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DOI: 10.1016/S0140-6736(18)30198-3

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Abstract

Thailand’s health development since the 1970s has focused on investment in the health delivery infrastructure at the district level and below, and training the health workforce. Deliberate policies guided increased domestic training capacities for all cadres of health personnel and distributed them to rural and underserved areas. Since 1975, targeted insurance schemes to different population groups improved financial access up to when universal health coverage was implemented in 2002. Despite its low GNI per capita, Thailand made a bold decision to use general taxation to finance the universal coverage scheme, not relying on contributions by members. Empirical evidence shows significant reduction and current low levels of out-of-pocket payments, incidence of catastrophic health spending and medical impoverishment; and greatly reduced provincial gaps in child mortality. Certain interventions such as antiretroviral and renal replacement therapy saved adult lives. Well-designed strategic purchasing contributed to efficiency, cost containment and equity. Challenges remain including on preparation for an ageing society, primary NCD prevention, law enforcement to prevent road traffic mortality, and effective coverage of diabetes and TB control.
Thailand: context, health achievements and challenges

Thailand has become internationally known for its Universal Health Coverage (UHC) policy and health development successes. This paper reviews and analyzes the recent historical evolution of health systems development focusing on the primary health care infrastructure, health workforce training and distribution, and extension of financial risk protection to different target populations culminating in UHC in 2002. The achievements of UHC, and factors contributing to them, are analyzed. Although the six building blocks of health systems are inter-linked and contribute collectively to successful implementation of UHC, this paper focuses on the critical elements of the health delivery system and health workforce development and financing reforms towards UHC.

The paper draws on an extensive review, analysis and synthesis of evidence from published and grey literature (such as government reports) in the areas of health systems development, health workforce, financial risk protection, outcomes of universal health coverage, and current health and health systems challenges. Box 1 describes the search strategy for this review. Lessons drawn from the review may contribute to low- and middle-income country policy makers’ understanding in their quest to achieve UHC as they have committed to do in the Sustainable Development Goals.

The Kingdom of Thailand is located at the centre of the Indochina peninsula, with land bordered by Myanmar, Lao PDR, Cambodia and Malaysia. The total surface area of 513,120 km² hosts a population of 68.9 million in 2017.

Politics have been quite unstable, with frequent military takeovers since the democratic revolution in 1932. The current military government has been in power since 2014. Political stability according to the Worldwide Governance Indicators has deteriorated with the percentile rank down from 58% in 1996 to 16% in 2015 [the higher the rank, the better the governance]. Ranking for control of corruption is poor and deteriorated from 55% to 43% in this time. Although the government has been relatively stable, its effectiveness ranked only 60% and 65% during the same period.

Economic and health development

Periods of rapid economic growth between the 1960s and 1990s resulted in Gross Domestic Product (GDP) growth of 7.5% per annum. However, between the 1970s and the 2000s, Thailand experienced three macroeconomic crises and related structural adjustment; the first (1973--1975) and second (1979--1985) oil crises and the 1997--1999 currency crisis. The second oil crisis, when oil prices in 1979 rose by 131% to 29.92 USD per barrel, was longer lasting and resulted in macroeconomic instability and slow GDP growth. The 1997 Asian economic crisis was triggered by the collapse of Thailand’s financial stock market. It took more than a decade for GDP per capita to recover to the pre-1997 level. The economic outlook has been sluggish over the last decade when average GDP growth was 3.5%, although Thailand did reach upper-middle income (UMIC) status in 2011.

Despite the political instability and periodically slow economy, social and health development has not been negatively affected. For example, the implementation of the social agenda foreseen in the 4th National Economic and Social Development Plan (1977--1981) was postponed to the next (1982--1986) due to the fiscal squeeze. An IMF loan was obtained and within the health fiscal envelope for the 1982-1986 plan, the government prioritised pro-rural health development to help fight poverty in the context of the rise of communism in neighboring countries. Investment was focused on district
hospitals and health centres, while capital investment in provincial tertiary care hospitals was frozen.  
There have been remarkable achievements over recent decades: extreme poverty has been less than 1% since 2004, gross enrolment in primary education has been over 95% since 1980, and universal health coverage was achieved in 2002. Table 1 shows key indicators for Thailand and UMIC peers (China, Malaysia, Mexico, South Africa, Turkey).

Demographic and epidemiological transition
Low fertility, birth and mortality rates and rapid demographic transition has resulted in the shrinking of the working-age population and an increased ageing population which demands higher health and social care expenditures.  
Between 1958 and 1997, infectious disease mortality declined five fold, with an annual reduction of 3.2 deaths per 100,000 of the population; this was largely due to reductions in malaria, tuberculosis, pneumonia and gastrointestinal infections. Between 1998 and 2003, infectious disease mortality increased to 70.0 per 100,000 of the population, coinciding with increased mortality from AIDS, tuberculosis and pneumonia. Between 2004 and 2009, mortality declined to 41.0 per 100,000 of the population, attributable to decreased AIDS mortality due to universal ART. Despite these improvements, tuberculosis remains a major public health problem. Thailand is one of the top twenty countries with a high TB burden, based on the absolute number of incident cases. Table 2 shows mortality and disease statistics 1990 to 2015.

Remaining health challenges caused by determinants beyond the health sector
Non-communicable diseases (NCDs) accounted for 71.3% of total mortality in 2015, and demand effective policy responses on primary prevention and the commercial determinants of health, in particular tobacco, alcohol and unhealthy diets. Fast-growing markets in Asia are main targets of the alcohol industry. Despite the significant economic burden caused by tobacco use - US$ 2.2 billion in 2009 (82% from productivity losses) equivalent to 0.8% of GDP or 18.2% of total health expenditure - policy interventions against tobacco have been undermined by the industry.

Across six UMIC, Thailand performed worst in adult mortality reduction with the exception of South Africa (Figure 2a for males and 2b for females). Mortality from road traffic injuries (RTI) in men explained the slow progress. There were 13,650 RTI deaths in 2012, and 79% were male. Taking into account inaccurate classification of cause of death, WHO has estimated a total of 24,237 deaths and an RTI mortality rate of 36.2 deaths per 100,000 of the population. High economic impact from RTI at 3% of GDP has provoked policy and legislative action but enforcement is poor despite its importance. Speed limits exist but enforcement was rated 3 out of 10. Enforcement of drink-driving was rated as medium at 6 out of 10; and 26% of road traffic deaths involved use of alcohol. Enforcement of motorcycle helmets was rated 6 out of 10 and the use rate was 52% and 20% among drivers and passengers respectively. Enforcement of seat-belt law was rated 6 as only 58% of drivers and 54% of front seat passengers wore them. Overall, law enforcement in Thailand was rated 3 to 6, compared with 8-10 in high-income countries.
Mental disorders: depression, screening, treatment and suicide prevention

Of the total 10.6 million years of Disability-Adjusted Life Years (DALY) lost in Thailand in 2013 (male 6.1 and female 4.5 million years), mental disorders ranked top among men, 34% of total DALYs lost with a DALY rate of 23.7 per 1000 population. They ranked second among women, 21% of total DALYs and 12.7 per 1000 population. Among men, alcohol dependence/harmful use, depression and schizophrenia accounted for the top three conditions; while depression, dementia and schizophrenia were the top three in women. ¹⁹

Un-recognized and un-treated depression contributes significantly to suicide. In response to these challenges, the MOPH in 2009 ²⁰ introduced integrated surveillance, prevention and treatment. Using the primary care platform, the programme includes community-based depression screening and severity assessment using a two-and nine-question tool. Those at-risk of severe depression are confirmed and treated by general doctors in district hospitals, while nurses provide psychosocial support, monitoring of relapses and prevention of suicide.

By 2016, more than 14 million people at risk of depression were screened and primary prevention provided. More than 1.7 million were diagnosed and received psychosocial support; of these 0.7 million received antidepressants, and 0.8 million were followed up for relapse and prevention of suicide. This programme increased access to standard care from 5.1% of total depressive disorders in 2009 to 48.5% in 2016.

The suicide prevention program has borne fruit, though there is still much to improve. In 2012, the age standardized suicide rate was 11.4 per 100,000 population (male 19.1 and female 4.5). The suicide rate reduction between 2000 and 2012 was 24.6% (male 22.4% and female 32%). ²¹

Health systems development: a historical perspective

Health development since King Rama VI (1910-1925) focused on control of infectious diseases such as smallpox, yaws, improved safe water and sanitation, and extension of health services through outreach activities in remote areas which were gradually transformed into static facilities. At the same time, successive governments established universities for training health professionals and other workforce cadres. ²²

National socio-economic development from the 1970s

The 1970s Indo-China war and conflicts between communism and democracy across nations in South East Asia triggered the “dominos theory” fearing that Thailand would fall under communist domination. In response government policy sought to fight poverty through rural development, and improved health, education, and agricultural extension services. ²³ Health, along with education and agriculture, became cornerstones of rural development and poverty reduction. ²⁴

Health development started in the 1970s as an integral part of the five-year National Economic and Social Development Plan (NESDP). A few foundation stones were laid such as a national family policy in 1970 and the National Expanded Program of Immunization (EPI) in 1976. Family planning policy contributed to a subsequent four decades of success in reducing the population growth rate, from 2.9% in 1970 to 0.3% in 2016. In other countries, such as the Philippines, family planning policy was less successful than it might have been mainly due to opposition from the Church. The Philippines with the same population as Thailand, of 36 million in 1970, reached 103 million in 2016 while Thailand had 69 million. ²⁵, ²⁶
Health delivery systems development: a solid foundation

Large-scale investment in health infrastructure at district and sub-district levels began in 1977 during the fourth NESDP. Full coverage of district hospitals was achieved by 1990 and was followed by a decade of health centre development (1992-2001). By the 2000s, all sub-districts were covered by a health centre.

The district health system, consisting of health centres and a district hospital, is the backbone of health development. A health centre covers between 3,000 to 5,000 people, while a district hospital covers between 30,000-50,000 people. A health centre is staffed by a team of three to five nurses and paramedics, and a 30-bed district hospital is staffed by three to four general practitioners, thirty nurses, two to three pharmacists, one to two dentists, more than twenty paramedics and other administrative staff. The size of a district hospital ranges from 30 to 150 beds based on the local population size.

Nurses are critical in the health system, due to their numbers (180,000 in 2016), qualifications, geographical distribution and wide-ranging contributions to public health, patient care and clinical services. With additional postgraduate training, they can respond effectively to the emerging needs for NCD chronic care, home care and clinical services including general anaesthesia and intensive care.

The health centre, the first point of contact by the population, provides primary health care such as basic treatment, prevention and health promotion through nurses and public health workers. District hospitals provide more comprehensive secondary level curative services, prevention and health promotion and admission facilities. Specialists, in particular covering obstetrics, internal medicine, surgery and paediatrics, are available in larger district hospitals.

Historically, provincial hospitals in all provinces have offered tertiary care and received referral cases from district hospitals in all clinical specialties. During the era of district health systems investment, provincial hospitals received less infrastructure development support but there was a greater focus on strengthening their clinical capacities through training additional specialists.

Despite rapid private sector growth at various times, including of private hospitals in the main cities, the public sector dominates the Thai health delivery system. By 2014, the Ministry of Public Health (MOPH) had 67% of the 161,000 hospital beds, other public non-MOPH had 14% and private hospitals had 19%. In general the private sector plays a minor role: in 2015 it contributed 14% of total outpatient visits (9% at private clinics and 5% at private hospitals) and 11.3% of total admissions.

Functioning of district health systems: the development of the health workforce

The achievement of full coverage of health services provided by the district health system was accompanied by MOPH health workforce development. Adequate numbers of competent and committed health workers are indispensable for a well-functioning district health system and the quality services provided gained the people’s trust. Thailand’s health workforce policies integrated recruitment, training, distribution and rural retention.

Firstly in 1972, the MOPH introduced the policy of a three-year mandatory rural health service placement, which was enforced with all medical and nursing graduates and subsequently dentists.
and pharmacists. The policy equitably enforced the same for medical graduates from private medical schools.

Secondly, the MOPH introduced in 1994 a special track which recruited high school students from rural and under-served areas for medical and nursing education on condition they worked in their home district upon graduation. This special track contributed to 20% of total annual national medical student enrolment over the last decade and increased to 30% in 2013. Studies showed a 10% to 15% higher probability of staff fulfilling the three mandatory years’ service than those on the normal track (accessed through a national entrance examination). There were also fewer annual resignations in the special track than the normal track. Although students in the special track had slightly lower examination grades at recruitment than those on the normal track, both tracks had similar success rates (99.6%) in the national licensing examination for practice required for all graduates.

Thirdly, to increase medical production capacities, the MOPH strengthened its regional hospitals as clinical training centres for the third to sixth clinical years of special track students. Students in the special track study together with the normal track students during their first year of basic science, and second and third year of preclinical courses. The normal track students continue their fourth to sixth clinical years in the faculty of medicine of their registered university; students in the special track are trained in the 37 MOPH centres. Both tracks are trained using the same curriculum and instructional style, though in different institutes. Medical teachers in these centres are trained in instructional skills, supervision and marking exam papers and their diplomas are conferred by 14 affiliated universities. Between 2000 and 2014, a total of 5,927 medical graduates from the special track added significantly to the provision of rural services. Universities have greater capacity to scale up basic science and preclinical training than clinical training so the MOPH clinical training centres fill the gap.

Recognizing the potential of nursing, since 1946 the MOPH has compensated for the limited training capacities in government universities by establishing MOPH nursing and midwifery colleges, which are licensed and certified by the Thai Nurse and Midwifery Council. In 2017, there were 30 MOPH nursing colleges which contributed 34% of total national graduates, while public and private universities produced 37% and 29% respectively. To ensure adequate competencies, all nurse graduates from public, private and MOPH colleges are required by the Nurse and Midwifery Council to sit and pass a national nursing licensing examination since 2002. Also, all practicing nurses are required to renew their license every five years based on the achievement of fifty credits of Continued Professional Education.

Fifthly, the MOPH established nine public health schools to train other paramedical personnel, mostly on two-year diploma courses; for example, dental public health, community public health and pharmacist assistants. These diplomas filled the gaps during the rapid extension of district health systems; the needs for diploma level personnel are now met and diploma courses have been replaced by bachelor level courses in response to the need for improved quality and standards.

Finally, the mandatory rural service policy was accompanied by financial incentives such as a hardship allowance and incentives for out-of-hours work. Non-financial incentives also played an important role: annual recognition awards for dedicated front line workers were organized regularly by various agencies, and the MOPH provided housing benefit in all health centres and district hospitals as in-kind support to ensure 24-hour services.

Health workforce expansion was facilitated by a supportive context. Tertiary school enrolment (post-secondary education in universities, colleges, technical training institutes, and vocational schools)
increased for men and women respectively from 4% and 3% in 1976 to 41% and 57% in 2015.
Female labour force participation is high; the ratio of female to male labour force participation in 2015 was 78%, on a par with 76% in the OECD.

**Extension of financial risk protection mechanisms**
While ensuring the availability of a functioning service delivery system, parallel policies extended financial coverage to certain groups of the population, with the application of a targeted approach.\(^{39}\)

**1975: Scheme for low-income and vulnerable populations**
Free medical care for the poor using “means testing” was launched in 1975. The household income was assessed and if it fell under a MOPH benchmark (not the national poverty line which was too low), households were granted a card entitling them to free medical care at MOPH health facilities with no copayment. The means testing method had a major weakness of leakage of the card to non-poor households while some poor households were not covered.\(^{40}\) The scheme was later extended to the elderly, disabled and children under 12 years old.

The scheme was tax financed through an annual budget allocation to MOPH health facilities based on the number of registered poor households in the catchment area. The service package covered outpatient, inpatient, and dental services and medicines; a few high cost services were excluded.

**1980: Civil Servant Medical Benefit Scheme (CSMBS) for the government employees**
The non-contributory CSMBS covered government employees and their dependants well before 1980 when a Royal Decree was adopted. A fee-for-service reimbursement model was applied for health care from the start. Services were funded by taxation to compensate for the low salaries of government officials, as part of a package of social security including pension, housing benefit and child allowance. The scheme covered not just government officials but also their dependants including parents, spouse and children under 18 years old.

**1983: Voluntary health insurance for the informal sector**
In 1983, the MOPH initiated the Health Card Project - a voluntary community-based health insurance - with an annual premium of 500 Baht (or US$ 20 at that time) per household (up to five members). The benefit package was comparable to the Low-Income Scheme. The main weakness was adverse selection, whereby members mostly consisted of the chronically ill and high users of services, while healthy members did not buy the card. In 1994, to increase enrolment, this scheme became a publicly-subsidized voluntary insurance scheme and the MOPH added 500 Baht per card.\(^{41}\) Despite the additional income, the scheme was financially non-viable with expenditure exceeding revenue. Spill over benefits included increased MOPH capacity in managing insurance funds, registration, fund allocation and monitoring and evaluation.

**1990: Social Health Insurance for private sector employees**
In 1990 the Social Security Act was passed, covering private sector employees. Social Health Insurance (SHI) was a component of a comprehensive social security system including pension, disability compensation and funeral grants. SHI is financed by equal tripartite contributions from a payroll tax paid by employers, employees and the government. The Social Security Office (SSO) purchased a comprehensive set of services including outpatient, inpatient and high cost services from existing public and private hospitals using a single capitation payment. This was the first time that capitation payment had been applied in Thailand, and in general it was well received by public and private hospitals and appeared to provide decent quality of care to members.\(^{42}\) Thus SHI set the precedent of a capitation contract model, which UHC later built on by adopting capitation payment for outpatient care and Diagnostic Related Groups (DRG) payment within a global budget for inpatient care\(^{43}\) (this dual payment system has now been introduced in the SHI).
Figure 3 shows the developments over time in health infrastructure expansion and financial risk protection mapped against the reduction in under-five mortality between 1970 and 2010.

**Political window of opportunity for UHC in 2001**

Different targeting approaches resulted in variations in the design of benefit packages and purchasing methods, resulting in inefficiency and inequity. Despite multiple efforts, 30% of the population were still uninsured by 2001. A Universal Health Coverage Scheme (UCS) was featured in the political manifesto of the January 2001 general election campaign. After victory, the Thai Rak Thai led government-piloted implementation of the UCS in six provinces in April 2001, and rolled it out nationwide by April 2002. At this time the GNI per capita was not high, US$ 1,990, and the fiscal space was low - government tax amounted to 13% of GDP. In parallel, a legislative process enacted the 2002 National Health Security Act in November 2002.

Thai people referred to the UCS as the “30 Baht” Scheme, reflecting the political slogan “30 Baht treats all diseases” used to promote the Scheme and highlight the comprehensiveness of the benefit package. Thirty Baht (approximately US$ 1) was the copayment for an outpatient visit or an admission paid by the non-poor.

The UCS was established to cover members of the Low Income Scheme, Health Card Scheme and the 30% uninsured and was managed by the National Health Security Office (NHSO), a statutory agency established by the Act. The UCS, CSMBS and SHI collectively comprise the UHC, though there is some variation in their design features (Table 3).

The UHC trajectory is demonstrated in Figure 4. Populations are classified into three layers: poor and vulnerable groups at the bottom, government and private sector employees at the top and the large informal sector in the middle. To keep the promises to the electorate, political decisions endorsed the reformists’ recommendation to finance the UCS by general tax. Enforcing premium payment by the large informal sector with their irregular income was neither technically feasible nor politically palatable; while resource needs for the UCS were within government fiscal capacity. At the UCS inception in 2002, total estimated resource requirements for 47 million members were THB 56.5 billion. The existing MOPH pooled budget for health services provided THB 26.5 billion, and the Prime Minister had the leadership ability and capacity to mobilize the shortfall of THB 30 billion from tax funding.

The decision to adopt closed-end budgets (per capita budgets based on unit cost and utilization rates of different types of services, and service reimbursement through capitation and DRG payment within a global budget) facilitated projection of total funding needs and hence assessment of financial feasibility.

UHC was at heart a political decision; success has been attributed to a ‘big bang’ policy reform, led by a populist government; and to the established institutional capacity mobilised by reformists who were technocrats in the MOPH influencing political decisions based on evidence-based knowledge, previous practical experience and institutional networks.
An understanding of political economy is critical in understanding policy change, in other words the political processes in adopting, achieving and sustaining UHC in the context of competing interests amongst actors. Box 2 provides several examples where decisions required conflicting interests and tensions among key players to be carefully managed. The examples also demonstrate the importance of political leadership and provision of evidence.

Successful implementation benefited from supply side capacity. In addition, rapid implementation was made possible by the Civil Registration and Vital Statistics (CRVS) system, established since 1956. This mandates registering all births and deaths and assigns a unique citizen ID number to everyone, making it possible to identify all UCS members and require them to register with a preferred provider network. In addition, this facilitates transfer of members across the three public insurance schemes to ensure seamless continuity of health coverage. For example, SHI members who become unemployed are automatically transferred to UCS; vice versa, UCS members once employed are transferred to SHI.

In summary, improved fiscal space from economic development, political leadership and commitment and health systems readiness were enabling factors for the adoption and successful implementation of the UCS.

Ensuring accountability and responsiveness of UHC

Previous decades of health system development had ensured services were available to respond to the health care demands which would arise from UHC, and design features ensured cost control. Critical features of any UHC design also include processes for accountability across stakeholders and responsiveness to citizens, to ensure the continuing society-wide support and trust needed for UHC to survive into the longer term.

Split role between purchasers and healthcare providers increases accountability

Both the SHI and CSMBS had split the roles of purchaser and provider from the beginning. The Low Income Scheme and Health Card Project applied an integrated model with the MOPH serving roles of both purchasing and service provision, and this was considered to be less responsive than other models. For the UCS, the National Health Security Office (NHSO) purchased services from public and private provider networks (though mostly MOPH provider networks due to their geographical monopoly of district health systems in rural areas) through annual contractual agreements using the dual payment system of capitation and DRGs. UCS completely separated the two functions from the previous single MOPH administrative entity, and meant that the NHSO could purchase services uninfluenced by provider self-interest. Capitation payment linked with the number of registered members, a call centre for grievance management and disputes settlement, and the annual public hearing for UCS members are designed by NHSO to increase healthcare provider accountability to UCS members.

From our analysis, the decision to split the two MOPH functions was a political decision. The SHI had set the precedent, since 1991, as a purchaser organization negotiating and purchasing services from existing public and private providers on an equal footing. In contrast the MOPH, which managed the low income and voluntary health insurance scheme, was perceived by private providers to face a conflict of interest and to favour contracting its own providers. Also the MOPH is mandated as a regulatory agency, setting norms and standards and with a policy formulation and oversight role rather than a purchaser role.

Financial accountability framework
The MOPH annual budget allocations for service provision at sub-district, district and provincial levels were terminated and integrated into the UCS budget managed by the NHSO. This supported the clarity of accountability between purchasers and providers, as MOPH and other public hospital revenues were generated only from service provision to members of the three insurance schemes, encouraging providers to be responsive to patients. Also the same rates of capitation and DRG payment (which included health worker salaries) was applied to purchasing services from the private sector. The level playing field in purchasing services across public and private providers smoothed the implementation of the reform and gained private sector collaboration.

**Budgeting: role of evidence, participation and transparency**

The per capita budgeting applied by NHSO for the UCS significantly changed the budgeting system. From the start of the UCS, the budget was estimated based on unit costs and utilization rates of different services and this principle is still applied. Cost and use rates are projected for the budget year. Unit cost includes labour, medicines, supplies and depreciation of major equipment. The total budget request is the multiplication of per capita budget and the UCS population. The Bureau of Budget cannot exercise its discretionary power as before, given the evidence of costs and utilization. The multi-stakeholder membership of the Budgeting Subcommittee appointed by the National Health Security Board has balanced power, as the Bureau of Budget is one of the members. All members have equal influence and use evidence to make recommendations.

A further example of use of evidence to support budget requests is the use of health technology assessment. Thailand strengthened and sustained its institutional capacity in health technology assessment through creating the Health Intervention and Technology Assessment Program, whose role has included prioritizing the inclusion of new medicines into the National List of Essential Medicines, and new interventions into the UCS benefit package.

**The role of primary health care (PHC) in UHC**

The strong public health, primary care, efficiency and equity orientation of UHC was driven by an exceptionally strong cadre of public health experts who have been influential health technocrats. Investment by the MoPH in postgraduate training in key health policy and systems areas using WHO and other funding sources yielded high pay-off when all returned to Thailand and served in positions of influence. Continuing capacity development in health systems and policy research supported evidence based health reforms. Developments in district health systems and PHC were further encouraged by a self-help social movement developing and supporting district public health leaders, some of whom later became prominent national public health leaders; see box 3.

The well functioning PHC system developed in Thailand was the foundation for implementing UHC and achieving the health MDGs well before the target date of 2015. PHC and UHC (SDG 3.8) are designed to achieve the maternal and child health targets in SDG 3.1 and 3.2, and facilitate access to reproductive health services including family planning (SDG 3.7). Thailand has eliminated vertical transmission of HIV through PMTCT, and the high coverage of universal ART indicates the likelihood of ending the AIDS epidemic as a public health threat by 2030 (SDG3.3), though it still faces challenges in ending TB as a major public health threat. NHSO strategic purchasing helps the PHC system enhance its detection, screening, prevention and effective coverage of several NCDs, including through diabetes, hypertension and cervical cancer screening.

However, achieving the NCD mortality targets (SDG 3.4) requires the whole of government, not the MOPH alone, to counteract the strong influence of commercial determinants and the resistance
from tobacco (SDG3.a), alcohol (SDG3.5) and unhealthy food industries. This requires policy coherence across government sectors and effective multisectoral action for health. The health service sector, though critical, is not adequate to achieve this SDG target when determinants are outside the direct command and control of the health sector. The MOPH must have the capacity to ensure a health lens is adopted in government and private sector policies.

**UHC achievements**

**Improved level and distribution of health service utilization**

The UCS reduces the probability of its members going without formal ambulatory care when sick by 3.2 percentage points (PPT). UCS increases the probability of using outpatient care at public service providers by 2.7 PPT (5%) and of hospitalization to a public hospital by 1 PPT (18%); these effects are largest among elderly people.

Another study shows that UHC increases the likelihood of having annual check-ups, in particular for women, and increases access to hospitalization by over 2% and outpatient visits by 13%. No evidence is noted of moral hazard such as increased unhealthy behaviour or reduced preventive efforts. Beyond improved access to care, higher utilization favours the poorest people and this is shown clearly in benefit incidence analysis. Benefit incidence - assessing whether the government budget benefits more the rich or the poor - is pro-poor due to higher utilization by the poorest than the richest wealth quintiles, especially at health centres and district hospitals.

Another aspect of utilization is the low prevalence of unmet healthcare needs. The nationally representative household survey on unmet needs, conducted by the National Statistical Office, reports low prevalence of unmet needs for both outpatient and inpatients on a par with OECD peers. The extension of renal replacement therapy into the UCS benefit package in 2008 has improved equitable access to services, saved lives and deepened financial risk protection (see Box 4).

Factors that contribute to pro-poor outcomes for both utilization and benefit incidence include the extensive geographical distribution of a well-functioning close-to-client district health system (the provider for UCS members) and the comprehensive benefit package free at the point of service. By 2016, the use rate among UCS members had reached 3.5 visits per capita per year, and 0.13 hospital discharges per capita per year with an average length of stay of 4.1 days. These utilization rates are similar to a few of the OECD countries.

Very often the district health system is the only provider in the district with whom the NHSO can contract. Strict quality conditions such as accreditation status cannot be applied where there is a geographical monopoly. The Healthcare Accreditation Institute has developed step-wise quality improvement processes since 2003. In 2007 the NHSO offered step-wise financial incentives, which were higher for accredited hospitals and lower for those in the process of quality improvement. By 2012, almost all hospitals were accredited or had quality assurance processes well in place.

**Equity in health financing and financial risk protection**

General tax, the sole source of financing UCS, is the most progressive financing source as the rich contribute a higher proportion of their income to taxes than the poor. A comprehensive benefit package and services free-at-the-point-of-use have resulted in reduced household out-of-pocket payments (OOP), from 34% of Total Health Expenditure in 2000 (prior to UCS) to 12% in 2014.
The lower the OOP, the lower the prevalence of households facing catastrophic health expenditure is.\textsuperscript{79} The Thai UCS has reduced the probability of catastrophic health expenditure, defined as households spending on health more than 10% of total household spending, and there has been a greater reduction of OOP spending among high-income households. UCS provides a safety net to all people including the rich.\textsuperscript{68}

UHC as a whole (including all three insurance schemes) has reduced the prevalence of households facing catastrophic health expenditure and medical impoverishment.\textsuperscript{80} A counter-factual scenario estimated that without the 2002 UCS, a total of 100,604 households nationwide would have been impoverished by out-of-pocket payments for health in 2008. UCS had reduced the number of health-impoverished households by 37,628 or 37.4%.\textsuperscript{81}

The chronology of coverage extension to certain high-cost services, as described in Table 4, has contributed to deepening financial risk protection. Inclusion of these new interventions was accompanied by increased financial allocations. Certain cost-effective interventions, such as dental root implants, are still not covered as these services are available only in certain urban centres and so access would be inequitable.

Relative to countries comparable to Thailand in terms of economic performance, health financing and outcomes, UHC reduced out-of-pocket payments by 13 percentage points of total health expenditure, and increased annual government per capita spending on health by US$ 79. This amount is worthwhile if financial risk protection for households is a societal goal. In terms of macro-economic impact, UCS had a small effect of an extra US$ 60.8 on the total health expenditure per capita and did not appear to have affected the size of GDP or the share of the government budget devoted to health.\textsuperscript{82}

Efficiency and cost containment

Although UCS employed mixed provider payment methods, the main mode for over 90% of payments was closed-end payment (capitation and DRG payment within a global budget); the remainder were based on fixed fee schedules for certain services such as dialysis and other high-cost interventions. Closed-end payments contain cost and can provide incentives for increased efficiency as they limit the opportunity for supplier-induced demand. Capitation disciplines providers to prescribe items in the National List of Essential Medicines (NLEM) for UCS members, while fee for service payment in the CSMBS influences them to prescribe drugs outside the NLEM - these comprise up to 41% of total prescriptions and 67% of outpatient medicines expenditure in the CSMBS.\textsuperscript{83}

The NHSO is able to assert monopsonistic purchasing power, since it is a large purchaser and can negotiate prices with assured quality from domestic and international suppliers for example for cataract lenses, medical devices and certain medicines such as erythropoietin, even from sole source producers. Table 5 shows cost savings estimated from the difference between market and negotiated prices and actual volumes purchased. The total savings of US$ 188 million are significant and make it possible to provide more services for UCS patients.

A risk in a system where expenditure is strictly controlled by the government through global budgets is that health expenditure is not allowed to rise to match increasing demands and benefit package extension. While it is not easy to assess appropriate levels of expenditure, the continuously...
increasing government allocation to the UCS, reflecting the extension of the benefit package, increased utilization, and general price and wage inflation, does suggest that funding kept pace with increasing requirements (Figure 5).

Health gain
Gruber et al in their assessment of the impact of UHC using mortality statistics from all provinces between 2000 and 2002, and regression analysis of the impact of increased access to health services under UCS, reported a sharp equalization of infant mortality rates across provinces. This was consistent with the increased access to medical services for the poor leading to a reduction in infant mortality rates.

Assessment of mortality change between 2001 (when UHC started to be introduced) and 2014 using mixed effects modeling to test whether the slopes of Standardized Mortality Ratio across super-districts were equal showed a steady decline of all cause mortality, though with a varying degree of reduction in the inequality of adult mortality across geographical areas.

UCS members’ satisfaction and concerns: monitoring for improvement
The satisfaction survey conducted annually by an independent agency since 2003 shows high level of satisfaction amongst UCS members - 8 out of 10. Provider satisfaction was lower at 6.2 in 2003, but increased to 7.6 in 2010 and has been sustained. Main causes of patient concern are long waiting time and service quality while providers are worried about lack of financial and human resources to meet patients’ high expectations.

Unmet health care needs are low: 1.4% and 0.4% for out- and in-patient care in 2010 and 0.1% in 2015. Reasons for unmet needs are long waiting times for outpatients, and geographical barriers for inpatient care.

Challenges and solutions
Achieving UHC has not been without its difficulties for Thailand. The first challenge was to manage the survival of the UCS financing model throughout a turbulent political climate. Between 2001 and 2015, UCS survived eight rival governments, six elections, two coup d’états and thirteen health ministers. Political analysts foresee continued protracted conflicts in the current climate. Despite political turmoil, GDP growth fluctuation and the economic crisis in 2009, the total UCS budget continually increased. UCS has gradually become owned by the people, not the political party which initiated it. Its positive impact on improved access and financial protection of households has meant that governments from all parties have continued support.

Finding ways to make budget decision-making more transparent, participatory and therefore effective has played a part in meeting the challenge. Not only is the annual budget prepared based on evidence of service utilization and unit cost, but also civil society representatives in the National Health Security Board help safeguard the interests of UCS members, and national media publicity on annual budget processes helps support continued funding of the UCS.

The termination of supply side financing previously managed by the MOPH has led to protracted conflict between the MOPH and the NHSO. For example, as a monopsonistic purchaser, NHSO has been able to drive down the purchase price of medical products while ensuring quality. This has reduced the profit margin of suppliers and been unpopular with a few right wing conservatives in the...
Medical Council and Private Hospital Association and led to claims of corruption in NHSO purchasing of medical products, which have been proved untrue.88

However, not all planned UCS developments have proved possible. In particular, slow progress was made addressing the segmentation of the insurance schemes. The National Health Security Act of 2002 provided for harmonisation of the schemes, and progress has indeed been made between the UCS and SHI in harmonising the benefit package and using closed-end provider payment. But the CSMBS remains problematic, in particular the cost escalation and inefficiency generated from fee for service payment for outpatient services. For inpatients, CSMBS applies multiple bands of DRG payment favouring of tertiary and teaching hospitals over other hospitals for clinical conditions of similar case mix and severity. This different payment system is an important explanation for why expenditure per capita in the CSMBs is four times higher than for the UCS. Reform of the fee-for-service outpatient reimbursement system in the CSMBS has been retarded by resistance from healthcare providers and conflicts of interests in prescribing medicines89, in a context of weak governance by the Comptroller General Department.

The second challenge relates to the health workforce in the context of the advent of the ASEAN Economic Community (AEC) in 2015 which has facilitated people, labour and capital movements across ASEAN member states' borders, global medical tourism, and health worker retention in a global market for health workers. The density of doctors, nurses and midwives between 2007 and 2013 was 24.7 per 10,000 population90, slightly above the threshold of 22.8 defined as adequate91, but below the proposed threshold of 34.5 of the International Labour Organization.92 Ageing and chronic diseases put pressure on the health workforce; the current density is vulnerable to shortages. Although the AEC does not have immediate effects on the out-migration of health workers, there is need to continue monitoring its implications.

Evidence from the Thai Nurse Cohort indicated that in 2012, 15.4% of the cohort intended to leave their nursing career in the next two years,93 an increase from 11.2% in 2009. Shorter retention in the profession has major implications for nurse shortages, and transformative health professional education is being implemented through reforms to the curriculum and instruction methods so that graduates are responsive to the emerging health needs of people.

International out-migration of Thai doctors and nurses is not common94, but international patients seeking hospital care in Thailand, so called medical tourism, is more common and has implications for demand for doctors and other medical personnel. There are conflicting estimates for annual international patients: a high estimate of 8.3 to 9.5 million visits in 201095 and a low estimate of 0.515 million visits in the same year which would have limited impact on the health workforce. A recent phenomenon is retirement of Japanese to Thailand: its impact on demand for health services and the health workforce is so far minimal though numbers are increasing.96

The third challenge relates to ensuring policy coherence and effective multi-sectoral action from both health and non-health sectors in order to respond to the health challenges arising from demographic and epidemiological transitions and economic development. Promoting healthy ageing and the development of community-based and social care for the elderly is at an early stage of policy development.98 The epidemiological transition towards NCDs99, technological progress and increased expectations from citizens for expensive new interventions add pressure for more resources.100 NCDs in Thailand claim 75% of disability adjusted life years lost and give rise to US$ 404 million annual economic losses.101,102 Primary prevention requires bold government leadership to address the commercial determinants, in particular tobacco, alcohol and obesogenic food industries. The best buy interventions for tobacco and alcohol have yet to be scaled up in Thailand, in particular
relating to prices and taxation.\textsuperscript{103,104} The stagnation of high mortality from road traffic injuries requires stronger law enforcement and a comprehensive package of interventions.

Fighting commercial interests and protecting health of the population requires strong ethical leadership and active citizenry guided by evidence, witness recent events concerning breast-milk substitutes. Concerns over the low level of exclusive breast feeding for the first six month in newborns, 23\% in 2016\textsuperscript{105}, and the repeated violations of the International Code of Marketing of Breast-milk Substitutes\textsuperscript{106} by the formula milk industry, led to government efforts to make the voluntary Code a national Law. In the public hearings of the MOPH-proposed draft Bill, there was strong resistance from certain pediatricians and the Medical Council who amplified the downsides of breast feeding by quoting a study in Nepal\textsuperscript{107} that “prolonged breast feeding beyond 12 months results in stunting”. This concealed the multiple factors contributing to stunting such as socio-economic status, maternal education, poverty, and inadequate and inappropriate feeding practices.\textsuperscript{108} The WHO Director General’s strong advocacy for the Thai law with the Prime Minister influenced the National Legislative Council consensus vote for the draft Bill.

Management of diabetes mellitus is a particular problem. Diabetes prevalence in adults (>15 years) increased from 6.9\% in 2009,\textsuperscript{109} to 8.9\% in 2014 (males 7.9\%, females 9.8\%).\textsuperscript{110} Of further concern is the low level of effective coverage of diabetes management: in 2014, 43.1\% of diabetic patients were un-diagnosed; 2.7\% of those medically diagnosed were not on treatment; and only 43\% of treated patients were well controlled (fasting blood sugar <130 mg/dl). Overall, only 23.5\% of diabetes patients were well controlled. The effective coverage in 2009 was better than in 2014; undiagnosed was 31.2\%, and overall well controlled was 30.6\%.

Increased incidence of End Stage Renal Diseases (ESRD) due to inadequate control of diabetes and hypertension has put pressure on the Renal Replacement Therapy (RRT) budget. This has prompted serious policy intervention by the MOPH, on urine test screening by Village Health Volunteers and laboratory confirmation by district hospitals, screening of diabetic retinopathy to ensure prompt treatment, and identification and treatment of Chronic Kidney Disease (CKD) in order to delay progression of CKD to ESRD.\textsuperscript{111}

The fourth challenge concerns tuberculosis. Despite good progress in controlling infectious diseases\textsuperscript{112}, in 2015 there were 117,000 new tuberculosis cases and 12,000 deaths.\textsuperscript{113} Thailand is listed as one of the 30 high burden countries for TB, TB and HIV, and MDR-TB. The complexity of case finding, contact tracing and successful treatment is challenging in highly mobile populations including migrants who have high TB prevalence.

Conclusions and lessons

Empirical evidence has demonstrated the significant progress and achievements of Thailand’s UCS. Increased fiscal space from favourable economic growth (even with some interruptions), when matched with political and financial commitments to health development, ensured favourable resources for health infrastructure and health workforce development. The five-year planning process ensured long term policy continuity despite short-lived governments. Full geographical coverage of functioning primary health care within a district health system provided a solid foundation for implementing UHC. Though over time, benefit packages have been harmonised to reduce the extent of fragmentation and inequity across the three schemes, there remain large differences in expenditure per capita and CSMBS payment reform faces serious resistance from healthcare providers.
Although most countries target various population groups using different sources of finance, the last phase of achieving UHC is usually to cover the uninsured population who are mostly engaged in the informal sector. This needs an informed and bold political decision on the financing choice between voluntary contributions and general taxation. A choice in favour of general taxation must be supported by adequate fiscal space and political commitment to increase the fiscal space for health. The choice in favour of a contributory scheme needs enforcement and administrative capacity to collect premiums; with this approach it may take a few decades to reach UHC due to the large size of the informal sector in developing countries. Thailand made the decision in 2002 to use general taxation, despite its small GNI per capita of US$ 1,990 and tax revenue at 13% of GDP. UHC was financially feasible because closed-end payment from the start contained costs effectively.

In addition to the inheritance of a solid platform of health delivery, the system whereby the NHSO contracts a PHC network has resulted in pro-poor utilization and benefit incidence. Closed-end payment has enabled cost containment and improved efficiency; a comprehensive benefit package and extension to high-cost but cost-effective interventions has deepened risk protection and resulted in low prevalence of catastrophic spending and impoverishment due to health care costs.

Lessons learned from Thailand’s UHC

1. Extensive geographical coverage of functioning PHC provides a solid platform for implementing UHC.
2. Rural recruitment, home town placement, financial and non-financial incentives can improve the availability of health workers in underserved areas and strengthen PHC.
3. The district health system is a strategic hub for translating UHC policy into pro-poor utilization and benefit incidence.
4. Tax-financed UCS proved the most feasible and progressive route to achieve UHC in the context of large informal sector.
5. A comprehensive benefit package, with minimal copayment at the point of service, prevents catastrophic health spending and protects households from being impoverished.
6. A well designed strategic purchasing organization and provider payment methods support efficiency, cost containment and equity outcomes.
7. Stringent health technology assessment for inclusion of new medicines and interventions into the benefit package enhances health systems efficiency.
8. An understanding of the political economy of health and the importance of good governance, an active citizenry and civil society, provision of evidence and ethical leadership helps manage tensions and conflicts and safeguard the interests of UCS members.
Acknowledgement
The authors acknowledge all MOPH predecessors who contributed to policy formulation, and health workers at the front line and hospitals who have untiringly implemented health programs since the 1970s which have benefited the Thai population. They brought the Thai health systems and UHC to the attention of the world. We pay tribute to the late Dr Sanguan Nittayaramphong for his UHC leadership and to all other “unsung heroes.”

Funding
No financial support for this work.

Contributions
All authors contributed to and agreed with the conceptual framework of this review, VT provided the first draft, all authors commented and strengthened the text and signed off the final draft. AM is the guarantor of this paper.

Conflict of interest
Declared none
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Box 1 Search strategy of literature used by this review

Literature was searched for systematically, framed under the main objectives of the paper: how health systems development has contributed to the implementation of UHC, what are the UHC outcomes, what have been the processes of expansion of financial risk protection to different population groups up to when the whole population was covered.

Using Google scholar search, we retrieved literature relate to health systems development with a specific focus on health delivery systems, PHC development, health workforce training and retention. We retrieved both published and grey literature in English and the Thai language. Literature related to socio-economic development, burden of disease, NCD challenges, alcohol and road safety, adult mortality and the contextual background were searched for and synthesized from World Heath Statistics, and global reports such as for TB, road safety, and NCDs. World Development Indicators were used for international comparisons.

Evidence related to outcomes of UHC and UCS was retrieved only from peer reviewed published literature, and were scrutinized for quality of analysis prior to use.
Box 2 The political economy of UCS: achievements amidst tensions and conflicts.

The benefit package initially excluded renal replacement therapy (RRT) because of its high cost and lack of capacity to deliver services equitably. The government decided to include RRT in the UCS package although it was relatively less cost effective, at four times the indicative benchmark of one GNI per capita per Quality Adjusted Life Year gain\textsuperscript{50,51}; the budget impact was high due to high and increasing prevalence. Inclusion was a political decision based on ethical and equity concerns: CSMBS and SHI members, having higher social status, job security and employment, already had full access to RRT. The cost of dialysis—US$ 7,000 per patient year—caused UCS patients and their families to incur catastrophic expenditure.\textsuperscript{52} Most patients died from sub-optimum treatment when they could no longer sell assets or borrow further. Given the evidence, and backed by a coalition of nephrologists, civil society organizations, and an End Stage Renal Disease patient group, Minister of Health Mongkol Na Songkhla, as chair of NHSO Board, boldly submitted and gained Cabinet approval for full subsidy of RRT\textsuperscript{53}, based on a ‘PD (Peritoneal Dialysis)’ First policy (see Box 4).

The Private Hospital Association was very unhappy with the PD First policy, since NHSO centrally negotiated the prices of supplies whereas hospitals could generate profit from Haeomodialysis (HD). Reformists argued that as HD will be provided for patients who fail PD, for example because of complications from peritonitis, there was a market for private HD centres. With strong political leadership, the Minister of Health made a firm decision for PD First against commercial interests.

Strategic purchasing adopted by the NHSO, despite the efficiency and equity advantages, created tensions among actors. First, closed-end payment such as capitation and DRG under global budget was unpopular with providers who favoured fee for service payment similar to the CSMBS outpatient payment, as more diagnostics and non-essential medicines could be provided. Fee for service also can boost pharmaceutical and diagnostic markets. Second, the hospitals’ gaming of NHSO by falsely reporting complications and co-morbidity to gain higher payment for inpatient care was checked by NHSO’s stringent audits which required over-claimed amounts to be return to NHSO. Third, despite significant cost savings and assured quality of medical products procured through NHSO monopsonistic bargaining (see Table 5), it was unpopular both with hospitals who might benefit from their own purchases and medical device and pharmaceutical companies who could gain higher margins from selling to hospitals rather than to NHSO. These tensions resulted in a recent interpretation by the Auditor General Office that the NHSO has no legal mandate to exercise monopsonistic purchaser power.

To sustain the good performance of UCS, NHSO, civil society and active citizens need to collectively steer and balance different interests to safeguard the interest of UCS members. Most importantly, politicians must have ethical leadership and be free from conflict of interest. Evidence on positive outcomes of UCS such as enhanced financial risk protection, number of lives saved, reduced inequitable mortality gap is powerful and needs to be made known to politicians and legislative bodies.
Box 3 The Rural Doctors Society

The Rural Doctors Society, known as the Rose Garden group after the hotel where it meets, was established in 1978 as a self help group for district health systems and PHC development; it coincided with the 1978 Alma Ata movement. Convened monthly for the last thirty years, it is an informal policy group, closely linked with civil society, where various policy agendas were generated such as the anti-tobacco campaign, Universal Health Coverage, the Sin Tax Health Promotion Fund and the Health Systems Research Institute. The Society’s early mandate was collective support and it convened an annual conference. Four years later, the Rural Doctors Foundation was established and an annual Best Rural Doctor Award was conferred on the most dedicated doctors in remote or underserved areas. This has become a prestigious award which gives social recognition to rural doctors and promotes rural retention; it has been followed by similar recognition of several other professional cadres.

Since completion of the district hospital network, the Society has expanded its role to political advocacy and oversight. In the IMF package related to the 1997 Economic Crisis, the MOPH earmarked 1.4 billion THB for medicines procurement. The Rural Doctors Society, the Rural Pharmacists Forum, NGOs, and the Drug Study Group and Consumer Protection Group formed a coalition of 30 organizations against corruption, and exposed a scandal associated with the medicines procurement. This resulted in a fifteen-year term of imprisonment for a Public Health Minister who found guilty in November 2004 of accepting bribes from drug companies. The corrupt senior officials were dismissed and their pension benefits suspended.
Box 4 Thailand’s Peritoneal Dialysis (PD) First policy: outcomes and challenges

Thailand has seen the world’s fastest increase in RRT treatment, with a 120% increase in the number of treated ESRD patients, from 100.3 per million population (PMP) in 2008 to 220.2 PMP in 2013.73 The UCS has prolonged the lives of nearly 50,000 ESRD patients since 2008.74 The main challenge is the increased incidence and poor control of diabetes and hypertension which are key determinants of ESRD. Between 2000 and 2012, Thailand has experienced rapid increases in diabetes-related ESRD and the highest increase in ESRD prevalence in the world, from 98 to 1,097 PMP. Kidney transplantation performs poorly in Thailand due to a donor shortage.

The PD First policy had explicit goals of achieving efficiency and equity, as patients can manage at home with no travelling costs, compared to three HD sessions a week at a provincial city which is not accessible for poor rural people. Also NHSO can better contain the costs of PD through national negotiation of solution costs, while HD is labour intensive and vulnerable to increasing labour costs.
Figure 1 Map of Thailand
Figure 2a Adult mortality rate of 15-60 year-old males (per 1,000 males) for Thailand and five upper-middle income peers

Figure 2b Adult mortality rate of 15-60 year-old females (per 1,000 females) for Thailand and five upper-middle income peers
Figure 3 Two strands of health system development, a) delivery and health workforce, b) financial protection, 1970-2010, and trend in under-five mortality reduction
Source: Reference 23
**Figure 4** Trajectory for achieving UHC
Source: Reference 46 with some modifications
Figure 5 Continued political commitment to UCS: annual budget, across rival governments, 2002-2017
Note: TRT denotes Thai Rak Thai party, Mil denotes military government, PPP denotes People's Power party, DP denotes Democrat party and PT denotes Pheu Thai party
Table 1 At a glance, Thailand and five upper-middle income peers

<table>
<thead>
<tr>
<th>Economic and fiscal space</th>
<th>China</th>
<th>Malaysia</th>
<th>Mexico</th>
<th>South Africa</th>
<th>Thailand</th>
<th>Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>• GDP per capita (current US$), 2016</td>
<td>8,123</td>
<td>9,503</td>
<td>8,201</td>
<td>5,274</td>
<td>5,908</td>
<td>10,788</td>
</tr>
<tr>
<td>• GDP growth (annual %), 2016</td>
<td>6.7</td>
<td>4.2</td>
<td>2.3</td>
<td>0.3</td>
<td>3.2</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Demography

| • Population, total (millions), 2016 | 1,379   | 31      | 128       | 56           | 69       | 80     |
| • Population growth (annual %), 2016 | 0.5     | 1.5     | 1.3       | 1.6          | 0.3      | 1.6    |
| • Poverty headcount ratio, $1.90 a day (2011 PPP) (% of population) | 1.9 (2013) | .. (2014) | 3 (2014)  | ..          | 0 (2013) | 0.3 (2013) |
| • Urban population (% of total), 2016 | 57      | 75      | 80        | 65           | 52       | 74     |

Health expenditure

| • Health expenditure per capita (current US$), 2014 | 420    | 456     | 677       | 570          | 228      | 568    |
| • Health expenditure, total (% of GDP), 2014 | 5.5     | 4.2     | 6.3       | 8.8          | 4.1      | 5.4    |
| • Health expenditure, public (% of total health expenditure), 2014 | 55.8    | 55.2    | 51.8      | 48.2         | 77.8     | 77.4   |
| • Health expenditure, public (% of government expenditure), 2014 | 10.4    | 6.4     | 11.6      | 14.2         | 13.3     | 10.5   |
| • Out-of-pocket health expenditure (% of total expenditure on health), 2014 | 32.0    | 35.3    | 44.0      | 6.5          | 11.9     | 17.8   |

Health

| • Life expectancy at birth, total (years), 2015 | 76      | 75      | 77        | 57           | 75       | 75     |
| • Fertility rate, total (births per woman), 2015 | 1.6     | 1.9     | 2.2       | 2.5          | 1.5      | 2.1    |
| • Mortality rate, under-5 (per 1,000 live births), 2015 | 11      | 7       | 13        | 41           | 12       | 14     |
| • Immunization, DPT (% of children ages 12-23 months), 2016 | 99      | 98      | 97        | 66           | 99       | 98     |
| • Prevalence of HIV, total (% of population ages 15-49), 2015 | ..      | 0.4     | 0.2       | 19.2         | 1.1      | ..     |
| • Improved water source (% of population with access), 2015 | 96      | 98      | 96        | 93           | 98       | 100    |
| • Improved sanitation facilities (% of population with access), 2015 | 77      | 96      | 85        | 66           | 93       | 95     |

Education

| • Literacy rate, adult total (% of people ages 15 and above), 2015 | 96      | 95      | 95        | 95           | 94       | 96     |

Source: World Development Indicators database (retrieved August, 2017)
<table>
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<tbody>
<tr>
<td>Life expectancy at birth, (years)</td>
<td>67.2</td>
<td>74.8</td>
<td>69.2</td>
<td>76.2</td>
<td>70.5</td>
<td>77.3</td>
</tr>
<tr>
<td>Mortality rate, adult, male (per 1,000 male adults)</td>
<td>228</td>
<td>254</td>
<td>258</td>
<td>234</td>
<td>216</td>
<td>205</td>
</tr>
<tr>
<td>Mortality rate, adult, female (per 1,000 female adults)</td>
<td>136</td>
<td>135</td>
<td>137</td>
<td>124</td>
<td>111</td>
<td>104</td>
</tr>
<tr>
<td>Cause of death, by communicable diseases and maternal, prenatal and nutrition conditions (% of total)</td>
<td>..</td>
<td>..</td>
<td>26.1</td>
<td>24.3</td>
<td>20.7</td>
<td>18.3</td>
</tr>
<tr>
<td>Cause of death, by non-communicable diseases (% of total)</td>
<td>..</td>
<td>..</td>
<td>64.0</td>
<td>64.6</td>
<td>67.7</td>
<td>71.3</td>
</tr>
<tr>
<td>Cause of death, by injury (% of total)</td>
<td>..</td>
<td>..</td>
<td>9.9</td>
<td>11.0</td>
<td>11.6</td>
<td>10.4</td>
</tr>
<tr>
<td>Mortality caused by road traffic injury (per 100,000 people)</td>
<td>..</td>
<td>..</td>
<td>26.5</td>
<td>29.8</td>
<td>32.7</td>
<td>31.7</td>
</tr>
<tr>
<td>Prevalence of HIV, total (% of population ages 15-49)</td>
<td>0.5</td>
<td>1.9</td>
<td>1.7</td>
<td>1.4</td>
<td>1.3</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: World Development Indicators database (retrieved August, 2017)
**Table 3** Characteristics of the three public health insurance schemes in Thailand, 2017

<table>
<thead>
<tr>
<th></th>
<th>Civil Servant Medical Benefit Scheme</th>
<th>Social Health Insurance</th>
<th>Universal Coverage Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchaser</td>
<td>Comptroller General Department, Ministry of Finance</td>
<td>Social Security Office, Ministry of Labour</td>
<td>National Health Security Office</td>
</tr>
<tr>
<td>Population coverage, million</td>
<td>4.4</td>
<td>10.6</td>
<td>48</td>
</tr>
<tr>
<td>Source of finance</td>
<td>Tax based, non-contributory</td>
<td>Tripartite contribution by employer, employee and government</td>
<td>Tax based, non-contributory</td>
</tr>
<tr>
<td>Budgeting</td>
<td>Open ended budget</td>
<td>Closed ended budget</td>
<td>Closed ended budget</td>
</tr>
<tr>
<td>Expenditure, 2016, Thai Baht</td>
<td>71.02 billion</td>
<td>37.7 billion</td>
<td>109.3 billion</td>
</tr>
<tr>
<td>Payment method</td>
<td>OP: Fee-for-service, IP: DRG with multiple cost bands</td>
<td>OP: Capitation, IP: DRG within global budget</td>
<td>OP and prevention and health promotion: Capitation, IP: DRG with global budget; fee schedule for specific high cost procedures</td>
</tr>
</tbody>
</table>

Source: Thai National Health Accounts 2013, International Health Policy Program, MOPH
Note: OP = Out-patient, IP = In-patient, PP = health promotion and prevention
<table>
<thead>
<tr>
<th>Year</th>
<th>Benefit package</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>• Outpatient and Inpatient services, high cost care, accident and emergency, personal prevention and health promotion services, rehabilitation services, pre-hospital care</td>
</tr>
<tr>
<td>2006</td>
<td>• Universal Anti Retroviral Therapy including provision of medicines, voluntary counselling and testing, monitoring CD4 count, viral load testing and condoms distribution</td>
</tr>
</tbody>
</table>
| 2008-2009 | • Thai Traditional Medicine  
• Renal replacement therapy: Peritoneal Dialysis First policy, haemodialysis, kidney transplants inclusive of all related medicines  
• Voluntary methadone replacement therapy for drug addictions  
• Access to expensive medicines in the national list of essential medicines, e.g. linezolid for methicillin resistant staphylococcus aurius, Botulinum A toxin for idiopathic cervical dystonia  
• Seasonal Influenza vaccination in at-risk groups |
| 2010  | • Access to all orphan medicines and antidotes  
• Treatment of psychiatric patients as inpatient without length of stay limits. |
| 2011  | • Secondary prevention for diabetes and hypertension  
• Specific medicines for psychiatric patients |
| 2012  | • Liver transplantation for hepatic failure in patients <18 years  
• Heart transplantation |
| 2013  | • Extension of seasonal influenza vaccine to more target groups  
• Stem cell transplantation in leukaemia and lymphoma with specific indications |
| 2014  | • Special earmarked budget for hard-to-reach areas |
| 2015  | • Detect and treat policy for HIV, with any level of CD4 count |
| 2016  | • Long term home and community care for frail elderly  
• Home and community based psychiatric care |
Table 5 Cost savings from central negotiation by NHSO for medical supplies and medicines, various years, US $

<table>
<thead>
<tr>
<th>Medical supplies</th>
<th>Market price per unit US$</th>
<th>Negotiated price per unit US$</th>
<th>Units purchased</th>
<th>Cost difference US$</th>
<th>Cost savings US$</th>
</tr>
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<tbody>
<tr>
<td>• Folding lens (2011-2012)</td>
<td>133</td>
<td>93</td>
<td>64,100</td>
<td>40</td>
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<td>• Unfolding lens (2011-2012)</td>
<td>133</td>
<td>23</td>
<td>7,197</td>
<td>110</td>
<td>791,670</td>
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<td>• Balloon stent (2009-2012)</td>
<td>667</td>
<td>23</td>
<td>26,655</td>
<td>334</td>
<td>8,902,770</td>
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<td>• Coronary stent (2009-2012)</td>
<td>1,000</td>
<td>167</td>
<td>10,575</td>
<td>833</td>
<td>8,808,975</td>
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<td>• Drug-coated stent (2009-2012)</td>
<td>2,833</td>
<td>567</td>
<td>33,794</td>
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<td>• Drug eluting alloy stent (2012)</td>
<td>1,833</td>
<td>833</td>
<td>343</td>
<td>1,000</td>
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<td>Medicines</td>
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<td>• ARV (2010-2012)</td>
<td>747</td>
<td>658</td>
<td>29,973</td>
<td>89</td>
<td>2,667,597</td>
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<td>• High cost drug (2010-2012)</td>
<td>4,508</td>
<td>3,197</td>
<td>4,674</td>
<td>1,311</td>
<td>6,127,614</td>
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<td>• Influenza vaccine (2010-2012)</td>
<td>7</td>
<td>5</td>
<td>643,319</td>
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<td>1,286,638</td>
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<td>• Erythropoietin (2009-2012)</td>
<td>22</td>
<td>8</td>
<td>1,634,239</td>
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<td>22,879,346</td>
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<tr>
<td>• Continuous ambulatory peritoneal dialysis solution (2010-2012)</td>
<td>7</td>
<td>4</td>
<td>19,095,657</td>
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<td>57,286,971</td>
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<td>Total cost saving to UCS</td>
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<td>188,235,785</td>
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Source: NHSO 2012