White paper
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Reaching 650 Million: How Digital Technology is Key to Achieving Universal Health Coverage in ASEAN

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Executive summary

The ASEAN region is one of the most dynamic and fast-growing economic regions worldwide, bringing to its citizens new levels of wealth, opportunity, and quality of life. Comprised of ten countries, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam, the region accounts for one-tenth of the world's population and boasts an annual real GDP growth rate of 5.2%,[1] against the global growth rate of 3.2% for 2019.[2] However, rapid economic growth has also brought challenges to the region. Among them, a rising demand for healthcare and increasing healthcare costs have led to significant concern and an urgent need for action across ASEAN.

In response to growing healthcare needs, all ten countries in ASEAN have committed to the achievement of universal health coverage, a goal that defines and manifests the principle of health as a human right. As defined by the World Health Organization, universal health coverage is a system "ensuring all people have access to needed health services (including prevention, promotion, treatment, rehabilitation and palliation) of sufficient quality to be effective while also ensuring that the use of these services does not expose the user to financial hardship."[3] In other words, all people should have access to high quality and affordable healthcare. Global commitment to universal health coverage was crystallized in the 2015 United Nations Sustainable Development Goals, where 193 countries committed to achieving universal health coverage by 2030.[4]

Despite strong commitment and action, universal health coverage is difficult to achieve and sustain. Universal health coverage challenges the reality that trade-offs must always be made between the three pillars of quality, affordability, and access. While policymakers can aim to achieve high levels of all three pillars, resource scarcity requires that they prioritize two at the relative expense of the third. This tension is further exacerbated in ASEAN by the higher rates of chronic disease and disability across all member states. For most nations, universal health coverage currently still appears to be out of reach.

[1] OECD. (2019). Economic Outlook for Southeast Asia, China and India 2019. OECD Publishing. Paris. https://www.oecd.org/development/asia-pacific/01_SAEO2019_Overview_WEB.pdf

[2] OECD. (2019). OECD Economic Outlook, Volume 2019 Issue 1. OECD Publishing. Paris. https://doi.org/10.1787/b2e897b0-en

[3] WHO. (n.d). Universal health coverage. World Health Organization. Geneva. Last accessed August 1 2019. https://www.who.int/healthsystems/universal_health_coverage/en/

[4] UN. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. United Nations. New York. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

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In this paper, we offer countries a potential solution to the policy conundrum – enabling the digitization of health systems to aid in achieving universal health coverage. Effectively harnessed, digital technology can overcome many of the trade-offs that come from using traditional health solutions. While digital technology encompasses thousands of initiatives, we will focus on three main technologies with high potential and demonstrated impact – telemedicine, health information systems, and tracking and notifications – and show how they bring high quality and affordable access to health for all people.

The key for many countries is to move from identifying opportunities to implementing these technologies in ways that deliver impact, starting with primary care. This paper recommends a **10 point action** plan to achieve universal health coverage through the implementation of digital technologies:

1. **Establish head of state mandate.** A head of state mandate should be put in place to ensure access to necessary funding and cross-ministry coordination for eHealth in national development plans.
2. **Build the national digital infrastructure.** Governments must invest in necessary Information, Communications and Technology (ICT) infrastructure that underlies the eHealth strategy.
3. **Invest in human capital.** Governments and the private sector need to share a mutual interest in and responsibility for training medical personnel and civil servants in technology capabilities and applications.
4. **Develop a regulatory and legal framework.** Parliament or the national assembly should cements a mandate for digitizing healthcare in national legislation, protecting patients and enabling innovation.
5. **Appoint an eHealth government agency.** A centralized agency should be positioned to coordinate national eHealth projects across ministries; across district, provincial, and federal levels of government; and with patient associations, medical associations, and businesses.
6. **Define an impact measurement framework.** Impact, affordability, and cost-savings metrics should be built into every digital health intervention from the early stages of planning and extending to an assessment of health outcomes.
7. **Lead a multi-sectoral strategy.** An effective eHealth strategy requires an approach led by the Ministry of Health that is transparent and multi-sectoral, including a clear vision for how the government will work with the private sector and a willingness to work with non-traditional partners.
8. **Enable private sector innovation.** The government should work with and empower the private sector to innovate, share knowledge, and deliver efficient healthcare services.
9. **Adopt a lens of equity.** Technology investments and policies should strive to create equality and not focus primarily on urban areas or high-income groups.
10. **Design for user experience.** Innovators must engage and collaborate with users early on, aiding seamless clinical adoption and ensuring digital health interventions meet patients' habits, lifestyles, and needs.

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Universal healthcare: Aspirations and challenges

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Universal healthcare: Aspirations and challenges

The promise of universal health coverage

Affordable, high quality access to healthcare for all people is the principle espoused under the global movement to achieve universal health coverage. In 2015, the United Nations Sustainable Development Goal (SDG) Agenda called for global commitment to universal health coverage in Sustainable Development Goal 3.8 to "achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all."[5]

In ASEAN, there is a remarkable level of political commitment to universal health coverage. As early as 2002, Thailand committed to universal health coverage, a move that was unprecedented for a low-middle income economy at the time.[6] In 2012, Vietnam ratified the Master Plan on Universal Health Coverage to reach 95% universal health coverage by 2025.[7] Indonesia launched Jaminan Kesehatan Nasional in 2014, becoming the world's largest system offering universal health coverage.[8] Most recently, in February 2019, Philippines joined its ASEAN neighbors in enacting its first universal health coverage law.[9]

The World Health Organisation (WHO) and World Bank developed the Universal Health Coverage Service Coverage Index to help countries track their progress in providing coverage for essential health services. The universal health coverage index is a composite index based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access. The universal health coverage index measures service coverage on a percentage scale with a current evaluation limit greater than or equal to 80%.[10]

[5] UN. (2015). Transforming our world: the 2030 Agenda for Sustainable Development. United Nations. New York. https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

[6] World Bank. (2015). Going Universal. World Bank Group. Washington D.C. http://documents.worldbank.org/curated/en/936881467992465464/pdf/99455-PUB-Box393200B-OUO-9-PUBDATE-9-28-15-DOI-10-1596-978-1-4648-0610-0-EPI-210610.pdf

[7] UHC Partnership. (n.d). Viet Nam. UHC Partnership Publishing. Geneva. Last accessed August 1 2019. https://uhcpartnership.net/country-profile/vietnam/

[8] Hutton J. (2014). Indonesia launches world's largest health insurance system. The Christian Science Monitor. Boston. Last accessed August 1 2019. https://www.csmonitor.com/World/Asia-Pacific/2014/0310/Indonesia-launches-world-s-largest-health-insurance-system

[9] Montemayor T. (2019). Health for all Filipinos: Universal Healthcare Law. Philippine News Agency. https://www.pna.gov.ph/articles/1075580

[10] WHO. (2017). Tracking Universal Health Coverage: 2017 Global Monitoring Report. World Health Organization. Geneva. https://www.who.int/healthinfo/universal_health_coverage/report/2017/en/

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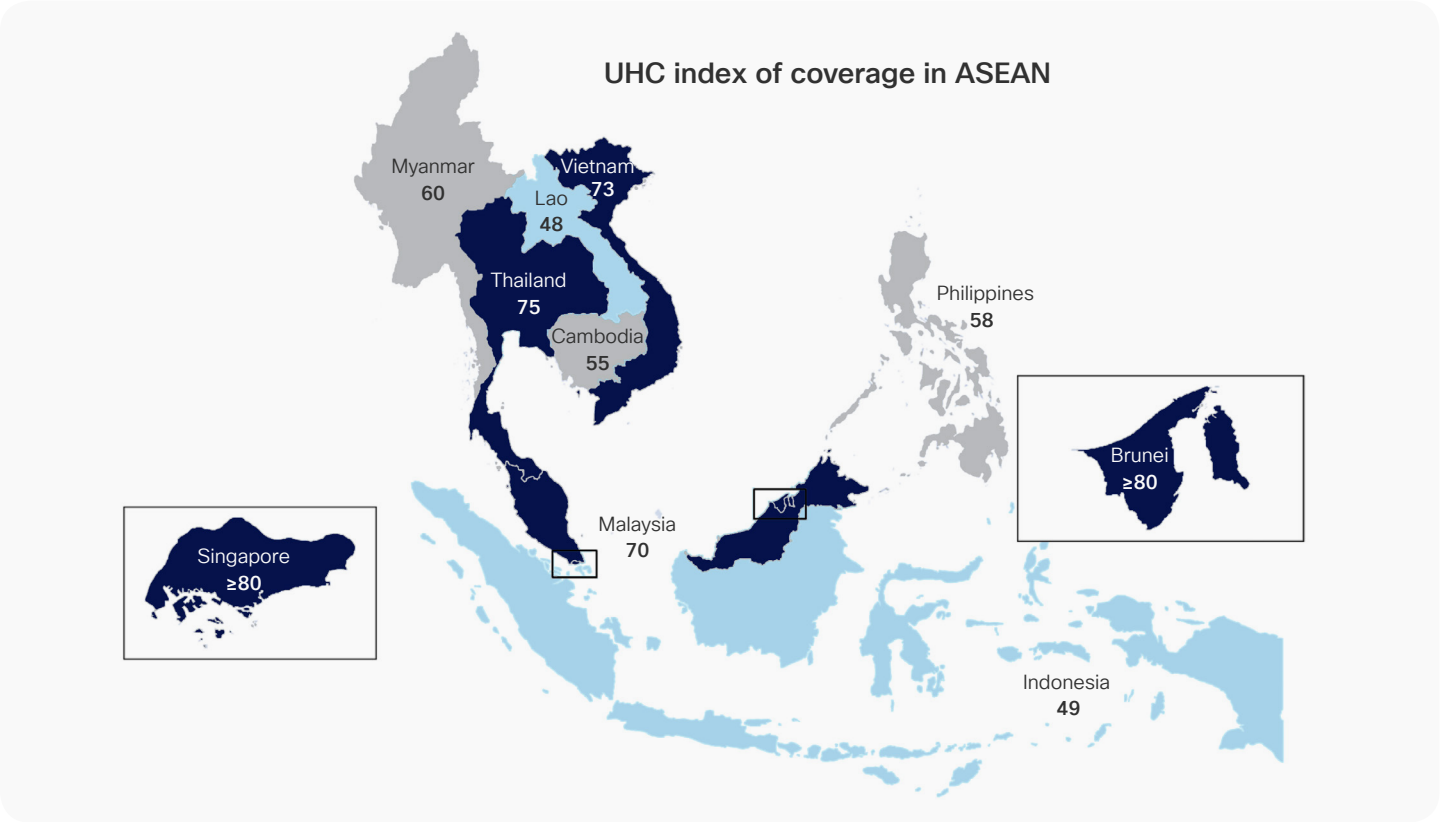
According to the 2017 WHO and World Bank monitoring report, **Tracking Universal Health Coverage: 2017 Global Monitoring Report**, five ASEAN countries have surpassed the global median of 65% population coverage of universal health coverage, with two – Singapore and Brunei – already considered to have achieved universal health coverage (defined as population coverage of 80% and higher, Figure 1). The Universal Health Coverage Service Coverage index similarly shows several countries making significant progress on the coverage of essential services.[11]

Figure 1. Universal Health Coverage Index of Coverage in ASEAN[12]



Source World Health Organization

[11] Hognan DR et al. (2017). Monitoring universal health coverage within the Sustainable Development Goals: development and baseline data for an index of essential health services. The Lancet. London. https://doi.org/10.1016/S2214-109X(17)30472-2

[12] WHO. (2017). Tracking Universal Health Coverage: 2017 Global Monitoring Report. World Health Organization. Geneva. https://www.who.int/healthinfo/universal_health_coverage/report/2017/en/

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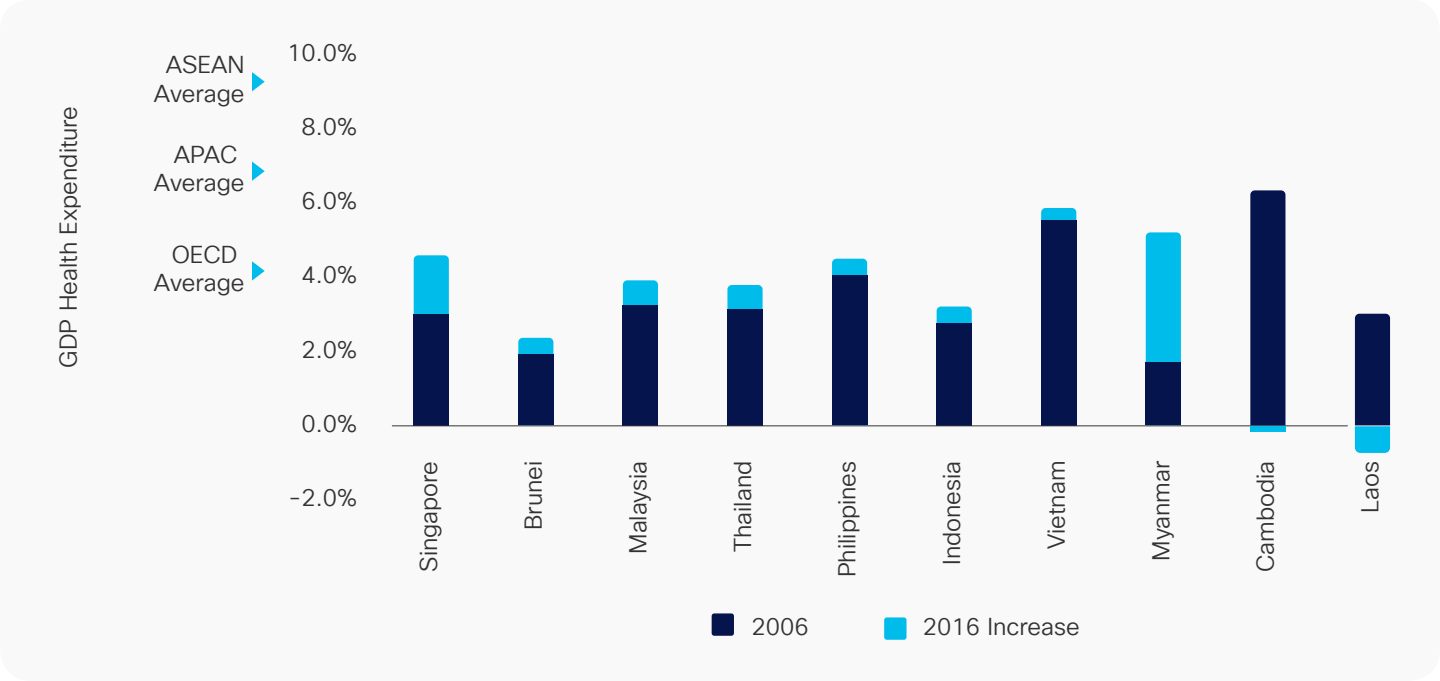
A promise that is difficult to keep

Growing prosperity has increased longevity and resulted in lifestyle changes that are both linked to the emergence of chronic diseases. The twin trends of aging populations and chronic diseases are contributing to rising health expenditures in the region. Moreover, as education and income levels have risen, people have higher expectations of their health systems to provide access to affordable and high-quality care. As a result, most Southeast Asian nations have experienced significant increases in domestic healthcare spending (Figure 2).

Figure 2. Total health expenditures as a percentage of GDP[13]



Source: World Bank Open Data

As of 2018, Indonesia faces a health financing deficit of USD 1.17 billion.[14] In the Philippines, the universal health coverage law was estimated to be underfunded by USD 3.31 billion as of 2019,[15] and in the same year, 18 of Thailand's hospitals were reportedly in deficit.[16] While laudable commitment and progress has been made, universal health coverage is difficult to achieve and to sustain.

[13] World Bank. (2018). Current Health Expenditure (% of GDP) - World Development Indicators. The World Bank Group. Washington D.C. Last accessed August 1 2019. https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS

[14] Tang W. (2019). Health services return for BPJS patients as deficit remains. The Jakarta Post. Jakarta. https://www.thejakartapost.com/news/2019/01/09/health-services-return-for-bpjs-patients-as-deficit-remains.html

[15] Diaz J. (2019). Expanded healthcare lacks P170 billion. Phil Star Global. Mandaluyong City. https://www.philstar.com/headlines/2019/02/24/1896316/expanded-health-care-lacks-p170-billion

[16] Today. (2017). Thailand's national healthcare scheme hits financial trouble. MediaCorp. Singapore. https://www.todayonline.com/world/asia/thailands-national-healthcare-scheme-hits-financial-trouble

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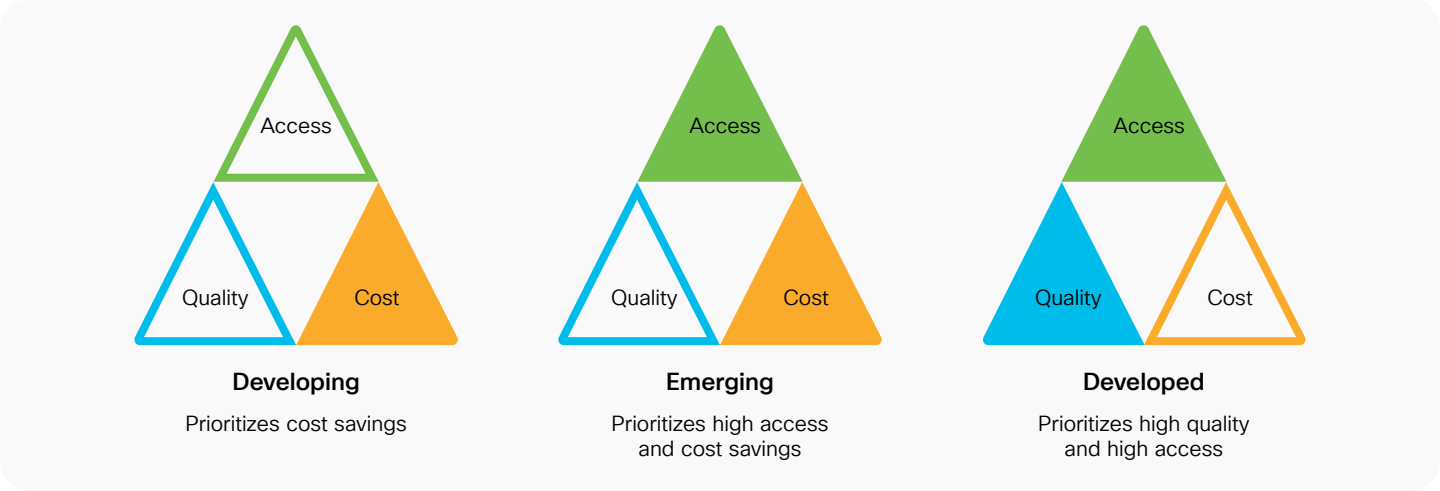
The iron triangle of healthcare constraints on universal health coverage

The difficulty of achieving high quality, affordable and accessible care for all people can best be illustrated by the "iron triangle" of healthcare.[17] The iron triangle conveys the natural constraints of each healthcare system from simultaneously improving access, cost and quality.

For example, improving healthcare quality and access is resource intensive and expensive, which makes it difficult to keep costs low. Accordingly, lowering costs might require using cheaper health substitutes, which challenges quality. Because of these trade-offs, most countries can prioritize up to two of the three aspects at a time (Figure 3). The least resourced (developing) countries may only be able to prioritize one factor – common in places where healthcare is free but overall healthcare access (availability of facilities and doctors) and quality of care is low. With the advent of universal health coverages, an increasing number of emerging economies in the region are striving towards affordable healthcare for all, but still struggle with issues of quality of care and service delivery. Lastly, developed economies largely provide high quality universal health coverage, but the financial burden is still high either on the individual or the state.

Figure 3. Scenarios for universal health coverage iron triangle



Source: Authors

[17] Kissick. W. (1994). Medicine's Dilemmas. New Haven and New London. CT: Yale University Press. https://books.google.com/books?id=G038jRhEwRkC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

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Achieving an equilateral iron triangle with digital technology

Digital technology has been hailed as revolutionizing healthcare around the world. In both developed and developing countries, individuals now have access to unprecedented levels of health information and services through mobile technology and smart phones. On a national scale, countries have achieved remarkable benefits from comprehensive digital transformation of healthcare. In Canada, the Health Infoway initiative invested USD 2.15 billion into digital transformation (e.g. telehealth, drug information systems, eclinics), which led to an estimated USD 16 billion in benefits.[18] In Estonia, where 99% of health records and medical prescriptions are digitized, the first level of evaluation of impact by the DIGIMPACT project estimated, after ten years, an annual socioeconomic return over 2000%.[19]

South Korea

The impact of digital technology on universal health coverage

In 2004, the Health Insurance Review and Assessment (HIRA) Service of South Korea launched a digital medical bill checking service allowing any healthcare user to take a picture of their healthcare bill from a healthcare provider reimbursed by the national health insurance (99% of all health systems) and send it by smartphone to HIRA to verify that he or she received a fair and true estimate of their bill for the services received. This service has been estimated to have reduced erroneous claims equivalent to USD 16.5 million annually.

In 2010, HIRA established the Drug Utilization Review (DUR) services, a drug reporting database to which all doctors are required to submit patient prescriptions in real time. If there is a contraindication to the drug being prescribed based on a person's drug history or demographic profile (e.g. pregnant, elderly), the system will send the physician an alert. As a second safety checkpoint, pharmacies are also mandated to dispense via the DUR system with additional safety alerts. This service was estimated to have prevented 5.4 million cases of unsafe or inappropriate drug prescriptions by 2013.

By 2013, the entire system of health insurance claims was converted from a paper-based to a fully digitized system, replacing 1.4 billion paper documents with electronic documents. This not only allowed for faster processing of claims (40 days to 15 days), but the ability – through data analytics – to pinpoint areas of health quality improvement. Through quality assessment data, the Korean government was able to identify and intervene in the improper/overuse of antibiotics in hospitals and the rates of medically unnecessary C-sections (2 of the 34 quality assessment indicators) leading to a 15% and 4% drop over a ten-year period.

Behind these remarkable services and their impact is a database of over 800,000 providers, 50 million citizens, 84,000 drugs and 50,000 medical materials (supplies), and the force of a government making good on the promise of universal health coverage.

Source: HIRA (2013). Total Solution for Value-based Healthcare Purchasing. Health Insurance Review & Assessment Service. Seoul, Korea.

[18] Infoway. (2018). Benefits Evidence – Pan-Canadian Studies. Canada Health Infoway. Toronto. https://www.infoway-inforoute.ca/en/what-we-do/progress-in-canada/pan-canadian-studies

[19] ProeHealth. (n.d). Estonian EHR Case Study. Empirica. Bonn. Last accessed August 1 2019. http://pro-ehealth.eu/fileadmin/pro-ehealth/casestudies/proehealth_case_report_estonia_ehr.pdf

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Digital technology for universal health coverage

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Digital technology for universal health coverage

Digital technology has transformed the way we live in a way that is remarkably inelastic to income level. While many experts rightly highlight the current global digital divide, there is a significant degree of population penetration of mobile phones and Internet connectivity across the world. Whether in the United States (USD 62,641 GDP per capita) or Vietnam (USD 2,564 GDP per capita),[20] most people in either country can catch up on viral trends or locate the nearest health clinic.

What is digital technology for health?

The WHO defines eHealth, or digital health, as the use of information and communications technologies for health.

Telehealth, which requires access only to telecommunications, is the most basic element of "eHealth," which uses a wider range of information and communication technologies (ICTs). Telehealth involves the use of telecommunications and virtual technology to deliver healthcare outside of traditional healthcare facilities.

mHealth is a component of eHealth. To date, no standardized definition of mHealth has been established, however mHealth or mobile health is generally defined as medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices.

Source:

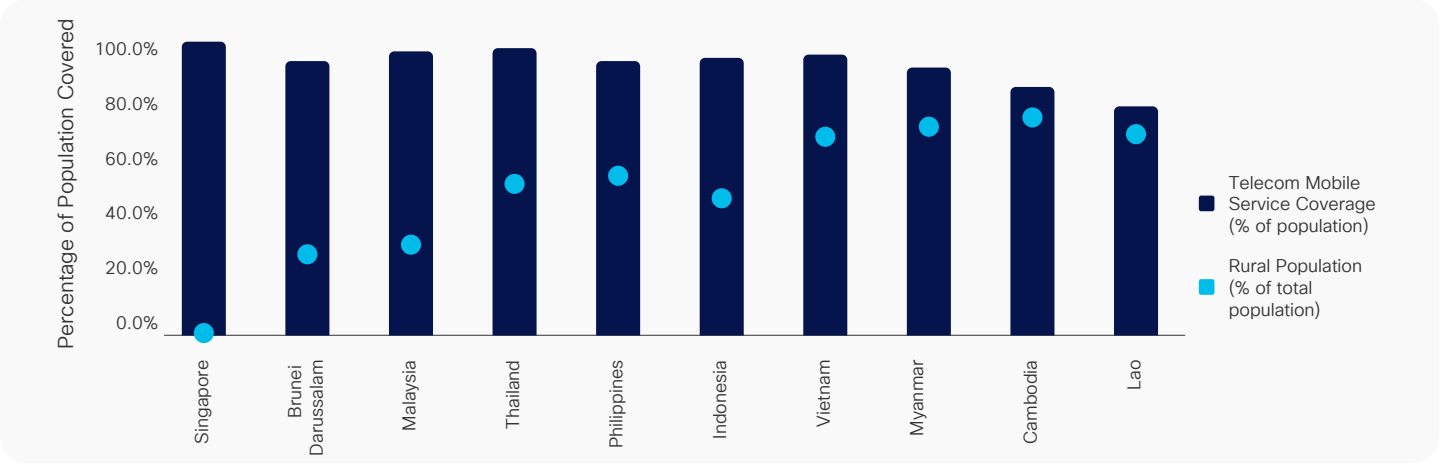
WHO. (2019). "eHealth at WHO". World Health Organization. Geneva. https://www.who.int/ehealth/about/en/

WHO. (2011). mHealth New horizons for health through mobile technologies. World Health Organization. Geneva. https://www.who.int/goe/publications/goe_mhealth_web.pdf

WHO. (n.d). TeleHealth. World Health Organization. Geneva. Last accessed August 1 2019. https://www.who.int/sustainable-development/health-sector/strategies/telehealth/en/

Presently, in eight ASEAN nations over 55% of their population are active Internet users, and seven nations enjoy over 90% mobile network coverage of their populations (Figure 4).[21] ASEAN is further prioritizing the development and use of ICT infrastructure across sectors in their multi-year economic development plans and with the ICT Masterplan 2020.[22] Against this rich digital landscape, the opportunities for improving healthcare access, quality, and affordability in the region through the use of digital technology are growing.

Figure 4. Mobile service coverage and rural population in ASEAN[23]



Source: International Telecommunications Union

[20] World Bank. (2018). GDP per capita (current US$) - World Development Indicators. The World Bank Group. Washington D.C.. Last accessed August 1 2019. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

[21] ITU. (2018). Measuring the Information Society Report Volume 2 2018. ITU Publications. Geneva. https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf

[22] ASEAN. (2015). The ASEAN ICT Masterplan 2020. ASEAN Publications. Jakarta. https://www.asean.org/storage/images/2015/November/ICT/15b%20--%20AIM%202020_Publication_Final.pdf

[23] ITU. (2018). Measuring the Information Society Report Volume 2 2018. ITU Publications. Geneva. https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf

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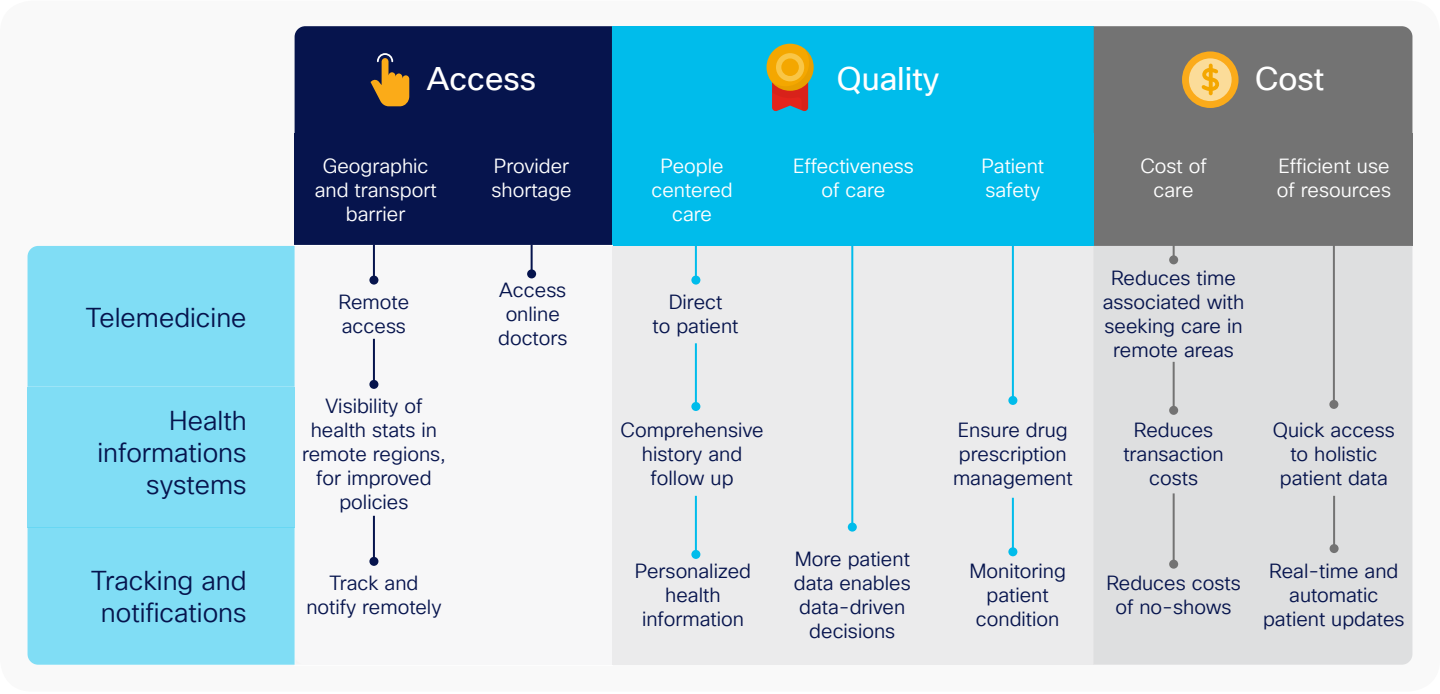
Foundational ICT infrastructure coupled with the deployment of digital technologies and applications has enabled increased connectivity and analysis of vast amounts of data leading to innovations across the healthcare sector, positively impacting the quality, affordability (cost savings) and access to healthcare (Figure 5). Three fundamental technologies that have been the basis for the digital revolution in healthcare are telemedicine, digital health information systems, and tracking and notifications.

Figure 5. Digital heath solutions in response to persistent health challenges across quality, access, and affordability



Source: Authors

Digital solutions to improve access to healthcare

The principle of access is perhaps the pillar of universal health coverage that receives most attention. Over the last decade, the notion that everyone should have access to healthcare has swiftly transformed into the call that health is a fundamental human right and that governments have an obligation to ensure healthcare access to all people. The implications of "universal" access are not only about extending coverage for the privileged few, but to those who are normally left out of the system.

In six out of ten countries in ASEAN, more than 50% of the population lives in rural and remote areas, where medical facilities, clinicians, and healthcare workers are few and far between.[24] Over half of the countries in ASEAN face a severe shortage of physicians and other health workers. The WHO recommends a minimum of 4.45 skilled medical personnel (physicians, nurses and midwives) per 1000 population, and much of ASEAN is below this threshold or just barely crossing it.[25]

[24] World Bank. (2018). Urban population (% of total population) - World Development Indicators. The World Bank Group. Washington D.C. Last accessed August 1 2019. https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS

[25] WHO. (2019). Medical Doctors. World Health Organization. Geneva. Last accessed August 1 2019. http://apps.who.int/gho/data/node.main.HWFGRP_0020?lang=en

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Worsening the workforce shortage in ASEAN are the high levels of emigration of skilled health workforce to urban areas or even overseas. Efforts to mitigate this 'brain drain' of physicians and nurses have been met with mixed results. Training of the healthcare workforce is often expensive, and licensing and reporting requirements vary between provinces within a country.

When providers in remote and underserved areas are highly skilled and have access to the most recent medical knowledge, the patients in those areas have as equitable of access to high quality healthcare as their urban, higher income counterparts. The opportunity zone (Figure 6) shows the countries where digital technologies can make the biggest and most immediate impact on access to skilled healthcare workers, including doctors, nurses, and midwives.

In Nepal, I was hesitant that e-Reporting could work in remote areas, until I found reporting is indeed working in such remote areas. The people told us that they do not have to bring more books to the village and could send everything digitally to save four days of walking

Paul Rueckert
Chief Technical Advisor, GIZ, Support To The Health Sector Programme

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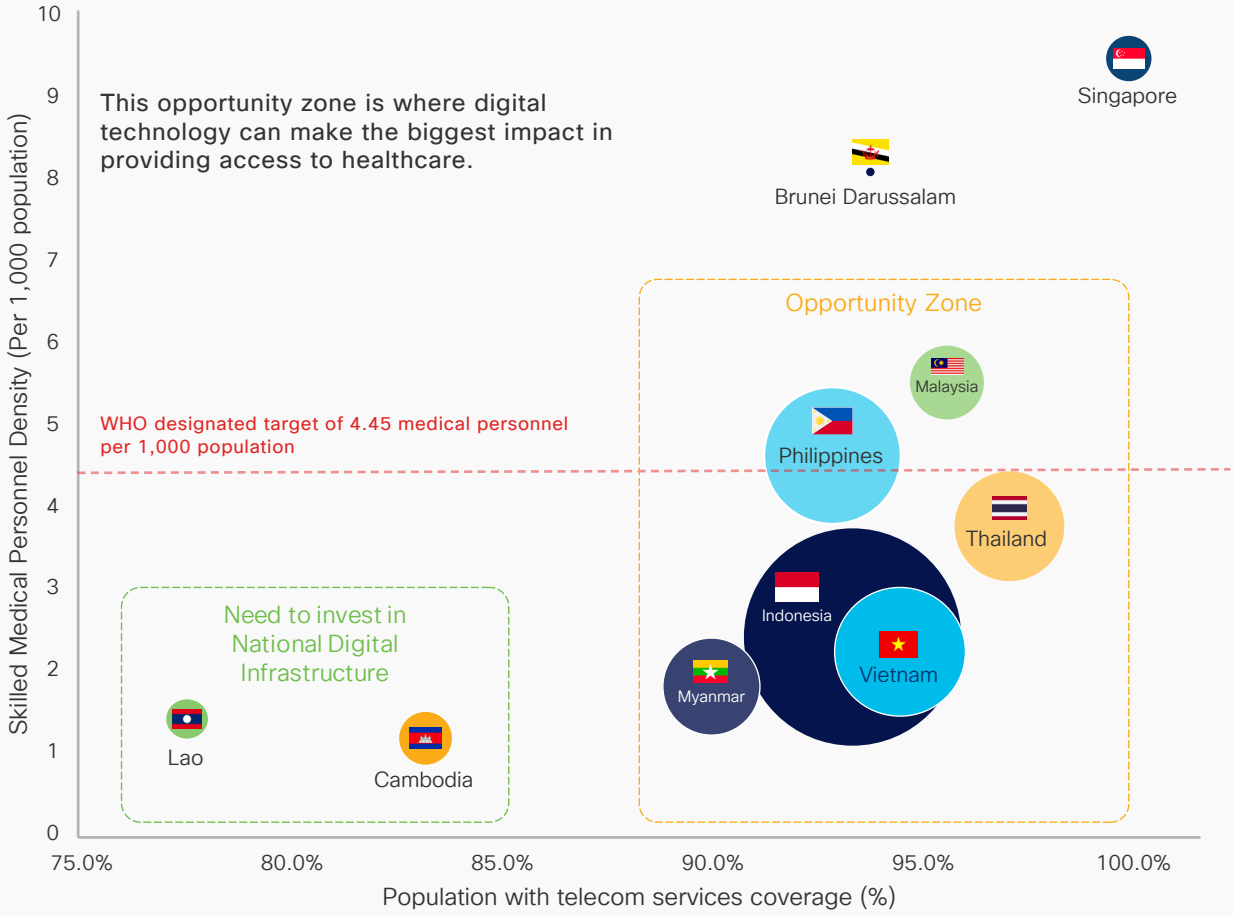
Figure 6. Opportunity zone: Skilled medical personnel density and telecom Coverage[26]



Source: World Health Organization and International Telecommunication Union

Digital technologies can extend the reach of high-quality healthcare into some of the most isolated communities by providing remote access to skilled care. It also has an important role in fast growing urban centers, where transportation infrastructure has not caught up to population growth, leading to densely populated cities and burdensome commute times.

Increasingly, telemedicine – the delivery of healthcare through the use of ICT has been an important and effective means of "last mile delivery" of healthcare. In Thailand, a recent inter-government initiative is using telemedicine to drive primary healthcare access in rural areas (Case study 1). In Indonesia, a local technology start-up is leading digitally-enabled access to primary healthcare services throughout the country (Case study 2).

[26] WHO. (2019). Density of nursing and midwifery personnel (total number per 10 000 population, latest available year). World Health Organization. Geneva. Last accessed August 1 2019. https://www.who.int/gho/health_workforce/nursing_midwifery_density/en/

WHO. (2019). Density of medical doctors (total number per 10 000 population, latest available year). World Health Organization. Geneva. Last accessed August 1 2019. https://www.who.int/gho/health_workforce/doctors_density/en/

ITU. (2018). Measuring the Information Society Report Volume 2 2018. ITU Publications. Geneva. https://www.itu.int/en/ITU-D/Statistics/Documents/publications/misr2018/MISR-2018-Vol-2-E.pdf

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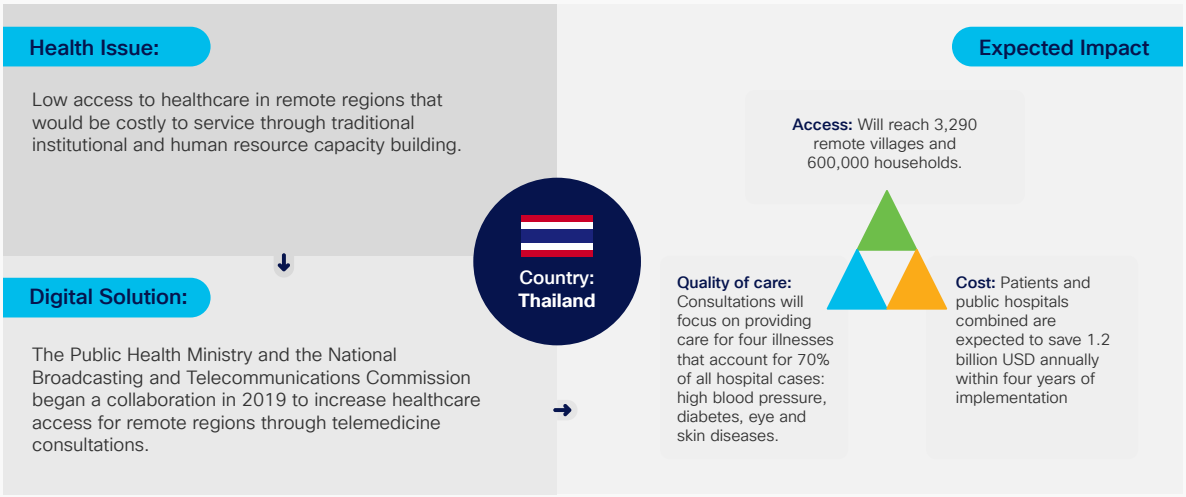
Case study 1: Expanding healthcare access through telemedicine in Thailand[27]



Case study 2: Expanding healthcare access through telemedicine in Indonesia[28]

In ASEAN countries with significant gaps in access, telemedicine can be a force for democratizing healthcare and a necessity in achieving international standards of care. The WHO has named telemedicine as a critical digital intervention to extend access to higher quality healthcare to those who would not receive it otherwise.[29]

Other digital technologies and applications, such as health applications, remote patient monitoring devices, wearables, and sensors are increasingly moving healthcare systems to patient-centric and community-based care. Tracking and notification extend the reach of quality healthcare to the patient and the community (Case study 3).

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[27] Tortermvasana K. (2019). State launches telemedicine in rural areas. Bangkok Post Group. Bangkok. https://www.bangkokpost.com/business/1648204/state-launches-telemedicine-in-rural-areas

[28] Iwamoto K. (2018). Telehealth apps rise in Southeast Asia due to doctor scarcity. Nikkie Asian Review. Tokyo. https://asia.nikkei.com/Business/Business-trends/Telehealth-apps-rise-in-Southeast-Asia-due-to-doctor-scarcity

[29] WHO. (2019). Who guideline recommendations on digital interventions for health system strengthening. World Health Organization. Geneva. https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf?ua=1

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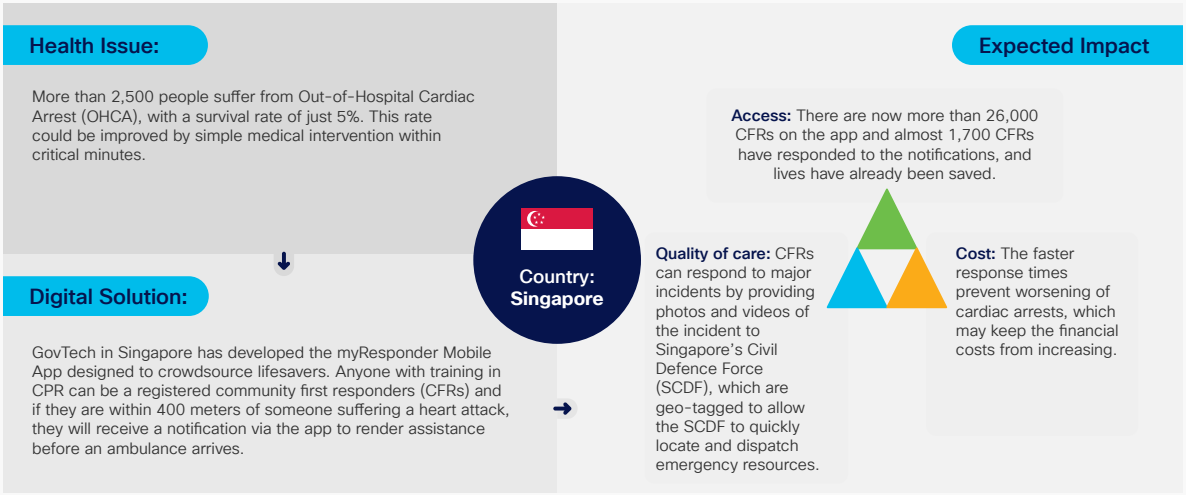
As opposed to leaving residents in remote regions "off the grid" from medical coverage, broadband infrastructure, combined with effective digital solutions, can bring remote residents into formal, trusted healthcare systems.

"People with lower resources have both limited access and limited opportunities to access digital healthcare services. The markets in Southeast Asia need to view healthcare through the lens of health equity, and specifically focus on how to design healthcare services, including the provision of digital healthcare services, to ensure that all people have access to high quality healthcare. The digitization of healthcare has a great potential to make healthcare more equitable."

Dr. David Duong
Director, Program in Global Primary Care and Social Change,
Harvard Medical School

Case study 3: Mobile application improves access to care for time critical scenario[30]



[30] SCDF (2019). Mobile Applications. Scdf.gov.sg. Singapore. https://www.scdf.gov.sg/home/community-volunteers/mobile-applications. Last Accessed 1 August 2019

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Digital solutions to improve quality of healthcare

According to the WHO, quality can encompass one of three measures of healthcare services: safety, effectiveness, and patient-centeredness. These metrics are the closest measures of why people seek care – to feel better, to get treated and cured and to live longer.

In many low and middle income countries, people seek care in overburdened district or national hospitals because of their misgivings about public community health centers – the lines are long, there are too few clinicians and nurses, inexperienced or poorly trained staff, needed diagnostics or tests or not offered and frequent medicine stockouts. Anyone who can afford it will turn to the closest hospital for care, at a high cost to both public health financing systems and to patients and their families.

While quality metrics are notoriously difficult to quantify, digital solutions can result in dramatic quality improvements across the health system from the local clinic to the largest public hospital in the capital city. Telemedicine improves quality of care by making it easier to train medical staff and provide seamless ways for doctor-to-doctor teleconsultation. Through telemedicine, a lone rural doctor could benefit from a team of expert clinicians from the national university hospital.

Project ECHO (Extension for Community Healthcare Outcomes)

Founded in the United States, matches rural, remote, or individual clinicians handling complex cases with specialist teams at academic medical centers in weekly virtual clinics or "teleECHO" clinic. It now operates in over 220 hubs for more than 100 diseases and conditions in 31 countries.

Source: Echo. (n.d). Our Story. Project Echo. Albuquerque. Last accessed August 1 2019. https://echo.unm.edu/about-echo/ourstory

Training and consultations through telemedicine offers the opportunity to upskill healthcare workforce and to be operated at a lower cost without the limits that physical classrooms exert. These trained providers can avail of newer technologies and have access to up-to-date medical information and treatment guidelines, whether delivered through email alerts, webinar updates, or platforms driven by artificial intelligence. Digital technology can also ease the pressure on scalability, enabling training to be delivered to a larger group of healthcare workers at a lower cost with minimal disruption to their daily work commitments.

Health Information Systems also play an important in role in enabling patient-centered care and safety to ensure that prevention, diagnoses, and treatment decisions can be tailored to the individual. One of the major quality issues that arise in healthcare systems in ASEAN is the fragmentation of patient history information. Most healthcare facilities do not have access to full patient history other than what is related at the time of the visit. At best, an incomplete account of a patient's health status may leave out pertinent information to diagnosis and treatment. Worse yet, a partial or missing account can compromise safety as in the case of incomplete drug prescription histories where different drug interactions can lead to severe health consequences.

Comprehensive population databases of patients, health services and biomarkers have led to enormous innovations in data analytics for clinical decision-making. Comprehensive high-quality databases not only allow for continuous and accurate patient follow-up but is now being harnessed to improve effectiveness of care. Digital therapeutics, integrated with sensor and chip technologies, is a fast-growing segment of the health technology landscape. These remote health management systems are important not only to better track a patient's health condition, but to move health systems more closely to patient-centered, integrated, and community-based care.

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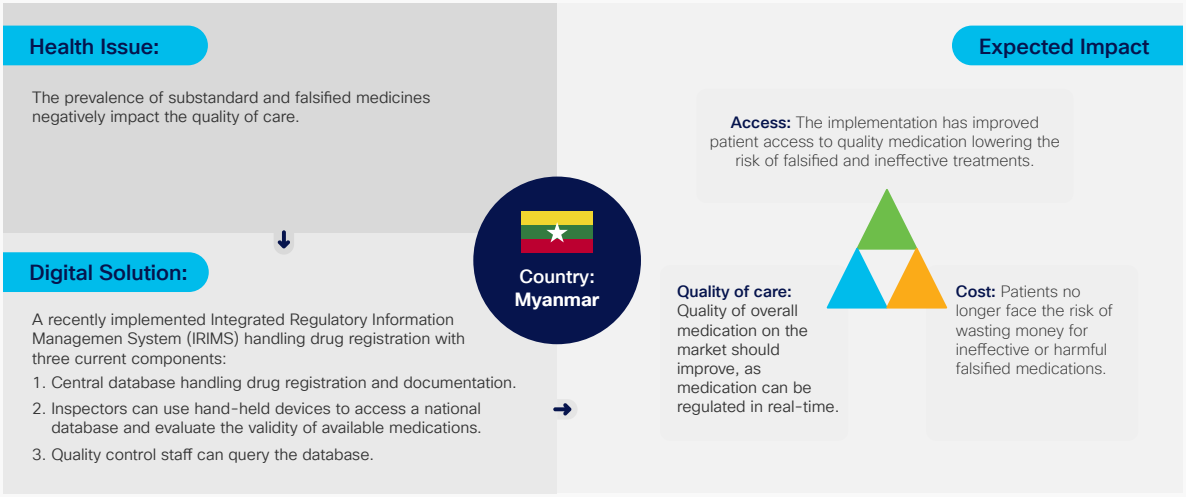
Singapore has harnessed its digital health infrastructure to inform policy making decisions and prioritize health systems planning from its aging to diabetes to cardiovascular disease and primary care. As of December 2017, healthcare professionals from over 1,200 healthcare providers across all care settings have access to the National Electronic Health Record (NEHR). This includes all the public healthcare institutions, all community hospitals, slightly more than half of general practitioner clinics, clinical laboratories, and approximately 70% of nursing homes. Usage of the NEHR is active and increasing every month, with more than 1.1 million patient record searches in the month of November 2018, signalling the usefulness of the system.[31]

Other countries in the region, like Thailand[32] and Vietnam, [33] are using artificial intelligence for clinical research into genomics and biomarkers to better identify risk factors and targeted therapies to disease. In Myanmar, the creation of a digital database for medical registration has led to important improvements in the capacity of the country to safeguard public health (Case study 4).

Case study 4: Safeguarding public safety through enhanced regulatory capacity in Myanmar[34]



Digital solutions to improve affordability of healthcare

No other principle elicits more concern about the ambition and sustainability of universal health coverage than financing, related both to the cost to the Government to launch and sustain a system of universal health coverage and to the promise of affordable healthcare services to individual and their families.

[31] IHiS. (2018). Media Factsheet. IHiS. Singapore. https://www.ihis.com.sg/Latest_News/Media_Releases/Documents/2018%20Media%20Releases/Factsheet%20-%20NEHR%20(2%20Jan).pdf

[32] Phloyphisut P et al. (2019). MHCSeqNet: a Deep Neural Network Model for Universal MHC Binding Prediction. Pubmed.gov. NCBI. www.ncbi.nlm.nih.gov/pubmed/31138107.

[33] Shoombuatong W et al. (2018). Unraveling the Bioactivity of Anticancer Peptides as Deduced from Machine Learning. Pubmed. NCBI. www.ncbi.nlm.nih.gov/pubmed/30190664

[34] Roth S et al. (2018). Strong Regulation of Medical Products: Cornerstone of Public Health and Regional Health Security. Asian Development Bank. Mandaluyong City. https://www.adb.org/sites/default/files/publication/456866/adb-brief-099-strong-regulation-medical-products.pdf

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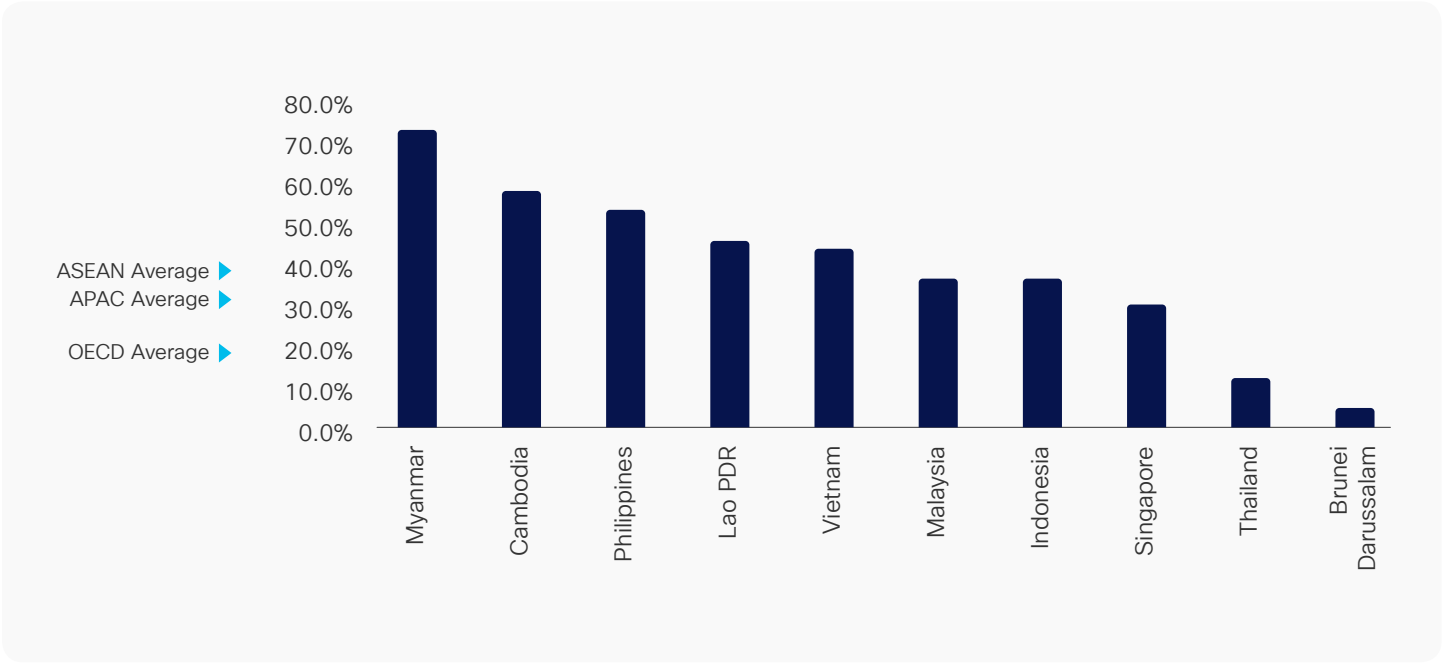
For regional governments the challenge is two-fold – mobilizing more resources for healthcare services and optimizing the money spent. The WHO estimates that 20-40% of healthcare expenditures are wasted through inefficient processes and poor allocation of resources worldwide.[35] Procedural inefficiencies add delays and cost to health systems, which is ultimately borne by patients.

For individuals, the out of pocket payment demanded at the time of an illness or health crisis is one of the main determinants of whether they receive care, they fall into bankruptcy, and most concerning, whether they live. In ASEAN, out of pocket expenditures have been declining since the announcement of universal health coverage but remain high throughout the region (Figure 7). In eight out of ten ASEAN countries, more than a third of healthcare expenses are paid out of pocket by individuals, without the aid of insurance or other financial support.[36]

Figure 7. Percentage of healthcare expenditures paid out of pocket (OOP) in ASEAN[37]



Source: World Bank Open Data, OECD

Technology can streamline administrative processes enabling faster decision making, improved engagement, elimination of wasted or duplicative process and higher rates of compliance, as was revealed in Vietnam through the digitization of childhood immunization registries (Case study 5). Health Information Systems are critical digital interventions that optimize administrative and clinical processes. An estimated 80% of health data globally is unstructured and stored across hundreds of formats such as lab reports, images and medical transcripts.[38] Consolidating and making use of this scattered information is difficult and time-consuming without the aid of technology. Reduced out of pocket expenditures have been realized when cost-savings can be transferred to the patient. At the individual level, digital interventions like telemedicine reduce the cost of consultation and transport to make health visits more affordable.

[35] WHO. (2014). WHO Golbal Health Expenditure ATLAS. World Health Organization. Geneva. https://www.who.int/health-accounts/atlas2014.pdf

[36] World Bank. (2016). Out-of-pocket expenditure (% of current health expenditure) - World Development Indicators. The World Bank Group. Washington D.C.. Last accessed August 1 2019. https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS

[37] World Bank. (2016). Out-of-pocket expenditure (% of current health expenditure) - World Development Indicators. The World Bank Group. Washington D.C. Last accessed August 1 2019. https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS

[38] Sandoz. (2018). How digital tools are improving access to healthcare. Sandoz International. https://www.sandoz.com/stories/access-healthcare/how-digital-tools-are-improving-access-healthcare-13-min-read

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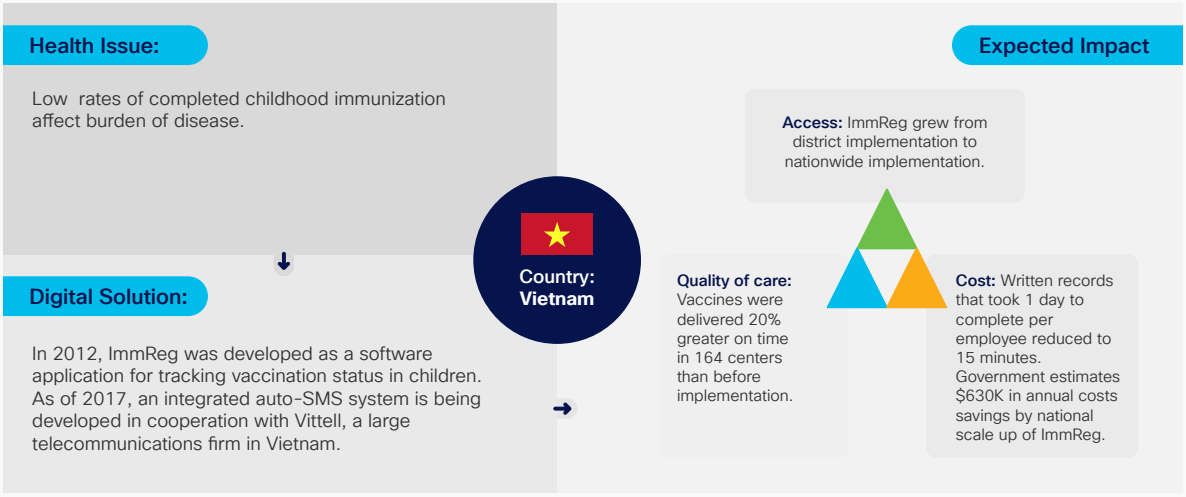
Case study 5: Increasing immunization rates at lower costs in Vietnam[39]



For digital technology to be effective in fulfilling the promise of universal health coverage, a set of enabling factors need to be put in place so that digital interventions can reach their full impact. Several prominent bodies – such as the WHO in partnership with the International Telecommunications Union (ITU) and the Broadband Commission for Sustainable Development have provided frameworks on the core elements that enable digital transformation of healthcare.

Many countries have implemented digital health initiatives and eHealth strategies, but do not reach impact or scale. One of the key problems is that digital technology for health is still highly centralized, focused on cities and tertiary centres, which also serve as the epicentres for rising healthcare costs. However, the majority of healthcare services are delivered through the primary healthcare system. Thus, the potential impact of digitally-enabled health systems is muted when majority of the population is left out. The solution is to enable the digital transformation of primary healthcare.

"Primary care digital offerings are required by all countries. Those are where essential needs are."

Chintan Desai
COO, Southeast Asia, GE Healthcare

[39] Path. (2016). "PATH VIETNAM AND IMMREG Expanding Reach of the Immunization Registry in Vietnam", Path. Ho Chi Minh City. https://path.azureedge.net/media/documents/ID_vietnam_unf_cs.pdf

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Start with primary care

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Start with primary care

The Astana declaration, signed in 2018, as a recommitment of the Alma Ata Declaration, states that primary care is the cornerstone of universal health coverage and is the "most inclusive, effective and efficient approach to enhance people's physical and mental health, as well as social well-being."[40] According to the World Bank, 90% of healthcare needs can be met through primary care.[41]

Academia, development organizations, and governments have focused on primary care strengthening in recent years, recognizing that right siting care-- accessing the right care, at the right time, and at the right place-- is often dependent on high quality primary care. The Joint Learning Network for Universal Health Coverage, established in 2007 on the premise that countries learn from each other and together as they go through the process of achieving universal health coverage, includes primary care as one of its six technical tracks.[42]

Harvard Medical School Center for Primary Care, established in 2010, states that primary care is the foundation of all medical care "both care delivered and care averted."[43] In 2015, the Bill & Melinda Gates Foundation, World Bank Group, and the WHO partnered to launch the Primary Healthcare Performance Initiative (PHCPI) with the double aim of curating country-level primary care data and helping governments use this data for decision making and health services planning.[44]

With renewed commitments to universal health coverage, and thus a responsibility to cover rising healthcare costs, countries in ASEAN are developing strategies and partnerships to strengthen primary healthcare and improve population health, thus saving health systems from expensive hospital-based care, and saving patients the costs of transportation, lost work time, and high out of pocket payments.

In 2017, the Government of Singapore launched its vision for healthcare transformation, the "3 Beyonds," which includes "beyond healthcare to health; beyond hospital to community; and beyond quality to value."[45] This vision reflects Singapore's multi-year shift from an acute care, hospital centric model of care to community based, primary care. In 2019, the Vietnam Ministry of Health launched a public private partnership to strengthen primary care as its focal point in achieving universal health coverage[46]. The Primary Healthcare Performance Initiative (PHCPI) designated Malaysia, a "Trailblazer" country,[47] and the only country from Southeast Asia, in the initial set of countries to complete Vital Signs Reports, providing baseline data and indicators for the status of its primary healthcare systems.

Spotlight: Thailand's shift to primary care

Thailand has led regionally in the transformation toward primary care, rebalancing its investments toward rural healthcare facilities since the 1960s and 1970s. Through a combination of financing schemes, infrastructure investments, and human resources, Thailand has reached 99% healthcare coverage nationally. Four decades after implementation, outpatient visits to rural health centers increased by 40%, and outpatient visits to urban hospitals declined by 60%, demonstrating a significant shift to rural, primary care. The health outcomes were equally impressive: Thailand's under-5 mortality rate dropped from 37 death per 1,000 live births in 1990 to 13 deaths per 1,000 live births by 2013. In the same time period, its maternal mortality rate dropped from 42 deaths per 100,000 live births to 26 deaths per 100,000 live births.

Source: Sakolsatayadorn P. (2016). "Thailand: At the forefront of Universal Health Coverage". Medium. https://medium.com/health-for-all/thailand-at-the-forefront-of-universal-health-coverage-d1bb9c0c3e79

PHCPI (2019), **"Thailand: Improved geographic and financial access to care strengthens primary care",** Primary Healthcare Performance Initiative, https://improvingphc.org/promising-practices/thailand

[40] WHO (2018). Decleration of Astana. World Health Organization. Geneva. https://www.who.int/docs/default-source/primary-health/declaration/gcphc-declaration.pdf
[41] Doherty J. and Govender R. 2004. The cost-effectiveness of primary care. World Bank. Washington. https://www.popline.org/node/275622
[42] JLN. (2016). Implementing UHC Programs: The Challenge of Capacity and Know-How. Joint Learning Network. Arlington. https://www.jointlearningnetwork.org/events/implementing-uhc-programs-the-challenge-of-capacity-and-know-how
[43] Center for Primary Care. (2019). Why Primary Care?. Harvard Medical School. Boston. https://primarycare.hms.harvard.edu
[44] PHCPI. About PHCPI. Primary Healthcare Performance Initiative. Washington D.C. Last accessed August 1 2019 https://improvingphc.org/about-phcpi
[45] Ministry of Health Singapore. (2018). Opening Address by Dr Amy Khor. Senior Minister of State. Ministry of Health. At the Singapore Healthcare Management Congress 2018. 14 August 2018. Ministry of Health. Singapore. https://www.moh.gov.sg/news-highlights/details/opening-address-by-dr-amy-khor-senior-minister-of-state-ministry-of-health-at-the-singapore-healthcare-management-congress-2018-14-august-2018
[46] Anh T. (2019). New PPP model for universal healthcare. Vietnam Investment Review. Hanoi. https://www.vir.com.vn/new-ppp-model-for-universal-healthcare-67960.html
[47] PHCPI. (n.d). Malaysia. Primary Healthcare Performance Initiative. Washington D.C. Last accessed August 1 2019. https://improvingphc.org/east-asia-pacific/malaysia

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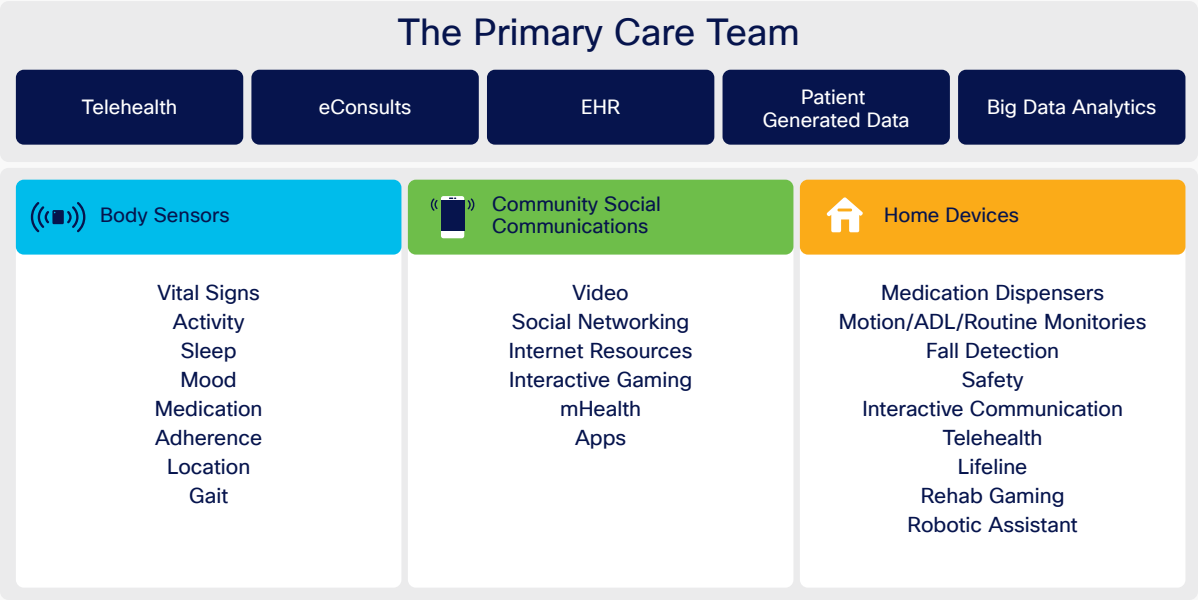
Given the importance of primary healthcare as the principal vehicle through which healthcare is truly delivered for the whole population, digital technologies will have the largest impact in healthcare if implemented at the primary care level (Figure 8).

Figure 8. Digital technological applications in primary healthcare[48]



Source: Adapted from Journal of General Internal Medicine Volume 32 (4): 398-403

1. Digitizing primary care is the first step in realizing a national health record system for providing high quality, integrated care across the care continuum

When the WHO revisited the Alma-Ata declaration 40 years later, it called on health systems to view primary healthcare not in isolation but rather as a system to harness new technologies to address care needs across the continuum. Locally designed IT systems or platforms, that are harmonized, adhere to interoperability standards, and are user-centered, are poised to take advantage of emerging technology developments like IoT, artificial intelligence, machine learning. Digital technologies, built on a robust ICT foundation, can help lower and middle income countries to leapfrog developed countries in their deployment of patient centered and integrated care. While there is not yet consensus on the definition of integrated care, all prevailing definitions put the needs of individuals, families, and communities at the center of care.

[48] Journal of General Internal Medicine. (2017). Volume 32 (4): 398-403. Published online 2017 Feb 27. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5377889/

[49] Sakolsatayadorn P. (2016). Thailand: At the forefront of Universal Health Coverage. Medium. Bangkok. https://medium.com/health-for-all/thailand-at-the-forefront-of-universal-health-coverage-d1bb9c0c3e79

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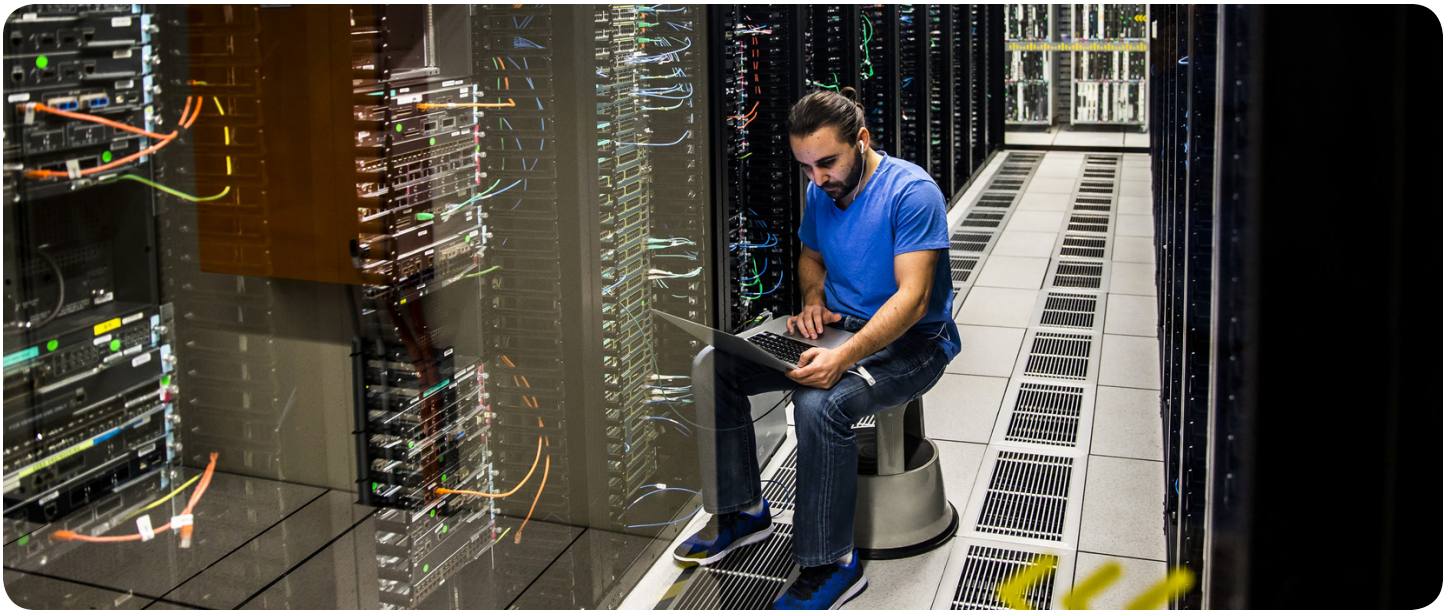
People living in emerging economies have struggled to get access to high-quality primary healthcare. We have a unique opportunity to change this by leveraging the power of digital technology. Advances in digital connectivity, can ensure that good quality primary healthcare is accessible and affordable for hundreds of millions of people in Southeast Asia. This in turn has the potential to reduce the strain on tertiary healthcare and contribute to socio-economic growth in ASEAN.

Naveen Menon
President, Cisco ASEAN

Primary healthcare serves as the traditional and most common point of contact for a person to the healthcare system. The local clinic is the place where health education, early detection and diagnosis of diseases, prenatal and postpartum healthcare, well-baby checkups, and monitoring of both infectious and noncommunicable diseases occur.

Investing in the digital underpinning at the primary care level is a smart investment by governments for the public good, but rarely done and hard to do without political leadership and legislation that can pull together a fragmented primary healthcare system.

Most commonly, technology investments are made first in hospitals, building data systems that capture acute and episodic care and poorly track a person's well-being and complete medical history. Where governments have encouraged adoption of electronic medical records at the clinical level, the results have been mixed and often with poor uptake due to the financial and time burden on physicians and clinical administration in doing so. Governments who have successfully achieved full electronic medical records implementation at the primary care level have mandated, incentivized, and/or subsidized it.



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"A lot of countries get their investment plans for digital health upside down. While hospitals have episodic data, most of our health records and interactions are with general practitioners. It is these doctors that keep our longitudinal data about our lives, our family histories and our day to day to interactions. If you start with primary care as the key enabler of digital health for a country, you can build an integrated national health record. Once that is complete, we can then then bind the hospitals into the national health record. The data store needs to first include primary care providers if you want to drive national digital health success."

Gabe Rijpma
Senior Director, Health Industry, Microsoft

2. Digital technology enables early detection, early diagnosis, and health education at the local level, before advanced staged disease sets in, which can be costly and harder to treat

Southeast Asia is going through a rapid demographic and epidemiological transition as populations age and disease burdens shift from communicable to non-communicable diseases. Some countries are facing a double burden of disease, as infectious disease rates remain high and noncommunicable diseases increase in prevalence.

At a macro level, rising healthcare costs are being driven largely by aging populations and increasingly unhealthy lifestyles that lead to chronic diseases, often with debilitating and expensive complications that are caught too late and treated in tertiary care centers.

Preventing these diseases and detecting them early is best done in local, public community health centers or by private general practitioners, leading to better health outcomes and cost savings.

It is often due to lack of perceived or real quality of public community health centers that people seek care in and overburden secondary and tertiary centers, at a high cost to both public health financing systems and to patients and their families. Patients pay in travel costs and time, lost work and income, and long wait times. Shifting resources from secondary and tertiary centers to primary care can result in cost savings for patients.

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3. Data is needed for policy planning and localized innovation

There is a dearth of data at the primary care level in ASEAN, leading to poor resource planning and an incomplete picture of primary care and population health needs. By digitizing primary care, countries can establish and extract robust epidemiological data on population-level health needs and related costs. Harvard Medical School's Center for Primary Care noted in their "Primary Care in Vietnam" report that an attribute shared by most, if not all, lower and middle income countries is "in terms of the struggle most low and middle income countries health systems have with strategic planning and decision making due to a lack of reliable data."[50]

The PHCPI aims to improve primary care through better data and better decision making using that data. Provincial and national governments will have better epidemiological and financial data that can be used for policy planning and for future health services investments, including a better-estimated return on investment.

Jointly, public and private healthcare providers can design and provide integrated care based on local resources and needs, both vertically (from primary care to tertiary centers) and horizontally, (including social determinants of health with healthcare data) to get a fuller picture of population health needs. In order to gather this data and share it safely, governments first need to implement health information systems that are interoperable, secure, and user centric.

In 2017, the Singapore Ministry of Health worked with the Urban Redevelopment Authority, using their in-house developed digital geospatial urban planning tools, to create a mapping tool for policy planners to query indicators for mobility, health status, age, and community resources within a geographical area and visualize where and to what extent primary care and related services are needed in communities. The government was able to do this because of the national ID, which is linked to all government services.[51]

"Strong universal health coverage needs very robust data and IT"

Dr. David Duong
Director, Program in Global Primary Care and Social Change, Harvard Medical School

4. Data needs to be safe and secure to protect patient's interests

When implementing a digital focused, data-centric approach towards primary care, it will be of utmost importance to ensure patient data is secured and protected. Concerted efforts need to be made to fortify the healthcare ecosystem by mandating that government institutions and private healthcare providers adopt a risk-centric, layered defence approach to cyber threats. This includes instilling a culture that enables the sharing of threat intelligence, extending cyber resilience across the supply chain, and encouraging the development of regional public–private partnerships (PPPs) and industry alliances (as we have seen in the banking and telecommunications industries). Finally, because cybersecurity is a continuously evolving challenge, the region must build future capacity by cultivating the next generation of security professionals and driving research and development around innovative technologies that can address emerging and unforeseen threats.

[50] Center for Primary Care. (2019). Global Gains. Harvard Medical School. Boston. https://hms.harvard.edu/news/global-gains

[51] Woon TS, and Zainal K. (2018). Successful Ageing: Progressive Governance and Collaborative Communities. Civil Service College. Singapore. https://www.csc.gov.sg/articles/successful-ageing-progressive-governance-and-collaborative-communities

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White paper
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Implementing national digital health strategies: 10 point action plan

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Implementing national digital health strategies: 10 point action plan

For digital technology to be effective in fulfilling the promise of UHC, the conditions for success must be met. In this section, we outline ten key actions that countries must undertake to ensure that the potential of digital technology is fully realized on the ground. We have spoken to experts across the development, government, private, and public sector to inquire what countries can do to ensure success.

Action 1
Establish Head of State Mandate

Action 2
Build the National Digital Infrastructure

Action 3
Invest in Human Capital

Action 4
Develop Regulatory and Legal Frameworks

Action 5
Appoint an eHealth Government Agency

Action 6
Define an Impact Measurement Framework

Action 7
Lead a Multi-Sectoral Strategy

Action 8
Enable Private Sector Innovation

Action 9
Adopt a Lens of Equity

Action 10
Design for User Experience

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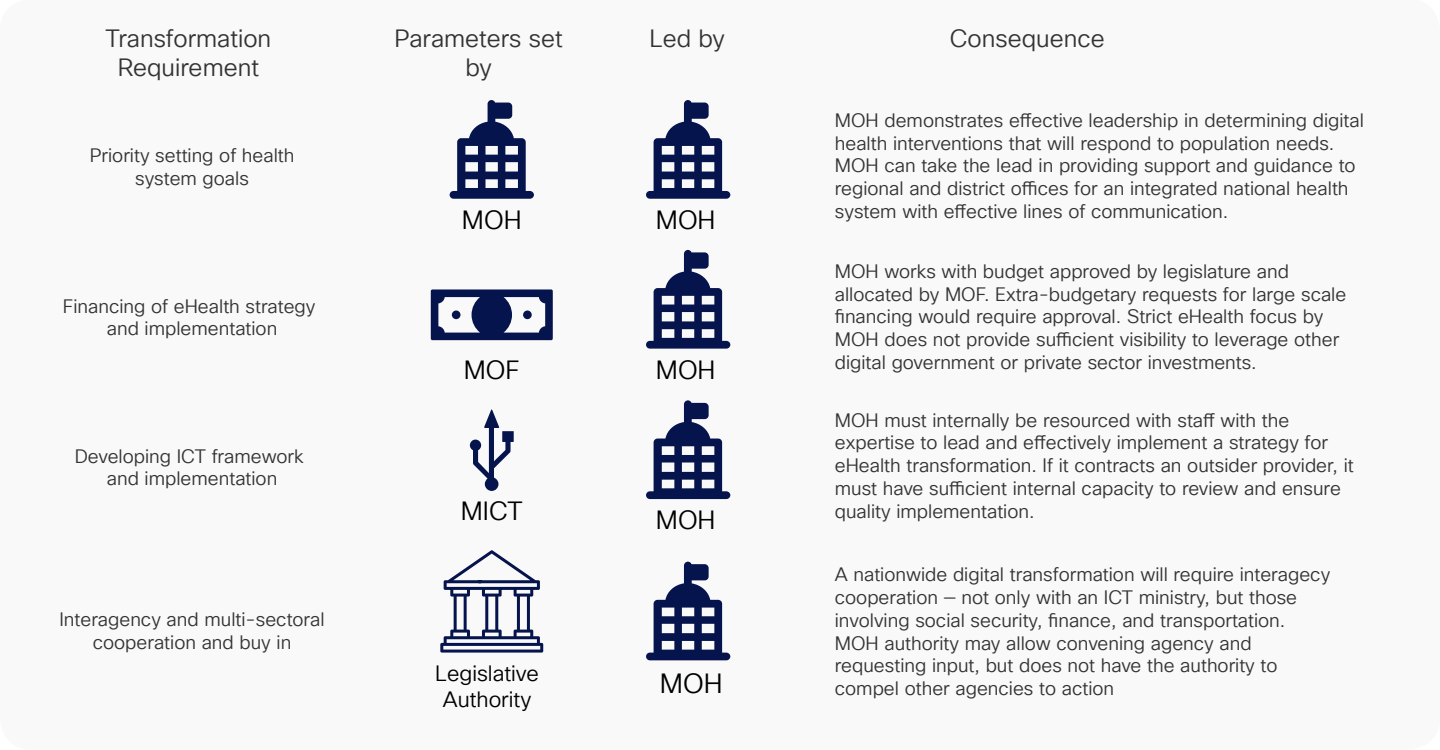
Action 1: Establish Head of State Mandate

Leadership is a consequential factor in driving a successful nationwide digital transformation of healthcare.

While Ministry of Health leadership is essential for developing and guiding an eHealth strategy, the budget for the Ministry of Health is approved by the legislative body and allocated by the entity responsible for finances. As such, the Ministry of Health has limited decision-making authority for financing large scale health IT investments, which can impede the implementation of the digital transformation of healthcare (Figure 9). In Malaysia, while IT transformation of health is one of the key pillars of the national health strategy (2016-2020), approximately only 5% of the capital expenditures from the health budget are allocated for digital initiatives.[52]

Figure 9. Limitations of Ministry of Health leadership in digital health transformation



Source: Authors

A head of state mandate ensures that appropriate healthcare funding is allocated in the national budget and enables coordination between the Ministry of Health (MOH), the Ministry of ICT (MICT), Ministry of Education (MOE), Ministry of Finance (MOF) and other relevant agencies that will mutually benefit from a strong digital foundation.

[52] Ministry of Health Malaysia. (2014). National eHealth: Moving Towards Efficient Healthcare. Ministry Of Health Malaysia . Kuala Lampur. http://www.moh.gov.my/index.php/file_manager/dl_item/

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South Korea: Three decades of commitment to UHC and the digital transformation

South Korea is widely recognized as having one of the world's most comprehensive and ubiquitous digitally-enabled health system. The factors behind their success are many e.g., strong economic growth, increasingly educated population, national unity. Among them, strong presidential leadership driving a whole-of-government approach to digital transformation and universal health coverage has been recognized as a critical factor to success.

Presidential leadership in ICT

A recent World Bank report that takes a deep look at the history of South Korean digital transformation maintain that presidential leadership was necessary for "funding, coordination among agencies, and revisions of laws and rules" to drive a nationwide digital transformation. The first presidential commitment to digitization occurred under the leadership of President Park Chung-hee (1978-1982) for the development of e-government, mandating integration of all computerized government initiatives. In 1983, President Chun Doo-hwan's administration declared it to be the "Year of Information Industry" and appointed a Presidential Committee to oversee implementation of a National Basic Information System (NBIS). In the 1990s, the Kim Young-Sam administration implemented the High-Speed Broadband Network Project through the IT Development Committee, established under the prime minister's office. And by the end of 2000, the Kim Dae-jung administration had established high-speed Internet broadband in 144 regional areas. The authors contended that the Kim Dae-Jung harnessed the development of e-governance to improve government administration towards transparency, integration, and reduced corruption. The South Korean Government plants to support 5G by investing more than USD 26.2 billion over the next four years. The President said that the country aims to establish "the worlds best 5G ecosystem" and capture "15 per cent of the world's market share by 2026". As of June 2019, South Korea now has over a million 5G users and at a faster adoption rate than when the nation launched 4G.

The ICT underpinning of South Korea's Universal Health Coverage

Equally strong was the vision behind a robust health system that was developed to be sustainably financed and comprehensively covering the entire Korean population. In 1977, President Park Chung-Hee and the legislature passed a law that mandated consolidation of health financing requiring medical insurance for employees and their dependents in large firms with more than 500 employees. Over the subsequent years, health insurance coverage expansion was mandated by successive governments as necessary for the economic and social development in South Korea. In 1982, universal health coverage was a major priority of President Park Chung-hee's presidential platform. By 1989, South Korea achieved population-wide (universal) health coverage.

Today, South Korea's health system has the medical records of nearly all 50 million citizens and over 85,000 providers registered in the national database, which underpin decision-making and action for health policy, development of evidence guidelines, and the safeguarding of public safety, thereby contributing to the safety, quality, affordability of health services.

Presidential commitment to eHealth continues to date with a focus on digital technology and health as necessary drivers of economic growth. In 2019, the Presidential Committee on the Fourth Industrial Revolution have identified key, including a platform for big data collection and management, artificial intelligence-enabled drug development platforms, and smart clinical trial management.

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Action 2: Build the National Digital Infrastructure

The benefits of a robust digital infrastructure for health systems extend well beyond the needs of the healthcare sector – be it improving other social areas like environment and education or spurring economic growth and job creation.

The Masterplan on ASEAN Connectivity 2025 estimates that the potential of digital disruption in healthcare in the region can result in economic benefits of USD 20-53 billion by 2030.[53] According to an A.T. Kearney report on the Digital Economy, ASEAN is far behind others in the digital economy and experts surmise that the region has an opportunity through digital transformation to spur growth and development of all sectors in the region and 'leap frog' to become a top 5 digital economy by 2025.[54]

However, there is a big difference between potential and probability. As it stands, all countries in ASEAN have multiple major IT investments, across sectors that are plagued by issues of fragmentation in investments, uncoordinated planning, and low uptake of technologies. The reality is far from the ideal.

All experts interviewed agreed that investing in critical digital infrastructure like information systems, connectivity, cybersecurity, and tools to collect and analyse data are fundamental to a digitally-enabled system that can fulfil the promise of UHC. In remote areas, health posts with a basic computer, database for collection and storage, and broadband connection can go a long way to improving health provider efficiency and responsiveness.

These digital improvements are expensive but necessary, with funding options ranging from upfront government investments to public private partnerships with telecommunications companies to development bank loans.

Action 3: Invest in Human Capital

Multiple experts interviewed stated that the lack of technical knowledge within the public sector is an impediment to moving an eHealth strategy forward. Currently, governments compete with the private sector in hiring and retaining technical talent. One consequence of this is that technical talent and knowledge resides in the private sector, with higher salaries than the government can offer, yet the people tasked with leading eHealth strategy and implementation are work in government.

Similarly, ICT offers the current and potential healthcare workforce, ranging from specialists to frontline health workers, to upskill their practice at a lower cost without the limits that physical classrooms exert. These trained providers can avail of newer technologies and have access to up-to-date medical information and treatment guidelines, whether delivered through online courses, email alerts, webinar updates, or platforms driven by artificial intelligence.

The Government and the private sector share a mutual interest and responsibility in upskilling and training civil servants and health workers on technical capabilities so that eHealth projects can flourish.

Action 4: Develop Regulatory and Legal Frameworks

Following a head of state mandate, parliament or the national assembly ensures that the commitment extends beyond the political life cycle by cementing the mandate in national legislation. Legislation protects patients while enabling innovation, and demonstrates whole-of-government political will toward achieving universal health coverage goals. Governments across ASEAN are currently working on a raft of legislation and frameworks to support a digitised economy. The focus on building a regulatory environment that supports and enables digital transformation is increasingly important as the pace of disruption increases.

[53] ASEAN. (2016). Masterplan on ASEAN connectivity 2025. The ASEAN Secretariat. Jakarta. https://www.asean.org/storage/images/2015/November/ICT/15b%20--%20AIM%202020_Publication_Final.pdf

[54] ATKearney. (2015). The ASEAN Digital Revolution. A.T. Kearney. Chicago. https://www.atkearney.com/digital-transformation/article?/a/the-asean-digital-revoluti-1

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As technology increasingly becomes a part of daily life and the corresponding data is shared across networks and devices, appropriate regulations are needed to protect privacy and security. For instance, in Singapore, the Personal Data Protection Act is designed to protect all personal data, not only healthcare data.[55] In 2016, the Malaysia Personal Data Protection Department reviewed and updated the Personal Data Protection Act passed in 2010 to align with technological developments,[56] while in Philippines, the Department of Information and Communications Technology created an independent body with the Data Privacy act of 2012, dubbed the National Privacy Commission. The body will monitor and ensure compliance of the country with international standards for data protection.[57]

In Thailand, the Electronic Transactions Development Agency stated that a law relating to digital identity services is expected to be in place by the end of 2019, with a public hearing to be organized and a draft for Cabinet approval to be submitted by August. The Digital ID bill is intended to regulate the management of digital ID services and is aimed to address trust and security issues.[58] Specific to healthcare technology, Thailand's National Broadcasting and Telecommunications Commission is developing regulations governing Internet of Things (IoT) devices, and by the end of 2019 plans to publish drafts on two of the five initial categories of regulatory frameworks devoted to IoT.[59]

In Singapore, the Ministry of Health, the Health Science Authority, and the Singapore Medical Council have each published guidelines related to telehealth products and services. Yet in the absence of legislation, industry and healthcare operators were slow to implement telehealth services and take on litigatory risk.[60]

Spotlight: Singapore Telehealth Sandbox

In April 2018, the Singapore Ministry of Health launched a regulatory sandbox to encourage the innovation and participation of telemedicine providers in the delivery of healthcare services. The regulatory sandbox enabled telemedicine services to be developed and tested for the Singaporean population, with the oversight of the Ministry and safeguards in place. This model is ongoing and provides benefits to several stakeholders: patients would have early access to new healthcare models, telemedicine companies can operate in an evolving regulatory environment that fosters their growth while assuring patient interest, and the Ministry can collect the information to develop a clear regulatory regime for telemedicine.

Source:
Ministry of Health Singapore. (2018). MOH Launches first regulatory sandbox to support development of telemedicine. Ministry of Health. Singapore.
https://www.moh.gov.sg/news-highlights/details/moh-launches-first-regulatory-sandbox-to-support-development-of-telemedicine

Action 5: Appoint an eHealth Government Agency

Ministry of Health leadership is critical as they are the central entity ensuring and safeguarding the health of the nation. They are also responsible for setting the national policy and programmatic policy on health and ensuring evidence-based high-quality healthcare. In all 10 ASEAN countries, digital heath and eHealth strategies are driven by the Ministry of Health.

Health ministries may well recognize the importance of eHealth and the potential of digital technologies to expand universal health coverage; however, they are often not internally resourced with individuals or teams that understand or have expertise in how to implement a nationwide ICT plan that is responsive to healthcare needs.

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[55] Personal Data Protection Act, 2012. Singapore. https://sso.agc.gov.sg/Act/PDPA2012

[56] Personal Data Protection Act 2010. Malaysia. http://www.agc.gov.my/agcportal/uploads/files/Publications/LOM/EN/Act%20709%2014%206%202016.pdf

[57] Data Privacy Act of 2012. Philippines. https://www.privacy.gov.ph/data-privacy-act/

[58] Leesa-Nguansuk S and Tortermvasana K. (2019). Paving the way to Digital IT. Bangkok Post Group. Bangkok. https://www.bangkokpost.com/business/1545478/paving-the-way-to-digital-id

[59] Tortermvasana K. (2019). NBTC readying two drafts for IoT. Bangkok Post Group. Bangkok. https://www.bangkokpost.com/business/1700732/nbtc-readying-two-drafts-for-iot

[60] NG K. (2018). Telemedicine to be regulated: Health Ministry. MediaCorp. Singapore. https://www.todayonline.com/singapore/medical-watchdogs-urge-caution-doctors-practising-telemedicine-issuing-e-mcs

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For an effective eHealth leadership emanating from the Ministry of Health, Dr. Alvin Marcelo, Executive Director of AeHIN and former Chief Technology Officer of PhilHealth, recommends that all governments appoint an eHealth focal point to lead the strategy and development of a blueprint that prioritizes and plans investments in digital technologies for health. Dr. Marcelo stressed that this focal point must be sufficiently resourced with staffing and finance and with a high degree of IT competency. This is where many countries run into problems.

The government can establish an agency whether an arm of civil society or a government-owned company specifically for the coordination of national eHealth projects across ministries, across district, provincial, and national levels of government, and with patient associations, medical associations, and businesses. The advantage of establishing a government-owned company is the government can recruit people with high levels of technical expertise and pay market rates to lead an effective national eHealth strategy.

In Thailand, the Digital Economy Promotion Agency, while a government agency, has the mandate to coordinate digital health projects with partners both within and outside the government. The agency is currently coordinating the Khon Kaen Smart Health project, working with universities, chamber of commerce, health tech associations, local drug stores, and incubators to share knowledge and a unifying vision for how technologies can increase access to healthcare.[61]

In Singapore, the Ministry of Health Holdings, a government-owned company, oversees Integrated Health Information Systems, an agency tasked with implementing technology in Singapore's public healthcare systems that results in better, more cost effective patient care.

Action 6: Define an Impact Measurement Framework

> "You need to be very clear about what you want to achieve with your digital health investments and you need to have a road map. You need to have a phased approach because singular investment in your disease surveillance or EMR without any other foundational investments is not going to lead to a sustainable result."
>
> **Dr. Susann Roth**
> Principal Knowledge Sharing and Services Specialist, Asian Development Bank

Impact, affordability, and cost-savings metrics should be built into every digital health intervention from the early stages of planning. Ultimately, the metrics should extend to an assessment of health outcomes. Unfortunately, evaluation and monitoring is usually considered following implementation. To date, data on health outcomes from digital interventions have not been well documented, warranting further investments in cost-effectiveness studies.

Many public sector digital initiatives have underestimated the time, investment, and resources need to realize a digital initiative, resulting in costly projects which do not have a demonstrable return or even negative return.

[61] World Bank. (2018). Thailand and World Bank to collaborate on promotion of digital economy. The World Bank Group. Bangkok. https://www.worldbank.org/en/news/press-release/2018/02/26/thailand-and-world-bank-to-collaborate-on-promotion-of-digital-economy

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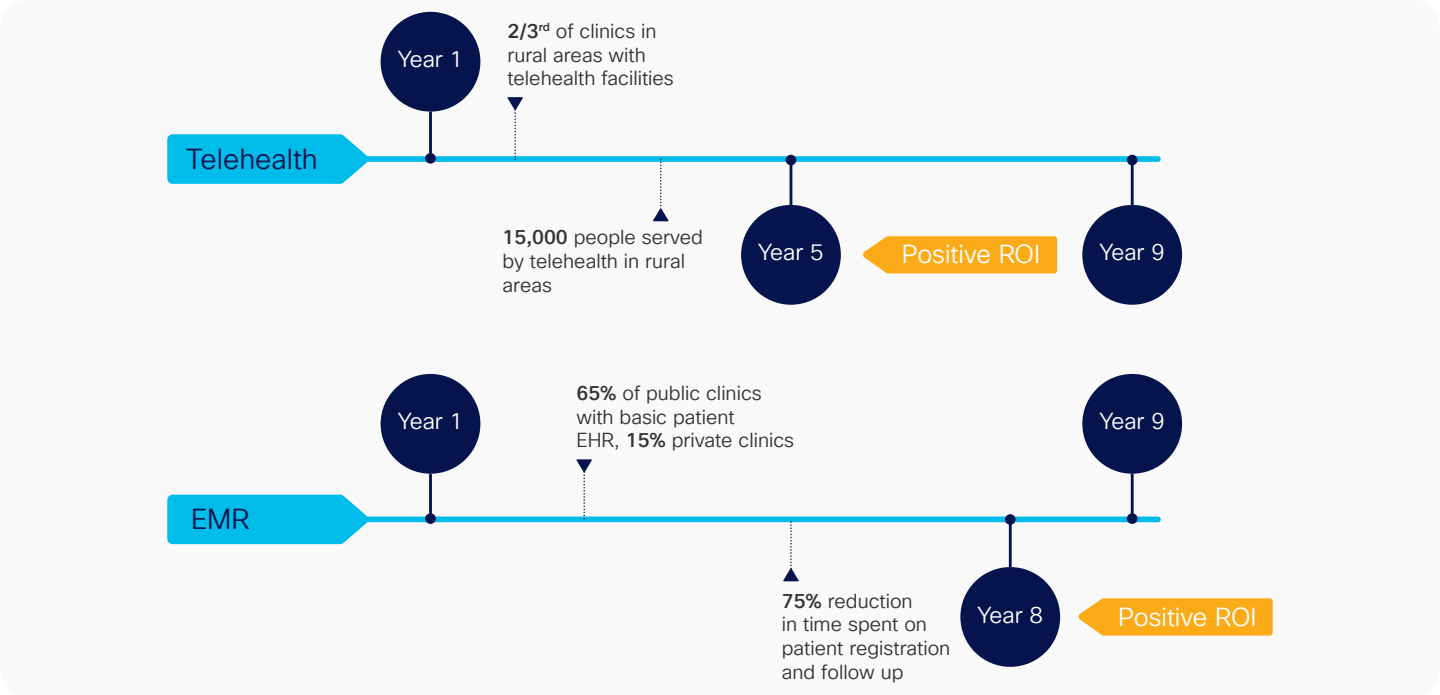
Experts estimate that even well-planned large-scale digital interventions may only show positive returns anywhere from a 5 - 9 year period, as highlighted in the Digital Health Impact Framework Manual.[62] Countries should be prepared financially and politically for the long-term horizon. Several economic experts stressed that prioritization and sequencing of investments based on a balanced evaluation of economic and health priorities is crucial. Subsequently, a blueprint for digital transformation should be created to ensure unity and clarity of vision as well as knowledge sharing.

Dr. Susann Roth, one of the region's leading experts on the impact of digital health investments, underscored the importance of demonstrating quick wins and returns on investment at every stage of implementation. While the ultimate goal might be a nationwide electronic record system, policy and program planners can identify the social returns in terms of workforce training, competency, patient follow up and patient satisfaction benefits within the first years of the project.

To convince investors whether the head of state, a national assembly, a private partner, or a donor, a solid investment case must be established. There are several toolkits to guide countries on the costing and prioritization of digital investments for health. Among these, the Digital Health Impact Framework provides detailed guidance of the steps, key questions, and criteria for consideration. The Digital Health Impact Framework is currently being converted into a tool for countries to follow. Dr. Susann Roth cautions against the over-optimistic calculations of returns on investments that are made with best-case assumptions. That is not to say that returns on investments cannot be significant and positive for health and economic benefits to the digital transformation of health systems, but proper evaluation and planning will permit appropriate costing, resource mobilization, and allocation (Figure 10).

Figure 10. Illustrative capture of benefits on digital interventions before a positive ROI[64]



Source: Authors

[62] Jones T et al. (2018). DIGITAL HEALTH IMPACT FRAMEWORK USER MANUAL. Asian Development Bank. Mandaluyong City. https://www.adb.org/publications/investing-digital-health

[63] Jones T et al. (2018). DIGITAL HEALTH IMPACT FRAMEWORK USER MANUAL. Asian Development Bank. Mandaluyong City. https://www.adb.org/publications/investing-digital-health

[64] Jones T et al. (2018). DIGITAL HEALTH IMPACT FRAMEWORK USER MANUAL. Asian Development Bank. Mandaluyong City. https://www.adb.org/publications/investing-digital-health

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Action 7: Lead a Multi-Sectoral Strategy

While there is no fixed way of building an eHealth strategy, it does require a Ministry of Health-led approach that is transparent and multi-sectoral, including a clear vision for how the government will work with the private sector and a willingness to work with non-traditional partners. The WHO and others have developed toolkits for creating digital strategies.

Dr. David Duong from the Harvard Medical School Center for Primary Care encourages governments to have open dialogue with the private sector when creating and designing an eHealth strategy. The purpose of this is two-fold: the private sector can ensure its own growth and innovation strategy is aligned with the government strategy, while the government can lean on technical and market expertise from the private sector. The private sector can inform the government strategy, including working with government to prioritize investments according to needs and future requirements and trends.

This approach has recently resulted in the launch of the Technical Working Group for Primary Care, a public-private partnership for primary care in Vietnam, with initial partners including the Vietnam Ministry of Health, Harvard Medical School Center for Primary Care, the World Economic Forum, and Novartis.[65]

> "The government has to be ready to let the innovation happen. Ideally, the private sector would be on board early in the government's plans so that they are naturally incentivised at later stages."
>
> **Alvin Marcelo**
> Executive Director, AeHIN

Similarly, development banks host a wealth of technical expertise and tools that can be leveraged for eHealth strategy development. International development organizations and development banks are positioned to work with partners to ensure an eHealth strategy is operational on the ground as they are moving away from disease-specific verticals toward a health systems strengthening approach. A current example is in Lao PDR, where eight development partners coordinated by the Ministry of Health are collectively developing a comprehensive Health Information System.[66]

[65] Anh T. (2019). New PPP model for universal healthcare. Vietnam Investment Review. Hanoi. https://www.vir.com.vn/new-ppp-model-for-universal-healthcare-67960.html

[66] Ministry of Health LAO PDR. (2017). National Health Information Systems Strategic Plan (HISSP). Ministry of Health LAO PDR. Vientaine.

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"In the past, a number of donors invested in their own parallel projects and this led to fragmentation of digital systems. There was no coherent approach and the systems were not interoperable. The government needs to bring some order, standards or guidelines that everyone will use in order to link the different systems. The crux is with the implementation because at this moment it is still silo driven; every program acts in its own kingdom. I often observe little preparedness to harmonize digital approaches as implementing agencies feel more accountable to their donors that fund their existence, i.e. job guarantee, than to national policies that might eventually lead to the end of their existence as a project – at the least the digital part. Hence one has to address the conflict of interest to achieve a "higher good", i.e. a functional harmonized digital system.

Paul Rueckert
Chief Technical Advisor, GIZ, Support To The Health Sector Programme

As social insurance and private insurance markets expand in the region, they will play an increasingly important role in the adoption of digital therapeutics and other health technologies into practice. These sources of sustainable financing play a significant role in healthcare systems' willingness and capacity to invest in the long term for a digital foundation for health.

Action 8: Enable Private Sector Innovation

Health technology needs fall into one of three categories:

1. Data that helps a health worker do their job, and is a natural by-product of their work
2. Data that helps families and communities take decisions in their own lives, such that they can make better (health) decisions
3. Data that helps governments better understand population health needs

Aside from investing in infrastructure and implementing enabling regulations and strategy, the government's role is to facilitate innovation using data and a collaborative, multi-sectoral approach. Experts mentioned that in an ideal scenario, the Ministry of Health would canvas the market and set guidelines to move the market in a specific direction. After gathering market intelligence, listening to providers and patients, the Ministry of Health would determine what should be done to ensure that a health information system or technology driven solution is fit-for-purpose and context.

Experts highlighted that innovation requires a government-enabled yet localized, user-centric, participatory approach. Using data and knowledge from across government, and listening to the stated needs by doctors, frontline health workers, and patients, the Ministry of Health is best positioned to identify service delivery requirements, and financing priorities and to determine how technology is embedded in building solutions at the country level.

Healthcare providers can also lend perspectives on the situation and can articulate what is needed; finance and technology companies can lead the innovation process, as they have deep insight into industry challenges, access to new technology and expertise in building solutions based on the user experience. Multiple countries in ASEAN are experimenting with incubator models that encourage and facilitate the innovation process between clinicians and health workers, administration, and industry, from startups to multinational corporations. Government and industry can set aside funding for projects to test and iterate technology-enabled workflows.

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Action 9: Adopt a Lens of Equity

In "Tracking Universal Health Coverage: 2017 Global Monitoring Report" [67] the WHO and World Bank they warn that without a lens of equity, increases in a country's national average service coverage may mask worsening inequalities. To improve access to care for the poorest quintile of people, health systems must be structured with these groups in mind.

"Poor people do not have access to digital health. The scales are tipped. The markets in Southeast Asia need to shift that narrative through the lens of equity and focus on how to design for people with low access, with difficult challenges and problems."

Dr. David Duong
Director, Program in Global Primary Care and Social Change, Harvard Medical School

The same report recommends measuring inequalities in service coverage by calculating coverage levels for subpopulations, including household income, educational achievement, geographical region, age, and sex.

Social enterprises are now stepping in to fill these gaps. One such organisation is Allied World Healthcare, whose mission is to sustainably deliver basic healthcare services in underserved communities, by filling the gaps in Cambodia and the Philippines where traditional healthcare services do not reach the population. They equip and train access managers to provide community-based care, including diagnostics, medicines, and health education.[68] While providing care, they are also collecting needs assessment data via patient surveys, helping their corporate partners to better understand the population health needs of low-income patients in remote areas.

Action 10: Design for User Experience

The lack of user-centric design has been a hindrance to technology adoption and usage. Studies have shown mixed success for health technology implementation, which often rests on the ability of practitioners to seamlessly integrate the technology into healthcare workflows.[69] Many times usage rates fall when the primary purpose of the technology itself is lost in its design and implementation, hindering decision making and patient-provider communication, and increasing administrative burden. [70]

One of the challenges cited by interviewees was the low compatibility between digital health interventions and the user's habits, lifestyles, and needs – whether at the individual level, such as a patient monitoring device, or large scale such as a new database system. Technology must be compatible with clinical workflows and will remain unused if it adds to the reporting burden of healthcare workers and is not easy to integrate into existing systems and behaviour patterns. Technology is only as effective as the people who are using it.

Start-ups, thanks to their small size and flexible organizational structure, are adept at rapidly designing and iterating for users' needs and are flexible in implementation processes. By fostering partnerships between a range of stakeholders, including non-governmental organizations, medical associations, and patient advocacy organizations, an ecosystem can grow that will that enable governments and industry to consult and co-create when designing and implementing technology-based health interventions.

[67] WHO. (2017). Tracking Universal Health Coverage: 2017 Global Monitoring Report. World Health Organization. Geneva. https://www.who.int/healthinfo/universal_health_coverage/report/2017/en/

[68] Allied World Healthcare. (n.d). Delivering Healthcare, Everywhere. Allied World Healthcare. Singapore. Last accessed August 1 2019. https://www.alliedworld.healthcare/#home

[69] Ludwick DA, and Doucette J. (2008). Adopting electronic medical records in primary care: Lessons learned from health information systems implementation experience in seven countries. https://www.sciencedirect.com/science/article/abs/pii/S1386505608000920?via=ihub

[70] Ngyuen L et al. (2014). Electronic health records implementation: An evaluation of information system impact and contingency factors. Elsevier. Ireland. https://www.sciencedirect.com/science/article/abs/pii/S1386505614001233

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Moving forward: A call to action

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Moving forward: A call to action

The United Nations General Assembly meetings are noted for their formality, pageantry, power, and prestige but above all, they are recognized as the preeminent forum to articulate the collective global conscience and human desire for progress.

The General Assembly meetings is an important opportunity for ASEAN countries to showcase their commitment and progress towards the achievement of universal health coverage. It is also an opportunity for the region to show leadership, calling for the digital transformation of healthcare systems to achieve universal health coverage. At home, ASEAN countries can lead by example, by focusing the digital health agenda first on primary healthcare, investing in a robust ICT foundation, and enabling a true multi-sectoral and participatory approach. Without digital technology, there will be no universal health coverage. We call on all countries to commit and invest to the ten action points to make universal health coverage not merely an aspiration, but a reality.

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Reaching 650 million: How digital technology is key to achieving universal health coverage in ASEAN

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