highlighted that 23% of cancers that occur in less-developed geographical regions do so as a result of IDs, including parasitic infections.[42]

Both HIV infection itself and its treatment increase the risk of NCDs such as cardiovascular disease, certain cancers, diabetes and depression. Such risk is further compounded by lifestyle factors.[43] Experts interviewed for this report point to the challenge posed by these relationships for a region that is simultaneously struggling with IDs and a rising NCD burden. "NCDs and HIV are often seen as two different worlds, whereas at a clinical level we are starting to see increasing NCDs in people living with HIV," says Adeeba Kamarulzaman, dean of the Faculty of Medicine and professor of medicine and infectious diseases at the University of Malaya in Kuala Lumpur. "Programmatically, because of the numbers, NCDs in many countries in Asia are now seen as requiring a far greater priority than HIV/AIDS."

1.3 Country snapshots



Infectious diseases in China – an overview

Country profile

4,699

Number of deaths from diarrhoeal diseases in 2017 in children aged 0-4 years old.[44] Despite water and sanitation interventions consistently being a strategic part of each of China's five-year development plans, the burden remains high.

Number of lower respiratory tract infections in 2017.[45] A high prevalence of COPD and bronchiectasis can increase the risk of acute infections, leading to negative outcomes.[46]

500,341

63 per 100,000

China's TB incidence rate puts the country among the top 20 worldwide for TB burden.[47]

0.1% adult HIV prevalence[48]

The HIV/AIDS epidemic in China has shifted from primarily affecting injecting drug users and female sex workers to men who have sex with men.[49] Testing and treatment are free, but stigma continues to hinder testing.[49, 50]

95%

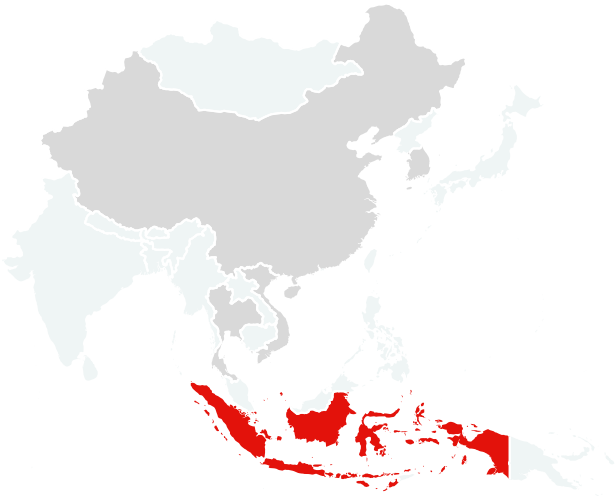
Coverage of China's child hepatitis B vaccination programme.[51] Nonetheless, China has the world's largest burden of hepatitis B infections, with around 70m cases.[51]

Percentage of deaths that NCDs account for.[52] Over 40% are due to cardiovascular disease and 23% are caused by cancer.[52]

89%

Overview of China's health system

- Health has been an important focus of the Chinese government in recent years, with large-scale reforms such as universal health care (UHC).[53] Public health and prevention, in particular, have received renewed attention following the 2003 SARS epidemic.[54]
- China has a strong information system infrastructure, which plays an important role in guiding policy decisions. After SARS, the country established the world's largest internet-based reporting system of ID epidemics for the country's 37 notifiable diseases.[3,4]
- China extended coverage of basic medical insurance from 29.7% in 2003 to 95.7% in 2011, with a view to achieving 100% coverage by 2020.[53]
- Despite attempts at decentralisation of administration, the central government remains the leading force in policymaking.[53] This has allowed China to deliver public health programmes at scale, with a focus on areas and population groups most at need. In particular, the government has played an important role in coordinating programme funding from donors targeting the same disease area.[50, 55]
- China's healthcare system is heavily reliant on hospital-based care and lacks an effective primary healthcare system.[56]
- Owing to the sheer size of China's geography and population, there are large variations in infection rates, health services, treatment and outcomes across regions. The divide has been found to be even greater between urban and rural populations.[53]
- China's economic development has generated an important internal migrant population. Migration has negatively affected access to services and the continuum of care.[57-59]
- Despite the expansion of UHC in China, out-of-pocket payments still represented 34% of total health expenditure in 2012.[53] The hospital fee-for-service model is also creating negative incentives for unnecessary procedures. [53, 60, 61]
- The government is also engaged in various efforts to reform the medical insurance system and has introduced diagnosis-related, group-based payments in various cities around the country.[62]



Infectious diseases in Indonesia – an overview

Country profile

7,750 Number of deaths from diarrhoeal diseases in 2017 in children aged 0-4 years old.[44]

4% Mortality from pneumonia in under-5-year-olds in 2017.[45] Lower respiratory tract infections affected 444,000 people in 2017.[45]

319 per 100,000 TB incidence rate puts Indonesia among the top 20 countries worldwide.[47] Many private clinics that are not linked to the national TB control programme are not prescribing within this guideline.[62]

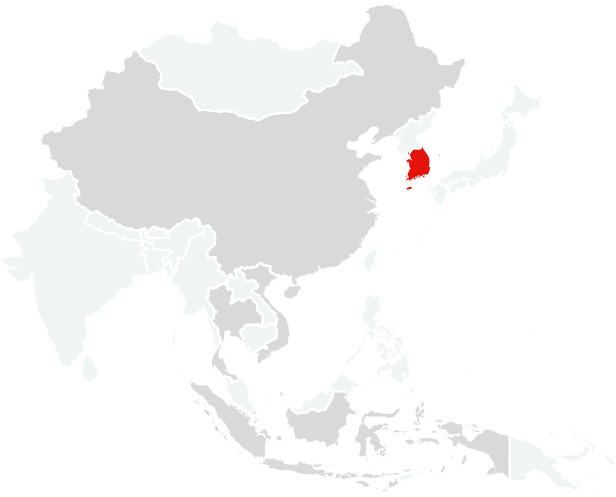
48,000 cases per year[63]
Indonesia is experiencing the fastest growing HIV epidemic in Southeast Asia.[63] Low public awareness and condom use, stigma and opposition from religious organisations, and counselling and testing for pregnant women that requires husbands' approval has hindered national programmes.[64]

19m People currently live with hepatitis B virus in Indonesia.[65] Childhood vaccination commenced in 2013, but there is a large variation in coverage.[65]

73% Percentage of deaths accounted for by NCDs, a third of which are due to cardiovascular disease.[52] Seventy-six percent of men smoke and over 10m people have type 2 diabetes, putting Indonesia into the global top 10 for prevalence.[52]

Overview of Indonesia's health system

- Indonesia introduced a novel national health insurance scheme in 2014, the Jaminan Kesehatan Nasional. By 2019 the scheme covered 77% of the population, making it the largest single-payer scheme in the world.[63]
- A defining characteristic of the Indonesian health system is decentralisation, owing to the complexity and diversity of the country's population and geography. Decentralisation has allowed flexibility in local health policies but also hindered the implementation of cohesive national plans.[63] Collection and monitoring of health data are weakened by decentralisation and multiple separate reporting systems.[66]
- The health workforce is currently insufficient. The health worker/population ratio remained static between 2004 and 2015, meeting less than 50% of the intended goal. Geographical distribution is also not aligned with population needs, with the workforce concentrated in urban centres.[63]
- Indonesia's health expenditure stands at less than 3% of GDP, which is the lowest among LMICs in Southeast Asia.[63] This has impacted the capability to deliver ambitious programmes. Despite the implementation of UHC, the government only covered 39% of total health expenditures in 2015, while out-of-pocket expenses covered almost 47% of total health expenditure.[66] The focus of government investment has also been on curative services rather than public health and prevention.[66]
- The availability of medicines and medical equipment is a major challenge for remote, underserved areas. Stronger management and procurement systems are needed.[67]



Infectious diseases in South Korea – an overview

Country profile

8

Number of deaths from diarrhoeal diseases in 2017 in children aged 0-4 years old.[44] Diarrhoeal disease prevalence is low, reflecting a higher standard of living conditions compared with other countries in Asia Pacific.

17,326 LRTI cases in 2017[45]

The prevalence of lower respiratory tract infections is comparatively low.[45] However, it has increased in the past ten years to become the fifth leading cause of death, possibly linked to the smoking rate in men of 40%.[68, 69]

77 TB cases per 100,000 in 2016[70]

South Korea is the most TB-affected OECD country.[70] The elderly are particularly affected, making up 42% of all cases and 82% of TB-related deaths.[70] TB treatment is now fully paid for by the national health insurance system.[70]

14,880 total cases in 2015[71]

HIV prevalence has remained relatively low. The government has shifted its early focus on mass mandatory testing and compulsory treatment to voluntary and anonymous testing and ensuring better access to free treatment.[72]

<1%

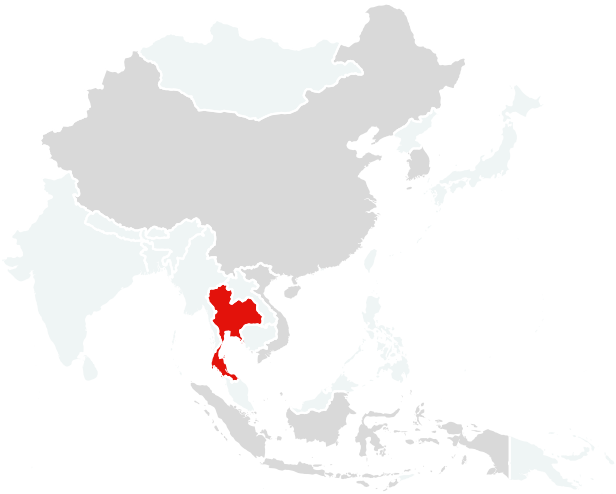
The 2020 interim goal of children infected with hepatitis B under 5 was met. Nationwide vaccine coverage since 1995 means that South Korea is on target to meet the WHO SDG to eliminate hepatitis B by 2030.[73]

84%

Percentage of deaths that NCDs account for.[52] NCD burden is boosted by physical inactivity, high blood pressure and the fact that 40% of men smoke. Rising levels of obesity and diabetes are also of concern.[52]

Overview of South Korea's health system

- South Korea achieved UHC in 1989. National Health Insurance (NHI) covers 97% of the population and the remaining is covered by Medical Aid for the low-income population.[68] Purchasing decisions on health services to be covered by the NHI are centralised.[74]
- NHI requires co-payments for covered services, which are capped. Insured services, which typically involve new technologies and medicines, require high out-of-pocket payments and are an increasing concern.[68]
- Health expenditure has increased rapidly, from 3.7% of GDP in 1995 to 7.4% of GDP in 2011. The share of government expenditure increased by 36% in this time, while out-of-pocket payments decreased from 52% to 35%.[68]
- Population ageing and the associated rise in NCDs have been at the forefront of Korea's health policy and funding decisions, with limited attention paid to infectious diseases.[70, 75] As a result, public interest and understanding of ID remain limited.[70]
- Human resources for health have increased in response to the growing demand for healthcare due to UHC implementation and population ageing. Nonetheless, the health worker/population ratio is still below the OECD average and is concentrated in large metropolitan areas.[68]



Infectious diseases in Thailand – an overview

Country profile

174
Number of deaths from diarrhoeal diseases in 2017 in children aged 0-4 years old.[44] The prevalence of diarrhoeal diseases remains high despite efforts to improve water and sanitation.

131,790
Number of lower respiratory tract infections in 2017.[45] Lower respiratory tract infections remain a public health concern.

Top 30
With an estimated 14.6m infected, Thailand ranks among the 30 countries globally with the highest prevalence of both TB and HIV-associated TB.[76] Only 20% of cases of DR-TB and MDR-TB are detected and treated.[77]

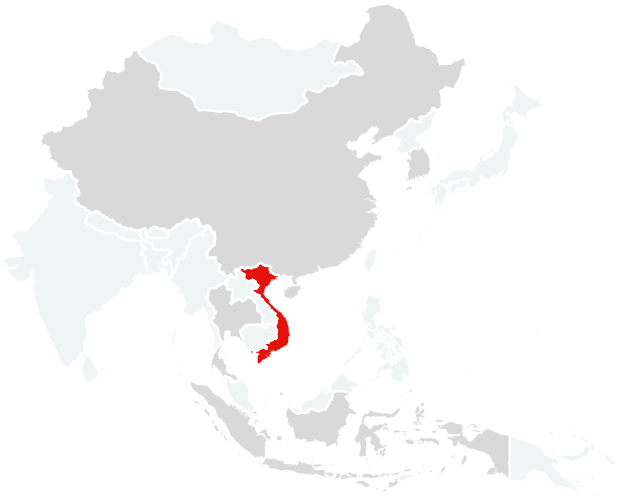
↓58%
Decrease in AIDS-related death since 2010.[78] The prevalence of adults aged 15 and over living with HIV is around 1%.[78]

3m
Estimated number of people with chronic hepatitis B infection. Elimination goals have worked well in driving policy interest in the virus over the past five years and vaccination is free.[79]

74%
Percentage of deaths accounted for by NCDs.[52] Twenty-three percent of these are due to cardiovascular disease and 18% are caused by cancer. Obesity has become a major issue, with 12% of male and 7% of female adolescents obese in 2016.[52]

Overview of Thailand's health system

- The Thai government has made health a priority, which is reflected in its well-functioning public health system. Its focus on HIV/AIDS has been critical in driving successes in this sphere.[80, 81] The health system has remained centralised for the most part, owing to risks of fragmentation.[82]
- Thailand achieved universal health coverage in 2002; this has delivered substantial reductions in out-of-pocket payments and the incidence of catastrophic health spending.[76]
- Institutional strategic purchasing capacity of the National Health Security Office has been strengthened to ensure equitable access to certain high-cost interventions, including antiretroviral therapy.[82]
- The government share of total health expenditure increased from 63% in 2002 to 77% in 2011, reflecting political prioritisation.[82] Government spending represented up to 89% of HIV expenditure in 2013, the rest being funded by foreign aid.[83]
- Thailand is self-reliant in terms of healthcare workforce, and standards are high. The ratio of health workers to population is slightly higher than the WHO recommended level.[80]
- While rural health services are well-established, the urban healthcare infrastructure tends to be dominated by hospital-based care and lacks effective primary healthcare that could improve access to diagnosis and treatment of ID.[80]



Infectious diseases in Vietnam – an overview

Country profile

2,213 Number of deaths from diarrhoeal diseases in 2017 in children aged 0-4 years old.[44] These diseases remain a public health concern, despite improvements in water supply, hygiene and sanitation halving the number of cases between 2007 and 2013.[84]

262,223 Number of lower respiratory tract infection cases per year.[45] The under-5 mortality rate is high, at 2.9%. Nonetheless, Lower respiratory tract infections receive comparatively limited policy attention in Vietnam.

33% of new TB patients in 2011 showed resistance to any drug.[85] Vietnam has worked to decentralise drug-resistant TB care to reduce the burden on hospitals. At 73%, treatment success rates for DR-TB were 25 percentage points above the global average of 48% in 2014.[86]

<0.5% HIV prevalence has remained low, with about 10,000 new cases per year.[87] In 2020, the government issued a national strategy focused on key at-risk groups (including their partners) and poorly educated people living in remote areas.[88]

8.4% of the population were estimated to be chronic hepatitis B carriers in Vietnam in 2017.[89] Vaccine coverage rates have dropped occasionally owing to national stockpile issues and reports of adverse events following immunisation.[90, 91]

77% Percentage of deaths accounted for by NCDs, with almost a third due to cardiovascular disease and 19% caused by cancer.[52] Modifiable risk factors include physical inactivity, high blood pressure and smoking—half of the male population are smokers.[52]

Overview of Vietnam's health system

- Vietnam has launched a range of laws and programmes in the past decade to tackle its ID burden, including targeted strategies on TB and HIV/AIDS.[87, 92, 93] A core strength of these policies has been their intergovernmental approach of explicitly setting out the roles and responsibilities of other ministries and stakeholders.[87, 92]
- A national surveillance system operated all the way down to the Community Health Centres reports weekly and monthly counts of notifiable diseases.[84, 91]
- Foreign aid has been critical for some ID programmes in Vietnam. Funding from international sources, including the US President's Emergency Plan for AIDS Relief (PEPFAR), accounted for up to 73.7% of Vietnam's AIDS expenditure in 2009-10.[91, 94]
- Vietnam has implemented policies to strengthen the health coverage of its poorer population. There is still scope to expand the insurance system, as only 62% of health costs among the poorest are paid by health insurance.[95]
- Every commune had a village health worker in 2009, but only 69% had a doctor. Health professionals are particularly sparse in rural areas, which can impede access to care.[95]
- Following its recent economic development, Vietnam is graduating from eligibility to some of its foreign aid funding streams and will need to increase domestic investment in these programmes and the health sector more broadly.

Chapter 2.
Covid-19 as a wake-up call

Following the identification of a cluster of suspected pneumonia cases in Wuhan, China in December 2019, the rapid spread of the novel coronavirus led to the WHO categorising the outbreak of covid-19 as a pandemic in March 2020.[96] Since then, measures to mitigate the impact of covid-19 have had mixed success—vaccines have been developed at incredible speed, while lockdowns, quarantining and distancing measures have been adopted into daily life. Covid-19 marks an important moment in public health, revealing the linkages between infectious and non-communicable diseases—and between disease and wider socio-economic inequalities—which should prompt policymakers to develop more integrated strategies for dealing with these problems concurrently.

"Covid-19 has been correctly characterised as a syndemic….it preys on underlying health conditions, NCDs in particular."

Nina Renshaw, director of policy and advocacy at the NCD Alliance

2.1 A syndemic: Covid-19 and pre-existing conditions

"Covid-19 has been correctly characterised as a syndemic," says Nina Renshaw, director of policy and advocacy at the NCD Alliance in Switzerland. "It preys on underlying health conditions, NCDs in particular." It was apparent from early in the pandemic that individuals with pre-existing conditions had a greater chance of contracting severe covid-19, with estimates suggesting that approximately 22% of the global population (1.7 bn people) are at increased risk owing to the presence of at least one underlying health condition.[97] Data have shown that diabetes and hypertension are moderately associated, while cardiovascular disease is strongly associated with covid-19 disease severity and mortality.[98]

In a retrospective analysis of 2,665 patients with confirmed covid-19 in Tongji Hospital in Wuhan, those with cancer demonstrated significantly higher mortality rates than those without (29.4% versus 10.2%). Cancer patients with complications were at an especially increased risk of poor outcomes from

covid-19.[99] In countries with a high burden of HIV and TB, modelling studies have shown that covid-19 may increase deaths from these conditions by up to 10% and 20% respectively over five years.[100]

2.2 Emerging evidence of long covid

Along with the role of NCDs in shaping the risk of contracting serious covid-19, there is also the phenomenon of "long covid", where patients present with longer-term symptoms following initial viral infection. WHO defines long covid as "a condition that occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually three months from the onset of covid-19, with symptoms that last for at least two months and cannot be explained by an alternative diagnosis". Currently, the full extent of long covid, with respect to prevalence, symptoms and outcomes remains unclear. Studies have identified up to 200 symptoms of long covid; common ones include fatigue, shortness of breath and cognitive dysfunction.[101]

As new evidence pointing to the extent of ongoing covid-19 symptoms emerges, it is crucial for health systems to take into account the care, management and rehabilitation of patients, and the manner in which an ID can transition into a chronic condition. The potential long-term effects of post-viral infection, while still greatly unknown, could mean that covid-19 impacts health systems in multiple ways, as populations present with complications affecting neurological, kidney, heart and lung health. "We're expecting [long- and post-covid conditions] to swell the figures of people living with NCDs around the world," says Ms Renshaw.

2.3 The impact of covid-19 on service delivery

2.3.1 Impact on supply chains and healthcare infrastructure

Experts interviewed in this report raised concerns about the disruption caused by covid-19 in relation to both IDs and NCDs in terms of preventive services, drug distribution and patients' avoidance of healthcare providers. "[Covid-19] shutdowns have impacted on antiretroviral supply chains and diagnoses in HIV treatment," says Dr Kamarulzaman. Similarly, "diversion of lab space, equipment, infrastructure and human resources has had an impact on our ability to deliver TB care," says Yodi Mahendradhata, vice-dean for research and development at the Faculty of Medicine and Public Health and Nursing at the Universitas Gadjah Mada in Indonesia. GeneXpert Machines, typically used to diagnose TB in patients, have been repurposed for covid-19 services leading to delays in scaling up TB treatment and concerns that many new cases will remain undiagnosed.[102]

2.3.2 Disruptions to accessing treatment

While countries have attempted to mitigate the pandemic in different ways, it has been challenging to maintain the continuation of care for patients with longer-term diseases. Notifications of TB fell by 14% in Indonesia between 2019 and 2020 because of disruption to TB services, lockdowns and patient reluctance to visit healthcare facilities.[103] Travel restrictions and fear of contracting covid-19 resulted in more than a quarter of TB patients in China postponing or missing follow-up examinations between January and April 2020.[104] A 2021 report by the Global

Fund to Fight AIDS, Tuberculosis and Malaria, demonstrated that 29% fewer people were tested for TB in the top 13 countries by TB burden in 2020 compared with the previous year, while 45% fewer people in those countries were tested for multidrug-resistant TB.[105]

Donghyok Kwon, director of public health emergency response research at the Korea Disease Control and Prevention Agency, says that while the Korean government made considerable efforts to maintain health services and to ensure they were accessible to all, "we have seen a decrease in the amount of hepatitis B virus patients seeking care, despite health systems remaining open."

Taweesap Siraprapasiri, senior advisor on HIV in Thai Ministry of Public Health's Department of Disease Control, highlights a similar pattern in Thailand: "During the lockdown, the number of people getting HIV tested dropped 30% from the previous year."

"A huge positive impact of covid-19 is that contact-tracing technologies have great potential to be transferred into TB"

David Boettiger, research fellow at the Kirby Institute of the University of New South Wales

In addition to concerns about the immediate impact of disruption to care access—such as missing diagnoses and acute symptom management—there are also longer-term fears that this period will lead to rising health challenges associated with NCDs. In China, experts have voiced concern that in future there will be an increased burden of liver cancer because of delays to hepatitis B diagnosis, and that fewer immunisations against the virus have been occurring because women are avoiding antenatal care, which will increase the rates of mother-to-child transmission.

The pandemic has also raised questions about how to accurately assess incidences of other IDs. For example, public health advice directed at minimising the transmission of covid-19 mirrored directives leveraged against seasonal influenza, and externally they exhibit similar symptoms—an ecological study demonstrated a drop in the number of seasonal flu cases in East Asia during the 2019-20 season in comparison to prior years. However, it is uncertain whether this decline can be attributed to increased awareness of IDs and preventative measures, or instances of influenza being misattributed to covid-19, which would hinder the understanding of the transmission and impact of influenza alongside covid-19.[106]

2.4 The innovation imperative

Although the pandemic has been catastrophically disruptive, it could also catalyse long-term improvements in the management of both IDs and NCDs, particularly through improved surveillance systems and telemedicine interventions.

The success of contact-tracing systems set up to deal with the pandemic is projected to have benefits for long-term ID management. "A huge positive impact of covid-19 is that contact-tracing technologies have great potential to be transferred into TB," says David Boettiger, a research fellow at the Kirby Institute of the University of New South Wales, in Sydney. This is echoed by other experts. "Contact tracing for TB pre-covid-19 had failed as an initiative because of a lack of resources," says Dr Mahendradhata. "But now that it's being operationalised for covid-19 management,

we'll be able to build on the existing infrastructure." Similarly, the experts that we spoke to outline the positive impacts of newly integrated controls for infectious patients in hospitals, and the potential for these measures to curb the spread of other IDs, such as TB.

In Vietnam, swift actions at the beginning of the pandemic to implement the Ministry of Health-developed, F-system, a tracing system specific to covid-19 that categorises individuals by proximity of exposure and outlines appropriate isolation methods, contributed to the country's early success in managing the pandemic.[107] The success of this system hinges on the fact that Vietnam had existing tracing infrastructure as a result of its management of the severe acute respiratory syndrome (SARS) epidemic in 2003 and cases of avian flu in humans in 2004.[108]

Increased use of telemedicine is a second area where innovation has accelerated as a result of the pandemic. Although the benefits of telemedicine were already well-known, prior to 2020 many countries' health systems had only limited engagement. In Vietnam, researchers identified the positive effect of telemedicine in diabetes care, with a pilot programme to assess the safety and efficacy of integrating digital diabetes care systems into diabetes management via the use of wireless blood glucose monitors and monthly "digital visits".[109] In April 2020, the Ministry of Health and the Ministry of Information Communications launched several synchronous telemedicine projects, and one project, providing remote health examination and treatment, has been approved by the Ministry of Health for the five-year period covering 2020-25.[110] In March 2021, the health ministry advanced this initiative by completing and approving a legal framework on telehealth that is to be included in the country's Law on Medical Examination and Treatment. This is expected to aid in the development of financial mechanisms for reimbursement, improving access to these services.[111]

China has seen notable growth in new users of an online healthcare service platform, Ping An Good Doctor (China), which rose almost 900% between December 2019 and January 2020. Similar online platforms in the country (Chunyu Doctor and Ding Xiang Yuan) also reported increased user numbers, while two Indonesian healthcare apps, Halodoc and Alodokter, reported respective increases in daily active users of 101% and 39%, respectively, between March 2019 to March 2020.[112]

The West China Hospital implemented a telemedicine strategy, allowing providers to manage tele-consultations, tele-rounds, tele-radiology and tele-intensive care to increase efficiency during the pandemic. The success of the strategy (which resulted in 10,557 online covid-19 consultations and 32,676 non-covid follow-ups) has led the hospital to adopt the technology more widely.[113] Several countries in Southeast Asia have now passed legislation and best-practice guidelines around the use of telemedicine in response to covid-19, although reviews have identified several areas for systems strengthening and the need for robust data to ensure that ongoing expansion is sustainable and effective.[114]

While driving innovation and rapid adoption of technologies, the pandemic has also exposed dramatic inequities in technology access and utilisation. For example, not everyone has the high-speed internet connectivity required for telemedicine, and some even lack the electronic devices (smartphones, for example) that allow them to take advantage of new modes of service

delivery. The UN Conference on Trade and Development (UNCTAD) 2021 Technology and Innovation Report states that the countries that are best prepared for "frontier technologies", a group of new technologies that take advantage of digitalisation and connectivity to multiply their impacts, are those with higher per capita incomes, such as the US, UK and Switzerland.[115] Asian countries, with the exception of leading countries like Singapore and South Korea, are lower ranking in their readiness for frontier technologies.[113] Not surprisingly, the countries that are most "ready" are the most likely to use frontier technologies, while those least ready will find themselves on the back foot. Developing countries also had low rankings for ICT connectivity and skills in the UNCTAD report, implying that they will need to work towards universal internet access and ensure that the citizenry has opportunities to learn related skills before the benefits of innovative technologies can truly be realised.[113]

"Community groups have innovated, with house-to-house delivery of ART and harm-reduction paraphernalia, and they've forced programmes to move towards innovation and digitisation such as self-testing."

Adeeba Kamarulzaman, professor of medicine and infectious diseases, University of Malaya.

2.5 Community organisation

The pandemic has highlighted the importance of community engagement and the positive effect of community groups in strengthening health systems and response. In Malaysia, lockdowns impacted supply chains, access to antiretroviral therapy (ART) and HIV diagnosis, leading community groups to act creatively. "Community groups have innovated, with house-to-house delivery of ART and harm-reduction paraphernalia, and they've forced programmes to move towards innovation and digitisation such as self-testing," says Dr Kamarulzaman.

In Indonesia, Atma Go, a localised social network previously developed for disaster relief, has enabled communities to track information and government regulations, helping people to tackle misinformation around covid-19, as well as create localised support by organising events, recruiting volunteers and meeting community needs via the platform.[116] HIV community outreach workers in the capital, Jakarta, attempted to mitigate disruptions to in-person services and maintain their involvement in communities, particularly among men who have sex with men, transgender people and sex workers, who all face additional discrimination. Outreach, which previously involved accompanying patients to clinics and offering sexual health advice, has pivoted to developing previously underdeveloped online outreach and designing innovative programmes to courier medications to clients.[117]

Swift adaptation by health authorities in the Pak Kret District in central Thailand ensured that they were able to provide continuous NCD treatment to patients during the height of the pandemic. Authorities established strong online communications between hospitals, health centres and community health workers, provided online services via a specially developed app, and created a "one-stop-shop" service for elderly and vulnerable NCD patients. The success of this programme hinged on the work of community health volunteers, who helped to dispense medications, relayed information and visited patients to provide assistance and basic care.[12]

Chapter 3.
Infectious disease and NCDs

3.1 The current state of ID and NCD integration

In recent decades, there has been a strong focus on global targets for IDs, with the UN Millennium Development Goals (MDGs; covering 2000-15) and the Sustainable Development Goals (SDGs; covering 2015-30) placing particular attention on efforts to eradicate conditions including HIV/AIDS, and malaria, among others.[118, 119] Similarly, disease-specific targets such as UNAIDS' "95-95-95" HIV target (95% diagnosed among all people living with HIV, 95% of diagnosed people on ART and 95% of treated people virally suppressed by 2030) contribute to a funding landscape that has over time led to "verticalisation", a highly disease-specific approach, and a possible under-appreciation of the complexity of disease comorbidities and the associated burden of NCDs.[120]

"A lot of international donor funding and philanthropy is still guided by the MDGs and the infectious diseases within them—malaria, HIV, maternal and child health. Not to reduce the focus on these, but NCDs are interrelated with all of them."

Nina Renshaw, director of policy and advocacy at the NCD Alliance

This has impacted funding streams and led to the under-funding of NCDs. "A lot of international donor funding and philanthropy is still guided by the MDGs and the infectious diseases within them—malaria, HIV, maternal and child health," says Ms Renshaw. "Not to reduce the focus on these, but NCDs are interrelated with all of them." There is a need to focus future funding priorities directly onto NCDs, to accommodate for the disparities evident in current funding landscapes.

In the Asia-Pacific region, integrated healthcare has seen some level of implementation. In September 2017, the Chinese National Health and Family Planning Commission introduced the Luohu model, based on an integrated approach pioneered in the Luohu district that yielded progress towards preventative, integrated care.[121] However, a qualitative investigation of 764 GPs in China regarding their understanding of the government's integrated healthcare approach demonstrated that while GPs were largely in support, many noted that incomplete two-way referral systems and insufficient publicity remained challenges to effective implementation.[122]

3.2 Challenges to integrating IDs and NCDs

Although recognition of the linkages between infectious and non-communicable diseases is growing, experts identify several challenges and obstacles that need to be overcome to ensure better integration and more strategic healthcare policy, as well as best practices for overcoming hurdles.

3.2.1 Dichotomous thinking

There is a common narrative that separates IDs and NCDs, underpinning the challenges faced by attempts to successfully integrate care and preventing effective synergy in healthcare systems. This separation between the two areas of disease is often a result of professional differentiation and specialisation. This contributes to an insular approach to disease treatment and a search for simplicity in solving public health problems, in an attempt to alleviate the cause and threat of IDs more swiftly.[123] Experts highlight the difficulty in dismantling this siloed approach to treatment, which does little to acknowledge and raise wider awareness of comorbidities and linkages. "Currently, there are completely separated communities in global health between infectious diseases and NCDs—completely separate silos within health systems organisations at national and local levels—which has been proven to be ineffective," says Ms Renshaw. "Population resilience depends on a strong public health system, including management and prevention of NCDs to ensure a population can be resilient to a virus of epidemic proportions."

"Currently, there are completely separated communities in global health between infectious diseases and NCDs—completely separate silos within health systems organisations at national and local levels—which has been proven to be ineffective,"

Nina Renshaw, director of policy and advocacy at the NCD Alliance

3.2.2 Funding challenges

The challenge of directing funds appropriately and sustainably in part contributes to the silos that separate ID and NCD care and prevention. While IDs can predispose to, or have high comorbidity with NCDs, creating long-term programmes that manage IDs and NCDs together can be expensive and requires redesigning existing infrastructure.

Po Lin Chan, medical officer for viral hepatitis for the WHO Office for the Western Pacific, says that challenges can arise when large expert bodies outline programmatic solutions without accounting for a country's existing infrastructure and funding feasibility. "The problem with having responses that draw directly from high-level recommendations, as highlighted by efforts in China, is that sometimes they are unfeasible immediately and require deeper infrastructure alterations and more funding in order to be implemented effectively," says Dr Chan.

For example, she highlights the difficulties that occurred in China when attempting to implement recommendations from the WHO Global Hepatitis Programme, which encouraged countries to invest and build in more comprehensive screening and ongoing cancer treatment among people living with hepatitis.[124] "Because of the high prevalence of hepatitis [approximately 100m people nationally], implementing these recommendations

becomes a big undertaking; [there are not] annual budgets that can accommodate for that," she says. "There's an incredible financial challenge of caring for people with potential lifelong care. The testing and screening and clinical monitoring costs over a lifetime are huge for any chronic condition."

3.2.3 Stigma

Stigma and fear of discrimination impact the ability and desire of people to access healthcare services, contributing to increases in disease rates, late diagnosis and worsening outcomes. Stigma is hindering the implementation of effective synergistic policies and access to services across the region—especially in relation to HIV/AIDS.[125] Prejudice and negative attitudes related to the latter are directed against behaviours and communities that tend to be linked with higher rates of HIV, which can mean that the use of life-saving treatment, such as pre-exposure prophylaxis (PrEP), is discriminated against.[126] Stigma around IDs reduces patients' willingness to undergo testing and screening for fear of receiving a positive diagnosis or being associated with a certain disease.

"Historically, people have been very afraid about drawing links between TB and HIV because of the existing stigma surrounding HIV – there is currently slightly less reluctance towards integrating TB and HIV care, although they do exist as separate programmes," says Dr Mahendradhata. "At the community level, HIV is still very much stigmatised."

"There are complexities within the stigma that exists around HIV/AIDS—of the immediate social stigma, in a clinic setting and in overarching legal contexts with the criminalisation of drug use, sex work and homosexuality," adds Dr Kamarulzaman. This multi-layered stigmatisation creates multiple barriers to treatment access.

Currently, covid-19-related stigma is similarly creating challenges to accessing care for both IDs and NCDs. Experts have noted decreasing attendance at TB clinics and in treatment as a result of individuals not wanting their symptoms, most notably coughing, to be associated with covid-19.[127] This is concerning, as curbing the spread of both infections is dependent on swift diagnosis and providing effective treatment.

Innovative approaches are needed to engage academic stakeholders, scientists, regional and country officials, healthcare workers and patient advocates to positively inform public opinion and change attitudes in broader society, including in law. "A key stakeholder [group] in domestic policy are those working in justice and law," says Dr Siraprapasiri. "We are working with the attorney-general [of Thailand] on several key aspects of stigma and protection of human rights, as well key agencies involved in discrimination policy."

3.2.4 Awareness of the relationship between IDs and NCDs

To mitigate fear and discrimination surrounding certain diseases, awareness must be raised across populations in a non-judgemental and stigma-free way that highlights the potential comorbidity risks and the support that the healthcare system can deliver. "There is a lack of understanding around how hepatitis sits within the NCD framework," says Dr Chan. "Re-framing hepatitis as a primary cause of liver cancer makes prevention and treatment of hepatitis more relevant and powerful."

Dr Chan also highlights awareness issues regarding HIV and NCD linkages. "Awareness around HIV and associated NCDs is weak," she says. "While there is a general awareness of the links between HIV and cervical cancer, more advocacy needs to be done." This requires campaigns and public health messaging to flag the risks of HIV comorbidities including lung, anal and liver cancers, cardiovascular disease, and diabetes.[9] This lack of awareness is echoed in other countries: in Korea, says Dr Kwon, "hepatitis B is perceived more as an NCD than an infectious disease in some populations; people don't have a great awareness of their vaccination history or immune status."

"There is a lack of understanding around how hepatitis sits within the NCD framework. Re-framing hepatitis as a primary cause of liver cancer makes prevention and treatment of hepatitis more relevant and powerful."

Po Lin Chan, medical officer for viral hepatitis, World Health Organization Office for the Western Pacific

There is also a growing need to recognise the intersection of infectious and non-communicable disease in the context of anti-microbial resistance (AMR), a rapidly growing challenge in Southeast Asia, with drug resistance increasing in TB, HIV, malaria and bacterial infections, and impacting on NCDs (for example, antibiotics used to manage infections that occur in diabetes and cancer patients become obsolete after repeated use).[128-130] In the shadows of covid-19, AMR remains a global challenge owing to increasing—as well as often unchecked and unregulated—antibiotic consumption, a lack of stewardship programmes, and poor infrastructural capacity, especially in South and Southeast Asia.[131] In an effort to combat the rise of AMR in Vietnam, a national action plan was implemented in 2013, alongside the Vietnam Resistance project (now the National AMR Surveillance Network), which utilises standardised surveillance across 16 hospital laboratories. The network enables the standardisation of data on AMR and works towards a more accurate configuration of the burden of AMR in Vietnam, which has increased alarmingly in recent years.[132] Expanding national programmes is imperative; however, experts also advise building on existing country-wide surveillance programmes to generate sustainable inter-country collaboration, including collaboratively leveraging new technologies.[133]

3.3 Screening

Investment in screening programmes is essential to the ongoing control of both IDs and NCDs. Alongside considered public health messaging campaigns to highlight links between IDs and NCDs, well-publicised, integrated screening programmes are also vital to increasing diagnosis and ensuring that people enter care streams appropriately. As many IDs can progress to NCDs or exacerbate pre-existing conditions, screening is at the core of a well-integrated healthcare system. Screening helps not only with the diagnosis of conditions, but also with disease monitoring—for example, screening for secondary infections in the case of HIV—and early intervention to diagnose and treat co-morbidities.

One example is screening for both TB and diabetes. "There is a bi-directional relationship between these two conditions," says Ms Renshaw. "If screening isn't being offered, you're missing the fact that the treatment offered for TB could be less effective because

[the patient is] also struggling with untreated diabetes." This is also the case for women living with HIV, who are much more likely to access HIV care than their male counterparts, but may not consistently be screened for cervical cancer.[134] "Women living with HIV have a five-times higher risk of cervical cancer than the general population; there is a huge imbalance of access between the health priorities," says Ms Renshaw.

In some countries, integrated screening, in addition to increased understanding about the links between IDs and NCDs, is informing innovative change and steady progress. However, more comprehensive programmes that effectively combat intersecting IDs and NCDs need to be developed. Existing population-based screening programmes should also be evaluated for effectiveness, as this would create the scope for building into existing programmes and replacing ineffective ones with evidence-based screening (evaluating interval, age, specific at-risk populations and so on).

"There is a bi-directional relationship between these two conditions [TB and diabetes]. If screening isn't being offered, you're missing the fact that the treatment offered for TB could be less effective because [the patient is] also struggling with untreated diabetes."

Nina Renshaw, director of policy and advocacy at the NCD Alliance

There are examples of integrated screening and care being implemented in the region. In Vietnam, a pilot programme is exploring integrating hepatitis C and HIV care, and providing screening, counselling and referrals, as well as raising awareness about the links between the two conditions and associated health issues.[135] South Korean research into associations between HIV and gastrointestinal diseases has suggested a role for gastric cancer screening for patients with HIV infection.[136] In China, in accordance with the Healthy China 2030 plan, AIDS screening is conducted among TB patients in 294 districts, and hepatitis B and C screening are also conducted in ART clinics. However, a 2018 progress report notes that screening for cervical cancer in female patients with HIV is not noted in national HIV and AIDS strategic planning and guidelines.[137]

In addition to effective screening, understanding country-specific disease pathways is key to improving preventive measures. For example, in Vietnam, where the prevalence of human papillomavirus (HPV) 16 and 18 infections among women with cervical cancer is 82.8%, public health messaging should highlight the importance of HPV vaccinations and co-screening for HPV infection and cervical cancer should be implemented more broadly.[138, 139] Systematic reviews support the promotion of HPV testing and offering self-sampling HPV tests can also increase cervical cancer screening uptake compared with standard pathways of care.[140]

The experts we spoke to also voiced frustrations that implementation of screening programmes can be slow, despite recognition of the links between conditions. "We're finding that diabetes and TB are much more of a concern than TB and HIV in Indonesia," says Dr Mahendradhata. "There are guidelines for TB screening for diabetes patients and vice versa, but these are still mainly [limited to] guidelines. We haven't seen much in terms of implementation."

Research findings also highlight the importance of creating screening programmes

that adequately communicate appropriate messages, are culturally sensitive and build awareness. Researchers exploring hesitance around cervical cancer screening in Indonesia, where cancer rates are high and screening coverage is low, have found that screening needs to accommodate the needs of local populations, including a preference for women doctors and sensitivity around screening.[141] Public awareness of screening programmes can be generated through education campaigns—research has revealed the importance of stratified health promotion messaging (from individualised messaging to culturally sensitive community-level campaigns and beyond) for cancer screening uptake. This can be implemented by health ministries and should cover national audiences to reach as many people as possible, as effective screening uptake is an essential aspect of disease prevention.[142]

3.4 Diagnostics

While screening programmes have been cited by experts as integral to early detection, other diagnostic tools and programmes should also be integrated as part of a whole-systems approach to prevention, detection and care for both IDs and NCDs.

Future diagnostic improvements could build on infrastructure implemented during the covid-19 pandemic. Early in the pandemic, services such as TB diagnostics and HIV viral load testing capacity were swiftly re-routed to respond to the demands of the pandemic, leveraging existing laboratory infrastructure.[143] Out of necessity, throughout the pandemic, global testing and diagnostic capacity have developed to include decentralised testing, mobile testing sites, and tests available through community healthcare workers and pharmacists. There is clear transferability to TB care following these initial investments. The covid-specific development of artificial intelligence—especially its use to diagnose covid-19 from chest CT scans—was previously focused on TB diagnostics. The rapid innovation spurred by the pandemic has also led to improvements in battery life, increased portability and digitised x-ray systems; these can be reconfigured for TB diagnostics and combined covid-19 and TB testing.[144]

Innovation in covid-19 diagnostics has also led to the development of a chip-based ultrasensitive antigen test that can distinguish between SARS-CoV-2 and influenza A—an essential breakthrough, as the two viruses exhibit similar symptoms. The test, which uses swab specimens, can be scaled up as a molecular diagnostic test and implemented at point-of-care settings.[145] Similarly, multiplex assays have been developed for the detection of SARS-CoV-2, influenza A, influenza B and other viruses to test for SARS-CoV-2 without missing co-infecting pathogens.[146, 147] This is particularly important, as emerging reports indicate that co-infection may complicate diagnosis and lead to worse patient outcomes.[148, 149] There is clear application moving forward to capitalise on the investments made in self-testing and re-appropriate the diagnostic and laboratory infrastructure developed during covid-19.[150]

Chapter 4.
Country recommendations for the future of care

While the countries included in this study are diverse—necessarily so, to reflect the diversity of the region as a whole—our research has revealed a number of common themes that can inform actionable steps to improve health outcomes by more explicitly connecting IDs and NCDs.

4.1 Strengthen health systems for the post-covid world

National healthcare systems must act now to tackle the impact of covid-19 on patients with infectious and non-communicable diseases, from diagnosis to treatment and, potentially, end of life care. Experts expect a "final wave" of pandemic-driven impact on health systems as patients who have been unable or unwilling to access care throughout the preceding period begin to re-engage with healthcare systems. "We're unsure whether health systems have the financial and human resources and reserves to resume services," says Ms Renshaw.

[With integrated care], "patients have easier access to care and better opportunity for continuity of care, and there's more equity of access across the system"

David Boettiger, research fellow, The Kirby Institute, University of New South Wales

Countries should look to the rebuilding of health systems as an opportunity to create more integrated care pathways—this is a medical and financial imperative, according to the experts interviewed for this paper. Where there are clinical or epidemiological linkages, stakeholders should look to integrate ID and NCD care, from diagnosis, treatment and disease management through to public health communications. This could streamline resources and allow for the treatment of more than one healthcare issue within a given setting, as well as preventing certain IDs and NCDs in the first place.

Coordinated and patient-centred care will be particularly essential in managing the needs of ageing populations in Asia.[151] There are also undoubtedly synergistic benefits for patients and providers associated with the integration of HIV and NCD care.[152] With integrated care, "patients have easier access to care and better opportunity for continuity of care, and there's more equity of access across the system," says Dr Boettiger. "Providers benefit from reduced costs. Patients are coming to one place, so there's less need for administration staff, or

as much infrastructure; buildings, labs, supply chains etcetera can all be condensed."

For patient-centred integrated care to be widely adopted, its sustainability must be demonstrated. In a scoping review of 87 integrated NCD care programmes in the Asia-Pacific region, a key identifier of sustainability was financial incentivisation—financial incentives encourage providers to implement integrated programmes and utilise innovative payment models (such as bundled payment schemes and gain-sharing), driving cost-effectiveness. Patient-based incentives also exist to assist enrolment in integrated programmes; these can involve reducing or removing co-payments and offering financial assistance to invest in home-based care services.[153] The evidence for integrated care is strong, and understanding how such programmes can be sustainably implemented is essential in building a stronger health system.

Digitalisation can also play an integral part in strengthening healthcare systems, not only in the provision of healthcare but also in assisting with supply-chain management. In Indonesia, stakeholders have identified challenges and delays associated with healthcare procurement and supply chains due to weak ICT systems. Investing in advanced digital supply-chain management can drive data synchronisation and electronic data sharing, which can reduce errors, improve inventory accuracy and optimise the flow of products and materials.[154]

However, in working to strengthen healthcare systems, it is essential that funding does not become redirected entirely into digital innovation. As evidenced during the pandemic, financial support for healthcare has been mostly directed into research and infrastructure, with comparatively fewer resources allocated to the individuals delivering services. It is predicted that there will be a serious shortfall in human resources for health by 2030, especially in LMICs. Therefore, it is imperative that simultaneous meaningful investment is made in developing human resources for health.[155, 156]

4.2 Invest in primary care and community health approaches

Investment in primary care services is essential for detecting conditions that commonly co-occur, such as TB and diabetes, HIV and cervical cancer, HIV and heart disease, and lung infections and chronic lung conditions. Economist Impact's Index of Cancer Preparedness reveals that in higher-income countries primary care support improves the efficacy of cancer prevention messaging and increases screening uptake.[42] Integrative care approaches can also tailor services according to the needs of specific areas. "If there is a high prevalence of cardiovascular disease within a region's HIV population, we might consider combining and integrating those forms of care," says Dr Boettiger. Understanding the bidirectionality of infectious and non-communicable diseases and engaging with a population's specific needs forms the foundation of strong synergistic approaches to integration in healthcare systems.

Investment in community health also allows for the integration of upstream interventions to prevent NCDs by tackling risk factors and unhealthy behaviours. "Many channels within community health can be customised and developed according to higher prevalence rates of IDs and NCDs and associated risk factors," says Dr Mahendradhata. In Malaysia, the KOSPEN programme, whose full Malay

name translates to "Healthy Communities, Building the Nation", is a community-driven NCD-awareness and prevention intervention designed to help to halt the increase in the prevalence of NCDs and associated risk factors by 2025. Forty thousand trained community volunteers contribute to the programme, which offers screening for conditions such as hypertension and diabetes, as well as health promotion and community health engagement practices.[157] Yet community health investment must be done in an appropriate and patient-oriented manner. "Indonesia has a very diverse population, and we've learnt from covid-19 that there's been a failure of communication; it's been very biased towards the middle class—the language has been too sophisticated," says Dr Mahendradhata

Investing in cost-effective community care involves considering which tests and screenings can be done by community healthcare workers or nursing staff instead of waiting for a critical point where specialist care is required. An essential benefit of community healthcare workers is that simple screenings, tests and samples can be taken in rural or hard-to-access settings, helping to embed community-level preventative health and limit the need for specialist care. For example, community health workers can provide and assist with HIV self-testing. Although, a study in northern Thailand found that while HIV self-testing kits are available over the counter, more education is required to create awareness and facilitate uptake in rural areas.[158]

The covid-19 pandemic has demonstrated the worth of community-based interventions in areas including vaccination and testing. The WHO Regional Office for Europe's recommendations on influenza vaccination for the 2020/21 season, which coincided with the height of the pandemic, highlighted alternative methods to ensure the safe delivery of flu vaccination.[159] These included mobile community clinics, home visits, pharmacies and drive-through vaccinations in outdoor areas. Trained community workers would be well suited to delivering vaccinations in such settings; Australia has recently set up outdoor and drive-through vaccination clinics for influenza.[160] Elsewhere, a study in China showed that a community-based intervention, which involved educating community health workers about influenza vaccination and tasking them with driving its uptake in people aged 60 and above, increased vaccine coverage to 19% from a baseline of 0.3%. Of the older adults vaccinated, 98% of them said that the main reason for their willingness was a recommendation from community health workers.[161]

Such programmes provide community-led support and tailoring of initiatives to tackle the root causes of both IDs and NCDs, which can be particularly helpful in reaching vulnerable or marginalised communities who may benefit from locally provided personal care. "In the cases of men who have sex with men, digitisation and online testing may be able to mitigate some of the stigma associated with HIV, by providing anonymity," says Dr Kamarulzaman. "However," she adds, "for sex workers and people who use drugs, who might be less tech-savvy, those solutions are not so apparent." To maintain access to vulnerable communities with complex healthcare needs, it is integral to ensure that a variety of access and care pathways are available.

Previous reviews have suggested that investments in the community health workforce correlates with cost-effectiveness

in the management of certain conditions such as TB and, potentially, in maternal and child health needs in LMICs.[162] Data also suggest that primary prevention and screening programmes conducted by community health workers could be effective in smoking cessation, diabetes and blood pressure control in LMICs.[163]

Financial sustainability is an essential aspect of creating and sustaining a successful community healthcare programme. Prioritising health in political decision-making can drive resource allocation into health systems at a level that is equal to or more effective than in high-income countries—a country's socioeconomic status does not always directly correlate with its health expenditure or outcomes. In addition, establishing evidence-based policies and programmes based on embedding community healthcare workers in primary healthcare can ensure effective resource use. Research has also recommended tapping into non-traditional funding sources, as well as an exploration into innovative approaches and financing instruments such as results-based financing, impact bonds and innovative private-sector engagement.[164]

4.3 Harness data and information

Although integration of care for IDs and NCDs is beneficial, there is a need for more and better data to demonstrate outcomes and help to build the case for focus and resources in this area. "A lot of work has suggested that integration would be successful, particularly for patients," says Dr Boettiger. He adds, "the main thing is to generate evidence that synergistic and integrated approaches work, because that puts pressure on policymakers to enact change. We need empirical evidence, because currently there's just not enough empirical data that suggests that integrated care systems work."

Data collection can help to reveal gaps in healthcare systems and assess both overarching and granular elements of healthcare service delivery. For example, Economist Impact's Index of Cancer Preparedness collates data on 45 indicators related to aspects of the prevention and care continuum of cancer alongside the broader country context.[165] It considers data within three overall sections—policy and planning, care delivery, health system and governance—and allocates scores accordingly. Four of the countries within this report were included in the Index, with South Korea scoring highest (80.4; ranking 12th of 28 countries) followed by Thailand scoring 69.4 (ranking 17th), China scoring 64.5 (ranking 20th) and Indonesia scoring 55.1 (ranking 25th).

Such comprehensive national-level data highlights shortcomings at the country-level—such as a lack of compliance with smoke-free legislation, as well as the absence of national cancer-research programmes and screening or vaccination initiatives, that can contribute to higher rates of cancer. Such benchmarks help to provide a comprehensive overview of national care systems; however, experts have identified more glaring gaps in the empirical literature. "In terms of comorbidities, there's a huge data gap; it is believed that up to 95% of people living with NCDs are living with more than one, but the estimate is 13-95%—so that data gap needs to be filled," says Ms Renshaw.

Rosmawati Mohamed, a consultant hepatologist at the University Malaya Medical Centre, Malaysia, highlights the importance of operationalising data for policy change. "For hepatitis C we didn't have data in Malaysia until 2013, until they needed to impress on the

government the need to address hepatitis C instead of just hepatitis B. We had expertise from outside to aid us in pulling in data for estimating antibody prevalence and economic burden, which was sufficient to warn the government to look beyond hepatitis B. Even limited data was sufficient to encourage policy action."

4.4 Facilitate changes in healthcare delivery

Post-pandemic, there are identifiable changes to hospital and health-system infrastructure that can be consolidated as long-term best practices. The use of telemedicine for outpatient services in order to maintain social distancing and quarantine measures in hospitals, for example, has clear potential, especially in contexts where access to physical health infrastructure is uneven. Conducting outpatient clinics and appointments via text, phone call and video chat creates more physical space in hospitals that can be appropriated for diagnostics and treatment.[166] Telemedicine has the capacity to become integrated into healthcare systems in the Asia-Pacific region, which would help to overcome obstacles present in primary care, such as the challenges of accessibility and costs that accompany in-person care, especially for remote and rural communities. Effective scaling-up of telemedicine, to strengthen primary healthcare and lay the foundations for UHC, must involve a comprehensive, nationalised digital health strategy and accompanying legislation. This would require investment in digital infrastructure to facilitate e-health records, patient engagement platforms, e-prescriptions and connected diagnostic information systems. Concurrently, health worker training and in-depth evaluation of patient acceptability is required to ensure that all patients are able to access care in a way that benefits them and their health.[114]

Several countries in the region have rolled out rapid review and approvals of medical supplies during the pandemic, demonstrating the capacity of governments to move far faster than in normal conditions. This includes passing reforms allowing manufacturers to produce medical supplies and equipment, certification of test kits, waiving of import duties on equipment, and easing of quality-assurance processes from manufactures exported by well-regulated countries, including the US, Japan and EU nations. Even before the pandemic, China had moved to shorten clinical-trial processes, speed up new drug registrations and quicken approval for drugs already approved abroad. More streamlined approval pathways can be utilised in the future, accelerating drug review and approvals for essential medicines.

4.5 Engage key stakeholders

Building synergies between ID and NCD care requires political support. The countries that perform best in terms of acting on public health advice and communication around disease transmission and prevention are those willing to act on NCDs. For example, Thailand, Vietnam and China have strong NCD programmes embedded within their health ministries, close focus on issues such as tobacco control and healthy diets from a young age, and integrated mental health services. These countries can build on their progress, while others can look to their initiatives for ideas, best practices and guidance.

The importance of creating not only integrated healthcare systems but also public awareness about the interwoven nature of IDs and

NCDs requires high-level policy support that promotes healthy behaviour change and takes steps to address any obstacles that citizens might face. "There isn't much synergy beyond guidelines. We expect better control of NCDs to lead to better outcomes in TB, but it's difficult to control diabetes in Indonesia," says Dr Mahendradhata. "We have very high levels of sugar consumption, and mitigating that requires more of a policy approach and political commitment, and that can sometimes lead to conflict with commercial entities." Aligning national disease guidelines with clinical evidence can help to provide an appropriate framework in which health system participants can operate.

There is also a need to break down the sometimes damaging silos that exist between IDs and NCDs. "Philanthropy and international donors consider [IDs and NCDs] to be completely separate and not overlapping, which is difficult to contend with," says Ms Renshaw. It is imperative that the narrative of IDs and NCDs existing as separate entities is dismantled, to clear the way for stakeholders and donors to direct funds to more effective channels, prioritising programmes that aim to tackle the nexus of IDs and NCDs.

Conclusion

The Asia-Pacific region faces a dual challenge of rising NCD incidence—reflecting population ageing and changing lifestyles—and persistently high ID incidence. There is a frequent tendency to approach these two sets of conditions in isolation from one another in terms of service design and health strategy, which underappreciates their interlinkages and leads to suboptimal outcomes.

A greater focus on integrated care, one that recognises the ways in which IDs and NCDs can fuel each other—and the compromising implications that this has on healthcare overall—is crucial if the region is to build a strong overall healthcare system. Positively, countries in the region can draw from innovations driven by the covid-19 pandemic as proof that service delivery can be radically reimagined when the need is strong enough. Some of the agility and creativity seen in the past year, especially in areas such as telemedicine, accelerated drug review, supply-chain re-balancing and diagnostics, could provide a foundation for future innovation.

Decision-makers can also take heart from the evidence that healthcare integration, despite having some upfront costs, can be economically advantageous in the long term. Comprehensive screening programmes, variegated public health messaging strategies (to improve awareness and tackle stigma), and leveraging of the full healthcare workforce—including community health workers—are all cost-effective interventions that can improve healthcare service integration and efficiency. Greater synergy of ID and NCD strategies in national health plans and donor funding can tackle the inefficiencies that result from silos and dichotomous thinking.

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