An Independent Review of the Application of Universal Health Coverage in Asia

Leadership Institute for Global Health Transformation
Saw Swee Hock School of Public Health
National University of Singapore, Singapore
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Executive Summary

Universal health coverage (UHC) is target 3.8 of Sustainable Development Goal 3 (SDG 3), whose focus is good health and well-being throughout a person's life-course. UHC means that all populations worldwide receive quality, affordable healthcare; one that includes access to essential primary care services and safe, authentic, and effective medicines and vaccines, and protects against financial hardship. UHC is essential to achieving not only SDG 3 but also the health-related targets of the other 16 SDGs because it impacts social determinants of health such as employment and education, promotes positive health outcomes, and prevents premature deaths.

Progress towards UHC is susceptible to changes in population, healthcare trends, and consumer expectations but is consistent in measurement, using two target indicators. Indicator 3.8.1 measures health service coverage, and 3.8.2 measures financial risk protection from catastrophic health spending and impoverishment. Because low incidences of catastrophic health spending and impoverishment could mean either financial protection or people not receiving needed care due to service unavailability or unaffordability, UHC monitors measure the two indicators together.

A joint WHO/ World Bank Group monitors UHC and provides a framework for measuring progress. Its findings informed the 2017 and 2019 UHC Global Monitoring Reports, from which we obtained most of the data used to review UHC implementation in select Asian countries including, Cambodia, China, India, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Philippines, Republic of Korea, Singapore, Thailand, and Viet Nam. When possible, we also included data on Hong Kong SAR (China), and Taiwan (ROC).

It is important to take note of the current status of UHC in Asia because it is home to 4.4 billion people, has the largest economy in terms of gross domestic product, and is also the fastest emerging market economy. Yet, at present, 200 million people are living with diabetes in Asia, and by 2050, Asia is estimated to have the highest number of people in the world aged over 65 years, which would impact healthcare access and financial security in the Region.

Using the UHC service coverage index and the health access and quality index on amenable mortality, we found that Asian countries that scored high in these indices also had the highest economies. However, despite the disparities in access to healthcare and spending power among these countries, we found similar challenges in implementing UHC nonetheless. The lack of and difficulty in accessing available data are the most challenging for all countries in this review. Additionally, challenges to health service coverage included poor access to and unavailability of family planning services, inpatient capacity, TB, HIV, hepatitis B, and cancer treatments, anti-tobacco measures, and diabetes and hypertension prevention and control. Challenges to financial protection include a rising standard of living that pushes families across poverty lines, and an increase in GDP per capita spending that inadvertently leads to expensive treatments and higher out-of-pocket payments.

In addition to compiling data from the UHC Global Monitoring Reports, we compared the publicly available national lists of essential medicines (NLEM) to the 2019 WHO Model List of Medicines. We found that all the NLEMs need updating, particularly for TB, HIV, hepatitis B, the reserve group of antibiotics, targeted cancer therapies, palliative care, and HPV vaccine. Although, it was encouraging to find that some Asian governments, including those of Taiwan (ROC), Thailand, and Singapore, include health technology assessments in their national health technology policies to update their

NLEM and promote access to and the rational use of essential medicines that are authentic and of good quality.

We also queried the possibilities with digital healthcare in Asia and found that many countries already use digital health to some capacity, although most countries need to invest in robust IT systems. Digital healthcare has potential as a cheaper and faster alternative or supplement to traditional methods of increasing primary healthcare access that the 2019 Global Monitoring Report recommends, which requires a global investment of USD 371 billion to improve healthcare programs, build or upgrade 415,000 health facilities, and increase the number of healthcare professionals to 80.2 million by 2030.

Finally, we developed a logic model for our recommendations to governments, healthcare providers, partner organizations, pharmaceutical companies, academic institutions, and the general population. Our recommendations include policies on and provision of quality and authentic drugs and health technologies, real-time data collection, analysis, and sharing, development of new drugs and diagnostic tests and negotiating drug prices, research ethics, minority participation in research, cybersecurity, and UHC advocacy.

List of Abbreviations

2G NHI	National Health Insurance, 2nd generation
ACE	Agency for Care Effectiveness
ART	antiretroviral therapy
DTP3	three doses of diphtheria, tetanus, and pertussis vaccine
EHR	electronic health records
EMR	electronic medical records
GDP	gross domestic product
HAQI	healthcare access and quality index
HBV	hepatitis B virus
HIC	high-income countries
HITAP	Health Intervention and Technology Assessment Program
HIV	human immunodeficiency virus
HPV	human papillomavirus
HTA	Health Technology Assessment
HWD	heath worker density
ID	infectious diseases
IHR	International Health Regulations
IT	information technology
LMIC	lower-middle-income countries
LRI	lower respiratory infections
MFPG	mean fasting plasma glucose
mHealth	mobile health
MPH	Ministry of Public Health
NCD	non-communicable diseases
NIHTA	National Institute of Health Technology Assessment
NLEM	National List of Essential Medicines
OOP	out-of-pocket
PPP	purchasing power parity
RMNCH	reproductive, maternal, newborn, and child health
SDG	Sustainable Development Goal

SDI	socio-demographic index
TB	tuberculosis
UHC	Universal Health Coverage
UMIC	upper-middle-income countries
UN	United Nations
WHO	World Health Organization

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1. Background

Universal health coverage (UHC) means that all populations worldwide receive quality, affordable healthcare (1). Healthcare that includes access to essential primary care services and safe, authentic, and effective medicines and vaccines, and protects against financial hardship (1,2). National governments achieve UHC through regulation, taxation, and initiatives that enable them to provide affordable healthcare to more than 90% of their population (3). UHC is target 3.8 of Sustainable Development Goal 3 (SDG 3). SDG 3 is one of 17 SDGs endorsed by all United Nations (UN) Member States in 2015, whose focus is good health and well-being throughout a person's life-course (1,2,4).

Progress towards UHC promotes achieving SDG 3 and all health-related components of the other 16 SDGs by 2030 (1,5) because a) access to healthcare enable job productivity and children's education (6), and b) quality healthcare improve health outcomes and prevent premature deaths (7). Although measuring progress is a continuous process influenced by changes in demographics, trends in health epidemiology and technology, and expectations of the population, factors that indicate progress are consistent and include a) access to needed healthcare services; b) receipt of correct health diagnosis and necessary medicines and clinical interventions; c) health-seeking behaviour unencumbered by out-of-pocket (OOP) payments, location and condition of healthcare facilities, and numbers of healthcare workers; and d) strengthened health systems through healthcare financing, governance, workforce organization, service delivery, and information systems (5,6).

There are two indicators to measure progress towards UHC – indicators 3.8.1 and 3.8.2 (5). Indicator 3.8.1 measures equitable, essential health service coverage based on four categories: a) reproductive, maternal, neonatal, and child health (RMNCH); b) infectious diseases (ID); c) non-communicable diseases (NCD); and d) healthcare capacity and access. Indicator 3.8.2 measures the proportion of households that spend large amounts on healthcare, relative to their total household consumption or income, using catastrophic spending and impoverishing spending on health (5).

Catastrophic spending determines OOP expenditure beyond a household's ability to pay. It derives from household OOP health expenditures exceeding 10% and 25% of total household consumption or income. The current average incidence for the 10% threshold is 9.2%, while the average incidence for the 25% threshold is 1.8% (5). Impoverishment measures households that divert spending from food, shelter, and clothing to healthcare, such that it reduces their spending on the basics below the poverty level. Using the 2011 purchasing power parity (PPP), 3.20 international dollars per day correlates to moderate poverty, while 1.90 international dollars per day correlates to extreme poverty (5). Because low incidences of catastrophic health spending and impoverishment could mean either financial protection or people not receiving needed care due to service unavailability or unaffordability, indicators 3.8.1 and 3.8.2 are measured together (5).

This review focuses on the progress towards UHC in Asia. It is important to take note of the current status of UHC in Asia because, although it is the largest continent, covering almost 30% of the earth's total land area; the most populous, home to 4.4 billion of the 7.1 billion global population; the fastest growing global economy; and the largest economy in terms of gross domestic product PPP (GDP PPP), it also has huge disparities among its nations in terms of access to healthcare and spending power (8). At present, more than half of the 370 million people with diabetes live in Asia, mostly in rural settings with poor healthcare access. In the future, Asia's population is estimated to increase in numbers by up to 65% in some countries by 2050, have the highest number of people aged over 65 years globally by 2050, and have the largest middle-class in the world by 2030 (9), all of which would impact healthcare access and financial security in the Region.

2. Aims and Objectives

This review aims to illustrate 1) the current status of UHC progress in Asia, 2) the overarching trends in establishing and sustaining UHC, and 3) the areas for inter-sectoral support and collaboration. Our objectives are to describe a) the academic importance of UHC in Asia through a systematic review of published literature; b) progress towards UHC in Asia using global and national data in the public domain; and c) challenges and possible solutions to a positive UHC trajectory, using a logic model.

3. Methods

a) Literature review

We searched PubMed between 3 Oct. 2019 and 10 Oct. 2019 for peer-reviewed articles in English and on humans over the past two years, using the search phrases "universal health coverage in Asia;" "universal coverage Asia;" and "universal health coverage [specific country]," and over the past five years using the search phrase "universal health coverage Asian countries." For expediency, "[specific country]" searches only included Cambodia, China, Hong Kong SAR (China), India, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Philippines, Republic of Korea, Singapore, Taiwan (ROC), Thailand, and Viet Nam.

b) Data compilation and analysis

We used data from the WHO/World Bank Joint UHC framework, the World Bank 2017 and 2019 UHC Global Monitoring Reports, WHO databases, and country reports for our comparative analyses. Although cervical cancer screening and access to essential medicines are indicators for coverage of essential services, lack of data precluded their inclusion in the Global Monitoring Reports. Therefore, we looked at the healthcare access and quality index (HAQI) used in the 2016 Global Burden of Disease Study on amenable mortality, which used 32 causes from which death should not occur in the presence of effective care. We compared the most recent national lists of essential medicines that were accessible through WHO websites and compared them against the 2019 WHO Model List of Essential Medicines. We also used three examples of how Asian countries use health technology assessments to inform their national list of essential medicines. Finally, we included a section on digital health to explore possibilities of their supplementing traditional primary health care initiatives to achieve SDGs in Asia by 2030.

For expediency, we compiled data to focus on Asian countries in the Eastern (China, Japan, and Republic of Korea), South-Eastern (Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam), and Southern Regions (India and Pakistan). Where available, we included data on Hong Kong SAR (China) and Taiwan (ROC).

c) Statistical Analysis

We used the descriptive statistics and pivot analysis packages in Excel (version 2016) for basic statistics.

d) Logic model

Using qualitative and quantitative data, we developed a logic model to guide the public, private, and civil sectors, as well as international partners and organizations in progressing towards UHC in Asia.

e) Funding Source

F. Hoffmann-La Roche Ltd. (Roche) provided funding for this review. Roche had no role in the study design, data collection, analysis, and interpretation, or report writing.

4. Findings

a) Literature Review

We found 1,142 peer-reviewed publications using our search phrases, from which we selected 222 that were relevant to this review. Figure 1 is a flowchart of the selection process that indicates the number of hits for each search. The number of publications suggest an academic interest in UHC in the selected countries included in this review.

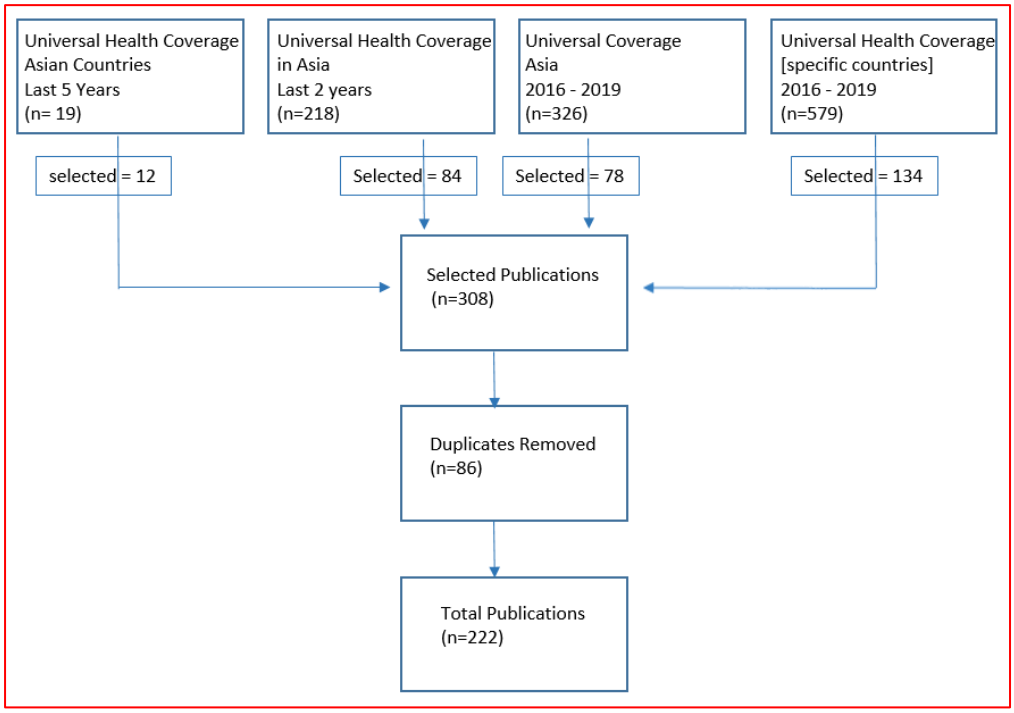
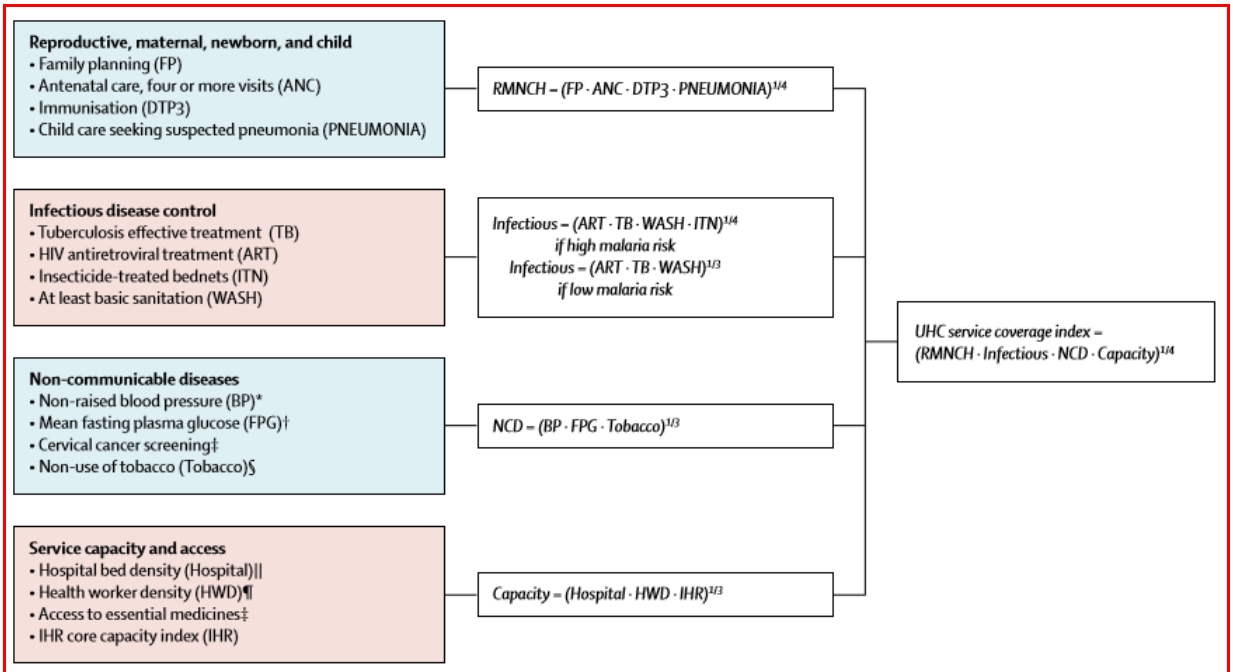


Figure 1 Flowchart of the systematic literature review on Universal Health Coverage in Asia

b) Baseline Progress towards SDG3 Target 3.8.1

To effectively measure target 3.8.1 implementation across the globe and overcome data gaps in many countries, the joint WHO/ World Bank Group UHC monitors devised an index system for the four essential health service coverage categories. The index ranged from 0 to 100, calculated through the geometric means of 16 tracer indicators that satisfied four criteria: 1) an epidemiological burden with corresponding cost-effective interventions; 2) measurable with a numerator, denominator, clear target, and definition of effective coverage; 3) most countries have current and comparable data, preferably those that can be disaggregated to measure equity, and 4) easy to communicate, preferably through using data that countries already collect, to reduce the burden of reporting (11). The UHC service coverage index established baseline information for countries with populations more than 90,000 in 2015, which decision-makers can use to discuss policy (11) and countries can use to track their progress over the years. Figure 2 defines the 16 tracer indicators and illustrates the geometric mean calculation for the UHC service coverage index.



*IHR=International health regulations. *The percentage of the adult population with non-raised blood pressure is based on age-standardised estimates. These distributions were rescaled to provide a finer resolution for the index, based on the observed minima across countries. †Mean fasting plasma glucose was not measured on a scale bounded by 0 and 100. Although very high concentrations are unhealthy, very low concentrations were not expected to provide additional health benefits and could even be harmful. ‡Cervical cancer screening and access to essential medicines were excluded because of low data availability. §Non-use of tobacco was also based on age-standardised estimates and rescaled to provide finer resolution on the basis of a minimum bound of 50%. ||Hospital bed density values were rescaled and capped on the basis of a threshold of 18 per 10 000 population on the basis of minimum rates observed in high-income Organization for Economic Co-operation and Development countries. ¶Health worker density was rescaled and capped on the basis of threshold values. Physician density had a threshold of 0·9 per 1000, psychiatrists had a threshold of 1 per 100 000, and surgeons had a threshold of 14 per 100 000 population.*

Figure 2 UHC service coverage index tracer indicators and geometric mean calculation
Source: Hogan, et al. Lancet Glob Health 2018; 6:e157 (11)

Global baseline results indicate UHC service coverage in 183 countries ranging from 22 (lowest) to ≥80 (highest). Countries in Sub-Saharan Africa dominate the lower values (up to 40), along with two countries in Southern Asia[1] – Afghanistan (34) and Pakistan (40). Countries that performed at least 10 index units higher than expected, based on gross national income per capita, include Myanmar and Viet Nam, while countries that performed at least 10 units lower than expected included Pakistan and Indonesia (11). Table 1 shows that, based on population-weighted averages across all four categories of RMNCH, ID, NCD, and service capacity and access, Eastern Asia is among the regions with the highest indices, while Southern Asia is among the regions with the lowest indices (5,11). Finally, equity calculations for 52 countries, using a subset of the 16 tracer indicators, show that the service coverage among the poorest quintiles of the population and the national average differ by at least 20% in countries such as Cambodia, Pakistan, and Viet Nam and by at least 10% in the Philippines (11).

[1] Regions are based on the study's modified SDG region list (11)

Table 1 Population-weighted averages of UHC service coverage index by SDG region and indicator categories

Area	UHC service coverage index	RMNCH	Infectious diseases	NCDs	Service capacity and access
Global	64	75	54	63	71
Africa	46	55	40	67	37
Northern Africa	64	73	50	62	77
Sub-Saharan Africa	42	51	37	69	27
Asia	64	75	51	63	71
Eastern Asia	77	86	64	64	99
Southern Asia	53	66	41	64	47
South-Eastern Asia	59	78	45	59	63
Central Asia	70	81	56	58	93
Western Asia	65	69	59	57	79
Europe and Northern America	77	88	73	58	96
Latin America and the Caribbean	75	81	65	68	88
Oceania	74	83	71	62	84

NCDs: noncommunicable diseases; RMNCH: reproductive, maternal, newborn and child health; UHC: universal health coverage.

Source: The World Bank; 2017. Tracking universal health coverage: 2017 global monitoring report (5)

Table 2 takes a closer look at the countries in Eastern, South-Eastern, and Southern Asia that we included in this review. Using the lowest (22) and highest (≥80) indices, we split the table evenly into three groups to classify the stages of implementing UHC target 3.8.1. We used the service coverage index scores 64 to ≥80 to classify countries that are ahead of the others in implementation; 43 to 63 for those getting on-track; and 22 to 42 for those falling behind.

Table 2 UHC service coverage index of selected Asian countries stratified by indicator category, economy, and SDI

Country	*UHC Index*	*RMNCH**	*ID**	*NCD**	*Service**	*Economy†*	*SDI‡*
Republic of Korea	≥80	89	82	69	100	HIC	High
Singapore	≥80	89	71	75	100	HIC	High
Japan	≥80	86	69	68	100	HIC	High
China	76	86	63	63	100	UMIC	Varies
Thailand	75	92	63	68	82	UMIC	High-Middle
Viet Nam	73	82	62	65	84	LMIC	Middle
Malaysia	70	78	56	60	89	UMIC	High-Middle
Myanmar	60	73	57	66	46	LMIC	Low-Middle
Philippines	58	65	54	65	49	LMIC	Middle
India	56	68	44	66	50	LMIC	Varies
Cambodia	55	72	59	67	33	LMIC	Low-Middle
Indonesia	49	79	26	49	58	LMIC	Middle
Pakistan	40	54	26	53	35	LMIC	Low-Middle

*RMNCH=Reproductive, maternal, newborn, and child health. ID=infectious diseases. NCD=non-communicable diseases. HIC=high-income country. UMIC=upper-middle-income country. LMIC=lower-middle-income country. *Values are based on the geometric means of tracer indicators for each category. †World Bank classification of economies. ‡SDI=socio-demographic index – the geometric mean of national income per person, educational level for those older* than 15 years, and total fertility rate of the population (12).

Source: Hogan, et al. Lancet Glob Health 2018; 6: Supplementary Appendix (11)

i. Countries ahead of others (UHC service coverage index 64 to ≥80)

Countries included in this review that are ahead of the others in implementing UHC target 3.8.1 are China, Japan, Malaysia, Republic of Korea, Singapore, Taiwan, Thailand, and Viet Nam. High index scores for RMNCH and service capacity and access, and high-income or upper-middle-income economies are common to all except for Viet Nam, which is a lower-middle-income country.

Figure 3 shows the service index scores of each country for the four tracer indicators for RMNCH (5,11). All countries in this group scored >90 on two out of four indicators, except for Taiwan (care-seeking, DTP3 coverage, and antenatal care) and Thailand (DTP3 coverage, antenatal care, and family planning), which scored >90 on three; all scored >90 for DTP3 coverage; and all HICs scored >90 for antenatal care. However, all scored <90 on family planning, except China and Thailand (5,11).

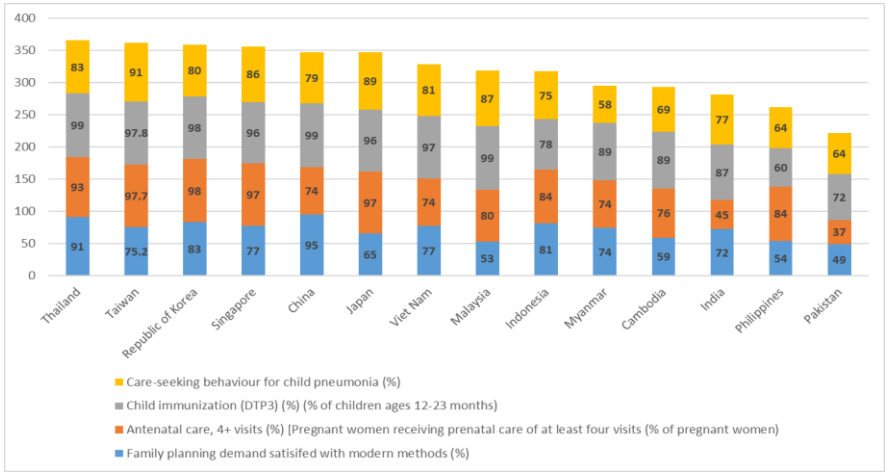


Figure 3 Graph of country scores for each tracer indicator for RMNCH

Figure 4 shows the service index scores of each country for three indicators for service capacity and access (5,11). Common to all countries in this group is a score >90 for international health regulations (IHR 2005) core capacity, which indicates preparedness for health emergencies as part of health security. Common to all HICs is a score of 100 for health worker density, which is a proxy for access to outpatient services, and is a combination of the number of physicians, psychiatrists, and surgeons per person.

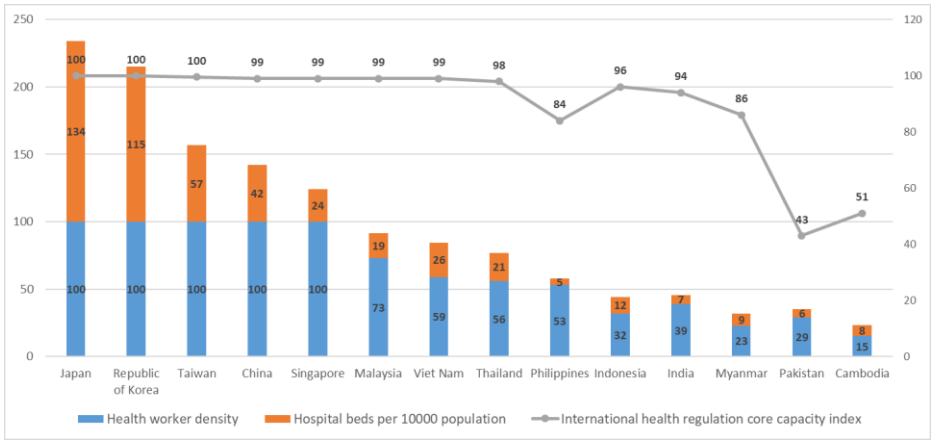


Figure 4 Graph of country scores for three tracer indicators for service capacity and access

ii. Countries getting on track (UHC service coverage index 43 to 63)

Countries included in this review that are getting on track in implementing UHC target 3.8.1 are Cambodia, India, Indonesia, Myanmar, and Philippines. Lower-middle-income economies and Index scores >50 for RMNCH and NCD are common to all except for Indonesia, which scored 49 for NCD.

Figure 3 shows that all countries in this group scored >50 on all four tracer indicators for RMNCH except for India, which scored 45 for antenatal care. All countries scored <50 on health worker density except the Philippines, which scored 53 (Figure 4), although figure 5 shows that the number of physicians per 1000 population had already increased, compared to data from 2000 – 2001 (5,11).

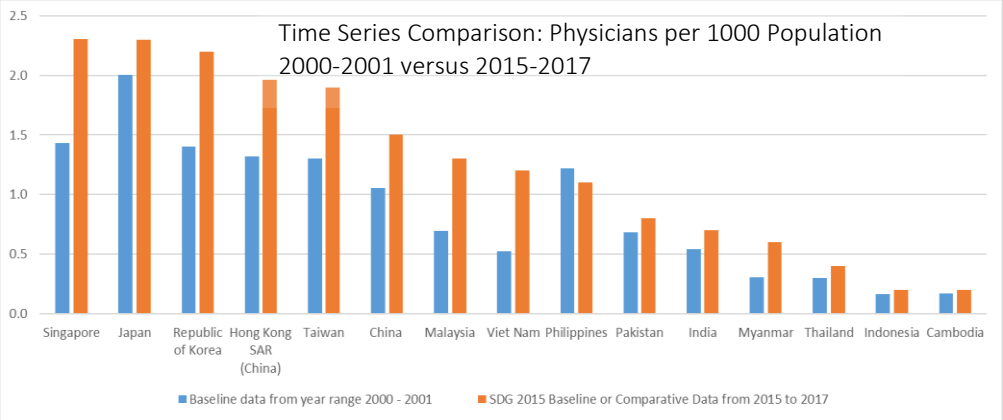


Figure 5 Time series comparison between 2000 – 2001 and 2015 of number of physicians per 1000 population

Figure 6 shows the service index scores of each country for three indicators for NCD (5,11). Common to all countries in this group is a score ≥50 for non-tobacco use, which is a proxy indicator for national anti-tobacco control measures.

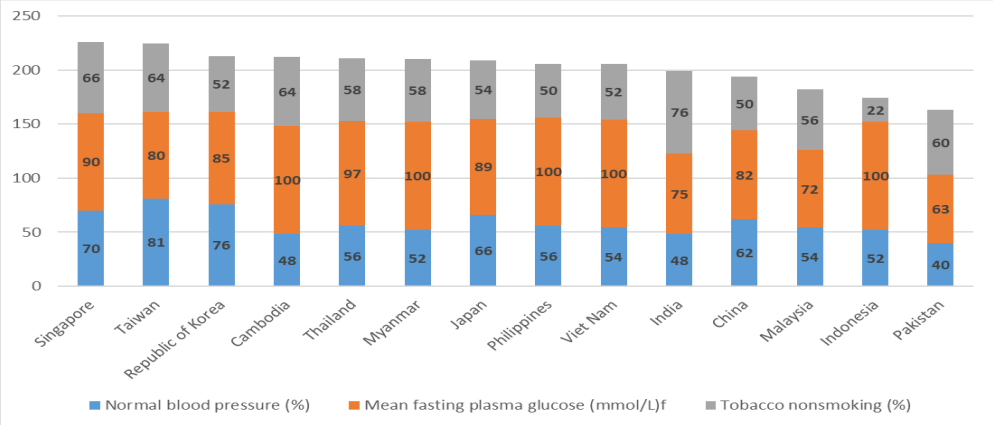


Figure 6 Graph of country scores for three tracer indicators for non-communicable diseases

iii. Countries falling behind (UHC service coverage index 22 to 42)

Only Pakistan, a country in conflict, falls behind all countries included in this review. Pakistan scored particularly low in infectious diseases and service capacity and access. It scored <50 on many tracer indicators including, antenatal care, family planning (figure 3), and HIV (figure 8). Pakistan also had

the lowest score for IHR (43), although figure 7 shows this is already an improvement compared to data from 2010, which is true for all countries in this review, except Myanmar (5,11).

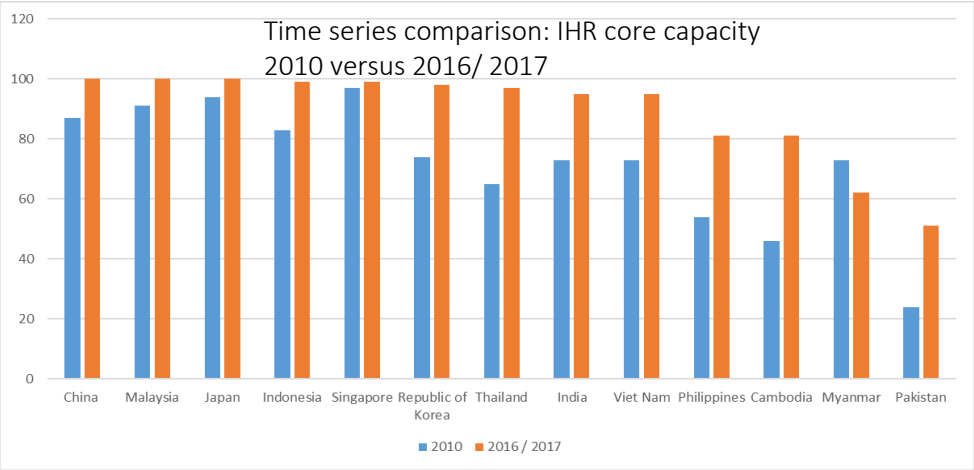


Figure 7 Time series comparison between 2010 and 2016/2017 of IHR core capacity

iv. Tracer Indicators that need the most attention

Countries in this review need to pay particular attention to 1) hospital beds per person, proxy indicators for access to inpatient services, on which the graph in figure 4 shows most countries scored <50; 2) tobacco non-smoking, a proxy for anti-tobacco measures, for which the highest score in figure 6 was 76 (India); 3) non-raised blood pressure, a proxy for normal blood pressure, for which the highest score in figure 6 was 81 (Taiwan); 4) TB, for which the highest score in figure 8 is 82 (China), and 5) HIV, for which only three countries scored >70 (Cambodia, Japan, and Republic of Korea) (5,11).

Until proper data become available, countries in figure 6 that scored 100 on mean fasting plasma glucose mmol/L (Cambodia, Indonesia, Myanmar, Philippines, and Viet Nam) need to pay attention to this indicator, a proxy for effective diabetes treatment and prevention. These countries have mean fasting plasma glucose concentrations that are lower than 5.1 mmol/L, which is the best estimate of the lowest health risks associated with diabetes. Countries with a high diabetes prevalence are not encouraged to attain non-diabetic levels for all patients, because lower levels have no added health benefits, and may even be harmful to some (11).

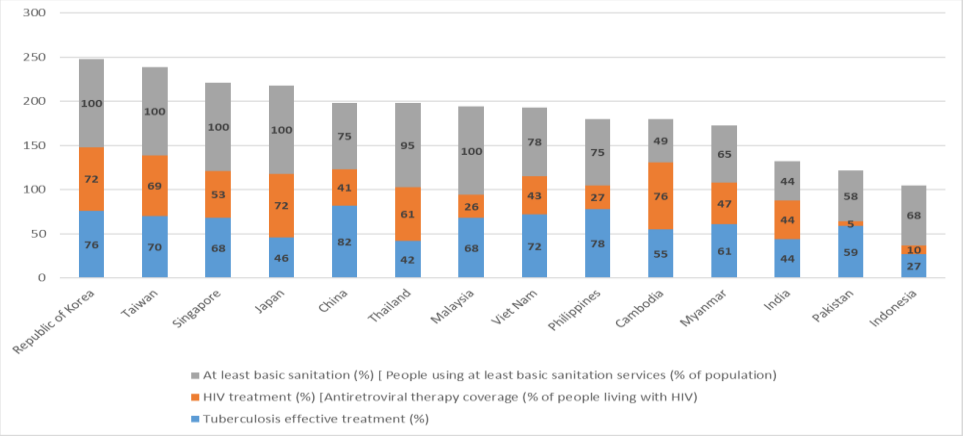


Figure 8 Graph of country scores for three tracer indicators for infectious diseases

v. Coverage of cancer screenings and access to essential medicines

The table in Appendix 1 shows the healthcare access and quality indices (HAQI) for amenable mortality of the countries included in this review. Similar to the UHC service coverage index, HAQI correlated better with the national level of economic development than with their socio-demographic index (7).

Of the 32 metrics for amenable mortality, all countries scored 100 only on effective medical care for upper respiratory infections and diphtheria, and very poorly for squamous-cell carcinoma (HAQI range: 5-30). Aside from these, common to all HICs were high scores on all categories except for Singapore, which scored <50 on communicable diseases (lower respiratory infections - LRI); common to UMICs are scores <50 on LRI and non-communicable diseases (NCDs) including, neoplasms, cardiovascular diseases, and diabetes and endocrine diseases; and common to LMICs are low scores on all categories, particularly for TB, all cancers, stroke, hypertensive heart disease, chronic kidney disease, and congenital heart anomalies (7).

The table in Appendix 2 shows a comparison of a snapshot of the national lists of essential medicines (NLEM) with the WHO Model List of Essential Medicines 2019 (13). We included the most recent, publicly available versions of the NLEM that are accessible in WHO databases (14,15) to illustrate the need for the selected countries to update their lists, to keep up with the 2019 Model List. Countries need to update essential medicines for 1) SDG 3 indicators, such as TB, HIV, and hepatitis B, with particular attention to combination therapies for TB and HIV; 2) the reserve group of antibiotics; 3) targeted cancer therapies; and 4) palliative care.

It is important to note that, as there are drugs in the WHO Model List that are not in the individual NLEMs, so too are there drugs and combination therapies in national lists that are not in the Model List. These may be unique to a country, but essential enough to make their NLEM.

vi. The role of Health Technology Assessments

To promote access to and the rational use of essential medicines that are authentic and of good quality, governments are including health technology assessments (HTA) in their national health technology policies for the advancement of UHC (16).

In Thailand, the government formed the Health Intervention and Technology Assessment Program (HITAP) to develop UHC further by expanding service coverage and equity through HTA (17). HITAP is a semi-independent, not-for-profit unit of the Thai Ministry of Public Health (MPH) that provides evidence-based recommendations on medical interventions and technologies, such as antiretroviral therapies (ART) for HIV and renal replacement therapy for end-stage kidney disease (18). The MPH then uses the HITAP recommendations to inform the NLEM, access to which the Thai government requires all healthcare schemes to provide to their patients (19).

In Taiwan, part of the reform blueprint for the second generation of their National Health Insurance scheme (2G NHI) was to reorganize their drug review board into the National Institute of HTA (NIHTA), thus, increasing the importance of HTA in their drug policies(20,21). NIHTA informs the NHI of the findings of technical evaluations for medicines, medical devices, and services, and recommends mechanisms for drug prices and service payments that are fair, transparent, systematic, multi-sectoral, and representative (20,21).

And, in Singapore, HTA informs the drugs and technologies to include in the government-subsidized Standard Drug List (22). In 2016, the Singapore government created the Agency for Care Effectiveness (ACE), to oversee HTA evaluations and recommend evidence-based guidelines for evaluating drugs and medical technologies, drug pricing, and introducing new drugs, diagnostics, and therapies (23). ACE also publishes the Appropriate Care Guides to inform good clinical practice (24).

c) 2019 Progress towards SDG3 Target 3.8.1

In recent weeks, the joint WHO/ World Bank Group UHC monitors published the 2019 progress report on UHC, which more strongly emphasizes the importance of primary health care, and the need for each UN Member State to increase healthcare spending by 1% of their GDP (25). Two years since the monitors reported baseline data, observed were the mixed but mostly increased indices for overall UHC service coverage, RNMCH, ID, NCD, and service capacity and access, shown in figure 9. Overall service coverage increased by an average of three units, with Indonesia improving the most by eight units (figure 9A). India was the only country on our selection that showed a decrease in overall service coverage, with a change of one unit. Based on the increase in its overall service coverage index, Pakistan now belongs to the group of countries in this review that is getting on track on UHC (index score between 43 and 63).

Infectious diseases had the fastest growth in improvements, which figure 9D shows as having the steepest rise in trendline (y = 0.7033x). Coverage in ID increased by an average of seven units, led by Indonesia, Japan, Malaysia, Thailand, and Viet Nam with huge increases of ≥10 units. The 2019 report attributed the improvements to increases in the use of insecticide-treated nets in malaria-endemic countries, and antiretroviral therapy in people with HIV (25). Nevertheless, because the number of people who receive ART depends not only on the availability of drugs but also on timely diagnosis of the disease, countries need to include ART in their NLEM and also continue increasing their capacities for HIV testing. The stigma associated with HIV infection is one of many barriers to testing, which data suggest self-testing could overcome. However, although self-administered HIV tests provide much-needed privacy, and are convenient and easy to use, there is a risk that they may lead to poor access to services such as counselling before and after HIV diagnosis (25).

Service capacity and access had the second fastest growth in improvements in the selected countries shown in figure 9C, mostly due to LMICs. The Philippines improved the most, increasing coverage by nine units, while India's coverage decreased by four units. The 2019 report indicates the slowest gains for most countries in this category, which the authors attributed to conservative calculations and data gaps over time (25). Therefore, needed are real-time data collection, analysis, and sharing.

All HICs and UMICs included in this review increased coverage for non-communicable diseases, with the fastest gains in HICs (figure 9E). Among the LMICs, only Cambodia, Indonesia, and Pakistan showed an increase in NCD coverage. Indonesia improved the fastest among all countries, by nine units, while India's coverage decreased the most, by two units. These correlate with the 2019 report, which attributed the reduced coverage in LMICs to rising burdens and risks of NCDs in countries that have not expanded and improved their capacities (25). In particular, incidences of cervical cancer in Asia and Africa account for 76% of new cases and 80% of associated deaths in 2018 alone. By contrast, most HICs included the human papillomavirus (HPV) vaccine in their NLEM, to immunize adolescent females against cervical cancer (25).

RMNCH coverage showed the most range of rate changes among all four categories, as shown in figure 9B. Pakistan gained the fastest, by nine units, while Malaysia, Myanmar, and Thailand

regressed the most, by two units. The 2019 report attributed improvements in this category to expanding childhood vaccination coverage and higher education and greater social independence of women in the population. Meanwhile, greater social independence in women in Cambodia, India, Indonesia, and the Philippines correlate with less demand for family planning services than the least independent women (25,26). Informal workers are also less likely to seek RMNCH services than formal workers in a population because they usually do not have sick leave or paid leave at work. In Asia, informal workers make up 68% of all people who work for a living (25,27). Therefore, health programs need more focus on equity of access among the population.

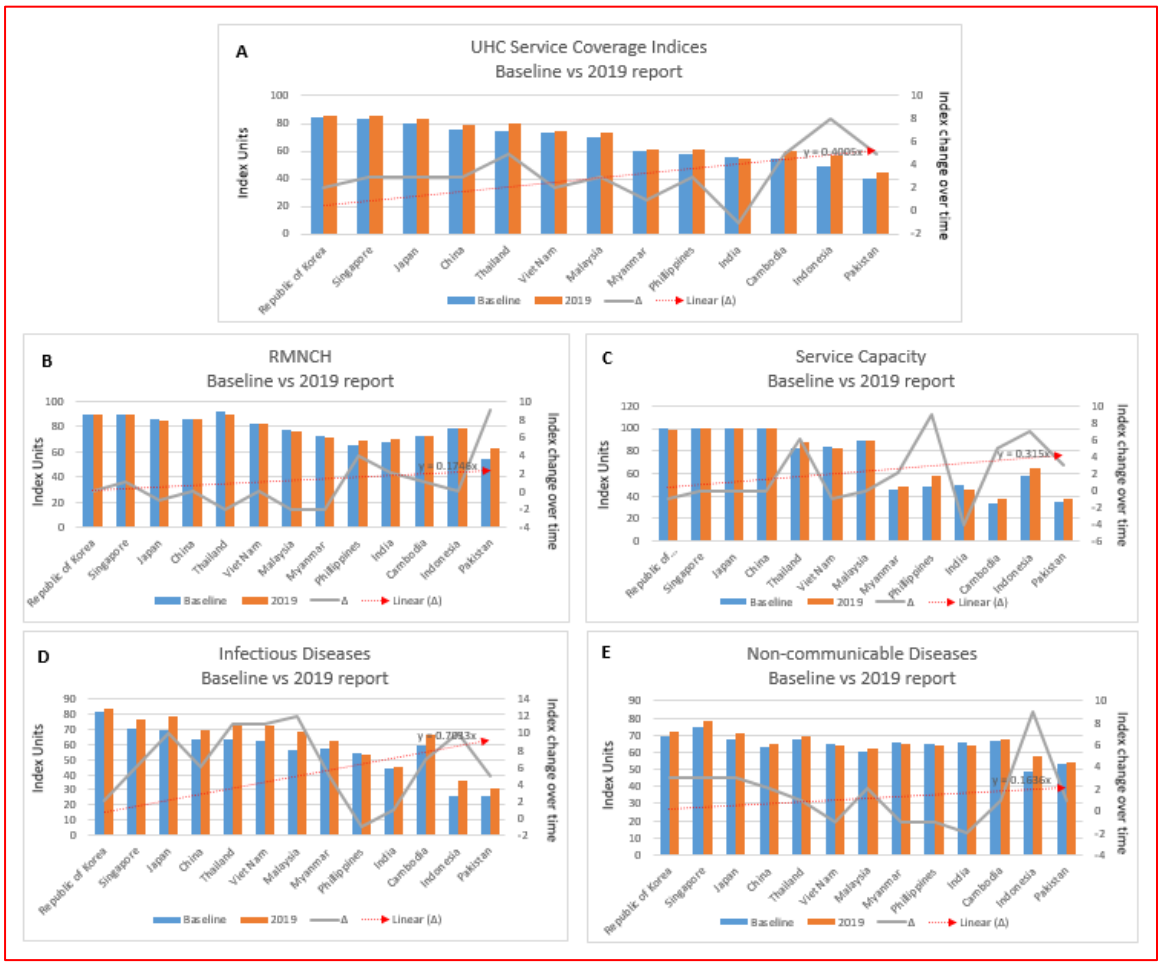


Figure 9 Graphs of progress towards UHC 3.8.1 from the 2017 baseline to the 2019 report

d) Baseline Progress towards SDG3 Target 3.8.2

i. Catastrophic Spending

To measure catastrophic spending, the joint WHO/ World Bank Group UHC monitors 1) estimated the incidence of catastrophic OOP spending as household consumption (or income, in the absence of consumption data) exceeding 10% and 25%; 2) observed the trends over a period of ten years from 2000 to 2010, and 3) correlated the incidence with gross domestic product (GDP) per person, the Gini income inequality coefficient, and total health spending by governments, private insurance companies, and non-profit organizations (28).

Globally, the incidence of catastrophic OOP spending varied by country and by region. When aggregating incidence data for 2010, the monitors estimated that 808.4 million people incurred OOP health spending at 10% of household consumption, of whom 531.1 million were in Asia, and 179.3 million people at the 25% threshold, of whom 128.7 million were in Asia (5,28). The number of people that incurred spending at 10% and 25% thresholds increased in trend between 2000 and 2010, likely due to increased OOP spending in Africa and Asia (5,28). The data showed a partial direct correlation between catastrophic spending and GDP spent per capita, and between catastrophic spending and income equality (5,28). Finally, the data showed public financial protection through government total health spending, but the same was not evident with data from private insurance companies and non-profit organizations (5,28).

For the countries in this review that had available data, figure 10 shows the percentage of Asian populations that incurred OOP health expenditure that exceeded 10% of their household consumption, and figure 11 shows incurred catastrophic health spending at the 25% threshold. Data at the 25% threshold show a lower percentage of excess health spending than at the 10% threshold. Nevertheless, comparative analyses of data between 1998 – 2005 and 2007 – 2015 indicate a trend of increased OOP health spending over the years for China, India, Indonesia, Philippines, and the Republic of Korea, and decreased spending over the years for Malaysia, Pakistan, Taiwan, Thailand, and Viet Nam for both thresholds (5,29). These data suggest that health insurance or public medical service coverage cannot be used to measure catastrophic spending because, although China, Indonesia, Philippines, Thailand, and Viet Nam have all increased their health insurance coverage, their outcomes differed (28,30-33).

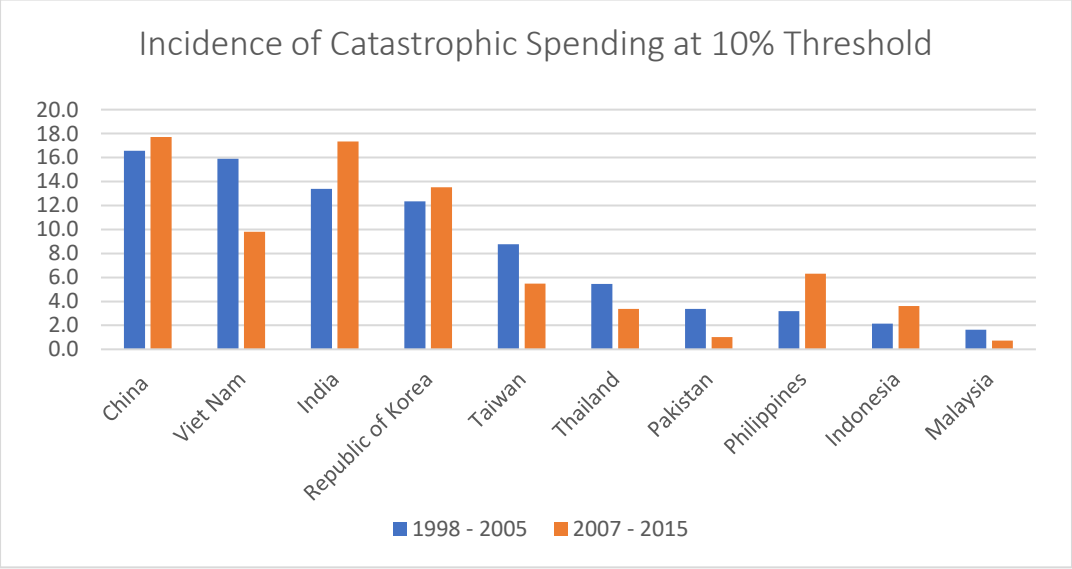


Figure 10 Comparative data on catastrophic health spending for select Asian countries at the 10% threshold

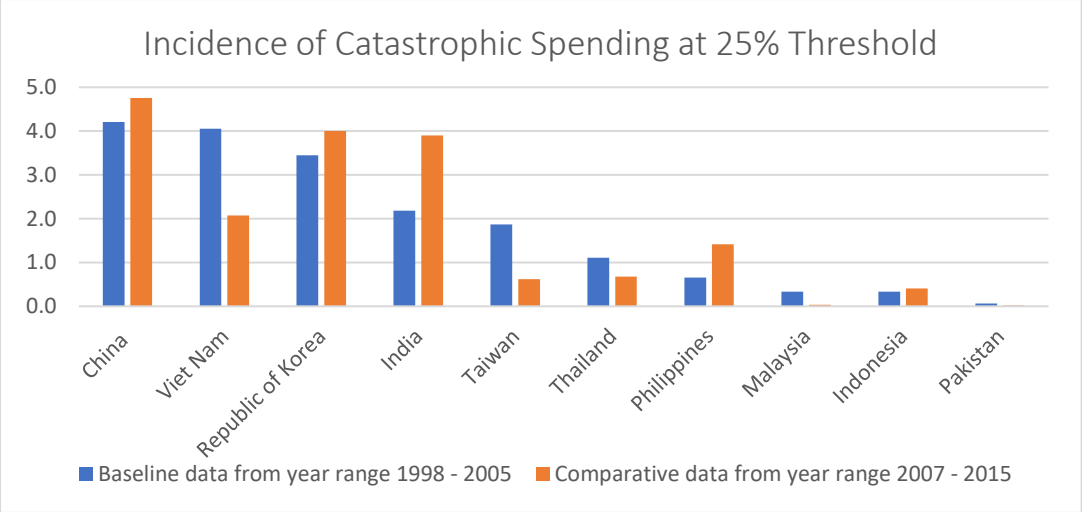


Figure 11 Comparative data on catastrophic health spending for select Asian countries at the 25% threshold

Figure 12 shows an increase in total health expenditure as a percentage of GDP between 2006 and 2016 for countries included in this review except for India, which remained the same, and Cambodia and Pakistan, which decreased. The average annual increase in GDP share per person ranged from 0.4% for Taiwan and 10.2% for Myanmar (34-36). Consistent with global results, GDP directly correlated with catastrophic health spending for some countries, such as China, Korea, Indonesia, Pakistan, and the Philippines (5,28), which suggests that increased GDP health spending per person may mean increased service availability, expensive technology, and higher OOP spending, and vice versa (28,37).

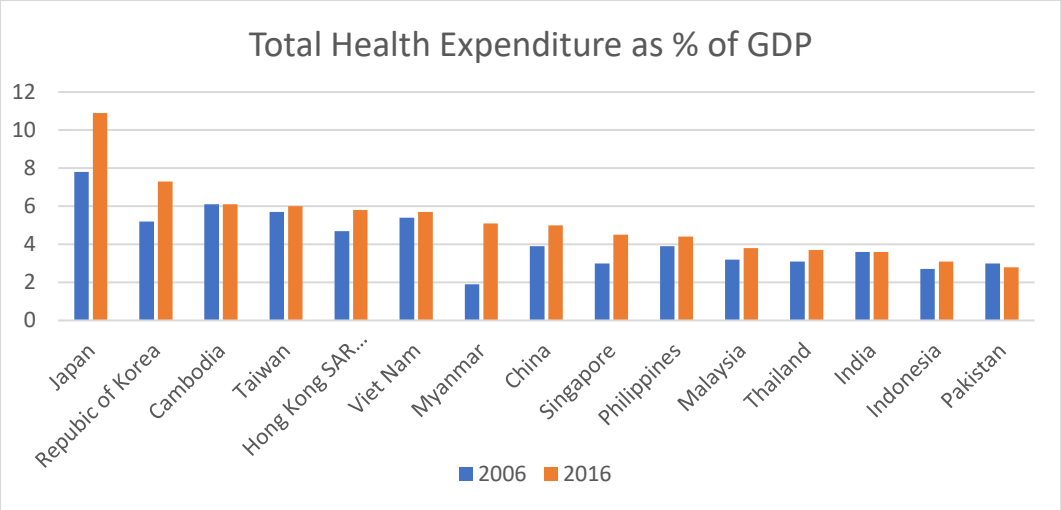


Figure 12 Comparative data on total health expenditure as % of country GDP share per person

Figure 13 illustrates current health expenditure through government programs and mandatory contributory schemes such as social health insurance. The graph shows an increase in public spending between 2001 and 2016 for all countries except Malaysia, which remained the same, and Hong Kong SAR (China), Taiwan, Pakistan, Philippines, and Viet Nam. The average annual increase in public spending ranged from 0.2% for Japan, and 6.4% for China, and the average annual decrease

ranged from -1.7% for the Philippines and Viet Nam to -0.1% for Taiwan (34-36). Data for Malaysia, Taiwan, Thailand, and Viet Nam are consistent with global findings that government health expenditure inversely correlate with catastrophic spending, particularly in countries with higher income levels per person (5,28), suggesting financial protection through government public health schemes (28).

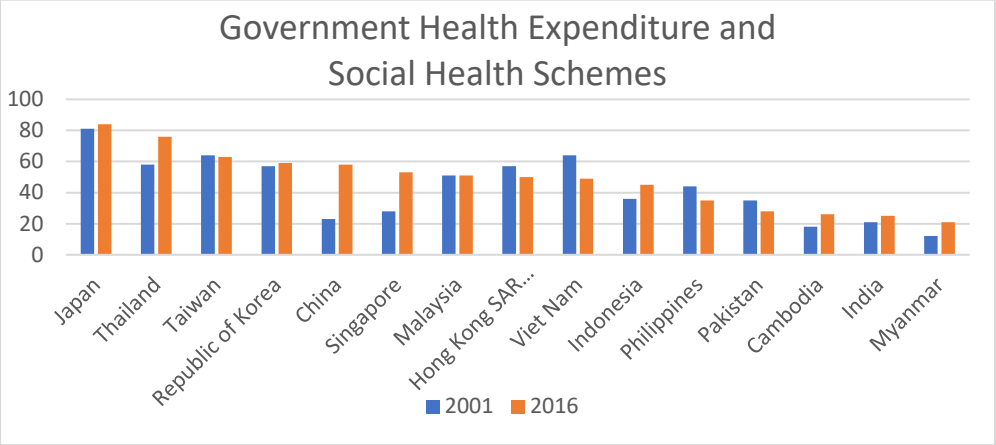


Figure 13 Comparative data on government current health expenditures and mandatory contributory health schemes

ii. Impoverishing Health Spending

Impoverishing health spending is not an endorsed indicator for UHC, but it supplements catastrophic spending data to estimate how many households are pushed into poverty by OOP health spending (38). The joint WHO/ World Bank Group UHC monitors measured the incidence and depth of impoverishing spending by calculating the difference between the number of people in poverty and the poverty gap with and without OOP health spending included in the total household consumption (or income, in the absence of consumption data). The number of poor people was assessed using the $1.90 and $3.20 per day international poverty lines and a 50% relative poverty line (38).

Globally, even countries with health insurance or health services schemes incurred impoverishing OOP expenditure. Asia and Africa have the highest incidence of impoverishment at $1.90 per day, making up 94% of the world's poorest poor due to OOP health spending. The incidence of poverty at $1.90 per day decreased between 2000 and 2010 but increased at the $3.20 per day and relative poverty lines, and the depth of poverty decreased for both international poverty lines. Similar to catastrophic spending, health insurance or public medical service coverage is a poor measure for impoverishment, and impoverishment correlated directly with GDP spending per capita and inversely with total government health schemes (5,38).

For the countries included in this review that had available data, figure 14 shows the percentage of Asian populations whose OOP health spending pushed them into extreme poverty (5,38), and figure 15 shows impoverishing health spending at moderate poverty. Similar to global data, impoverishment decreased at the $1.90 per day poverty line in China, Indonesia, Pakistan, and Viet Nam between 1998 – 2005 and 2007 – 2015, which may reflect the rise in living standards and a move away from extreme poverty (38). Also similar to global data, impoverishment increased at the $3.20 per day poverty line for China, India, Malaysia, and the Philippines, which may also reflect the rise in living standards lifting populations above moderate poverty (38).

Impoverishing health spending directly correlated with GDP health spending per person for both international poverty lines for Malaysia, Pakistan, and the Philippines, and at the $3.20 poverty line for China (5), and inversely correlated with government health schemes for both international poverty lines for Indonesia and the Philippines, at the $1.90 poverty line for China, and the $3.20 international line for Thailand(5). These data further illustrate that increased GDP spending could lead to impoverishment, while government health schemes may be financially protective (38).

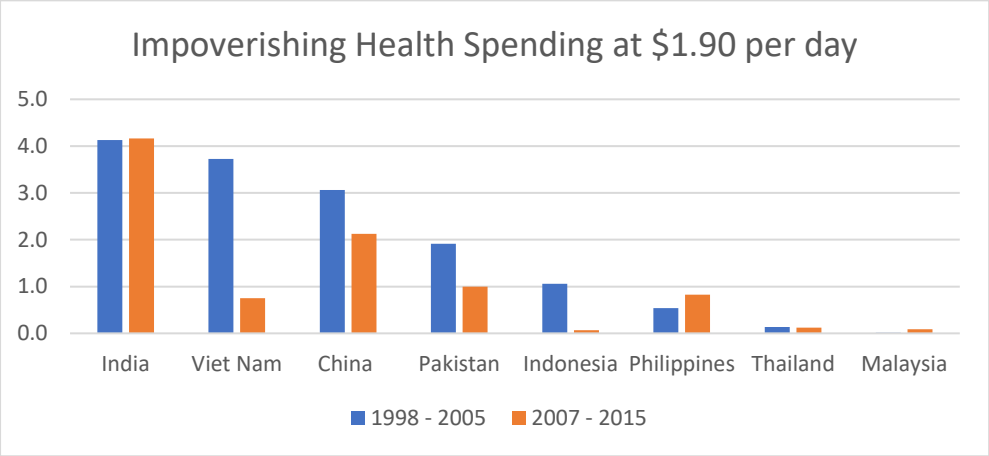


Figure 14 Comparative data on impoverishing health spending for select Asian countries at the $1.90 per day poverty line

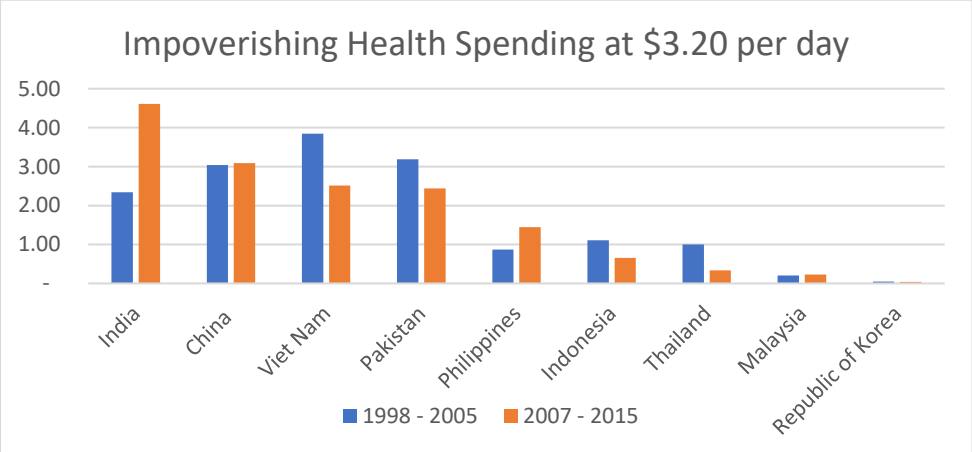


Figure 15 Comparative data on impoverishing health spending for select Asian countries at the $3.20 per day poverty line

e) 2019 Progress towards SDG3 Target 3.8.2

The joint WHO/ World Bank Group 2019 progress report on UHC showed that by 2015, the gap between catastrophic health spending in LICs and HICs narrowed, such that equal percentages of their populations now exceed the 10% threshold (25). And, although OOP expenditure for the 10% and 25% thresholds increased sharply at different time intervals in LMICs and UMICS, their populations now have relatively equal shares of the world's catastrophic expenditures, at 45% for LMICs and 41% to 43% for UMICs (25). In the WHO South-East Asian Region, the number and percentage of people with OOP health spending exceeding 10% and 25% thresholds increased at a

faster rate between 2010 and 2015 than in previous years (25). And, in the WHO Western Pacific Region, the number of people that incurred catastrophic spending at both thresholds stayed the same during 2010 - 2015, even though the percentages show a decline (25).

Between 2000 and 2015 the number of people and the percentage of the populations that fell below the $.190 and $.3.20 poverty lines due to health spending decreased at varied rates globally, although impoverishment due to health spending increased at the relative poverty line (60% median consumption per day within a country). Since 2015, the number of people pushed into poverty numbered 89.7 million at $1.90 per day; 98.8 million at $3.20 per day; and 183.2 million at the relative poverty line (25). Most of the impoverished live in middle-income countries and Asia, with 60% of those in extreme poverty due to health spending found in the WHO South-East Asia Region. Together with the African and Western Pacific Regions, people pushed into poverty in South-East Asia equal 95% at the $1.90 poverty line and >75% at the $3.20 and relative poverty lines (25).

Current data suggest disproportionate spending on medicines as the most likely reason for impoverishment in South-East Asia. Government interventions to curb OOP spending on medicines in the Region, following updates on their NLEM, include any combination of free and subsidized access at public facilities, direct reimbursement to providers and consumers, and price regulations for more affordable medicines, none of which had worked. Therefore, needed are more evidence-based data, such as those based on HTAs, to inform government policies on medicine access and affordability (25).

In our selected countries, figure 16 illustrates the changes in OOP expenditures that have led to catastrophic spending and impoverishment since baseline measurements. Note that the countries in the graphs that show no change in their spending were ones that had no new data available. For catastrophic spending, most countries decreased their OOP expenditure at 10% of household consumption, with Cambodia decreasing the most by 4%; however, the trendline in figure 16A shows a slight increase due to the rapid rise in spending in the Republic of Korea (8%) and Pakistan (4%). At the 25% threshold in figure 16B, most countries decreased spending since baseline, with Japan reducing the most by almost 2%, while China, Indonesia, and Pakistan slightly increased spending by <1%. For impoverishment at the $.190 per day poverty line, figure 16C shows financial protection from extreme poverty for all countries except for Indonesia, which had three times more people pushed further into poverty. We also observed financial protection at the $3.20 poverty line for all countries, except for Indonesia and Pakistan. However, figure 17 shows that OOP spending increased at both the $3.20 and relative poverty lines, albeit at a faster rate for relative poverty.

These findings further support the first UHC global analysis that the rising standards of living in Asia push families across, instead of below, poverty lines (5,38); thereby suggesting that, as countries become richer, GDP health spending per capita increases, which then exposes families to increased OOP spending due to the number of available services and the use of expensive technology (5,25,28,38). This is particularly true for Indonesia and Pakistan, the two countries in this report that gained the most in UHC service coverage but also spent the most for it.

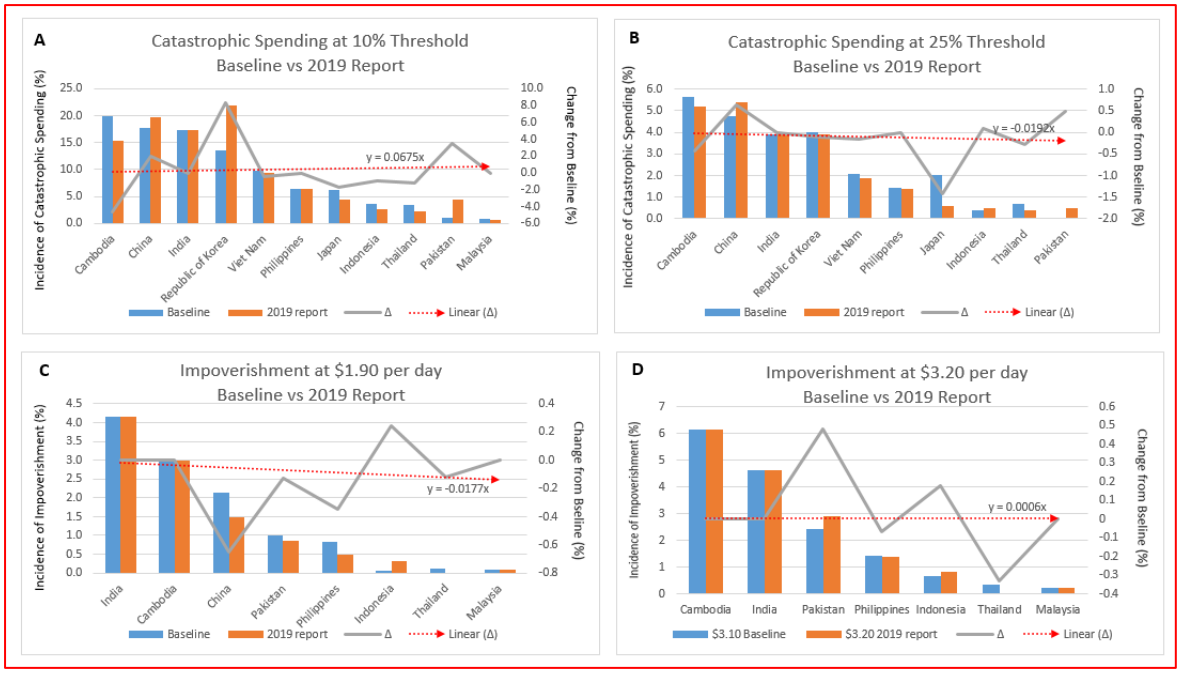


Figure 16 Progress towards UHC 3.8.2 from the 2017 baseline to the 2019 report

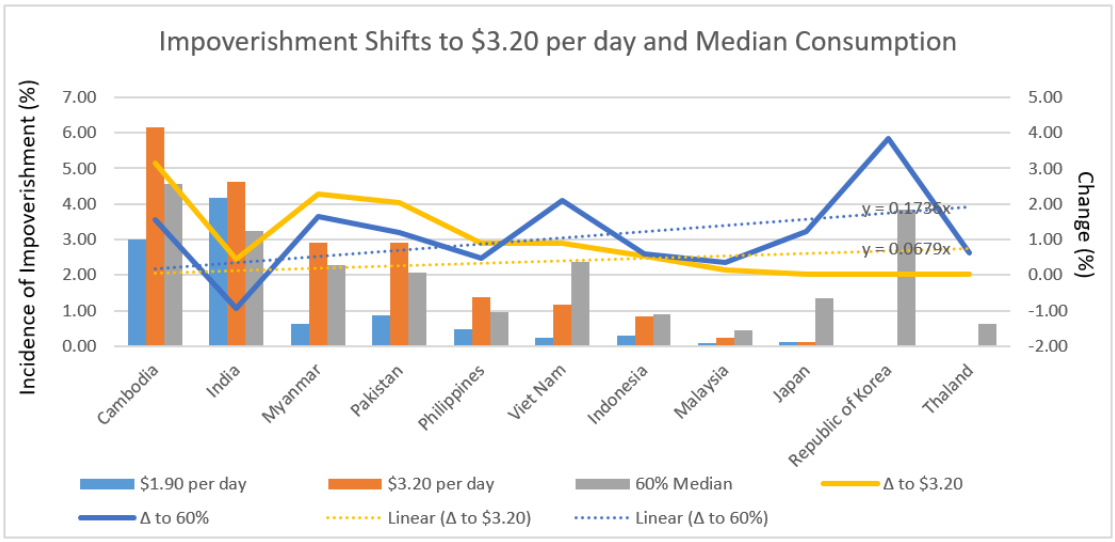


Figure 17 Impoverishment shifts from the $1.90 per day to $3.20 per day and relative poverty line (60% median)

f) The Possibilities with digital healthcare

The findings on progress towards UHC suggest that many countries included in this review face many challenges in implementing UHC. Overcoming these challenges in the traditional way as suggested in the 2019 report, including through increased spending on healthcare programs, building or upgrading 415,000 health facilities, and increasing the number of healthcare professionals to 80.2 million by 2030 (25), will take many years and huge financial investments that could mean missing the 2030 SDGs target altogether (9). An example is Indonesia's program to expand its whole-of-population national health insurance by 2019, which is impeded by funding gaps and the global

shortage of healthcare professionals and hospital beds (9). Therefore, countries need innovative solutions that would improve healthcare access and quality now, cut costs and OOP expenditure, and make the best use of current health workers (25), such as digital healthcare.

Digital healthcare is the technology that creates unique experiences for providers and consumers whose many benefits include improved healthcare productivity and patient outcomes, personalized treatments, and service satisfaction for the more discerning consumers (9). It is sustainable, in that it has the capacity for further innovation in response to changing consumer expectations, and system-wide expansion to cover healthcare service and access to whole populations (9).

Since its inception, digital healthcare has evolved into a more rapidly developed, user-friendly, and cost-effective system by capitalizing on information technology (IT), such as open-access records, cloud computing, mobile phone applications (mHealth), and wearable solutions (e.g., smart watches) (9). The evolved technologies function through four key principles: 1) disruption, through market innovation; 2) engagement, through prioritization of patients by providers; 3) integration, through the seamless transfer of health information across IT programs and platforms; and 4) trust, through cyber security (9). Figure 18 illustrates examples of digital healthcare innovations that some countries are currently using, and the potential benefits to patients, healthcare providers, and payers in the public and private sectors.

	Patients	Providers	Payers
EMR	Easier to read and understand	Easy storage and retrieval; improved efficiency and productivity	
EHR	Better diagnosis and treatment	Coordination and informed decision-making	Faster reimbursements
Personal Health Records	Personal wellness management	Consistency of information	Links to healthcare plans and lower claims
Remote Diagnostics	Reduces duplicated tests and referrals	Easy access	Lower cost
Remote Monitoring	Patient-centric integrated care	Reduce emergency and re-admissions	Lower cost
Telecare	Access to specialist care	Improves productivity and reduces burden of healthcare resources	Lower cost
mHealth applications	Greater patient engagement and saves time	Proactive and targeted care	
Big Data/Analytics	Accurate diagnosis, better treatment	Improves diagnostics and accuracy of treatment	Lower cost

* EMR – Electronic Medical Records; EHR – Electronic Health Records

Figure 18 Innovative digital healthcare
Source: McKeering, D. et al. PwC, the digital healthcare leap; 2017 (9)

Because the startup costs of evolved digital health are lower than either traditional healthcare or earlier digital technologies, some Asian countries are developing and upgrading their healthcare service to include digital health. For example, the Philippines uses open-access health records for government hospitals, and cloud computing for both public and private hospitals (9,39); Myanmar private companies offer mHealth for patient appointments, consultations, prescriptions, and health education and maternal and child health, and are expanding to include integrated data on patients and actively practicing medical professionals (9,40); and Singapore, a pioneer in digital healthcare, continues to upgrade with a move towards cloud computing for its National Electronic Health

Records System; telemedicine for patients recovering from heart failure, in partnership with private entities; and increasing data security (9,41).

Although digital health does not need a built structure and face-to-face consultations as in traditional medicine, it does rely on a robust IT system. As figure 19 shows, other Asian countries similar to Singapore in having a strong internet connection and high mobile technology and smartphone usage, also lead in digital healthcare systems including, Japan, Malaysia, and the Republic of Korea. Meanwhile, countries that have weaker IT capacities, such as China, India, Indonesia, Philippines, Thailand, and Viet Nam, lag in adopting digital healthcare (9,42).

Therefore, digital health may be a viable alternative or supplement to slow progress towards UHC through traditional methods of scaling up primary health care. Although investment in robust IT systems is needed, the costs are still less than the estimated USD 371 billion (25) to build hospitals, increase bed capacities, and source more health professionals worldwide by 2030.

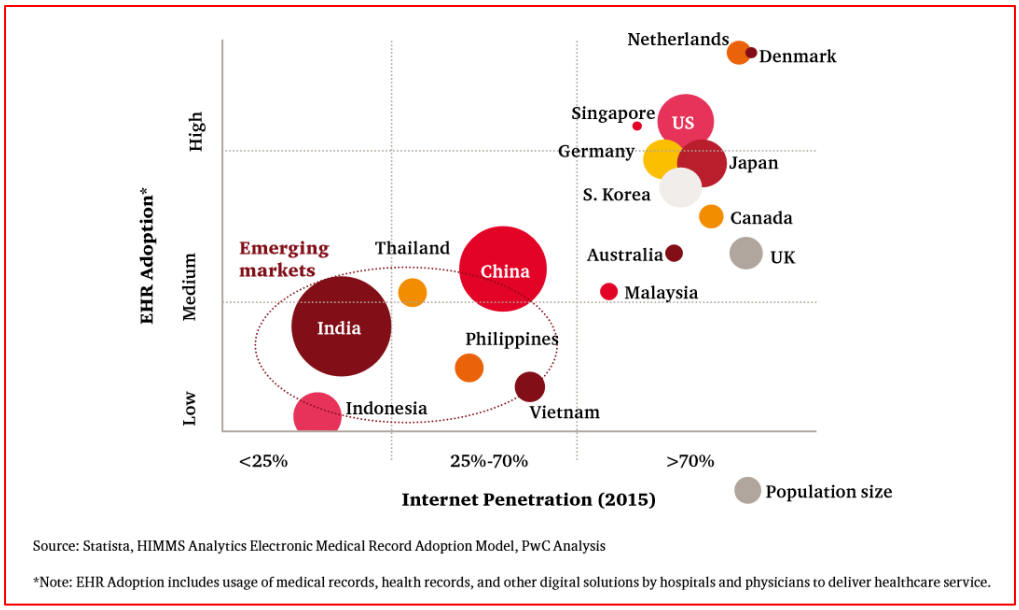


Figure 19 Digital health adoption relative to the availability of robust IT systems
Source: McKeering, D. et al. PwC, the digital healthcare leap; 2017 (9)

5. Conclusions

In this review, we showed that UHC implementation is important in Asia both academically and in reality. Using the UHC coverage index of standardizing implementation of target 3.8.1, we split the countries into those that are ahead of the others, getting on track, and lagging in implementation. We found that sorting the countries this way also grouped them by economies, more than by social demographics. The first group included China, Japan, Malaysia, the Republic of Korea, Singapore, Taiwan, Thailand, and Viet Nam, all of which are either HMICs or UMICs, apart from Viet Nam. The second group included Cambodia, India, Indonesia, Myanmar, and the Philippines, all LMICs. Pakistan sorted into the third group, likely because it is a country in conflict. However, recent data included in the 2019 report indicated that Pakistan has moved up the UHC index table, which now means that it is one of the LMICs getting on track with implementation.

For Indicator 3.8.1, we found that many countries in this review need to pay particular attention to family planning service access, inpatient service capacity, anti-tobacco measures, diabetes and hypertension prevention and control, and the recommended treatments for infectious diseases such as TB and HIV. There is a shortage of data on all indicators, but particularly on diabetes treatment and prevention, which is a real health threat in Asia. Most of the publicly available national lists of essential medicines are old and do not meet the WHO 2019 Model List for TB, HIV, hepatitis B, the reserve group of antibiotics, targeted cancer therapies, palliative care, and HPV vaccine. Finally, some Asian governments, including those of Taiwan (ROC), Thailand, and Singapore, include health technology assessments in their national health technology policies to update their NLEM and promote access to and the rational use of essential medicines that are authentic and of good quality.

For indicator 3.8.2, we found applicable to the countries included in this review the rationale that government public health schemes provided financial protection applied to many countries, increased GDP health spending per person did not correspond to a decrease in OOP expenditure, and the rising standards of living in Asia push families across, instead of below, poverty lines.

Finally, we found evidence that many countries in Asia already use digital health to some capacity, although more need to invest in robust IT systems. Digital healthcare has potential as an alternative or supplement to traditional methods of increasing primary healthcare access, which needs a global investment of USD 371 billion to improve healthcare programs, build or upgrade 415,000 health facilities, and increase the number of healthcare professionals to 80.2 million by 2030.

6. Recommendations

We provide our recommendations to governments, healthcare providers, partner organizations, pharmaceutical industries, academic institutions, and the general population in the logic model in figure 20.

Program: Universal Health Coverage in Asia Goal: Improve UHC implementation before 2030 through enhanced service coverage and financial protection					
Sector	**Inputs**	**Activities**		**Outcomes**	
		Action	**Target**	**Short-term (to 2023)**	**Long-term (to 2029)**
Government	Staff, Time, and Finance	Develop policies for UHC	National providers	Path toward UHC	Achieve SDG 3
			Subnational providers		
		Develop policies for quality and authentic drugs & technologies, including digital health	National providers	Better drugs & health service, less adverse drug effects & medical errors	Improved health outcomes
			Subnational providers		
		Healthcare provider and staff accreditation	National providers	Better drugs and less adverse drug effects and medical errors	Improved health outcomes
			Subnational providers		
		Develop and enhance cybersecurity	All healthcare providers	Data protection & increased use of digital health services	Data protection & increased use of digital health services
	Research findings	HTA	National providers	Updated NLEM	Access to quality, cost-effective drugs and technologies
			Subnational providers		
	Public healthcare schemes	Develop programs and enable access	Poor	Increased coverage in the under-served and vulnerable populations	Healthier populations
			Aged		
			Chronically ill		
			Young		
	Finance	Increase GDP spending per capita	Whole population	Lower OOP health spending	Financial protection
		Build or improve infrastructure	Areas with no or unsuitable healthcare facilities	Improved and equitable healthcare access	Improved and equitable healthcare access
			Remote locations		
Healthcare providers	Staff	Hire competent staff	Areas with no or unsuitable healthcare facilities	Improved and equitable healthcare access	Improved and equitable healthcare access
			Remote locations		
	Data	Share data securely	Governments	Improved outcome measures	Targeted approach to UHC implementation
			Researchers		

	Finance	Continuing education of staff and accreditation of facilities	All locations	Improved and equitable healthcare provision	Improved and equitable healthcare provision
	Medicines and technologies	Provide quality and non-counterfeit products	All locations	Better drugs and less adverse drug effects and medical errors	Improved health outcomes
		Provide digital healthcare	All locations	Convenient, affordable, and personalized healthcare	Achieve SGD 3 by 2030
		Provide HIV testing, including self-test	All at high-risk for HIV	Timely ART	HIV management and AIDS prevention
Partner Organizations	Finance	Provide external funding	LMICs	Collaborative and coordinated path towards UHC	Achieve SDG 3
			Countries with no UHC		
			Countries in conflict		
	Staff	Work with governments to devise UHC policies	LMICs	Collaborative and coordinated path towards UHC	Achieve SDG 3
			Countries with no UHC		
			Countries in conflict		
	Data and research findings	Share data and research findings	LMICs	Collaborative and coordinated path towards UHC	Achieve SDG 3
			Countries with no UHC		
			Countries in conflict		
Pharmaceutical Companies	New drugs, technologies, and life-course vaccines	Develop products throughout the life-course	NCDs (hypertension, cancers)	Better drugs with less side-effects	Improved health outcomes
			Infectious and vaccine-preventable diseases (HBV, HIV, TB)	Better drugs with less side-effects	Improved health outcomes
		Develop better quality diagnostics, including point-of-care tests	Sensitive, specific, convenient, easy, and rapid disease diagnosis	Accurate diagnosis and appropriate interventions	Reduced incidences of infectious diseases and health emergency preparedness
	Current drugs	Negotiate mutually beneficial pricing plans	Governments	Access to quality, cost-effective drugs and technologies	Improved health outcomes
			Healthcare providers	Access to quality, cost-effective drugs and technologies	Improved health outcomes
			3rd party organizations	Access to quality, cost-effective drugs and technologies	Improved health outcomes
	Finance	Fund HTAs	Global governments	Updated NLEM	Access to quality, cost-effective drugs and technologies

			Academic Institutions	Updated NLEM	Access to quality, cost-effective drugs and technologies
	Finance	Collaborate with private enterprises and governments to develop digital health prescriptions	Healthcare providers	Secure & convenient access to medicines through digital health	Secure access to quality, cost-effective drugs and technologies
Academic Institutions	Research findings	HTA	Global governments	Updated NLEM	Access to quality, cost-effective drugs and technologies
			Partner organizations	Focused and coordinated support	Reduced wastage of resources
			Pharmaceutical industry	Knowledge for innovation	Targeted medicines and technologies
		Ethical use and sharing of data	Global governments	Improved outcome measures	Better medicines and technologies
				Data protection	
			Partner organizations	Improved outcome measures	Reduced wastage of resources
				Data protection	
			Pharmaceutical industry	Improved outcome measures	Targeted medicines and technologies
				Data protection	
		Innovation with digital healthcare	Governments	Secure access to quality, cost-effective drugs & technologies	Secure access to quality, cost-effective drugs & technologies
			Providers		
			Pharmaceuticals		
			Consumers		
	Staff, time	Include minorities and under-served in research	Minorities and under-served population	Inclusive data	Health equity
	Staff	Advocacy	Global governments	Attention on improved healthcare service, access, and affordability	UHC implementation
			Partner organizations		
			Pharmaceutical industry		
General population	Time	Self-care*	Whole population	Improved health and more wanted pregnancies	Better outcomes and increase in young populations
		Participate in health research	Under-served populations such as women and informal sector workers	More representative data	Health equity
	Money	OOP co-payments	Employed populations	Decreased financial pressure on governments	UHC implementation

*Examples of self-care: smoking cessation and non-start; risk-aversion; self-exam for breast cancer; well-balanced diet; seek care when needed; family planning

Assumptions	External Factors
1. UHC can be implemented in Asia by 2030 2. Governments are committed to UHC 3. Stakeholders will cooperate and collaborate with each other 4. Pharmaceutical companies have the capacity for innovation	1. Conflict and political unrest 2. Financial crisis 3. Pandemic with catastrophic health outcomes 4. Natural disasters with catastrophic consequences

Figure 20 Logic model

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Appendix 1. Health access and quality indices (HAQI) using 32 metrics for amenable mortality in select countries in Asia
Source: GBD 2016 Healthcare Access and Quality Collaborators. *Lancet* 2018; 391:2236-71.

Country	***Japan***	***Singapore***	***Republic of Korea***	***Taiwan***	***China***	***Thailand***	***Malaysia***	***Viet Nam***	***Philippines***	***Indonesia***	***Myanmar***	***India***	***Cambodia***	***Pakistan***
HAQI	94	91	90	85	78	76	68	60	51	44	42	41	39	38
TB	95	85	69	78	70	59	61	44	30	29	33	30	38	31
Diarrhoeal Diseases	90	99	96	91	79	74	79	83	47	42	47	35	52	26
LRI	71	41	86	67	81	44	22	63	30	57	47	41	28	55
URI	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Diphtheria	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Whooping cough	100	100	98	93	98	71	91	52	99	47	61	51	55	39
Tetanus	100	100	100	100	100	100	100	94	72	63	81	71	57	58
Measles	100	100	100	88	100	96	81	99	98	47	89	52	88	72
Maternal Disorders	100	100	100	100	96	90	69	87	54	38	41	45	42	31
Neonatal Disorders	100	100	100	100	96	90	69	87	54	38	41	45	42	31
Squamous cell carcinoma	27	30	20	20	21	5	14	9	5	11	7	12	6	20
Breast cancer	100	93	96	91	80	61	70	43	49	55	6	42	23	34
Cervical cancer	100	79	91	82	62	66	66	46	66	61	2	45	33	35
Uterine cancer	92	89	88	86	66	56	66	38	40	46	12	33	16	22
Colon cancer	100	95	95	94	79	56	66	39	44	47	8	33	17	38
Testicular cancer	92	87	88	87	63	51	59	29	31	37	20	26	11	20
Hodgkin's lymphoma	92	90	87	95	43	36	53	18	21	26	3	18	5	17
Leukaemia	95	96	89	100	63	32	50	24	27	25	3	24	16	16
Rheumatic HD	100	100	100	93	54	100	72	69	47	50	46	26	50	23
Ischaemic HD	99	67	100	87	73	90	36	71	42	42	84	28	69	33
Stroke	76	74	62	63	31	56	40	30	25	22	33	30	30	30
Hypertensive HD	99	56	90	61	47	90	80	46	19	33	27	39	35	34
Chronic respiratory	93	100	100	100	95	73	77	73	30	64	48	62	65	47
Peptic ulcer	98	96	99	77	73	80	53	56	24	30	39	45	10	36
Appendicitis	100	100	100	97	100	74	74	71	54	37	52	31	23	25
Hernia	100	100	100	100	100	100	86	100	72	33	73	42	48	45
Gallbladder	90	86	74	64	81	51	53	65	48	39	60	59	24	50
Epilepsy	100	100	82	75	80	81	77	50	82	60	53	39	59	47
Diabetes	100	100	74	60	85	62	64	64	45	34	48	57	52	50
Chronic kidney	79	57	73	55	58	34	44	40	14	38	32	30	36	30
Congenital heart	84	88	91	69	36	73	59	32	29	43	45	40	65	45
Adverse med treat	99	100	97	83	97	57	47	60	64	51	35	24	41	27

Appendix 2. Snapshot of the NLEM of Selected Asian Countries As Compared to the WHO Model List 2019

WHO Model List 2019	***China 2009***	***India 2015***	***Indonesia 2011***	***Malaysia 2016***	***Myanmar 2010***	***Pakistan 2007***	***Philippines 2008***	***Thailand 2012***	***Viet Nam 2008***
Pain and Palliative Care									
Non-opiods and NSAIMs									
acteylsalycylic acid		√		√	√	√			√
ibuprofen	√	√	√	√		√	√		√
paracetamol	√	√	√	√	√	√	√		√
Opiod analgesics									
codeine			√		√	√	√	√	
fentanyl	√	√	√		√		√	√	√
morphine		√	√	√	√	√	√	√	√
methadone								√	
Other Palliative									
amitriptyline		√						√	
cyclizine									
dexamethasone		√							
diazepam		√							√
docusate sodium									
fluoxetine		√							
haloperidol		√							
hyoscine butylbromide									
hyoscine hydrobromide									
lactulose		√							
loperamide		√							
metoclopramide		√							
midazolam		√							√
ondansetron		√							
senna									
Antibacterials									
Access Group Antibiotics									
amikacin	√				√		√	√	√
amoxicillin	√	√	√	√	√	√	√	√	√
amoxicillin + clavulanic acid	√	√			√	√	√	√	√
ampicillin	√	√	√	√		√	√	√	√
benzathine benzylpenicillin		√				√	√	√	√
benzylpenicillin	√	√		√	√	√	√	√	√
cefalexin	√				√		√	√	√
cefazolin	√	√	√			√	√	√	√
chloramphenicol			√		√	√	√	√	√
clindamycin	√				√	√	√	√	√
cloxacillin		√		√	√	√	√	√	
doxycycline		√	√	√	√	√	√	√	√
gentamicin	√	√	√	√	√	√	√	√	√
metronidazole		√	√		√	√	√	√	√

nitrofurantoin	√	√					√			√
phenylmethylpenicillin			√	√	√	√	√	√	√	
procaine benzylpenicillin			√		√	√		√	√	
spectinomycin						√	√			
sulfamethoxazole + trimethoprim		√	√	√	√	√	√	√	√	
Watch Group Antibiotics										
azithromycin	√	√				√	√	√	√	
cefixime		√			√	√	√	√	√	
cefotaxime		√		√			√	√	√	
ceftriaxone	√	√	√	√	√	√	√	√	√	
cefuroxime	√				√		√	√	√	
ciprofloxacin	√	√	√		√	√	√	√	√	
clarithromycin		√					√	√	√	
piperacillin + tazobactam		√					√	√	√	
vancomycin		√	√		√	√	√	√	√	
ceftazidime										
meropenem							√	√	√	
Reserve Grp. Antibiotics										
ceftazidime + avibactam										
colistin								√	√	
fosfomycin	√							√	√	
linezolid										
meropenem + vaborbactam										
plazomicin										
polymyxin B										
Anti-Tuberculosis										
ethambutol	√	√		√	√	√	√	√	√	
ethambutol + isoniazid + pyrazinamide + rifampicin			√	√	√	√	√	√	√	
ethambutol + isoniazid + rifampicin						√	√			
isoniazid	√	√	√	√	√	√	√	√	√	
isoniazid + pyrazinamide + rifampicin			√	√		√	√	√	√	
isoniazid + rifampicin			√	√	√	√	√	√	√	
pyrazinamide	√	√		√	√	√	√	√	√	
rifabutin		√					√			
rifampicin	√	√		√	√	√	√	√	√	
rifapentine										
amikacin					√	√	√	√		
amoxicillin + clavulanic acid										
bedaquiline										
clofazimine										
cycloserine		√		√	√	√		√	√	
delamanid										

ethionamide		√			√	√	√			√		
levofloxacin		√			√	√			√	√	√	
linezolid		√										
meropenem												
moxifloxacin		√										
p-aminosalycilic acid (PAS)		√					√			√	√	
streptomycin	√	√	√	√	√	√	√		√			
Antiretrovirals												
Nucleoside/ Nucleotide reverse transciptase inhibitors												
abacavir (ABC)		√					√				√	
lamivudine (3TC)			√	√			√	√	√	√		
tenofovir disoproxil fumarate (TDF)									√	√		
zidovudine (ZDV or AZT)		√	√	√			√	√	√	√		
Non-nucleoside reverse transcriptase inhibitors												
efavirenz (EFV or EFZ)		√	√	√	√	√			√	√		
nevirapine (NVP)		√	√	√		√	√			√		
Protease inhibitors												
atazanavir									√			
atazanavir + ritonavir		√										
darunavir		√										
lopinavir + ritonavir (LPV/r)		√	√				√				√	
ritonavir		√		√	√	√	√			√		
Integrase inhibitors												
dolutegravir												
raltegravir		√										
Fixed-dose combinations												
abacavir + lamivudine		√		√								
dolutegravir + lamivudine + tenofovir												
efavirenz + emtricitabine + tenofovir							√					
efavirenz + lamivudine + tenofovir		√										
emtricitabine + tenofovir				√			√					
lamivudine + nevirapine + zidovudine		√					√			√		
lamivudine + zidovudine		√	√	√			√			√		
Prevention of HIV-related opportunisitc infections												
isoniazid + pyridoxine + sulfamethoxazole + trimethoprim												

Other Antivirals									
ribavirin	√			√	√	√			
valganciclovir					√				
oseltamivir							√	√	√
Antihepatitis B									
Nucleoside/ Nucleotide reverse transciptase inhibitors									
entecavir		√							
tenofovir disoproxil fumarate (TDF)		√						√	
Immunomodulators and Antineoplastics									
immunomodulators for non-malignant disease									
adalimumab									
azathioprine		√	√	√	√	√	√	√	
ciclosporin		√	√	√		√	√	√	
Antineoplastics and supportive medicines									
arsenic trioxide		√							
asparaginase		√	√	√	√	√	√	√	√
bendamustine									
bleomycin		√	√	√	√	√	√	√	√
calcium folinate		√	√			√			√
capecitabine		√						√	√
carboplatin		√		√	√		√	√	√
chlorambucil		√	√	√	√	√	√	√	
cisplatin		√	√			√	√	√	√
cyclophosphamide		√	√	√	√	√	√	√	√
cytarabine		√	√	√		√	√	√	√
dacarbazine		√	√	√	√	√	√		√
dactinomycin		√	√	√	√	√	√	√	√
daunorubicin		√	√	√	√	√	√		√
docetaxel		√	√	√			√	√	
doxorubicin		√	√	√	√	√	√	√	√
etoposide		√	√	√	√	√	√	√	√
fludarabine									
fluorouracil		√	√	√	√	√	√	√	√
gemcitabine		√					√	√	
hydroxycarbamide								√	√
ifofasmide		√	√	√	√		√	√	√
irinotecan							√		√
melphalan		√	√					√	√
mercaptopurine		√		√	√	√	√	√	√
methotrexate		√	√		√		√	√	√
oxaliplatin		√							√

paclitaxel		√	√	√				√	√	
pegaspargase										
procarbazine		√	√	√			√	√		√
realgar-Indigo naturalis formulation										
tioguanine				√					√	√
vinblastine		√	√	√	√	√	√	√	√	
vincristine		√	√	√	√	√	√	√	√	
vinorelbine										
Targeted therapies										
all-trans retinoid acid (ATRA)		√								
bortezomib		√								
dasatinib										
erlotinib										
imatinib		√					√	√		
nilotinib										
rituximab		√					√			
trastuzumab		√					√			
Immunomodulators										
filgrastim										
lenalidomide										
rivolumab										
thalidomide		√								
Hormones and antihormones										
abiraterone										
anastrozole										√
bicalutamide		√								
dexamethasone	√		√		√	√	√	√		
hydrocortisone	√			√		√	√			
leuprorelin							√			
methylprednisolone			√	√	√		√	√		
prednisolone	√	√		√	√	√	√	√		
tamoxifen		√	√	√	√	√	√	√	√	
Supportvie medicines										
allopurinol										
mesna		√	√				√			√
zoledronic acid										√
<u>Cardiovascular Medicines</u>										
Antihypertensive										
amlodipine		√		√	√	√	√			
bisoprolol										√
enalapril	√	√		√	√	√	√	√	√	
hydralazine					√	√	√	√	√	
hydrochlorothiazide		√	√			√	√			
lisinopril + amlodipine										

lisinopril + hydrochlorothiazide										
losartan					√		√	√	√	
methyldopa		√	√	√	√	√	√	√	√	
telmisartan + amlodipine										
telmisartan + hydrochlorothiazide							√		√	
sodium nitroprusside	√	√			√	√	√	√		
Medicines for Endocrine Disorders										
Medicines for diabetes										
insulin injection (soluble)	√	√	√		√	√	√	√	√	
intermediate-acting insulin		√	√		√	√	√			
gliclazide			√	√	√		√		√	
metformin	√	√	√	√	√	√	√	√	√	
Peritoneal Dialysis Solution										
intraperitoneal dialysis solution		√	√	√		√	√	√		
Hepatitis B Vaccine		√	√	√	√	√	√	√		
Human Papillomavirus Vaccine				√	√		√			