Perspective

Achieving the targets for universal health coverage: how is Thailand monitoring progress?

Woranan Witthayapipopsakul, Anond Kulthanmanusorn, Vuthiphan Vongmongkol, Shaheda Viriyathorn, Yaowaluk Wanwong, Viroj Tangcharoensathien

International Health Policy Program, Ministry of Public Health, Nonthaburi, Thailand

Correspondence to: Ms Woranan Witthayapipopsakul (woranan@ihpp.thaigov.net)

Abstract

Universal health coverage (UHC) is one of the targets within the Sustainable Development Goals that the Member States of the United Nations have pledged to achieve by 2030. Target 3.8 has two monitoring indicators: 3.8.1 for coverage of essential health services, for which a compound index from 16 tracer indicators has recently been developed; and 3.8.2 for catastrophic expenditure on health. The global baseline monitoring of these two indicators in 2017 shows that the progress in many low- and middle-income countries is unlikely to be on track and achieved by 2030. The monitoring and evaluation mechanism for UHC progress is a crucial function to hold governments accountable and guide countries along their paths towards UHC. This paper outlines key monitoring and evaluation tools that Thailand uses to track UHC progress; compares the strengths and limitations of each tool; and discusses monitoring gaps and enabling factors related to development of the tools. Thailand uses several data sources to monitor three UHC dimensions: population coverage; service coverage; and financial risk protection. The four key sources are: (i) national surveys; (ii) health facility and administrative data; (iii) specific disease registries; and (iv) research. Each source provides different advantages and is used concurrently to complement the others. Despite initially being developed to track progress for national health priorities, these tools are able to monitor most of the global UHC indicators. Key enabling factors of Thai monitoring systems are a supportive infrastructure and information system; a policy requirement for routine patient data records; ownership and commitment of the key responsible organizations; multisectoral collaboration; and sustainable in-country capacities. The areas for improvement are monitoring in the non-Thai population; tracking access to essential medicines; and maximizing the use of collected data. Lessons learnt from the Thai experience could be useful for other low- and middle-income countries in developing their UHC monitoring platforms.

Keywords: monitoring and evaluation, Sustainable Development Goals, Thailand, universal health coverage

Background

Universal health coverage (UHC) is central to health development in the post-2015 era, as it is the key platform for the achievement of health equity. UHC is an integral element of Sustainable Development Goal (SDG) 3, as Target 3.8, which includes ensuring that all people have "access to quality essential health services and safe, effective, quality and affordable essential medicines and vaccines" without suffering from financial hardship.[1]

There are two explicit indicators for global monitoring of the progress of UHC. Indicator 3.8.1 measures "coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health; infectious diseases; non-communicable diseases; and service capacity and access, among the general and the most disadvantaged population)"; and Indicator 3.8.2 measures the "proportion of people with large household expenditures on health as a share of total household expenditure or income".[1] Also relevant to UHC monitoring is SDG Target 3.b, which promotes access to medicines and vaccines in low- and middle-income countries (LMICs). For this target, Indicator 3.b.1 is for monitoring the proportion of people with access to affordable vaccines, while the proportion of health facilities having a "core set of relevant essential medicine available and affordable on a sustainable basis" is monitored by Indicator 3.b.3.[1]

Without significant and sustained commitments by governments, many low- and middle-income countries, are unlikely to be able to achieve UHC by 2030, given their current limited fiscal space for health.[2] Data from the World Health Organization (WHO) show that in 2016 the share of general government health expenditure as a percentage of general government expenditure for low-, lower-middle-, upper-middle-

and high-income countries was 6.8%, 8.3%, 12.2%, and 14.9%, respectively, showing significant differences across country income levels.[3] Tracking UHC progress is a key function that can hold governments and partners accountable for their UHC commitments. A monitoring and evaluation (M&E) mechanism is crucial to guide countries along their paths towards UHC.

WHO and the World Bank jointly published the *2017 Global monitoring report for* tracking UHC progress where Indicators 3.8.1 and 3.8.2 are measured.[4] For the first time, tracking of Indicator 3.8.1 was reported, using a new, single "UHC coverage index" derived from a series of tracer indicators. Sixteen tracer indicators were selected for the index, which included four from within each of the categories of reproductive, maternal, newborn and child health; infectious diseases; noncommunicable diseases; and service capacity and access.[4] The UHC coverage index is a composite index that ranges from zero to 100, with a higher index indicating better access. In addition to the report, three publications in *Lancet Global Health* also reported the details of development of the index and the global baseline data for 2015,[5] together with estimates of recent trends that are relevant to financial protection.[6,7] These global monitoring tools help countries to develop their own comparable framework, but the key responsibility lies with individual countries to improve institutional capacities and track their own progress, taking into account the national and subnational priorities.

Thailand had rolled out the Universal Coverage Scheme (also known as the 30-Baht Scheme) nationally by 2002, under the National Health Security Act, and currently has nearly 100% of the population covered under the programme – well before the SDG 3.8 commitment at the United Nations General Assembly in September 2015.[8,9] As a UHC pathfinder among LMIC countries, Thailand puts UHC at the top of government, foreign affairs and health agendas, where the M&E platform has been gradually strengthened. This paper outlines the key M&E tools that Thailand uses to track UHC progress with greater detail beyond the SDG Indicators 3.8.1 and 3.8.2, and it discusses strengths and limitations of and key enabling factors for the tools. The lessons from Thailand may help other countries in strengthening their M&E platforms for UHC.

Monitoring and evaluation platforms for universal health coverage in Thailand

Thailand monitors three dimensions of its UHC progress, namely population coverage, service coverage and financial risk protection, and expands each of these in more detail. The main data sources are national surveys; health facility and administrative data; specific disease registries; and research conducted by different organizations across the public sector.

Monitoring population coverage
The National Health Security Office (NHSO) monitors population coverage for all public health insurance schemes on a regular basis, through the use of civil registration and vital statistics (CRVS). The CRVS mandates birth and death registration of the whole population, through 15-day and 24-hour mandatory notification of such events to local civil registries. According to the *Survey of Population Changes 2005–2006*, registration of births and deaths was 96.7%

and 95.2% complete, respectively, at that time.[10] All citizens are given a unique citizen ID (CID) at birth, which is a key reference for all legal or official transactions, such as education enrolment, health entitlement, opening a bank account and holding a driving licence.[11] Every 2 weeks, the Bureau of Registration Administration of the Ministry of Interior shares the total number of births and deaths, including their CIDs, with the NHSO, allowing a real-time update of population coverage. In 2017, 99.95% of Thai people who were residing in Thailand were covered.[12]

In addition to CRVS, population coverage is also monitored by the Health and Welfare Survey (HWS) – a nationally representative household survey, conducted biennially by the National Statistical Office (NSO). The survey asks whether respondents have any public or private health insurance. The latest survey in 2017 showed that 99.2% were insured.[13] The benefits of this additional monitoring through survey are to confirm the CRVS data and also to ensure that people are aware of their insurance entitlements. The HWS provides more details than CRVS, such as the demographic, socioeconomic and wealth profiles of beneficiaries across three public health insurance schemes. It also links with service utilization and out-of-pocket payment. These independent parameters, which are not available from CRVS, facilitate equity assessment.[14] The HWS is responsive to country policy needs, as it can integrate additional modules of national interest, such as unmet health-care needs, citizens' knowledge about antibiotics, and awareness of antimicrobial resistance. Box 1 describes the strengthening of HWS as a key M&E platform at household level.

> **Box 1. Strengthening of the Health and Welfare Survey: a key platform for monitoring health policy implementation and impact at the household level in Thailand**
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> The Health and Welfare Survey (HWS) is a nationally representative household survey conducted biennially by the National Statistical Office, Ministry of Digital Economy and Society in Thailand. It is a multi-purpose health survey that aims to respond to the need for monitoring national health policy implementation and impacts. The key elements of this survey are health insurance coverage, health situation, access to health service and related out-of-pocket payment by households in public and private health facilities, including self-prescribed medicines, across wealth quintiles.[14]
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> The HWS has been strengthened over time. Its frequency and question modules are subject to adjustment, to serve the monitoring of national health priorities at a given time. For example, the HWS was conducted every year from 1974 to 1978, then every 5 years from 1981 to 2001. It became annual again for five consecutive years during 2003–2007, in response to requests by the International Health Policy Program for intensive monitoring of progress and to guide the implementation of universal health coverage, which started in 2001.

Subsequently, a module for unmet health-care needs was added in 2015.[15] A module on antimicrobial resistance was integrated in 2017, to assess the prevalence of use of antibiotics in the last month; clinical conditions and sources; knowledge of antibiotics; and awareness of antimicrobial resistance.[16] In some years, modules on the responsiveness of the health system and on noncommunicable diseases were integrated. The HWS is an important tool to monitor various health aspects within and beyond SDG 3. Monitoring unmet need is critical to verify whether the low prevalence of catastrophic health spending among poor households is the result of forgoing health care that is needed.

Intensive engagement by the Ministry of Public Health on the design and use of the HWS (and other surveys such as multiple indicator cluster surveys; tobacco, alcohol and physical activity surveys; surveys of disability; surveys of the elderly), and long-term trust-based collaboration between health and statistics agencies, are key factors making the HWS a multipurpose platform for monitoring health and health policy achievements at household level.

Monitoring service coverage
Service coverage in SDG Indicator 3.8.1
This section describes national data sources that support the monitoring of service coverage as required by SDG Indicator 3.8.1. Thailand uses surveys, health facility and administrative data, and disease registries to track the 16 tracer indicators in the four categories of reproductive, maternal, newborn and child health; infectious diseases; noncommunicable diseases; and service capacity and access.

First, reproductive, maternal, newborn and child health services are monitored through multiple indicator cluster surveys (MICS). The NSO has conducted these surveys in collaboration with the United Nations Children's Fund, as part of the global MICS programme, initially to track progress of the Millennium Development Goals, and subsequently to continue monitoring the SDGs and other health indicators.[17] The NSO has taken full financial and technical responsibility for MICS.

Second, for monitoring infectious diseases, specific disease registries are available for patients with tuberculosis (TB) and HIV. Individual data on access to TB drugs or antiretroviral therapy (ART) and their treatment outcomes are entered to the electronic registry by facilities in real time. The registries facilitate continuity in medication by all facilities, as their records are accessed by authorized staff in hospitals throughout the country. By comparing with the estimated incidence of TB or people living with HIV, treatment coverage and effective treatment coverage can be calculated. The TB registry in Thailand reports to the Bureau of Tuberculosis, Ministry of Public Health (MOPH), and the ART registry reports to the NHSO. In Thailand, malaria is only problematic in provinces bordering Myanmar, Cambodia and Malaysia, with confirmed cases below 20 000 in 2016.[18] Hence, there is no routine malaria survey. A survey on people at risk who sleep under insecticide-treated bednets is conducted periodically by the Bureau of Vector-Borne Diseases, Department of Disease Control, MOPH. The survey in 2015 showed the coverage of insecticide-treated bednets was 38.5% among the population

at risk.[19] For water and sanitation services, the basic sanitation accessed by households is monitored by MICS.

Third, the proxy indicators for noncommunicable diseases are monitored by NSO's household surveys and facility data. The National Health Examination Survey (NHES) is managed by the Health Systems Research Institute, in collaboration with the MOPH, Thai Health Promotion Foundation and many universities, primarily to estimate the prevalence and trends of selected noncommunicable diseases (cardiovascular disease, diabetes, hyperlipidaemia, hypertension, stroke) and their risk factors.[20] Despite its utility, the NHES is not conducted frequently; the first one was conducted in 1991–1992, with subsequent surveys in 1996–1997, 2003–2004, 2008–2009 and 2014. For tobacco control, a survey on cigarette smoking behaviour started in 1976 and has been conducted every 3 years since then, by the NSO.[21] For cervical cancer screening, coverage in the targeted population is monitored by the MOPH and NHSO using routine administrative data.[12]

Fourth, for service capacity and access, the numbers of hospital beds and health professionals per capita are reported by the Strategy and Planning Division of the MOPH, using administrative data.[22] However, Thailand does not conduct surveys on access to essential medicines at its public and private facilities. The *National list of essential medicines*, covering over 700 active pharmaceutical ingredients and 74 herbal medicines, is the basic pharmaceutical benefit package for all Thai citizens.[23] In the Thai district health-care delivery system, the MOPH's district hospitals also perform drug procurement and oversee stock management for health centres within their district health system network, to ensure the availability and quality of essential medicines. The general monitoring mechanism, operated through periodic site visits and a consumers' hotline, has not indicated any problems with drug adequacy at primary care level. Lastly, the International Health Regulations (IHR) core capacity index was assessed by the first joint external evaluation in 2017.[24] The immunization coverage of essential vaccines in the national programme is monitored by the MOPH, using health facility data and, less frequently, immunization surveys using the 30-cluster technique.[25]

Table 1 describes the data sources that Thailand uses to monitor the 16 essential services defined in SDG 3.8.1.

Service coverage beyond SDG Indicator 3.8.1
Beyond the SDG requirement of Indicator 3.8.1, Thailand's mature M&E system also provides comprehensive evidence on service utilization, unmet health-care need and other services, in accordance with national policy priorities.

The overall utilization rates are monitored using two channels: a routine administrative data set generated from health facilities; and the HWS. The numbers of outpatient visits and hospital admissions are recorded and the utilization rates per person per year are calculated. For the Universal Coverage Scheme, which is the largest public insurance scheme covering 73% of the population, the annual utilization rates have shown an upward trend, from 2.416 to 3.821 visits per capita for outpatient visits and 0.100 to 0.125 admissions per capita for inpatient services between 2006 and 2017.[12] This clearly shows improved access after introduction of UHC.

The HWS also provides information on the use of insurance entitlement, for outpatient, inpatient, health promotion and dental services, including the reasons for those who decided

Table 1. National data sources for monitoring service coverage of SDG Indicator 3.8.1, together with the most recent values

SDG 3.8.1 indicators	Tracer indicators	National data sources/main responsible agencies	Coverage or average: most recent value (year)
Reproductive, maternal, newborn and child health			
Family planning	Demand satisfied with modern methods in women aged 15–49 years who are married or in a union (%)	Multiple indicator cluster survey/ National Statistical Office	78.4% (2016)
Pregnancy and delivery care	Four or more visits to antenatal care (%)	• Multiple indicator cluster survey/ National Statistical Office • Facility data/Ministry of Public Health and National Health Security Office	• 90.8% (at least four visits, multiple indicator cluster survey, 2016) • 53.3% (five visits, Ministry of Public Health and National Health Security Office, 2017)
Child immunization	Children aged 1 year who have received three doses of a diphtheria, tetanus and pertussis vaccine (%)	Multiple indicator cluster survey/ National Statistical Office	87.6% (2016)
Child treatment	Care-seeking behaviour for children with suspected pneumonia (%)	Multiple indicator cluster survey/ National Statistical Office	79.5% (2016)
Infectious diseases			
Tuberculosis treatment	Effective treatment coverage for tuberculosis (%)	Tuberculosis Registry/Bureau of Tuberculosis, Ministry of Public Health	48.3% (2016)[a]
HIV treatment	People with HIV receiving antiretroviral therapy (%)	HIV Registry/National Health Security Office and Bureau of AIDS, Tubeculosis and Sexually Transmitted Infections, Ministry of Public Health	68% (2016)[b]
Malaria prevention	Population at risk who sleep under insecticide-treated bednets (%)	Periodic survey/Bureau of Vector-Borne Diseases, Department of Disease Control, Ministry of Public Health	38.5% (2015)
Water and sanitation	Households with access to at least basic sanitation (%)	Multiple indicator cluster survey/ National Statistical Office	97.2% (2016)
Noncommunicable diseases			
Prevention of cardiovascular disease	Prevalence of non-raised blood pressure regardless of treatment status (%)	National Health Examination Survey/ Health Systems Research Institute	75.3% (2014)[c]
Management of diabetes	Mean fasting plasma glucose (mmol/L)	National Health Examination Survey/ Health Systems Research Institute	98.1 mg/dL = 5.4 mmol/L (2014)
Cancer detection and treatment	Cervical cancer screening in women aged 30–49 years (%)	Facility data/Ministry of Public Health and National Health Security Office	34.6% in women aged 30–60 years (2017)
Tobacco control	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days (%)	The cigarette smoking behaviour survey/National Statistical Office	80.9% (2017)[c]
Service capacity and access			
Hospital access	Number of hospital beds per person	Administrative data/Strategy and Planning Division, Ministry of Public Health	23.1 beds per person[c]
Health-care worker density	Number of health professionals per person: comprising physicians, psychiatrists and surgeons	Administrative data/Strategy and Planning Division, Ministry of Public Health	0.5 physicians per 1000 population, 2.5 nurses per 1000 population (2017)[c]
Access to essential medicines	Proportion of health facilities with availability of the World Health Organization recommended core list of essential medicine	Primary survey at public and private health facilities	Not available
Health security	International Health Regulations core capacity index	Joint external evaluation of International Health Regulations core capacities/joint external evaluation team	3.75 out of 5.00

[a] Effective coverage of tuberculosis treatment is calculated based on treatment outcome data from the Tuberculosis Registry and WHO tuberculosis incidence of 172/100 000 population for Thailand.[26]
[b] HIV treatment coverage was reported in the annual report of the Bureau of AIDS, TB and STIs based on data from HIV registry.[27]
[c] These reported values were converted from their original sources to match with reporting units in SDG 3.8.1 indicators.

not to use their entitlement and opted to pay for service elsewhere. In 2017, the data showed that the proportion of insured patients who used their insurance entitlement was 63.1%, 92.2%, 88.4% and 66.3% for outpatient, inpatient, health promotion and dental services, respectively. The top three reasons for not using health insurance entitlement were having minor illness, the long queue and the inconvenience of seeking health care during office hours.[13]

The HWS also monitors unmet health need. Since implementing UHC policy does not always mean all barriers to health service are removed, a module to assess unmet health need, adapted from the European Union Statistics on Income and Living Conditions survey, was incorporated as a module of the HWS in 2015.[15,28] Unmet health needs and reasons for forgoing health care are monitored separately for outpatient, inpatient and dental services.[15] The latest data from the 2015 HWS showed that unmet health need was 1.50% for outpatient, 0.14% for inpatient and 0.99% for dental services.[15] The prevalence of unmet needs for outpatient and dental services is on a par with that of countries in the Organisation for Economic Co-operation and Development.[15] The factors significantly associated with unmet health needs were age, entitlement to health insurance, economic status and residential area. The main reasons mentioned were not having time to seek care, the long queue and inconvenient transportation.[15] Monitoring unmet health-care need is critical to verify whether the low prevalence of catastrophic health expenditure among the poorest quintiles is the result of forgoing necessary health care, which can result in disability or mortality. A high level of unmet need can explain a low level of out-of-pocket payment, as poor households forego treatment.

Through the MOPH and NHSO, Thailand monitors several indicators of service coverage for a wide range of services, using facility data. This covers proxy indicators for disease prevention and health promotion, curative care and rehabilitation service, for example influenza vaccine for elderly individuals; diabetes and hypertension screening; percutaneous coronary intervention; cataract surgery; renal replacement therapy; and rehabilitation care for people with disabilities and bedridden patients.[12,25] Access to high-cost medicines, orphan drugs, antidotes and antivenoms is also monitored annually by the NHSO.[12,29] Some of the proxy indicators are subject to adjustment, based on the country's priorities and policy agenda for specific periods. Furthermore, a few specific disease registries have been established for various purposes, for example case management, monitoring treatment outcomes and financial reimbursement. These registries, such as those for renal replacement therapy and ART, benefit the monitoring of service coverage and treatment outcomes.

Monitoring financial risk protection
Financial risk protection in SDG Indicator 3.8.2
The SDG target indicator 3.8.2 measures financial risk protection in terms of the proportion of the population suffering catastrophic expenditures on health. Two thresholds are used: spending greater than 10% and greater than 25% of total household expenditure or income on health.[6] The *2017 Global monitoring report* also presented additional data on catastrophic spending defined as 40% of non-food consumption.[4] Thailand monitors the incidence of both catastrophic health spending and medical impoverishment,

using data from the socioeconomic survey (SES), and provides prevalence at national and regional levels.

The SES is another nationally representative household survey conducted routinely by the NSO. It was conducted 5-yearly when it was first introduced in 1957, then biennially from 1987, and it has become annual since 2006 as a result of the cabinet's decision for more timely monitoring.[30] Samples of all households are divided into 12 equal portions for monthly survey throughout the year, to minimize seasonal variation of both income and expenditure. Data on household spending are surveyed every year, whereas a module to assess household income is added every alternate year. These data show households' monthly spending profile for both subsistence and non-subsistence categories.[31]

There are questions in the survey about spending on self-prescribed medicines and outpatient visits during the past month and spending on inpatient care during the past 12 months. The 2017 SES reported an average monthly health expenditure of 332 baht per household (self-prescribed medicines 108 baht, outpatient services 151 baht and inpatient services 73 baht), equivalent to 1.6% of total monthly expenditure, far below the 10% threshold for catastrophic health spending.[32]

Monthly health expenditures paid by households, recorded by the SES, are used to estimate the incidence of catastrophic health expenditure, using a threshold of 10% of total consumption expenditure.[30] Overall, the percentage of households experiencing catastrophic health expenditure has gradually reduced, from 7.07% in 1990 to 2.06% in 2016.[12] This low incidence has been enabled by a continued reduction of out-of-pocket expenditure as a percentage of current health expenditure, from more than 30% before 2000 to 12% in 2015.[4] The reduction in out-of-pocket health payment is a result of expansion of benefit packages by public health insurance schemes.

The incidence of medical impoverishment is also estimated from the SES data against the national poverty line published by the National Economic and Social Development Board. The national and regional poverty lines specific to five geographical regions are calculated separately for rural and urban areas, based on the subsistence level of food and non-food consumption, adjusted by other economic factors.[33] The difference in the numbers of households below the poverty line before and after health payment is the number of households that are pushed into poverty, as a result of out-of-pocket payment for health. Based on these data sets, the proportion of households experiencing impoverishment from health expenditure can be estimated.[34] The national figure for health impoverishment has reduced from 2.34% in 1990 to 0.30% in 2016.[12] Data at subnational level are also available for provincial policy utilities.

Thailand produces data on the incidence of catastrophic health expenditure and health impoverishment by socioeconomic stratifications such as geographical regions, urban/rural domiciles and wealth quintiles. This facilitates specific policy interventions to improve financial risk protection for the groups most affected.

Financial risk protection beyond SDG Indicator 3.8.2
The equity of health system financing and service use is also monitored through research using financial incidence analysis and benefit incidence analysis. Two series of analyses have been conducted, for the assessment periods of 2003–2009 and 2007–2017.[35,36] Financial incidence analysis considers who in

the rich or poor quintiles pays for health care and how equitable the contributions are in relation to their socioeconomic status.[37] It is assessed using the data sources from the SES and the National Health Account.[36] Benefit incidence analysis examines the distribution of benefits from using health services that are subsidized by the government. Benefit incidence analysis uses outpatient and inpatient utilization rates of public health service from the HWS multiplied by the unit costs of outpatient and inpatient services from the NHSO's estimates, then subtracts the out-of-pocket health payment by households.[36] Although health equity analyses have previously been monitored on a research basis, the NHSO, which manages the Universal Coverage Scheme, has seen them as a positive development, and requested the International Health Policy Program to conduct health equity analyses as part of its routine monitoring, and to work with the NSO to maintain the contributions of the SES and HWS.

Discussion

Thailand uses four key tools to track UHC, namely (i) national surveys; (ii) administrative and facility data; (iii) specific disease registries; and (iv) research. These tools have different benefits and drawbacks, which should be considered in the design of appropriate national M&E platforms.

The strength of using national surveys to monitor service coverage is the availability of the country's demographic profile and socioeconomic stratification, which can inform policy decisions to improve access in specific populations and promote equity. However, the downside of these surveys is their limited ability to explore access to services for specific clinical conditions. Provided that sufficient infrastructure is available, administrative/facility data are a more appropriate platform for following up coverage of specific services. On the other hand, the downside of facility data is the lack of socioeconomic profiles. The NHES has comparative advantage in measuring biomarkers, but it is very costly and cannot be conducted frequently.

The key benefit of specific disease registries is that they can serve well in M&E, with comprehensive and specific details as appropriate for particular diseases or conditions, such as continued treatment for the mobile population. However, if these registries overlap with existing routine reporting systems, the overall information system becomes fragmented, which hampers data analysis and puts heavy burdens on front-line health workers who collect data. Hence, harmonization between routine reports and registries is required.

Monitoring through research can be useful for introducing an innovative method that can provide a high level of detail. Compared with facility data and national surveys, it requires fewer resources. However, research provides limited long-term monitoring and comparability across time, owing to changes in methodology, scope or definition and changing focus on certain aspects of health care. Some specific methods may require high technical skills and be difficult to institutionalize.

The preconditions for monitoring and evaluation platforms: the Thai experience
There are several enabling factors that make the M&E systems in Thailand feasible. Well-developed infrastructure in both the health and non-health sectors is the fundamental cornerstone

for health development and UHC tracking. Building on supportive infrastructure, leadership and responsibility, good collaboration among stakeholders, and institutional capacities play important roles in functioning M&E systems.

First, the existence of a CRVS system with national identity mandated by the Ministry of Interior facilitates various kinds of individual data tracking. For health, the CID is linked to entitlement to public health insurance, and it is required in all transactions of service utilization. Another advantage is that the CID can be used as a reference across databases.

Second, patient clinical data are comprehensively recorded, owing to the full coverage of basic technology, including computers, universal internet access, and hospital software in all hospitals and health centres. The process for data entry is either made compulsory or promoted by the MOPH, as a national regulating body, as well as agencies managing public health insurance schemes, using various incentives such as quality indicators and conditions for fund reimbursement.

Third, there are a number of organizations with interests in the country's health situation and other related determinants, notably the NSO, NHSO, MOPH and research institutes. In particular, the NSO is a key responsible organization for collecting household-level information through national representative surveys relating to several dimensions of development. On top of that, good collaboration between these organizations synergistically strengthens the power of knowledge and information by improving the utilization of data to meet policy demands.

Finally, the establishment and function of the M&E platforms require certain capacities and skills. For instance, collecting data through facilities and disease registries needs technical capacities in health information and IT systems, to design and maintain the programmes. To conduct surveys, especially at national level, staff to collect data in the field must be well trained. Undertaking research may require more advanced skills in specific areas. These capacities should be developed in the country. At first, this may need support from international partners and external experts but, in the long run, domestic capacities must be sustained and should not rely solely on external consultants.

It is worth noting that all of these enabling factors discussed were not purposively established to monitor the SDGs according to the global agenda, but had been developed long before the SDGs as routine monitoring for internal use at facility, subnational and national levels.

Limitations and areas for improvement
Although Thailand has a M&E mechanism to monitor most indicators in SDG 3.8, some limitations should be highlighted. Most, if not all, monitoring tools only capture data on Thai citizens, especially when health information links with individual CIDs. In Thailand, there are quite a number of migrant workers and stateless persons, for whom the registration system is not very effective. As a result, information on non-Thai citizens is often lacking. Monitoring of UHC in these populations is, however, important for both public health security, such as spread of tuberculosis and neglected tropical diseases, and humanitarian reasons. Another point is that not all collected information is fully analysed and utilized for improving health system performance, which means that the current health information system is not at the most efficient stage. The

country should either maximize the use of available information or reduce collection of unnecessary data.

One missing area of information in Thailand is monitoring of access to medicines, which has not been well developed and put into practice. This may require primary work through research and development. For example, similar work to the analysis by WHO and Health Action International on the availability, price and affordability of medicines in 36 countries can be adapted with some methodology updates, to develop simplified and sustained monitoring as required by SDG 3.b.1 and 3.b.3.[38] At global level, there is a need for methodological development to support country monitoring.[39,40]

Conclusion

UHC is a top priority of Thailand's government and health agenda. The country has gradually developed the tools required to monitor its health development. Despite initially being developed to track progress for national priorities, these tools are able to monitor most of the global UHC indicators. There are four key data sources: surveys; administrative and facility data; specific disease registries; and research. Each source has benefits and drawbacks that should be taken into account. Key enabling factors of Thai monitoring systems are a supportive infrastructure and information system; a policy requirement for routine records of patient data; ownership and commitment of the key responsible organizations; multisectoral collaboration; and sustainable in-country capacities. Some areas for improvement are monitoring in the non-Thai population; tracking access to essential medicines; and maximizing the use of collected data. Lessons learnt from the Thai experience could be useful for other LMICs in developing their UHC monitoring platforms.

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