Introduction to health systems & Thai health system

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Presentation Agenda

- What is a health system?
  - Goals, Frameworks, Types
- Market failure in healthcare
- Universal Health Coverage
- Thai health systems
  - Health systems development
  - Thai health system
  - Performance and outcome

WHAT IS A HEALTH SYSTEM?

What is a Health System?

System

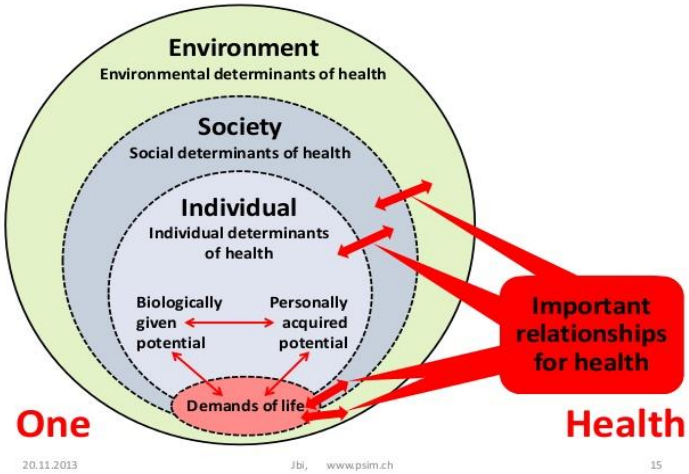
Health

Health systems

What is (are) health system(s)?

- What is health?
  - Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity *(WHO, 1948)*.

- What is a system?
  - A system is a regularly interacting or interdependent group of items forming a unified whole *(Merriam-Webster, 2016)*.
  - A system = a sum of its part?



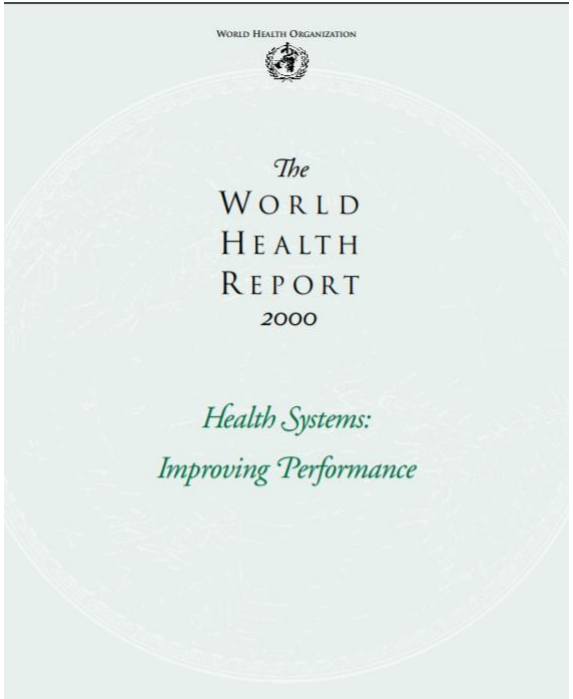
Source: adapted from Bircher, 2013

Again! What is (are) health systems?

- ‘Any set of arrangements in a society … which assigns social roles and resources to achieve the goals of protecting or restoring health to the eligible population.’*(Weinerman, 1971)*
- ‘The combination of resources, organization, financing, and management that culminate in the delivery of health services to the population.’ *(Roemer, 1971)*
- ‘Any service designed to improve the physical, mental, or social wellbeing of one individual or group of individuals must be considered a health service.’ *(Long, 1994)*

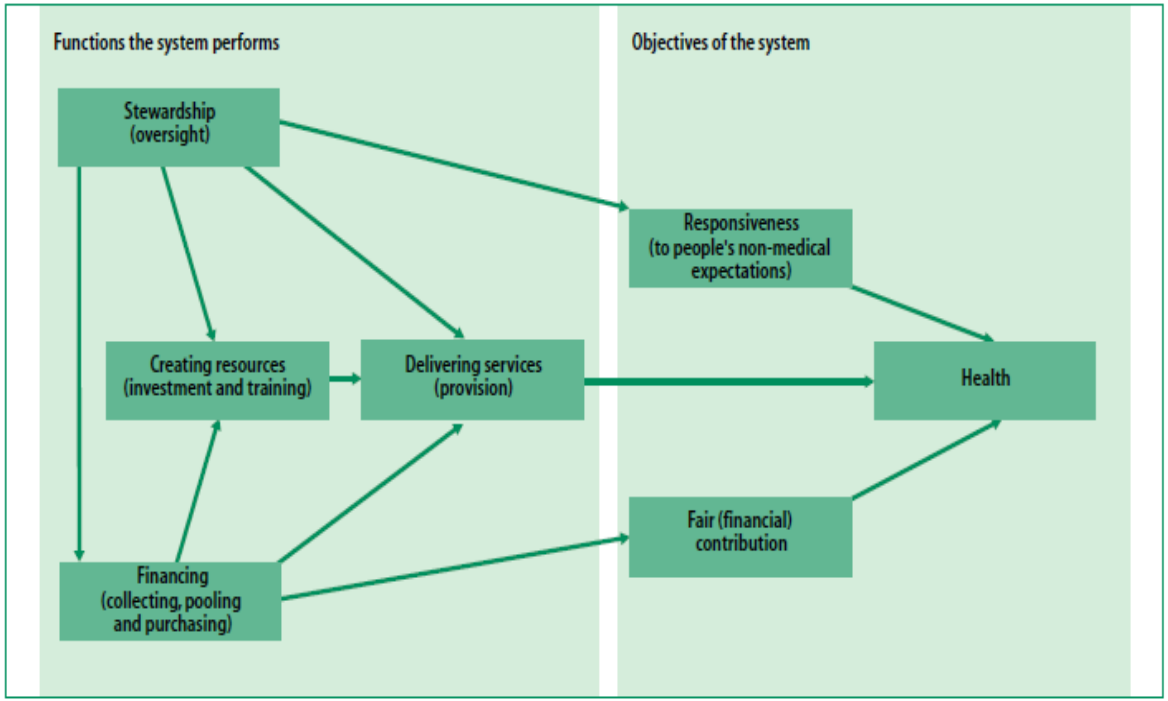
World Health Organization (WHO)'s definition

- World Health Report 2000 described that *'Health systems are defined as comprising all the organizations, institutions and resources that are devoted to producing health actions. A health action is defined as any effort, whether in personal health care, public health services or through intersectoral initiatives, whose primary purpose is to improve health.'*



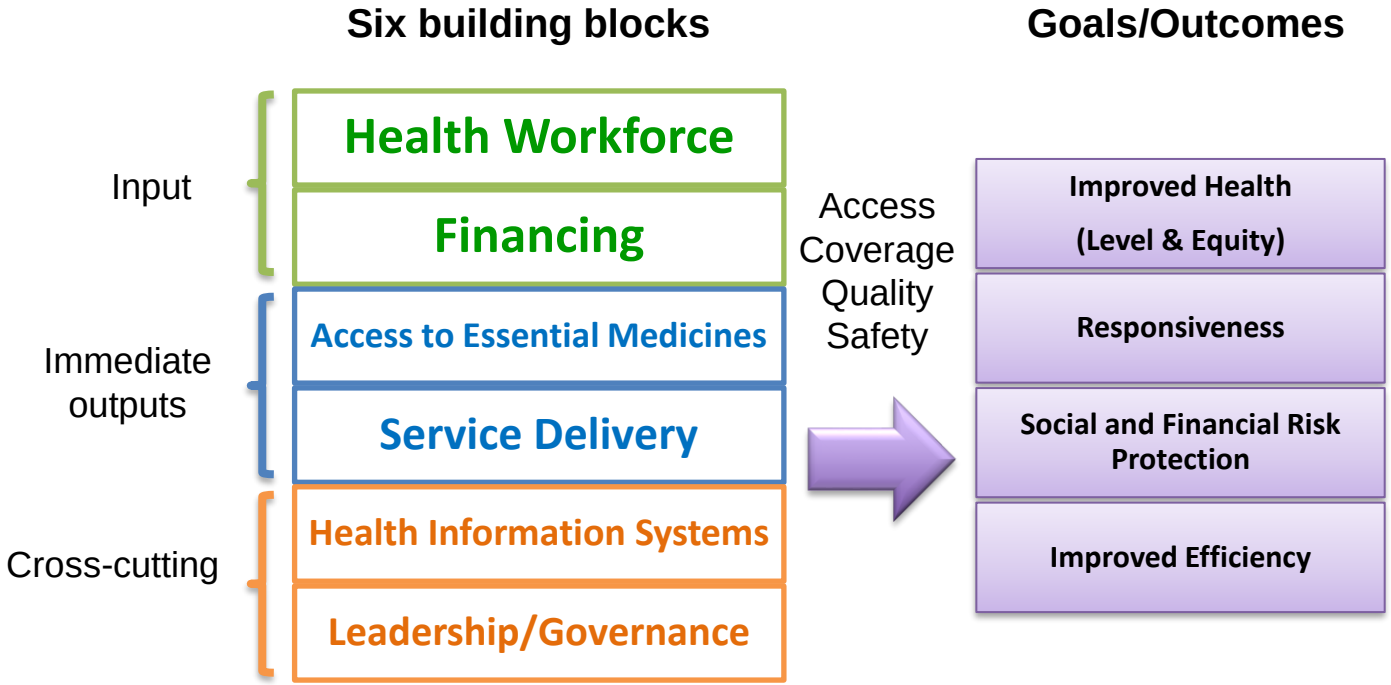
Source: https://apps.who.int/iris/handle/10665/42281

WHO's original framework



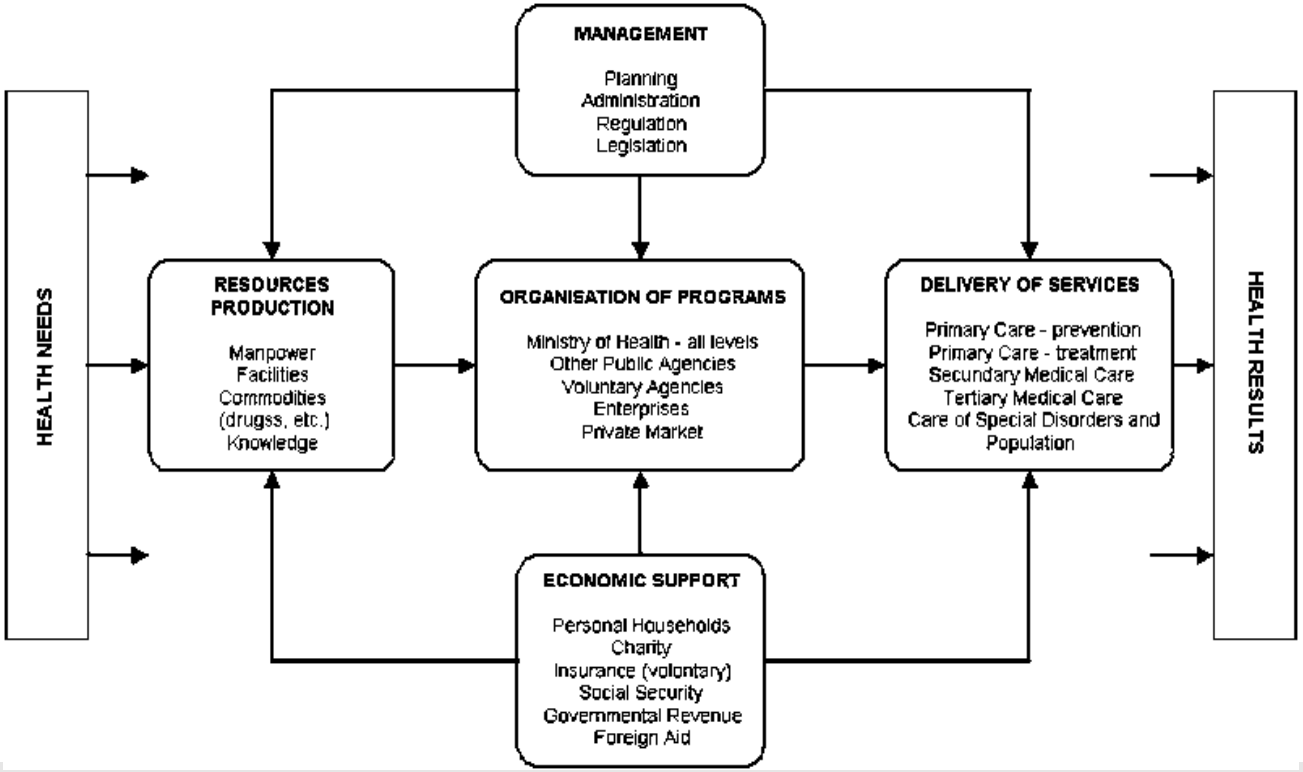
Source: https://apps.who.int/iris/handle/10665/42281

WHO's health systems framework: six building blocks



Source: WHO 2010. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies

Roemer's framework

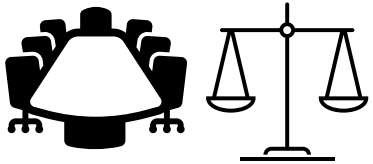


Health systems

Health financing

Health workforce

Service delivery



Governance and leadership

Health information

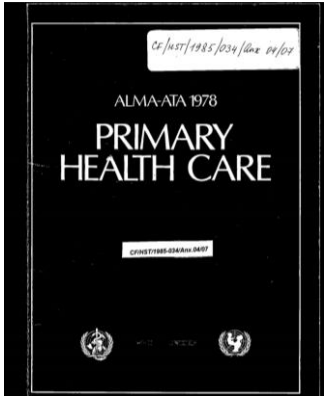
Essential medicines and technologies

Health systems?

Primary Health Care

All people, everywhere, deserve the right care, right in their community.

- addresses the majority of a person's health needs throughout their lifetime.
- includes physical, mental and social well-being and it is people-centred rather than disease-centred.
- is a whole-of-society approach that includes health promotion, disease prevention, treatment, rehabilitation and palliative care.



Three components of PHC approach:

- ✓ meeting people's health needs throughout their lives;
- ✓ addressing the broader determinants of health through multisectoral policy and action;
- ✓ empowering individuals, families and communities to take charge of their own health.

Primary health care throughout our life
https://youtu.be/uVNlez_IgdI

Source: https://www.who.int/health-topics/primary-health-care#tab=tab_1

What are effective heath systems?

- Availability
  - Do we have adequate healthcare facilities, medicines & equipment, and workforce?
- Accessibility
  - Can people access the care they need?
  - What are the barriers to access?
- Acceptability
  - Do people who have access use it? If not, why?
- Affordability
  - Who should pay? Do they have ability to pay & to which level?

Access to essential medicines

Availability	Are the medicines physically available at a place the patient can reach. (Point of Care – POC)
Accessibility	The relationship between the location of the product or service and the location of the eventual user of the product or service – as a guideline – being with 15Km of the user for rural areas, and at opening times acceptable to the user for urban areas.
Acceptability	Will the user accept the service (confidentially, discrimination, social norms, traditions, language, etc.)
Affordability	The relationship between prices of the products and the user's ability to pay for them – to provide a comparison between different regions and countries, normally measured as a percentage of a daily wage per course of treatment.

Source: Empower School of Health, Defining and measuring access to medicines

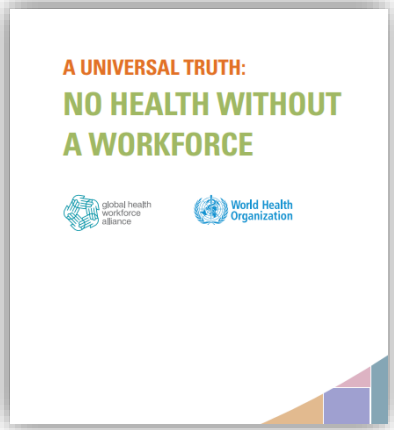
Service delivery

- Provision of care for the right people, in the right place, in the right way – equitable access and efficiency in delivering
- Balancing strategic purchasing with provider autonomy and quality of services
- Linking quality with control over resources

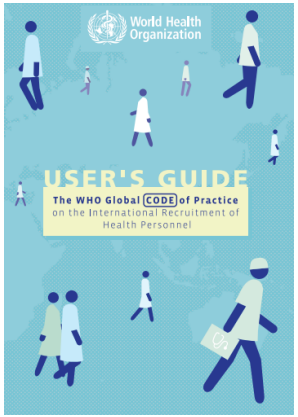
Health workforce

- Availability: sufficient number & appropriate skill mix to respond to population health needs
- Accessibility: equitable access, geographical distribution, time to access/consultation time
- Acceptability: trust, no stigma & discrimination
- Quality: competencies & skills

http://www.who.int/whr/2006/whr06_en.pdf

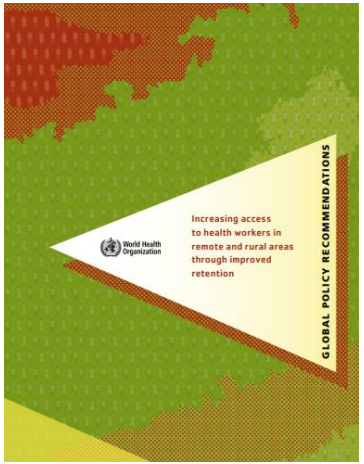


http://www.who.int/workforcealliance/knowledge/resources/hrhreport2013/en/



http://apps.who.int/iris/bitstream/handle/10665/70525/WHO_HSS_HRH_HMR_2010.2_eng.pdf?sequence=1

https://doi.org/10.1016/S0140-6736(10)61854-5



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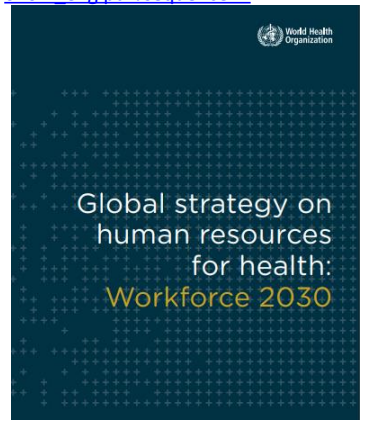
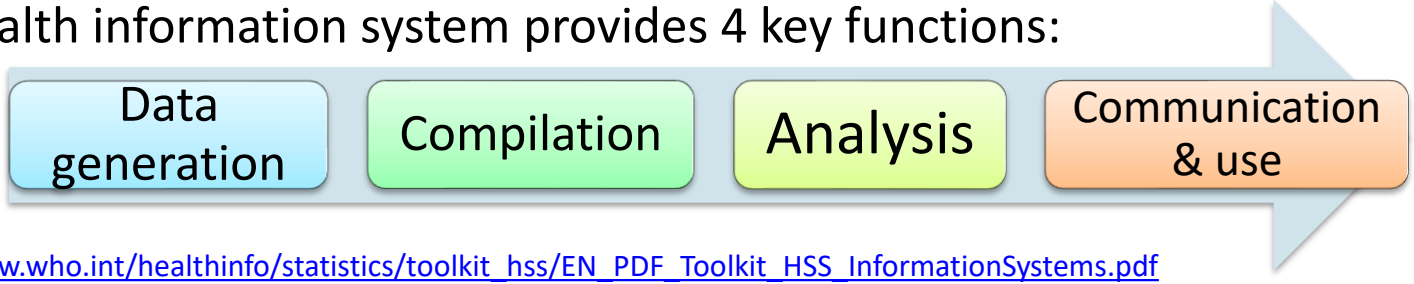


http://apps.who.int/iris/bitstream/handle/10665/250368/9789241511131-eng.pdf?sequence=1

Health information

- Sound and reliable information is the foundation of decision-making
- Availability: Do we the data that we need?
  - For patient care e.g. medical record
  - For planning at sub-national & national levels
- Accessibility: Who key in the data? Who can use the data?
- Acceptability: Is the data reliable?
- Affordability: Any cost involved in using health information system?
- Health information system provides 4 key functions:



http://www.who.int/healthinfo/statistics/toolkit_hss/EN_PDF_Toolkit_HSS_InformationSystems.pdf

Some examples

- Vital registration
  - citizen ID system
- Household survey data
  - Socio-Economic Survey (SES)
  - Health and Welfare Survey (HWS)
- Electronic Health Record
  - Medical records
  - Hospital information systems (HIS)
- The health provider facility ID system, standard data sets for reporting
  - the International Classification of Diseases (ICD)
  - Disease registry
  - Health Data Center
  - Reimbursement systems

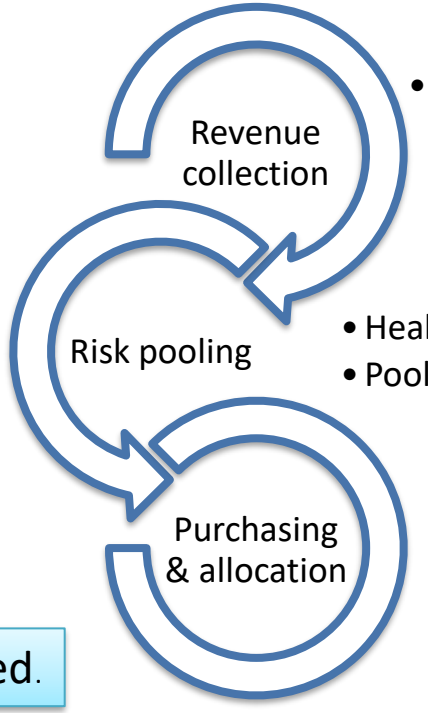
Governance

- System design
  - Single vs. multiple payers
  - Integrated vs purchaser-provider split
  - Centralised vs. decentralised
- Administration & management
  - Bureaucratic, independent agency,
  - Participatory management,
- Regulation
  - Registration and licensing
  - Quality control, consumer protection

Financing

We need to answer 3 questions. **How much? Who pays? And Pay for what?**

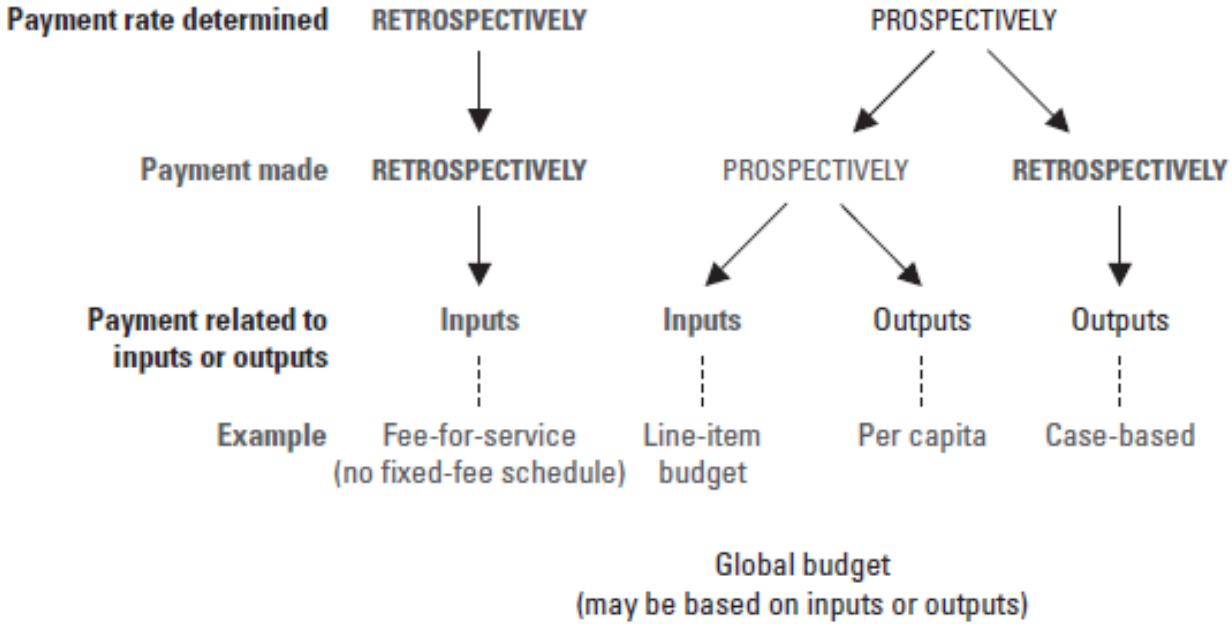
By National Health Accounts



- Source of financing e.g. tax, premiums, out-of-pockets by households, external sources
- Health & financial risks
- Pool & redistribute
- Link to service provision
- Strategic purchasing: what, how, for whom
- Provider payments

Both equity and efficiency should be addressed.

Financing: Provider payment methods



Source: Langenbrunner et al (eds) 2009. Designing and Implementing Health Care Provider Payment Systems

HEALTHCARE MARKETS

Perfectly competitive market

What about healthcare markets?

9 criteria to guide public resource allocation to health care

- Healthcare markets cannot rely on the invisible hand
- Market failure leads to under-provision, inefficiency, and inequity
- Government interventions are needed
- Then, to what extent should the government intervene?
  - Efficiency – public goods, externalities, catastrophic cost, cost-effectiveness
  - Ethical reasons – horizontal & vertical equity, rule of rescue
  - Political – demands by the people

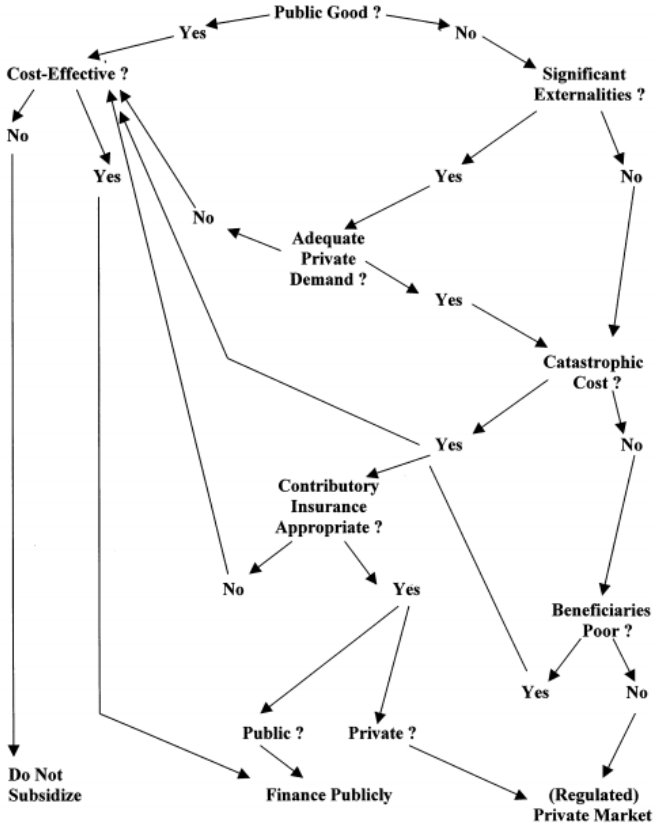


Fig. 4. Decision tree for public resource allocation to health care.

Source: Musgrove 1999 http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.203.4892&rep=rep1&type=pdf

Why health insurance?

- *Uncertainty* - No one can be certain when s/he will get ill and how much it will cost, which may be *unaffordable* or *catastrophic*.
  - Imagine you have 100 people and disease prevalence is 1% and the cost for treatment is $1000. If the insurer collects $10 per person, these 100 people are protected from financial risk of losing $1000.
  - Health insurance transforms uncertain loss (of $1000) into a certain loss (of $10).
- It does so by *risk sharing* across members.

What problems associate with insurance?

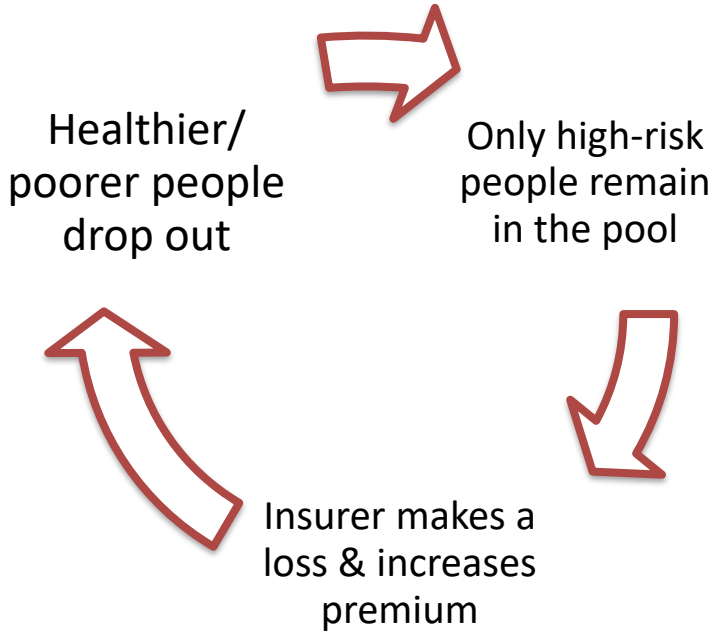
Moral hazard

- A moral hazard occurs when one party in a transaction can alter the probability of an event that negatively affect the other party.
- May regarded as *information asymmetry & principal-agent problem* for both patient-provider and insurer-provider
  - Demand-side –
    - ex ante - seeking care when it is not necessary, having risky behaviours
    - ex post – demanding more services per episode, more expensive services
  - Supply-side or supply-induced-demand
    - providing more care/more expensive service than needed esp when providers are paid by fee-for-service
    - Uprating episodes of care e.g. DRG creep
- Principal-agent relationship is when one person (agent) makes decisions on behalf of another person (principal). The dilemma exists in circumstances where agents are motivated to act in their own best interests, which are contrary to those of their principals.

Responses

- Forms of user fees (co-insurance, copayment, deductibles/excess, no-claim bonus
- Provider payment methods

What problems associate with (voluntary) insurance?



Adverse selection

- Individuals know their health risk more than the insurer (Information asymmetry)
- People consider their risk & ability to pay
- Resulted in a *death spiral*

Responses

- Experience rating but it is costly and leads to cherry picking, resulting in inequity of coverage due to risks
- Compulsory insurance/community rating

Health insurance: summary

- Insurance can transform uncertain catastrophic loss into certain loss of affordable price. *Financial risk protection*
- The larger the pool is, the better *risk sharing*. (and also reduce administrative cost of multiple pools)
- Voluntary health insurance leaves some people uninsured (*inequity*) because of adverse selection and increases price because of moral hazard (*inefficiency*)
- Provider payment mechanism must be carefully designed to tackle principal-agent problem

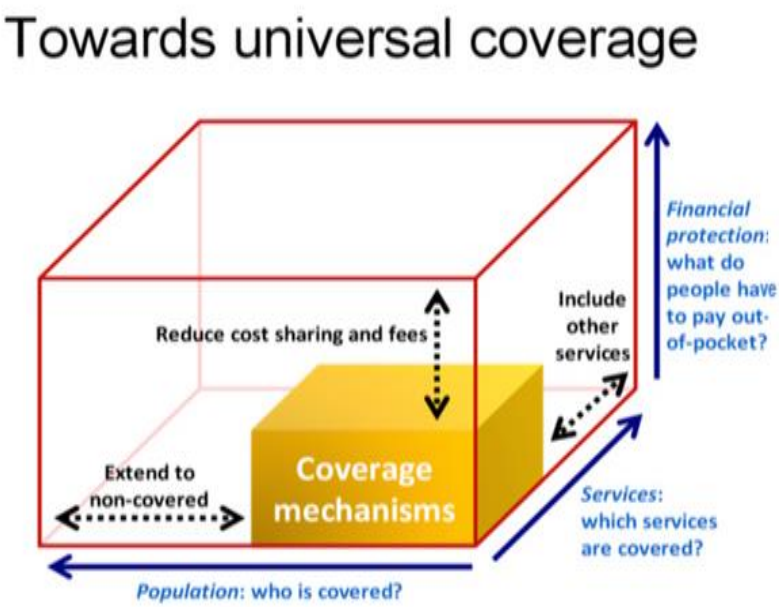
Health systems models – financing models

Archetypes	Features
Free Market (Laissez Faire)	little or, in extreme contexts, no state intervention **Entitlement basis:** pay-as-you-go, voluntary sign up **Finance:** predominantly private out-of-pocket payment or (voluntary) private health insurance **Service delivery:** private facilities **Health professionals:** privately employed
Social Insurance (Bismarckian)	Sickness fund, limited direct role of state **Entitlement basis:** employment **Finance:** insurance premiums paid to/controlled by employers/unions **Service delivery:** mostly private **Health professionals:** mostly privately employed
National Health Services (Beveridgian)	High level of market interventions, emphasis on primary care as gatekeeper to more advanced care **Entitlement basis:** citizenship **Finance:** general taxation and mostly free-at-the-point-of-service **Service delivery:** Mostly state owned **Health professionals:** State employees or contractors
Socialist	Similar to Beveridgian but restricted private sector role

UNIVERSAL HEALTH COVERAGE

Universal Health Coverage

- ***UHC*** *means* ***all people*** *can* ***use*** *the health services they need, of* ***sufficient quality*** *to be effective, while the use of these services does not expose the user to* ***financial hardship****.*



Global Movement on UHC

Sustainable Development Goals (SDGs)

3.8 - Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

Health in other SDGs

- Improved health contributes to other SDGs
- Achieving other SDGs contributes to health
- Ambitious SDGs require **multidimensional** policies and **multisectoral** actions

Why UHC?

UHC Monitoring

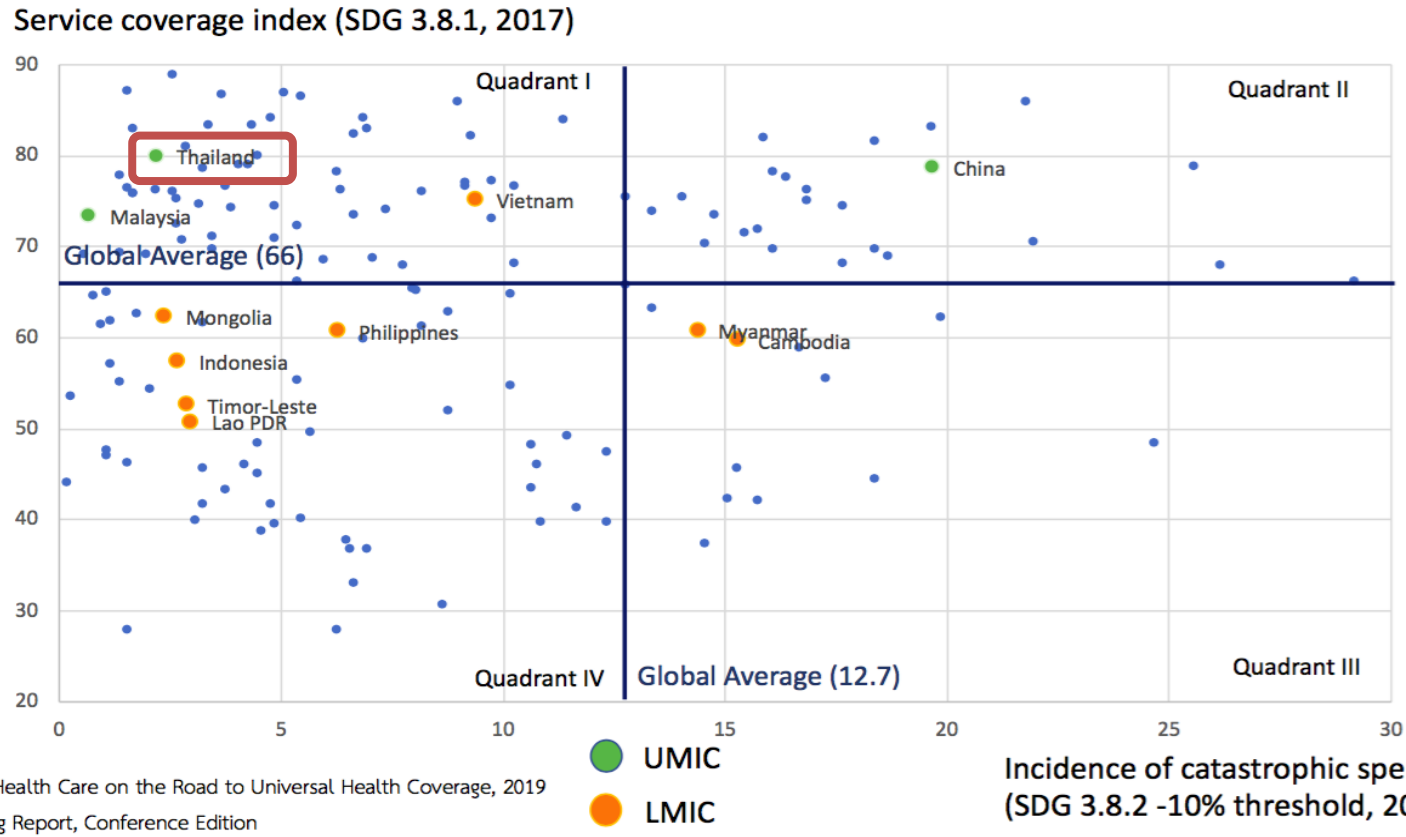
Indicator 3.8.1: Coverage of essential health services

- Service coverage index (MCH, NCDs, infectious disease, service capacity)

Indicators 3.8.2: Proportion of population with large household expenditures on health as a share of total household expenditure or income

- Incidence of catastrophic spending

WHERE is Thailand in SDG 3.8 plot?

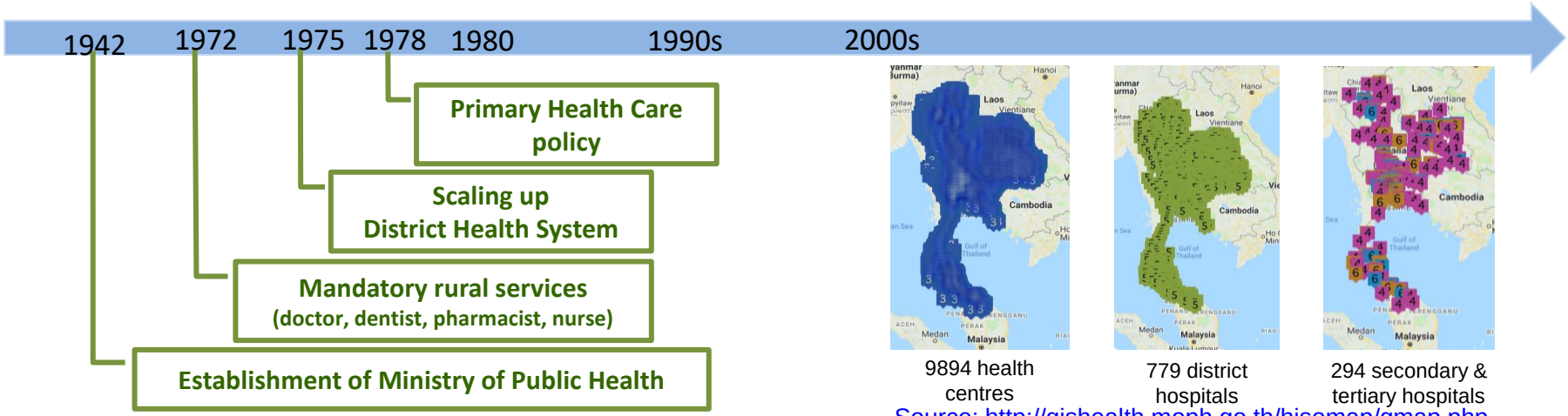


Source: Primary Health Care on the Road to Universal Health Coverage, 2019 Global Monitoring Report, Conference Edition

THAI HEALTHCARE DEVELOPMENT

1 Infrastructure development: facilities

- Strong Primary Health Care with full geographical coverage of health facilities and health workforce
  - Full coverage of district hospitals by 1990s
  - Full coverage of health centres by 2000s
- Referral system to more advanced care
- **People can use health service close to their homes**



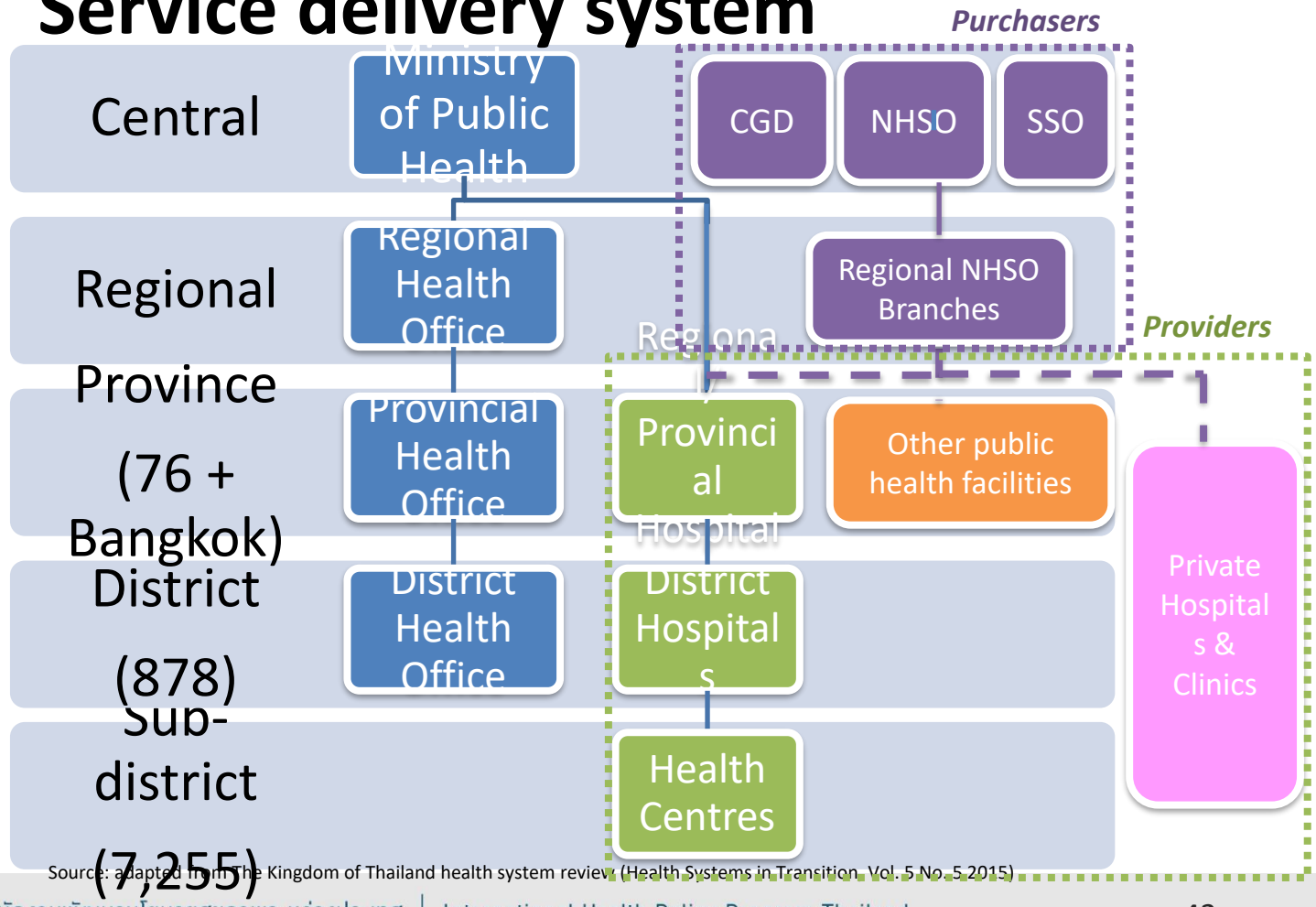
9894 health centres

779 district hospitals

294 secondary & tertiary hospitals

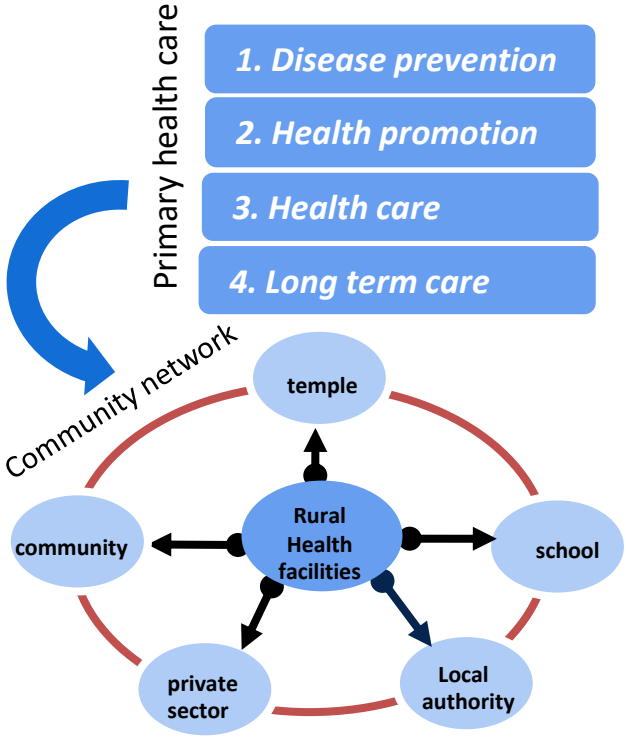
Source: http://gishealth.moph.go.th/hisomap/gmap.php

Service delivery system



Source: adapted from The Kingdom of Thailand health system review (Health Systems in Transition, Vol. 5 No. 5 2015)

District health system: hub for pro-poor outcomes



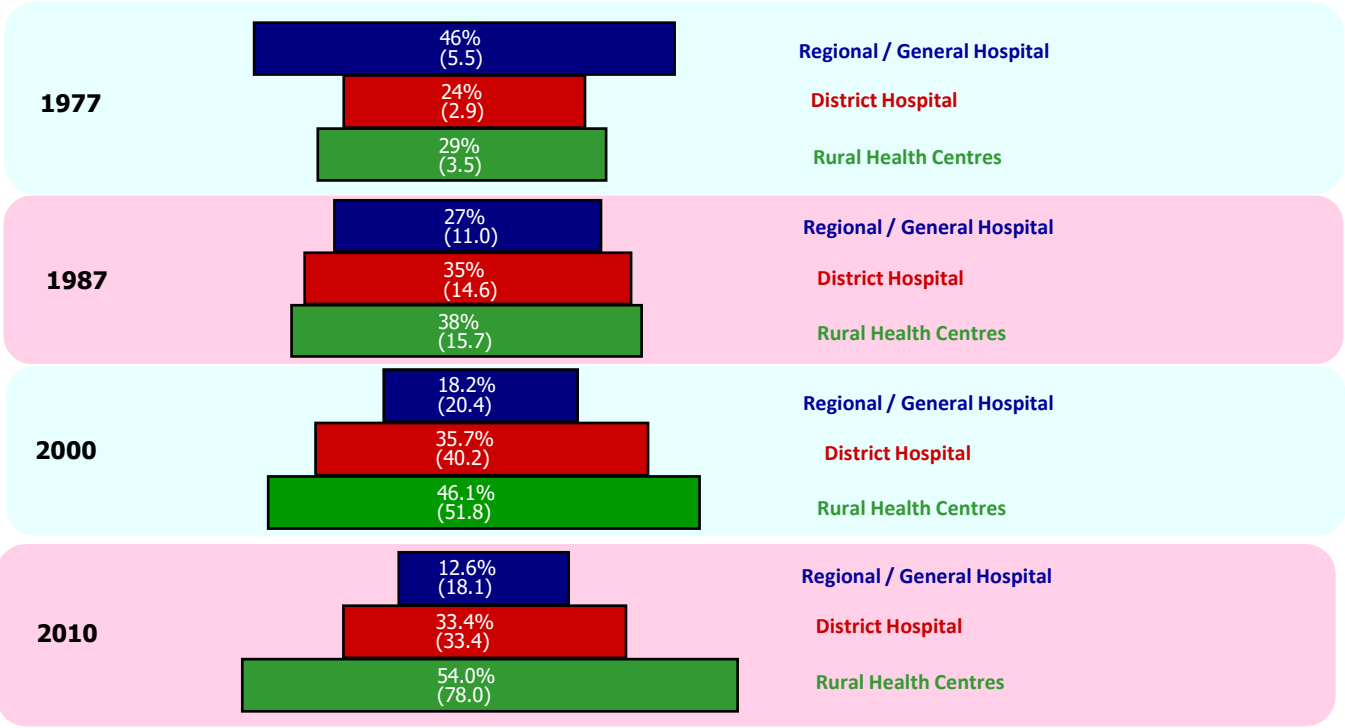
Rural community hospitals with 2-8 doctors cover 30-80,000 population

Rural health centers with 3-6 nurses and paramedics cover 2,000-5,000 population

Source: The Lancet 2013;381:2118-33.

AAAQ: Available, acceptable, affordable and quality PHC services

Huge increase in access to primary care

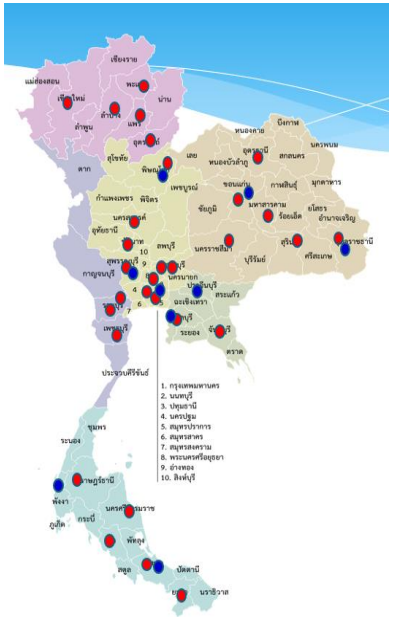


Note: (number of OP visits in million)

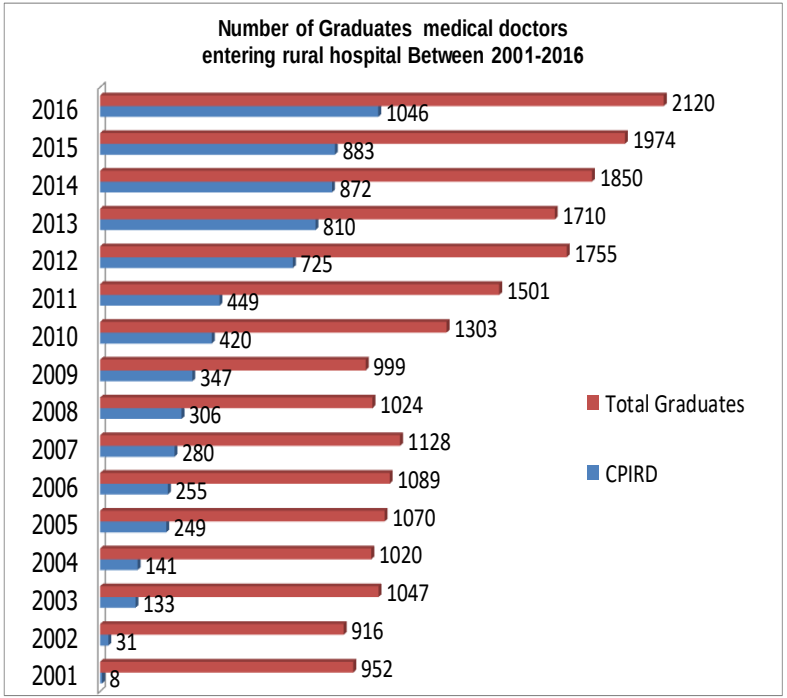
2 Infrastructure development: workforces

- **Compulsory rural service (since 1972)**
  - Target: doctors, dentists, pharmacists, and nurses
  - new graduates to spend at least 2-3 years in public facilities outside Bangkok
- **Rural recruitment, rural training and hometown placement**
  - MOPH nursing colleges and public health schools (since 1946)
  - The Collaborative Project to Increase Production of Rural Doctors (CPIRD) (since 1994)
- **Financial incentives (since 1970s)**
  - Target: doctors, dentists, pharmacists and nurses
  - remote hardship, non-private practice, non-official hour service, long years of service
- **Non-financial incentives**
  - social recognition for dedicated frontline workers
  - career advancement, opportunities for higher education
  - housing benefit

2 Infrastructure development: workforces

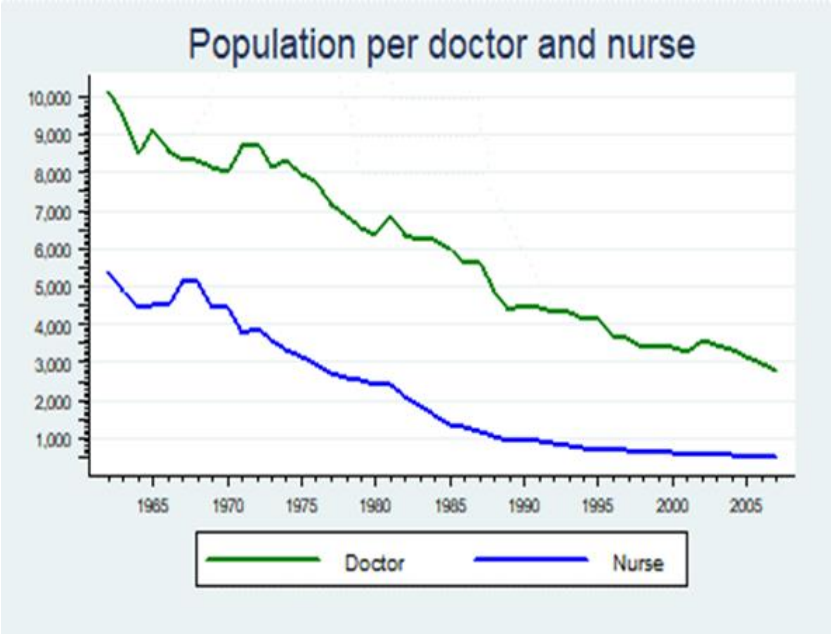


30 Nursing colleges
9 Public health schools

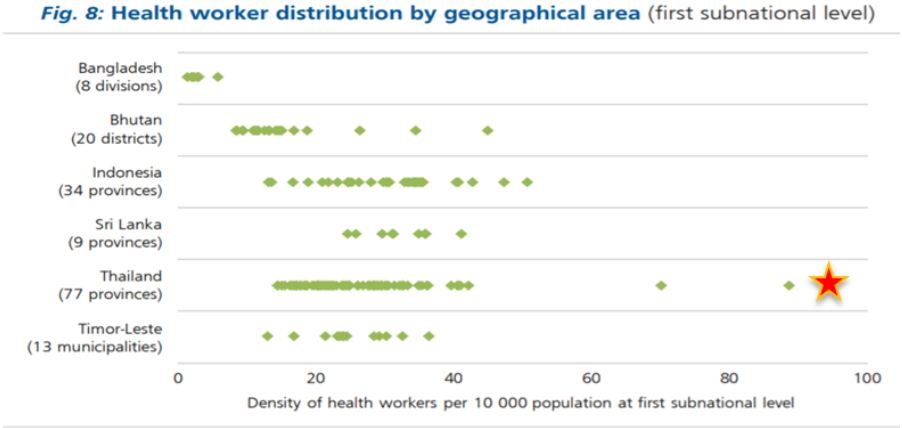


Source: Purak, S. (2017) Transformative education under MOPH

2 Infrastructure development: workforces



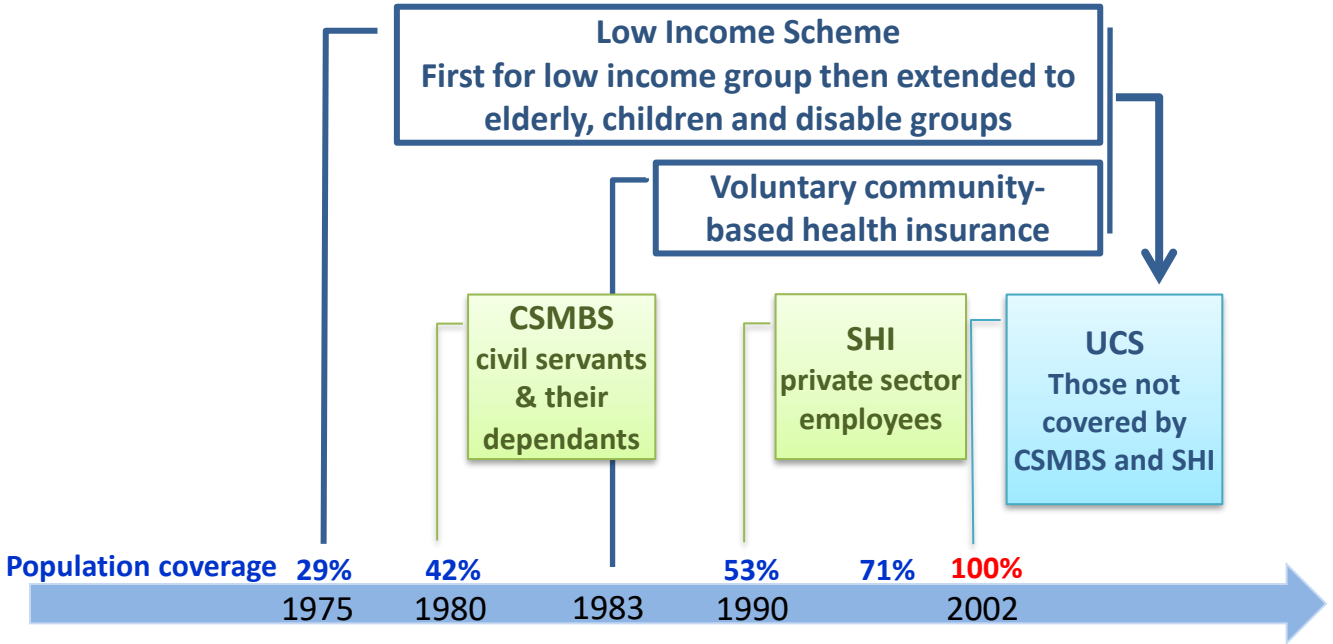
Health workers maldistribution is a challenge.



Source: Country data reported to WHO-SEARO, 2018.

Density of health workers by province	Range
14.4 (Nong Bua Lam Phu)–88.5 (Sing Buri)	6.1 Fold

3 Financial risk protection: population coverage

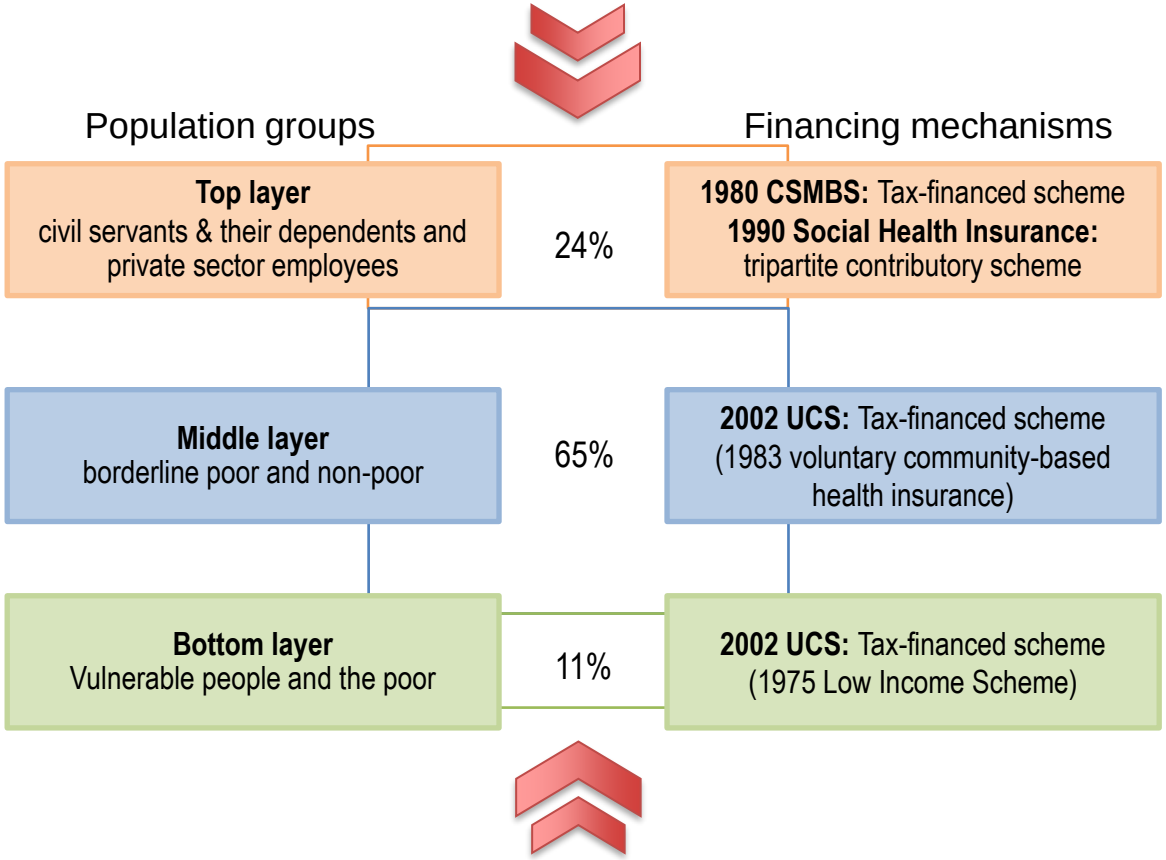


CSMBS = Civil Servant Medical Benefit Scheme

SHI = Social Health Insurance

UCS = Universal Coverage Scheme

Thailand trajectory: squeeze from the top and bottom



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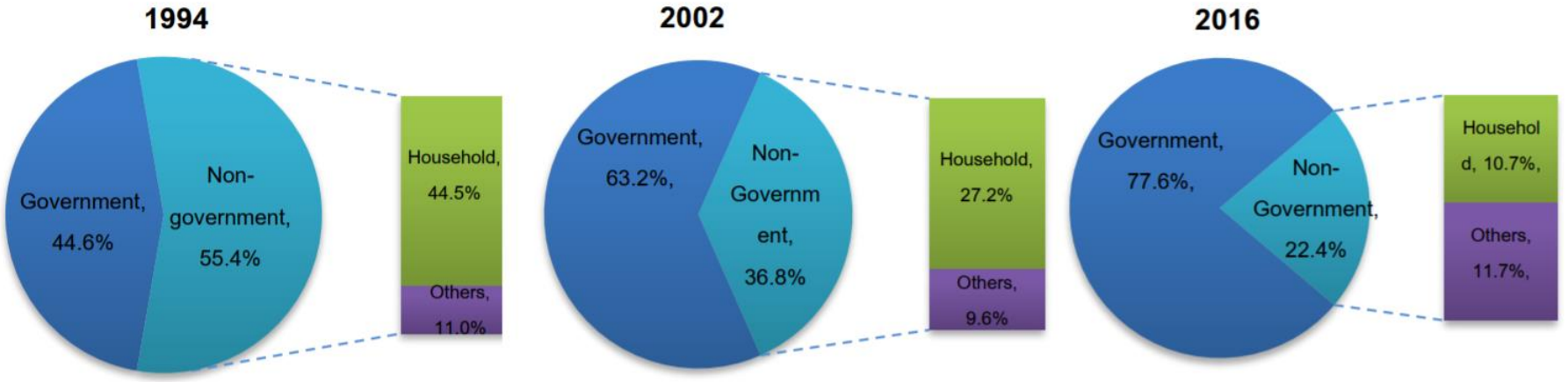
Significant increase in fiscal space for health



THE per capita: 2,168 baht, 3.5% of GDP

THE per capita: 3,148 baht, 3.5% GDP

THE per capita: 8,611 baht, 4.1% GDP

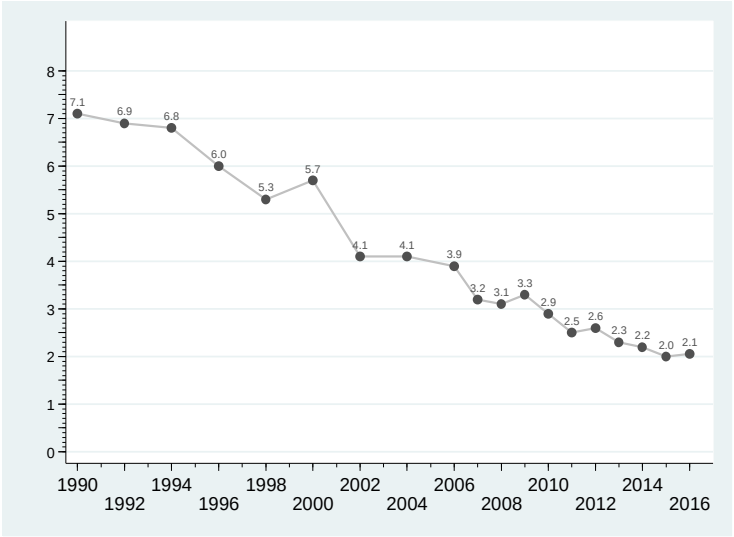
THE = Total Health Expenditure

Source: Thai National Working Group 2016. Thai National Health Accounts 2016

Financial risk protection

Catastrophic health expenditure*, 1990-2016

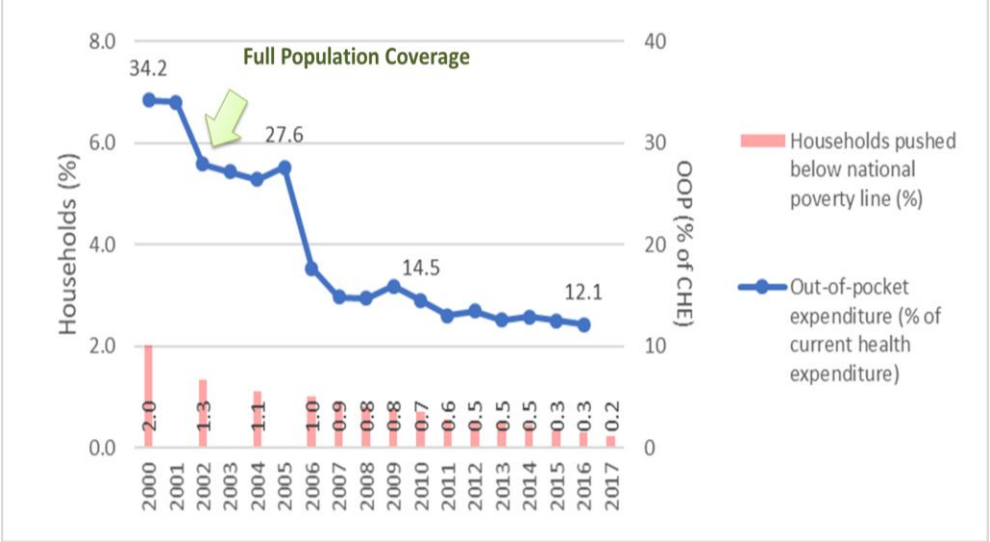
* > 10% total consumption



Source: Socioeconomic survey (various years)

Impoverishing health expenditure* and out-of-pocket payment, 2000-2017

* National poverty line



Source: NHSO report 2018

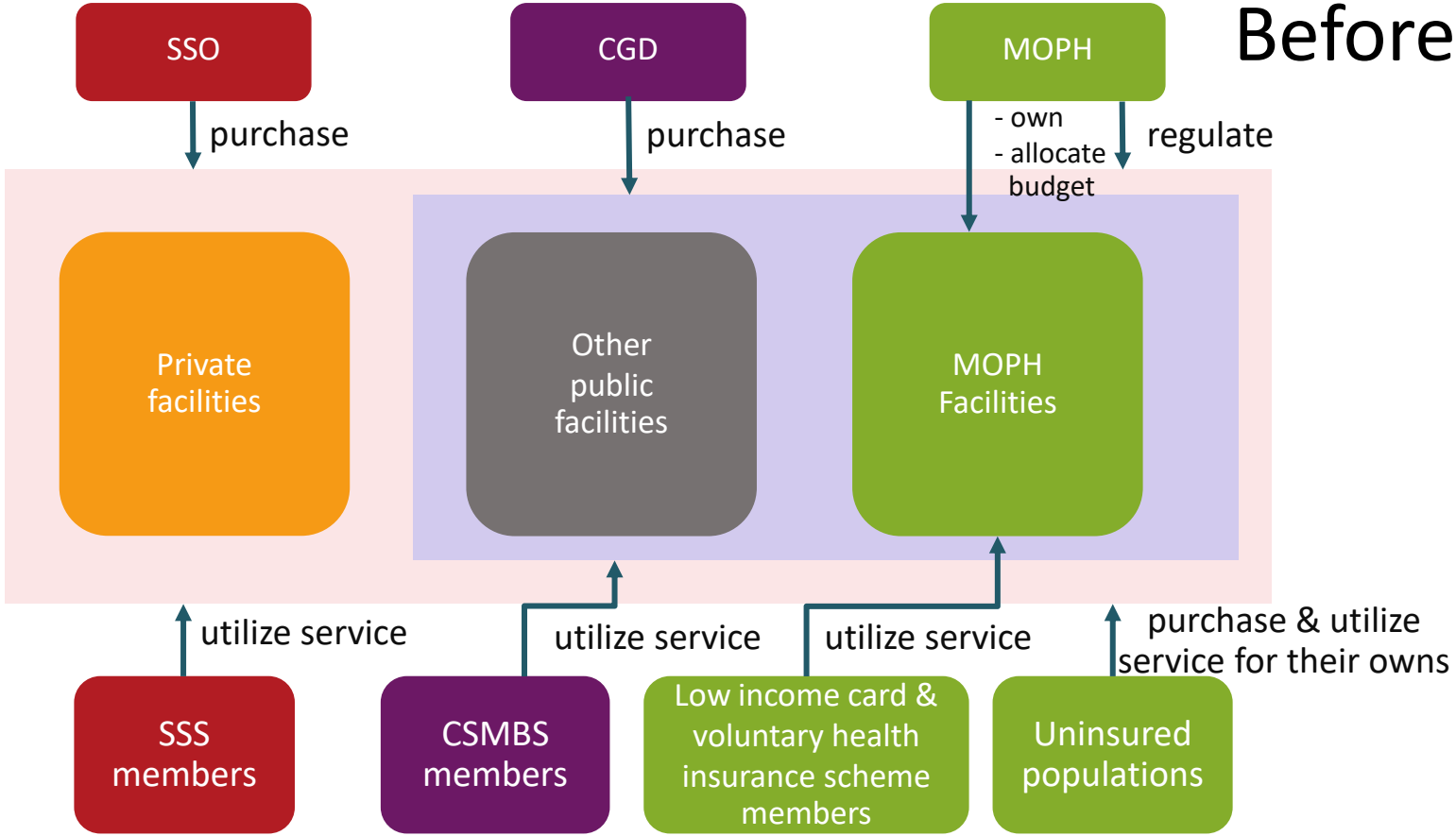
Benefit package expansion: boosted financial protection

2002	• Comprehensive OP & IP including high cost care, A&E, P&P, rehabilitation
2006	• Antiretroviral therapy
2007	• Services for Thai traditional medicines
2008	• Renal replacement therapy • Methadone
2009	• Seasonal influenza vaccine for high risk groups
2010	• Orphan drugs & antidotes • Thai traditional medicines • Treatment of psychiatric patients as inpatients w/o limited hospital stay
2011	• 2nd prevention for DM & HTN • Specific drugs for psychiatric patients
2012	• Liver transplantation • Heart transplantation
2013	• Seasonal influenza vaccine (expanded) • Stem-cell transplantation for leukaemia and lymphoma
2015	• Trastuzumab for breast cancer • Nilotinib & Dasatinib for leukaemia and lymphoma • Peginterferon for HCV genotype 2,3,1,6, HIV/HCV • ART at any CD4 • No limit for delivery
2016	• Long-term care for frail elderly • Home/community-based psychiatric care • HIV prevention in key populations
2017	• UCEP
2018	• HPV vaccine in Grade 5 girls • Colon cancer screening • HCV screening and treatment • One day surgery
2019	• P&P in pregnant women and infants • DTP-HB-Hib vaccine • Rabie vaccine • Raltegravir in pregnant women • Bevacizumab for retinal vein occlusion

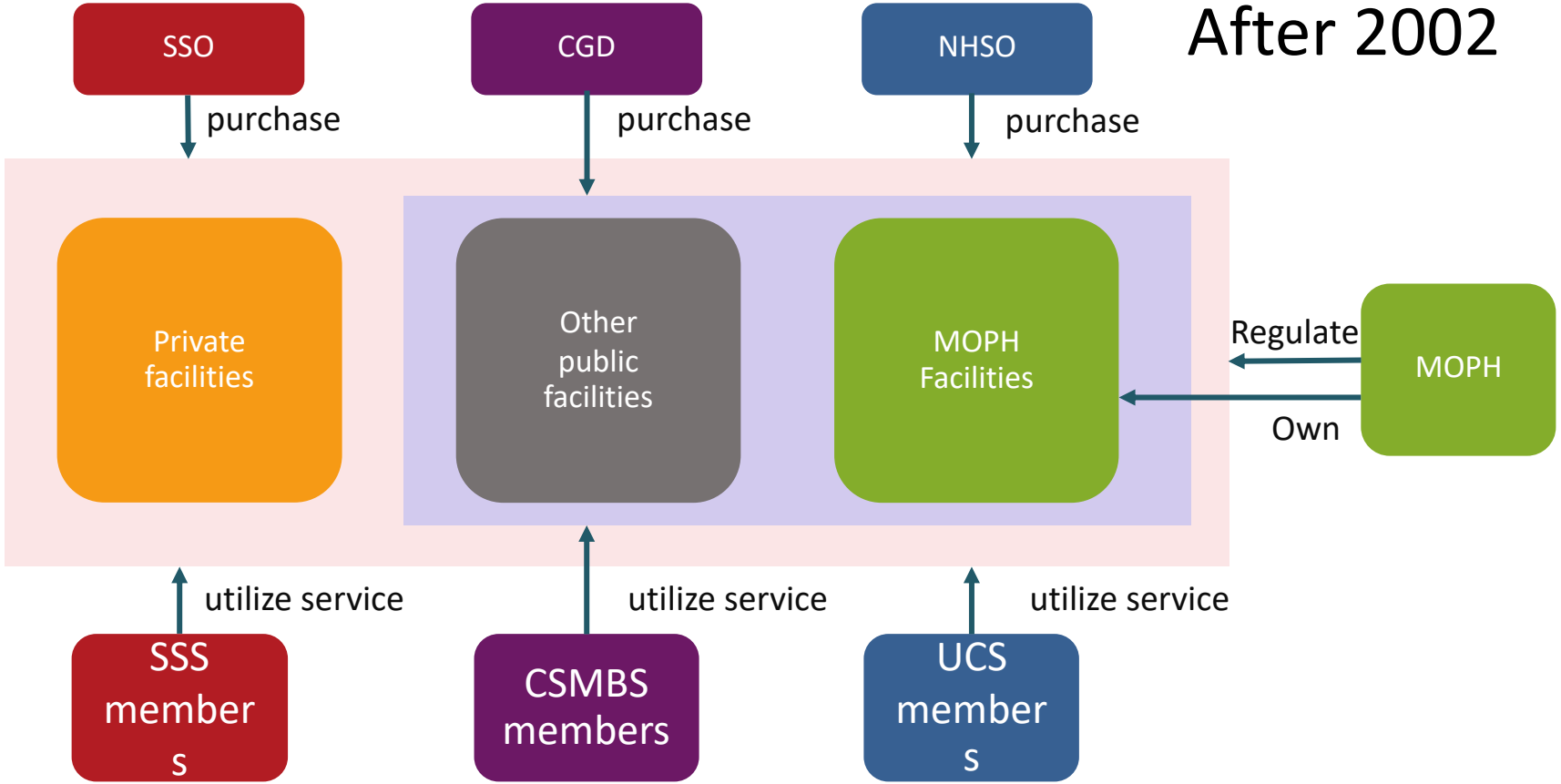
4 Governance transform: purchasers vs providers (UHC reform)

- "Contract model" replaces "integrated model": MOPH acts as major providers, regulatory functions while NHSO as a purchaser for UCS.
  - CGD and SSO remain "contract model"
- Budgetary process – demand-side budget allocation
- Provider payment – more strategic, mixed methods which promote equitable access
  - Except CSMBS outpatient still goes with the inefficient Fee For Service method, though DRG applies multiple base rates
- Clear accountability framework across actors
  - Government, healthcare providers, purchasers, and citizens
  - More people participation & empowerment

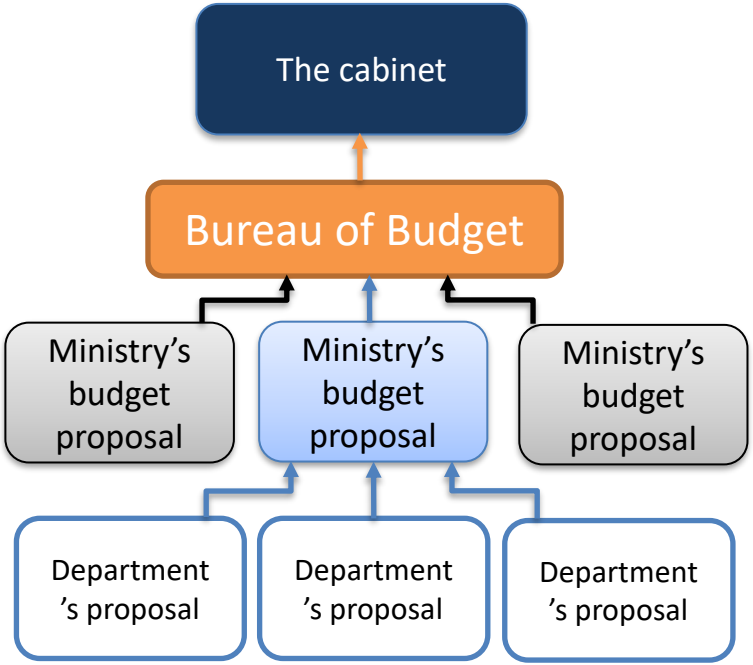
Before 2002


SSO
CGD
MOPH
purchase
purchase
- own
- allocate budget
regulate
Private facilities
Other public facilities
MOPH Facilities
utilize service
utilize service
utilize service
purchase & utilize service for their owns
SSS members
CSMBS members
Low income card & voluntary health insurance scheme members
Uninsured populations

After 2002


SSO
CGD
NHSO
purchase
purchase
purchase
Private facilities
Other public facilities
MOPH Facilities
Regulate
MOPH
Own
utilize service
utilize service
utilize service
SSS members
CSMBS members
UCS members

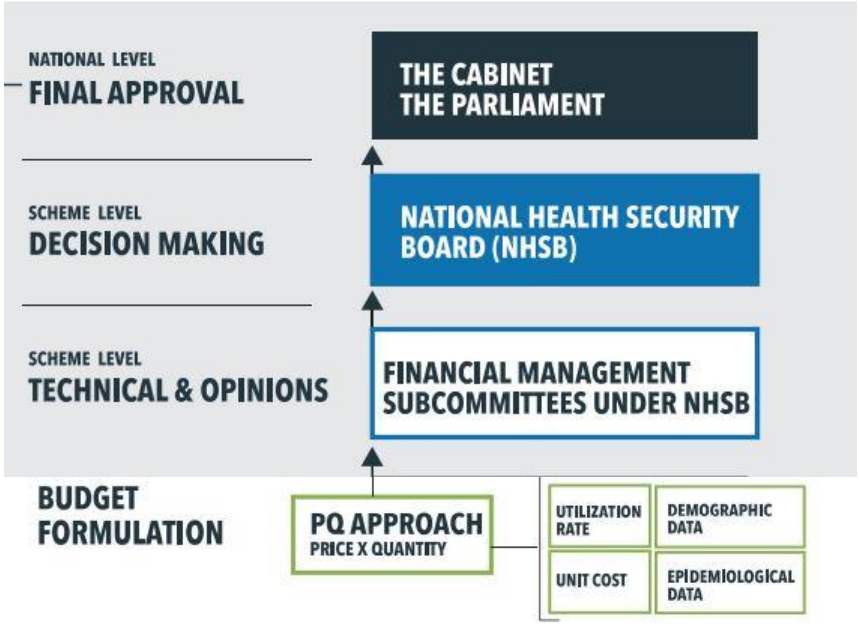
Budgeting process before and after 2002



Corruption = Monopoly + Discretion – Accountability

Source: Tangcharoensathien (2019) The Political Economy of UHC Reform in Thailand: Lessons for Low- and Middle-Income Countries, Health Systems & Reform, 5:3, 195-208
Klitgaard R (2011). Fighting corruption. CESifo DICE Report 2/2011.
https://bit.ly/2WslUkl.

UCS budgeting process



Source: Viriyathorn et al , (2019), Thailand UHC and Overview of the Universal Coverage Scheme of the National Health Security Office

THAI HEALTH SYSTEM

The current health system

- Three public insurance schemes while parallel private insurance is allowed.
- Population coverage in >99% entitled by employment or citizenship.
- A mix of tax-financed and social health insurance
  - Financed predominantly by general tax + tripartite contribution.
- Service delivery is public-dominated (81% of hospital beds, >85% of OP & IP).
  - District health system
  - Primary care as gatekeepers with referral system
- Staff are mostly publicly employed (dual practice is allowed)
- Comprehensive package – all needed healthcare is either free or charge a small copay of 30THB at the point of service

Thai health insurance schemes

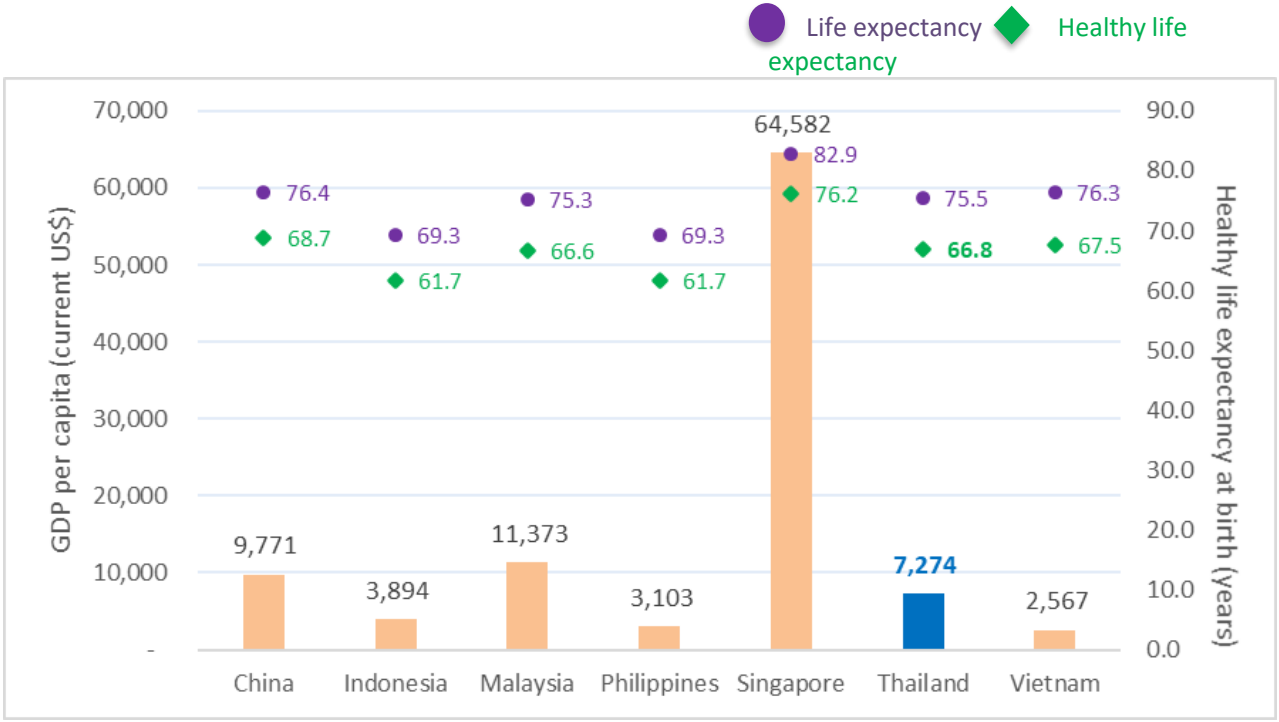
	Civil Servant Medical Benefit Scheme	Social Health Insurance	Universal Health Coverage Scheme
Legislation	Royal Decree 1980	Social Security Act 1990	National Health Security Act 2002
Purchaser	Comptroller General's Department, Ministry of Finance	Social Security Office, Ministry of Labour	National Health Security Office
Population coverage	4·4 million	10·6 million	48 million
Source of finance	Tax-based, non-contributory	Tripartite contribution by employer, employee, and government	Tax-based, non-contributory
Budgeting	Open-ended budget	Closed-ended budget	Closed-ended budget
Expenditure in 2016, Thai Baht	71·02 billion	37·7 billion	109·3 billion
Payment method	Out patient: fee-for-service; in patient: diagnostic-related groups with multiple cost bands	Out patient: capitation; in patient: diagnostic-related groups within global budget	Out patient and prevention and health promotion: capitation; in patient: diagnostic-related groups with global budget; fee schedule for specific high-cost procedures

Source: Thai National Health Accounts 2013, International Health Policy Program, and Ministry of Public Health.

Table 3: **Characteristics of the three public health insurance schemes in Thailand, 2017**

PERFORMANCE AND OUTCOME

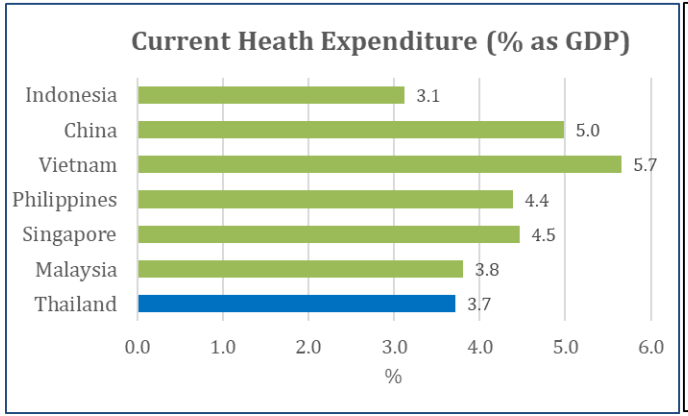
Life expectancy and healthy life expectancy

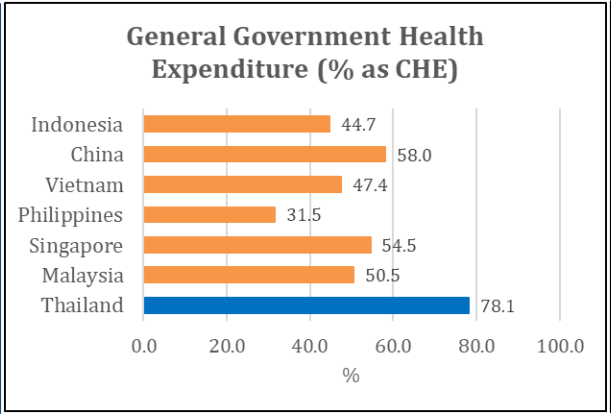


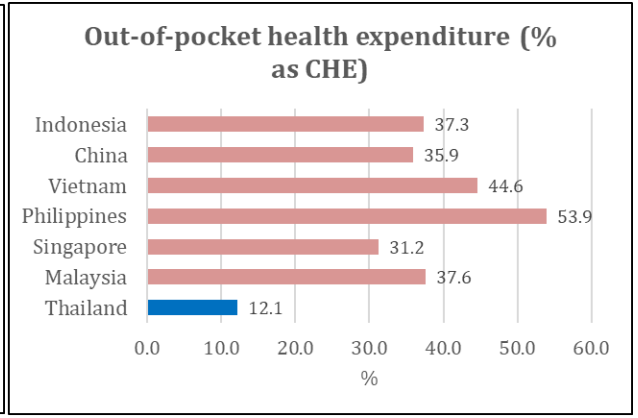
Indicators		Year	China	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
SDG 3.1	Maternal mortality ratio (per 100,000 live births)	2015	27	126	40	114	10	**20**	54
SDG 3.2	Under-five mortality rate (per 1,000 live births)	2017	9	25	8	28	3	**10**	21
	Neonatal mortality rate (per1,000 live births)	2017	5	12	4	14	1	**5**	11
SDG 3.b	Diphtheria- tetanus- pertussis (DTP3) immunization coverage among 1-year-olds (%)	2017	99	79	99	88	96	**99**	94
SDG 3.8	UHC service coverage index	2017	78.6	57.3	73.3	60.6	85.8	**79.8**	75
	Population with household expenditures on health > 10% of total household expenditure or income (%)		19.7 (2013)	2.7 (2018)	0.7 (2004)	6.3 (2015)	9.0 (2013)	**2.2 (2017)**	9.4 (2016)
	Population with household expenditures on health >25% of total household expenditure or income (%)	2009-2015	5.4 (2013)	0.5 (2018)	0.0 (2004)	1.4 (2015)	1.5 (2013)	**0.4 (2017)**	1.9 (2016)

Source: WHO (2019). World health statistics 2019: monitoring health for the SDGs, sustainable development goals . https://apps.who.int/iris/handle/10665/324835.
WHO (2019). Primary Health Care on the Road to Universal Health Coverage 2019 MONITORING REPORT. https://www.who.int/healthinfo/universal_health_coverage/report/uhc_report_2019.pdf

Health financing indicators in 2016







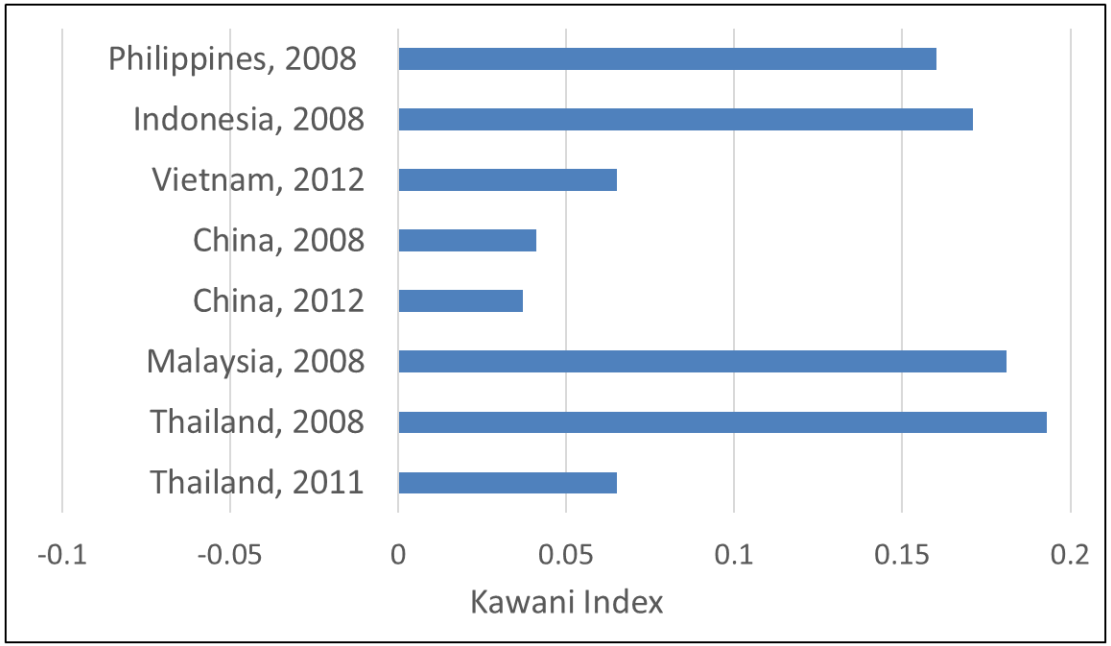
Current Health Expenditure (CHE) includes healthcare goods and services consumed during each year but does not include capital health expenditures such as buildings, machinery, IT and stocks of vaccines for emergency or outbreaks.

Out-of-pocket payments are spending on health directly out-of-pocket by households.

Domestic General government Heath Expenditure include domestic revenue as internal transfers and grants, transfers, subsidies to voluntary health insurance beneficiaries, non-profit institutions serving households (NPISH) or enterprise financing schemes as well as compulsory prepayment and social health insurance contributions. They do not include external resources spent by governments on health

Source: https://data.worldbank.org/topic/financial-sector?view=chart

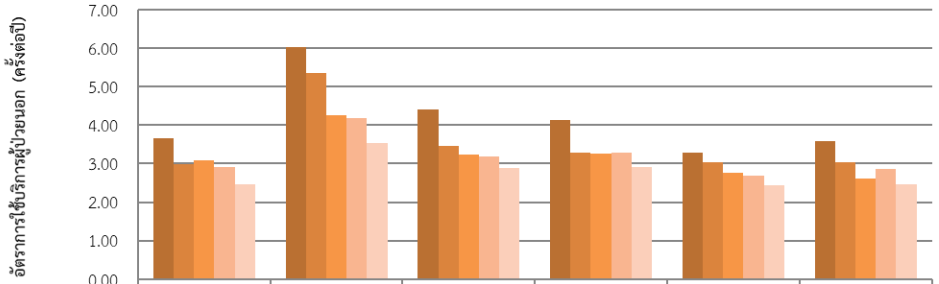
Equity in Health Care Financing: Financial Incidence analysis



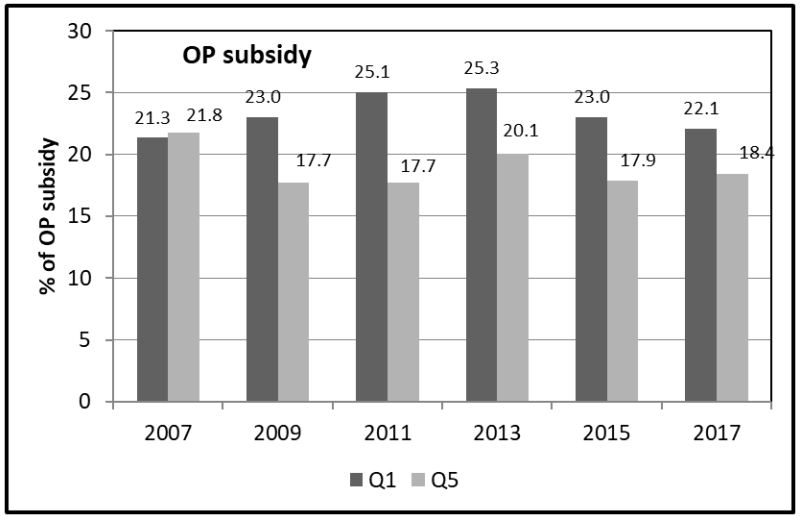
A positive Kakwani index indicates progressive distribution (the poor pay less than the rich compared to their ability to pay)

Source : Asante et al (2016) Equity in Health Care Financing in Low- and Middle-Income Countries: A Systematic Review of Evidence from Studies Using Benefit and Financing Incidence Analyses

Benefit incidence analysis for OP in Universal Coverage Scheme, Thailand

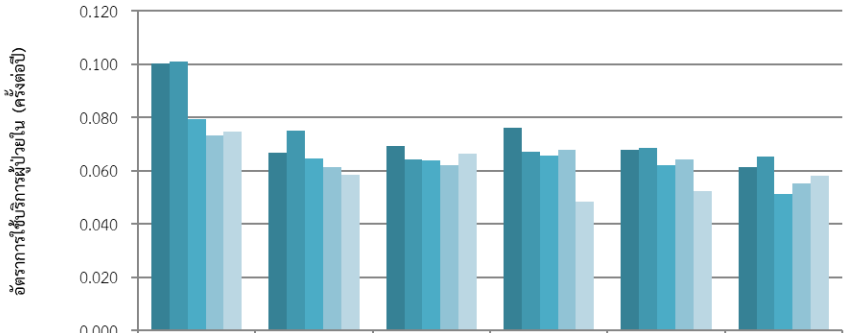


	2550	2552	2554	2556	2558	2560
จนที่สุด (Q1)	3.67	6.01	4.41	4.13	3.28	3.59
จน (Q2)	2.98	5.35	3.47	3.29	3.04	3.04
ปานกลาง (Q3)	3.09	4.27	3.24	3.26	2.77	2.61
รวย (Q4)	2.90	4.18	3.18	3.28	2.68	2.87
รวยที่สุด (Q5)	2.47	3.54	2.88	2.91	2.44	2.46

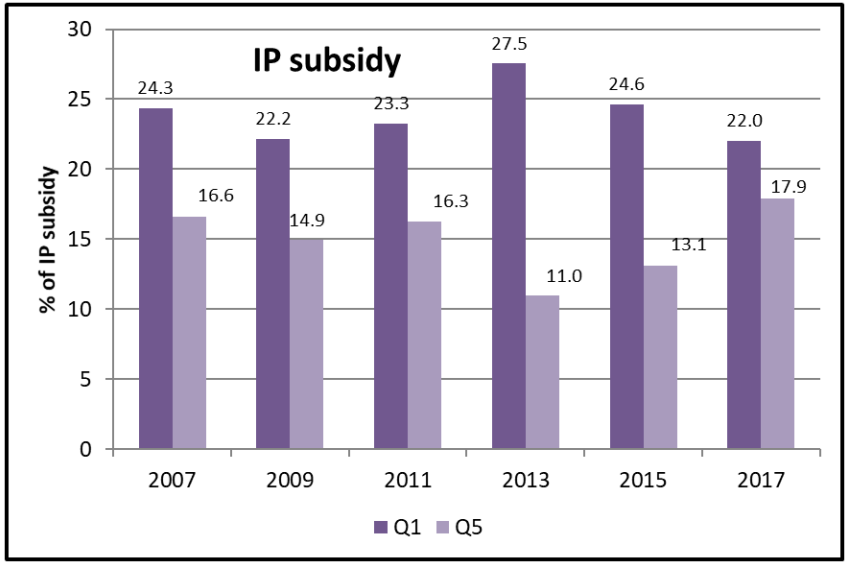


Source: โครงการประเมินความเป็นธรรมด้านการเข้าถึงบริการด้านสุขภาพและความเป็นธรรมด้านการคลังสุขภาพ (Benefit Incidence Analysis and Financial Incidence Analysis)

Benefit incidence analysis for IP in Universal Coverage Scheme, Thailand

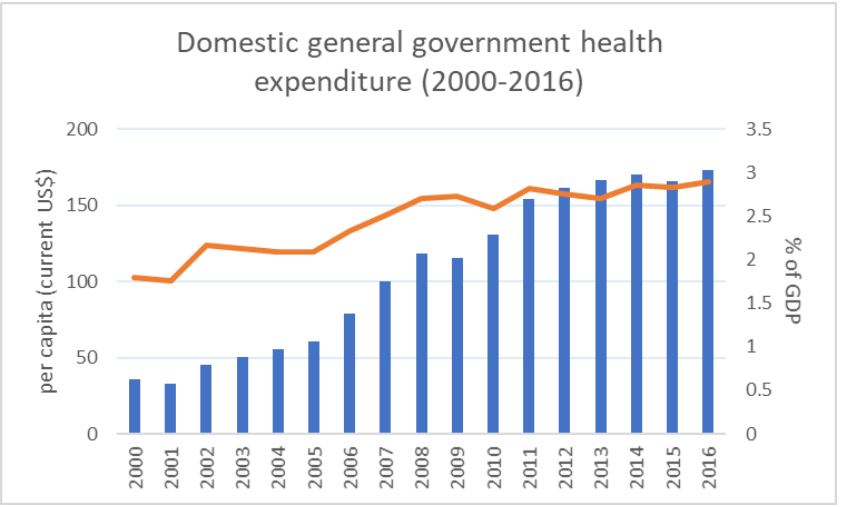


	2550	2552	2554	2556	2558	2560
จนที่สุด (Q1)	0.100	0.067	0.069	0.076	0.068	0.061
จน (Q2)	0.101	0.075	0.064	0.067	0.068	0.065
ปานกลาง (Q3)	0.079	0.065	0.064	0.066	0.062	0.051
รวย (Q4)	0.073	0.061	0.062	0.068	0.064	0.055
รวยที่สุด (Q5)	0.075	0.059	0.066	0.048	0.052	0.058



Source: โครงการประเมินความเป็นธรรมด้านการเข้าถึงบริการด้านสุขภาพและความเป็นธรรมด้านการคลังสุขภาพ (Benefit Incidence Analysis and Financial Incidence Analysis)

Remaining challenges



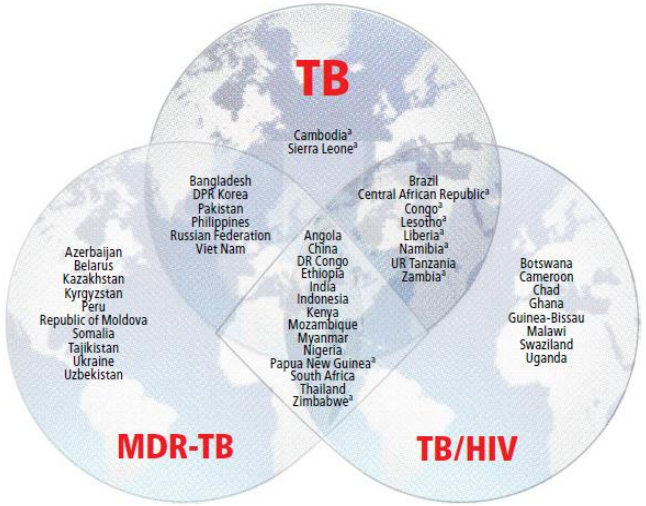
Source: World Development Indicator (accessed 15 Jan 2020)
https://data.worldbank.org/country/thailand

- Increasing government health expenditure leads to constant debate about co-payment strategy and who should be exempted.
- Equity across public insurance schemes particularly in terms of
  - per capita expenditure which rooted from different payment mechanisms.
  - Essential service e.g. dental service, some organ transplant
- Ageing population is approaching. Long-term care has not been well established. Strategy to support healthy ageing is not strong.

Remaining challenges (cont')

- Effective coverage of key services are below satisfactory level e.g. Tuberculosis, Diabetes, Hypertension.
  - Thailand is one of 14 countries having high burdens of TB, TB/HIV, and MDR-TB. Notified/estimated incidence was 80% in 2018. (WHO TB profile)
  - Effective coverage among UCS members in 2018 was 11.2% for DM (A1C<7) and 13.8% for Hypertension (controlled blood pressure in last 2 visits)
- Effective mechanisms to address determinants of health such as PM2.5, chemical pollution, marketing for unhealthy food.

Countries in the three high-burden country lists for TB, TB/HIV and MDR-TB being used by WHO during the period 2016–2020, and their areas of overlap



DPR Korea, Democratic People's Republic of Korea; DR Congo, Democratic Republic of the Congo; HIV, human immunodeficiency virus; MDR, multidrug-resistant; TB, tuberculosis; UR Tanzania, United Republic of Tanzania; WHO, World Health Organization.
[a] Indicates countries that are included in the list of 30 high TB burden countries on the basis of the severity of their TB burden (i.e. TB incidence per 100 000 population), as opposed to the top 20, which are included on the basis of their absolute number of incident cases per year.

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