SOCIAL INFRASTRUCTURE DEMAND FOR HEALTH SERVICES

Case Studies of Social Infrastructure Demand Estimates in Indonesia and Thailand:
JICA Research Institute (2018)

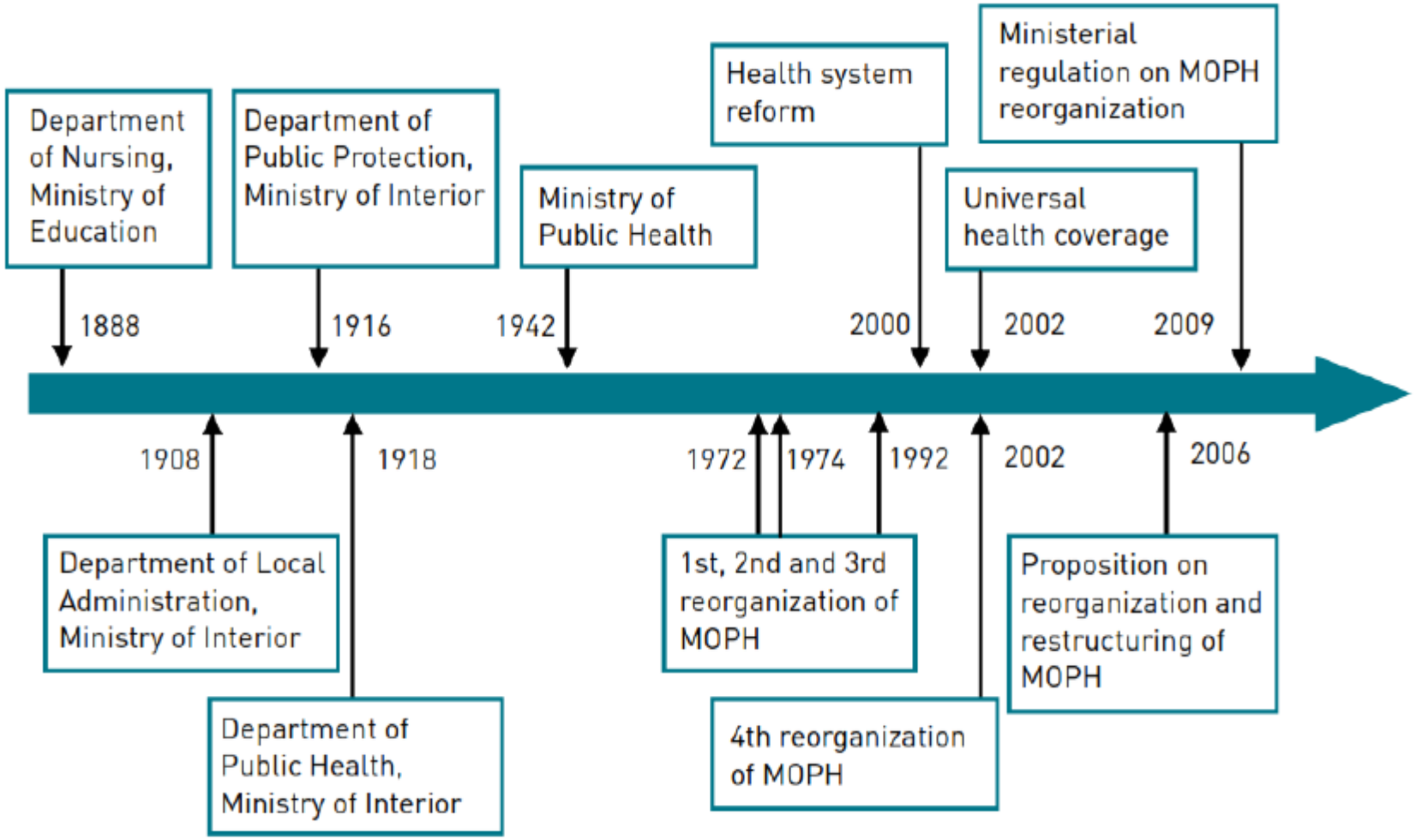
EE460: Thai Economy
Semester 1/2019
Faculty of Economics, Thammasat University

1. INTRODUCTION

- In Thailand, the main organization administrating the public healthcare service is the **Ministry of Public Health (MOPH)**. The history of public health services has been started in **1888**. At the time, the main service was from the **Department of Nursing, Ministry of Education**.
- In **1918**, the operation was under the **Ministry of Interior**, where the **Public Health Department** was established.
- In **1942**, the health services have been consolidated under the **Ministry of Public Health** according to the Reorganization of Ministries, Sub Ministries, and Departments Act, BE2485 (1942).

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.1 Chronology of development of public health in Thailand



Source: Tangcharoensathien et al. (2015) and Wibulpolprasert et al. (2011)

1. INTRODUCTION (cont'd)

- The public health service philosophy has been **substantially changed in 2002**. The civilian government has introduced a health system with the **Universal Coverage Scheme (UCS)**.The UCS has implemented **a nationwide *healthcare coverage* for the major population**. The service was managed by a **new organization, *National Health Security Office* (NHSO)**.
- The philosophy of management is to **separate supervision** of **supply and demand for health care**.
- The **healthcare demand by all clients** will be **consolidated** under the **supervision of NHSO**.
- The **healthcare supply** is provided by the hospitals under the **MOPH** and **private hospital**, which are additional providers.
- Under this scheme, the NHSO functions as **a clearinghouse** of **all health care purchasers**.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

1. INTRODUCTION (cont'd)

- Clearly, the UCS system has **empowered any Thais accessibility to fundamental healthcare service**. The government has shifted the supply side budgetary system allocated through the MOPH to the demand side with capitation system.

- Conceptually, the total cost of supply provision has been equated from the assumed **equilibrium between demand and supply of health service**, where 'average cost of provision average buying price of health service per capita'.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

1. INTRODUCTION (cont'd)

- The former is basically calculated from the *ex ante* average cost given size of hospital measured by a number of hospital beds. It is calculated by matching allocated budget to each hospital by the number of patients multiplied by a unit cost of medical care per person on the average.
- The **capitation of medical demand price** is **equated with the average cost per client**.
- **Payment is agreed** through the **budgetary process to the providers via the UCS**. Thus, it is a **budgeting process of the parliamentary system** where the whole feedback loop between demand and supply are determined by populations needs and cost of provisions.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

1. INTRODUCTION (cont'd)

- The **demand side** was calculated from the **given population cohort weighted by probability of illness** of in-out patients, less success rate in precautionary effort.
- Recently, the stochastic influence of non communicable disease, **NCD has distorted the demand price** and cost of supply unexpectedly.
- As a result, the ex-post demand price and average cost has created wide margin of gap.
- This is **currently a hot debate** in Thailand among practitioners, NPO and general public of the UCS.

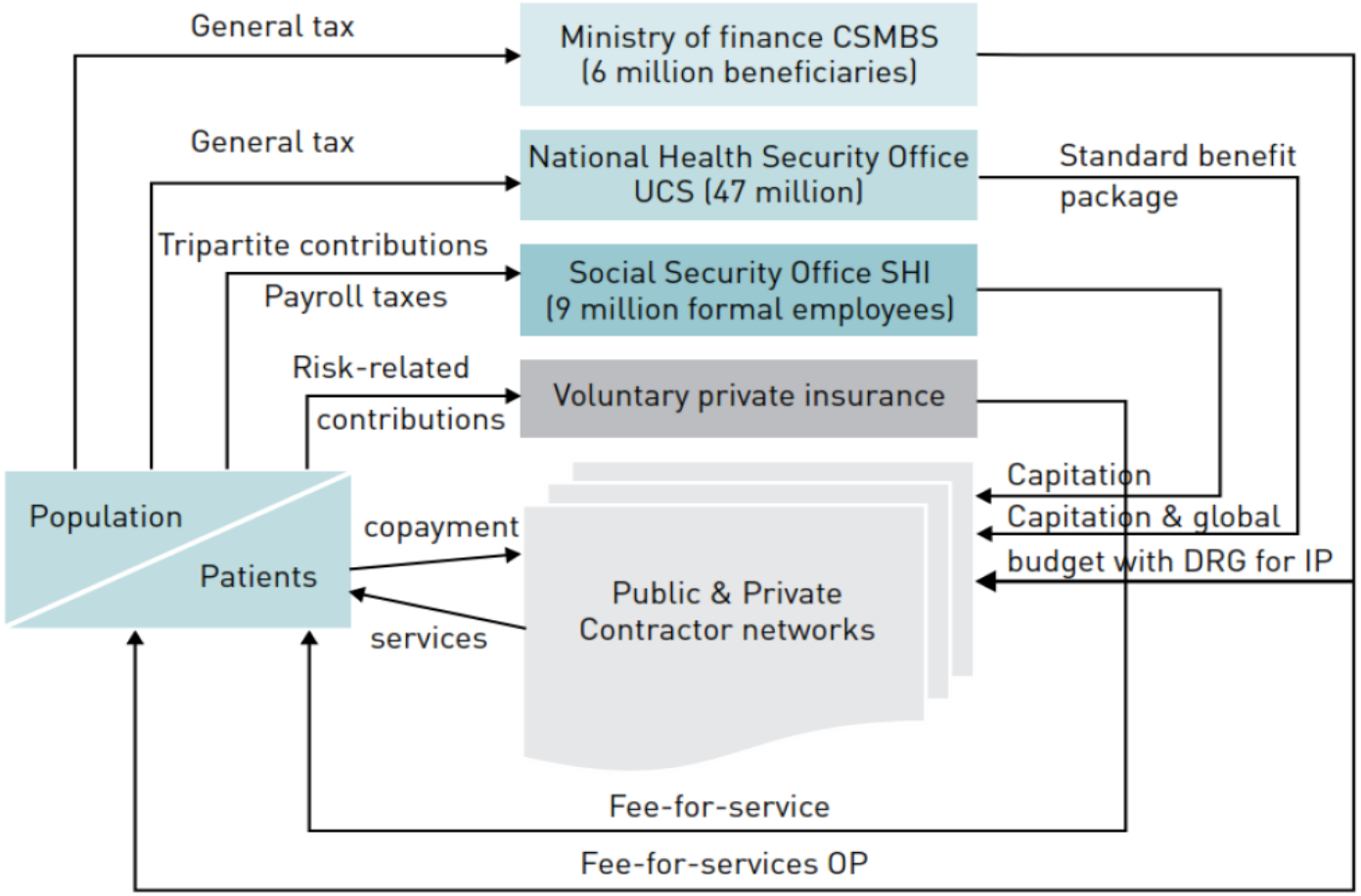
Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

1. INTRODUCTION (cont'd)

- Ideally, a **consolidated fraction** of financial account of the UCS fully funded by the government, **Social Security** funded through a joint contribution of employee and employer, the **Civil Servant Medical Benefit Scheme (CSMBS),** and other programs such as private health insurances is ultimate aim of the health system in Thailand.
- This is still far from actualization. A consolidated demand under the UCS has been claimed to **improve social welfare** of the Thais households on health accessibility.
- Problems still remain on the **supply side** and personnel's welfare i.e., medical doctors and others, as well as **capital investment** of hospitals owing to the rising marginal cost of supply provision, uneven congestion of demand and spatial inequality of service supply.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.2 The structure of healthcare coverage and its sources of funds in Thailand



CSMBS: Civil Servant Medical Benefit Scheme; DRG: diagnosis-related group; IP: inpatient; OP: outpatient; SHI: Social Health Insurance; UCS: Universal Coverage Scheme.

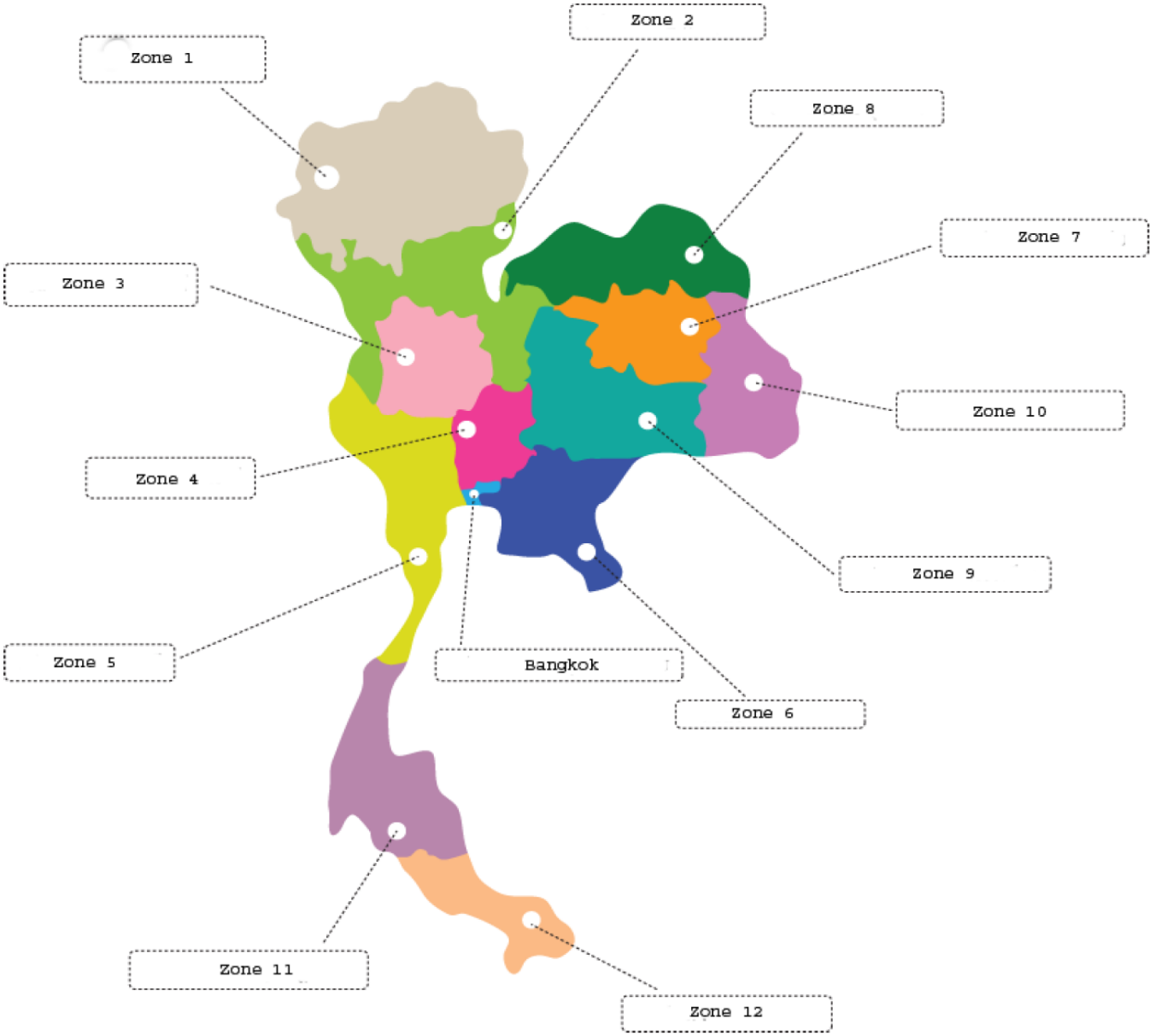
Source: Tangcharoensathien et al. (2015)

2. MAIN MECHANISM

- The main structure of healthcare service in Thailand. Particularly, the service has been classified into **4 broad categories** of **service levels**, which are provided by
  - the primary hospital
  - the secondary hospital
  - the tertiary hospital
  - the excellent center

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.5 Map of public-health service zones in Thailand



Source: Ministry of Public Health, Thailand

Figure 5.3 Main structure of estimation methodology

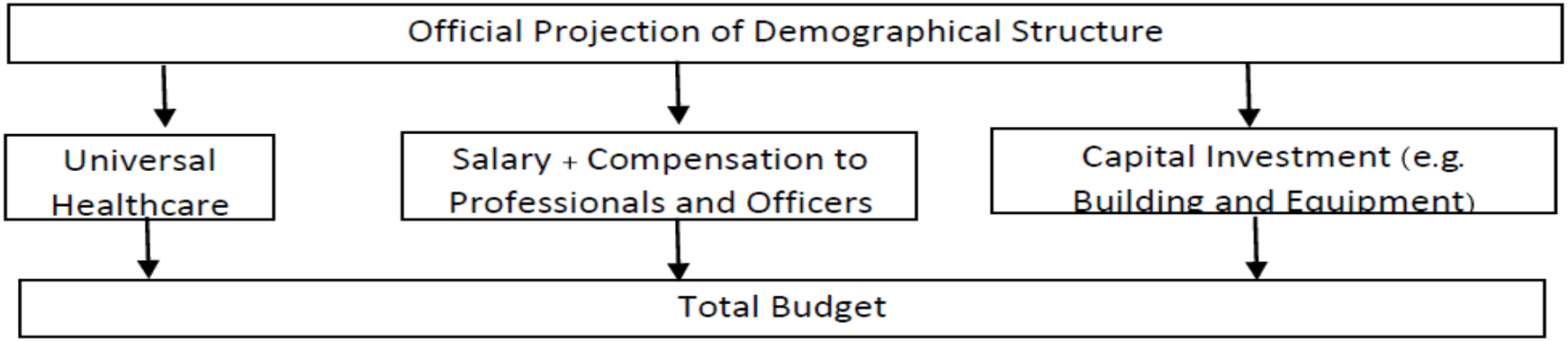
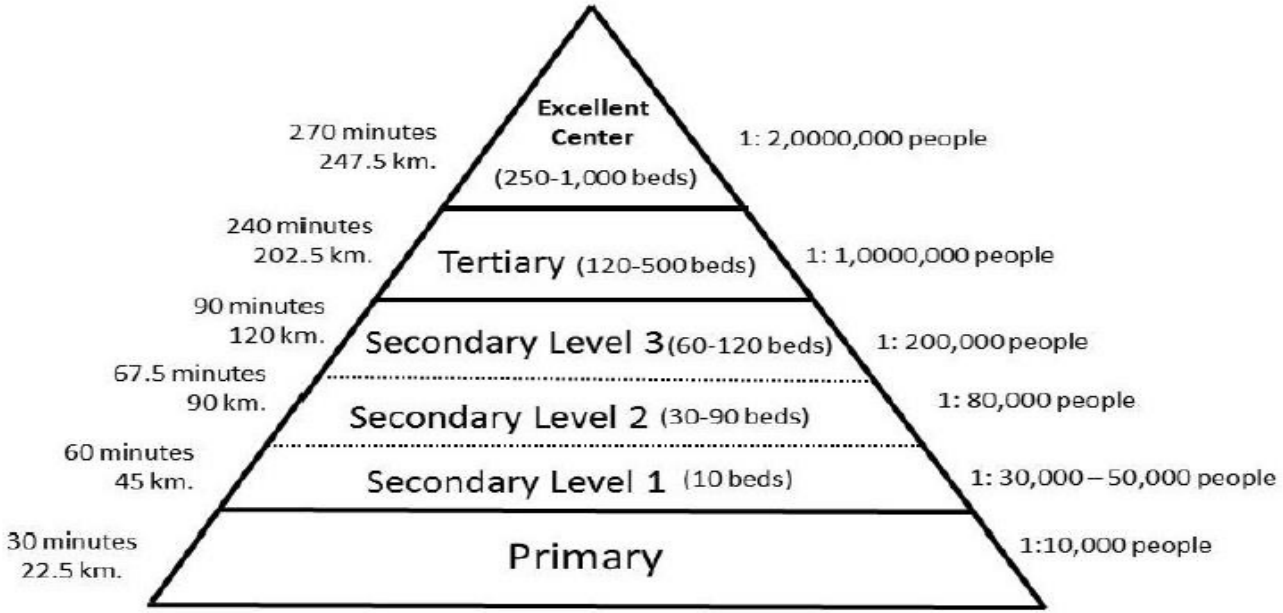


Figure 5.4: Hierarchical classification of public hospitals in Thailand



Source: Ministry of Public Health, Thailand

Table 5.1 Main requirement criteria for human resource and location at each level of public hospital

Requirement criteria of human resource demand (per population)	*Primary hospital*	*Secondary (level 1) hospital*	*Secondary (level 2) hospital*	*Secondary (level 3) hospital*	*Tertiary hospital*
Doctor	1 : 10,000		1 : 15,000	1 : 75,000	1 : 62,500
Dentist	1 : 12,500		1 : 75,000	1 : 50,000	1 : 500,000
Pharmacist	1 : 15,000		1 : 50,000	1 : 50,000	1 : 500,000
Nurse	2 : 5,000	1 : 1,500	1 : 4,000	1 : 7,500	1 : 7,500
Dentist Assistant	1 : 10,000		-	-	-
Pharmacist Assistant	1 : 10,000		-	-	-
Public Health Officer	3 : 5,000	1 : 12,500	1 : 25,000	1 : 50,000	1 : 75,000
X-ray Technologist	-	1 : 30,000	1 : 150,000	1 : 250,000	1 : 300,000
Medical Technologist	-	1 : 20,000	1 : 100,000	1 : 150,000	1 : 250,000
Physiotherapist	-	1 : 20,000	1 : 150,000	1 : 250,000	1 : 300,000
Criteria for location selection					
Population in service area	10,000	30,000 - 50,000	80,000	200,000	1,000,000
Traveling time of patient to the hospital (minutes)	30	60	90	120	240
Radius of service area (km.)	0-22.5	0-45	0-67.5	0-90	0-202.5

Source: Ministry of Public Health, Thailand

2. MAIN MECHANISM (cont'd)

- The service plan (2011-2016) of Thailand's Ministry of Public Health.
- This plan has been formulated to estimate the nationwide demands for both facilities and human resources.
- In addition, the plan has been used as the main guideline for administrating public health services which have the hierarchy of services and facilities. Thailand's Ministry of Public Health has classified hospitals into 6 categories. The classification s criteria are the following factors:

1. **Size of a population** in that area for example, the primary hospital has the ratio of one hospital per population of 10,000.
2. **Distance (kilometers) from the center** of a particular district to the hospital.
3. **Traveling time (minutes) from the center** of a particular district to the hospital.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

2. MAIN MECHANISM (cont'd)

- Among 6 categories, the **primary hospital** is the **smallest** one, having **1-2 doctors** and capable of offering **basic healthcare services**.
- The higher levels are **secondary hospitals**, which have **three subcategories**. When facing **complicated symptoms or diseases,** the primary hospital **transfers the patient** to these hospitals because they have the **higher capability** due to their **extended facilities and human resources**.
- However, if the treatment requires more specializations of doctor and medical equipment, the patient can be **transferred to the tertiary hospitals**, which have **medical specialists** in **all fields** and the higher level of medical facilities .

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

2. MAIN MECHANISM (cont'd)

- The criteria of location selection are consistent with a higher level of the public hospital which has a **large coverage area** of service, and also the **broader and deeper capability of services**.
- These specific details of capability and facility of each level of the hospital are described as follows:
- The **primary** and **secondary (level 1)** hospitals have the similar capability, except the case of offering **X-ray service** and the possession of **operating room** which are available in the secondary (level 1) one.
- The **secondary (level 2)** hospital has the **larger size**, providing services to the larger number of both OPD (Out-Patient Department) and IPD (In-Patient Department patients).

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

2. MAIN MECHANISM (cont'd)

- **The secondary (level 3)** hospital has the augmented functions of providing treatments from **medical specialties in some fields**.
- The allocation of medical specialties is based on the area specific demand.
- The **tertiary hospital** is the general hospital that can offer the broad ranges of services from **medical specialties in 6 fields**.
- Details of all available areas of services from 6 medical specialties, and also indicates the ratio of one specialty per population is shown.
- Here, the tertiary hospital has the extended facilities which are not available in the secondary hospitals. These are main physical facilities serve the high level of medical treatments conducted by medical specialties.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Capability	*Primary hospital*	*Secondary (level 1) hospital*	*Secondary (level 2) hospital*	*Secondary (level3) hospital*	*Tertiary hospital*
Service capability of Out Patient Department (OPD)	0 - 100 patients / day	0 - 100 patients / day	100 - 250 patients / day	200 - 400 patients / day	300 – 500 patients / day
Service capability of In-Patient Department (IPD)	0 -10 patients / day	0 -10 patients / day	10 -50 patients / day	30 -80 patients / day	60 -100 patients / day
Number of doctors	1-2	1-2	2-5	3 -10 (including Medical Specialties in some fields)	8-20 (including Medical Specialties in 6 fields)
Facilities	- Basic Operating Room - Delivery Room - Observation Ward - Dental Clinic	- IPD Ward - Operating Room - Delivery Room - X-ray Room - Dental Clinic	- IPD Ward - Operating Room - Delivery Room - X-ray Room - Dental Clinic	- IPD Ward - Operating Room - Delivery Room - X-ray Room - Dental Clinic	- IPD Ward - Operating Room - Delivery Room - Intensive Care Unit (ICU) - Neo-natal Intensive Care Unit (NICU) - Orthopedic Operating Room - Clinical Laboratory - Radiation Room - Dental Clinic

Table.5.3 List Medical Specialties and requirement criteria of Medical Specialties demand (for the Tertiary hospital)

Medical Specialties	*Ratio per population*
Physician	1 : 65,000
Surgeon	1 : 90,000
Obstetrician	1 : 80,000
Pediatrician	1 : 75,000
Orthopedist	1 : 95,000
Anesthesiologist	1 : 150,000

Source: Ministry of Public Health, Thailand

- The **excellent center** is the **highest level** of a hospital in the hierarchical structure. In addition to 6 areas of medical specialties, it has **specialties specialized in the subfields** i.e. the **sub specialists** , and it the total numbers of **205-352 doctors**.
- Most of the **excellent centers** also function as the **medical school** at a graduate level, offering the **official course of training for specialties**.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

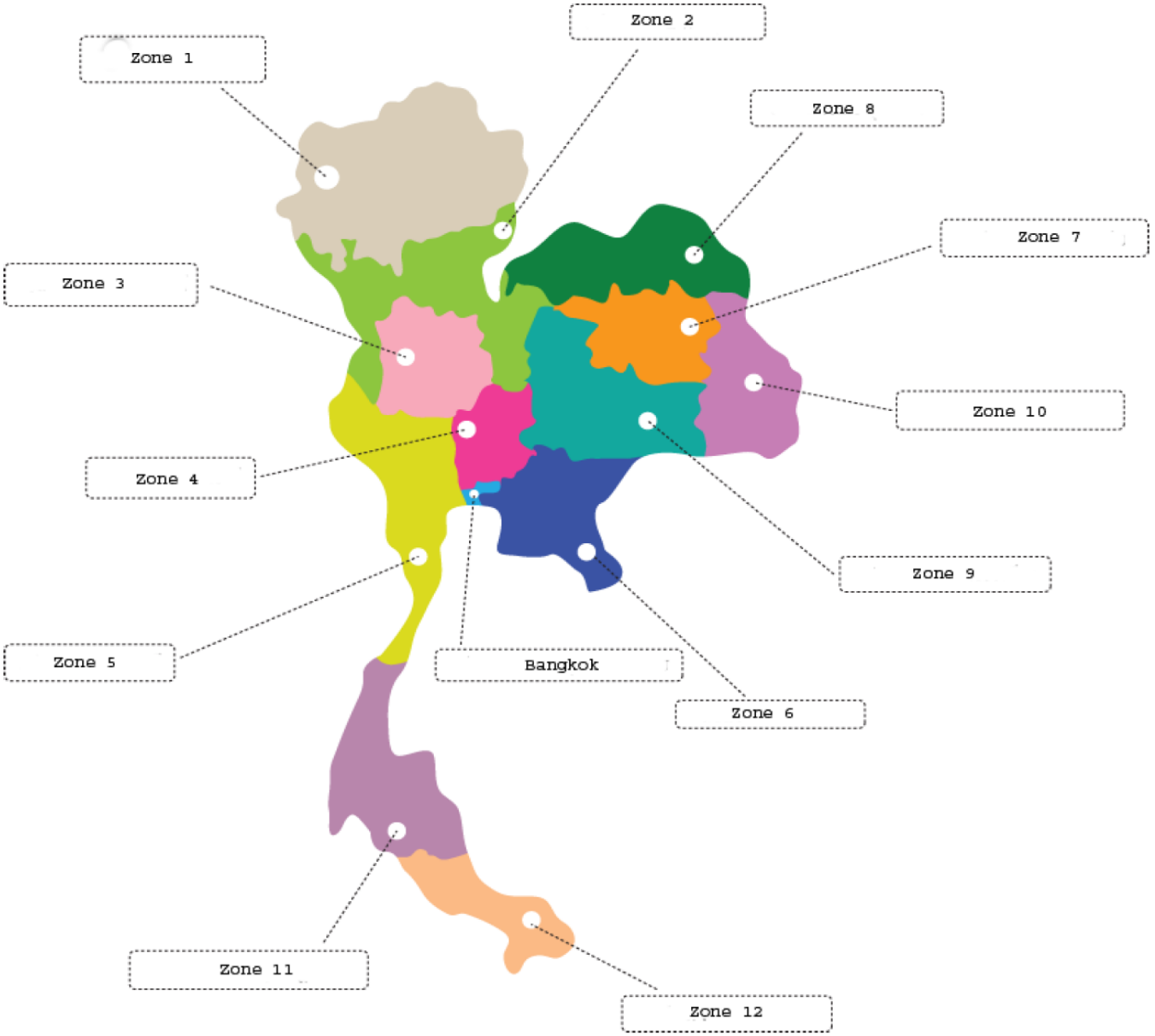
2. MAIN MECHANISM (cont'd)

- With criteria and specification indicated above, Thailand s Ministry of Public Health **has utilized GIS** (Geographic Information System) techniques to **locate hospitals and allocate human resources**. Specifically, the coverage of providing services has been categorized into **13 zones**, as illustrated in Fig 5.5.

- **Each zone** has its **hierarchical system of hospitals**, and there are approximately **3 excellent centers** functioning as the highest level of services, and there is a **network of primary, secondary and tertiary hospitals** connected to them.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.5 Map of public-health service zones in Thailand



Source: Ministry of Public Health, Thailand

2. MAIN MECHANISM (cont'd)

- With these allocations of 13 zones and the hierarchy network of hospitals within each zone, the table below indicates the nationwide **total number of hospitals** in each level.
- It is noted that the number of hospitals is **mostly proportionate to the hierarchical system**.
- The exception is the case of secondary hospitals because in many areas the level 2 secondary hospital is well suited for their numbers of the population.
- The number of key human resources in health science in Thailand in 2016 is forecasted with a projected number of Thai population and key ratios of demands for healthcare shown in previous tables also indicates the projected demand for key human resources in 2026.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Table 5.4 Number of the public hospital at each level

Level of hospital	*Number of beds*	*Number of hospitals (in the whole country)*
Excellent center	250 - 1,000	33
Tertiary hospital	120 - 500	118
Secondary (level 3) hospital	60 - 120	71
Secondary (level2) hospital	30 - 90	518
Secondary (level 1) hospital	0-10	35
Primary	0-10	9,976

Source: Ministry of Public Health, Thailand

Table 5.5 Number of public staff at each level

Occupation	*Number of public health personnel in 2016*	*Projected demand for public health personnel in 2026*
Doctor	50,573	62,800
Nurse	149,072	186,700
Dentist	11,575	17,400
Pharmacist	26,187	39,900
Medical Technologist	15,200	23,900
Physiotherapist	4,371	11,100

Source: Ministry of Public Health, Thailand and author's estimate

Table 5.6: Number of graduates in health care fields in Thailand (data as of 2016)

Occupation	*Number of educational institutes*	*Number of graduates (per annual)*
Doctor	21	3,121
Nurse	85	12,000
Dentist	13	826
Pharmacist	18	20,00
Medical Technologist	12	911
Physiotherapist	16	800

Source: Ministry of Public Health, Thailand

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES

- The **annual budget** for national healthcare has been separated into **3 categories**
  - (1) The annual budget for Universal Healthcare service
    - a. In Patient (IP)
    - b. Out Patient (OP)
    - c. Preventive Promotion (PP)
  - (2) The annual budget for personnel compensation(e.g. salary and benefit)
  - (3) The annual budget for capital investment
- The **budget** for **Universal Healthcare** is the **largest portion** and it has played a major role in the national scheme of public health.
- Specifically, there are three subcategories of budget allocation under the Universal Healthcare.
- Each has been estimated based on the **per capita requirement**.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES (cont'd)

- As shown in Fig 5.6 and 5.7, the per-capita budget allocation has been increasing since 2003.
- However, its ratio as a percentage of total fiscal expenditure has been stable during 2003-2016, as exhibited in Fig 5.8
- Originally, the budget was allocated to financially support the services of **In Patients (IP)** and **Out Patients(OP)**.
- Later, the **Preventive Promotion (PP)** has been also included in the budget because it can lower the incidences of many diseases, which will subsequently lower the demand for healthcare and the future budget burden.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES (cont'd)

- The methodology of forecasting the Universal Healthcare Budget was based on the average of cost per capita.
- As earlier stated, the combination of averages of **In Patient (IP)**, **Out Patient (OP)** and **Preventive Promotion (PP**) led to the average total costs.
- The projection of future budget of Universal Healthcare was then computed by using this average with the official projection of population.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.6: The historical trends of budget allocated to Universal Healthcare and to Salary and Compensation

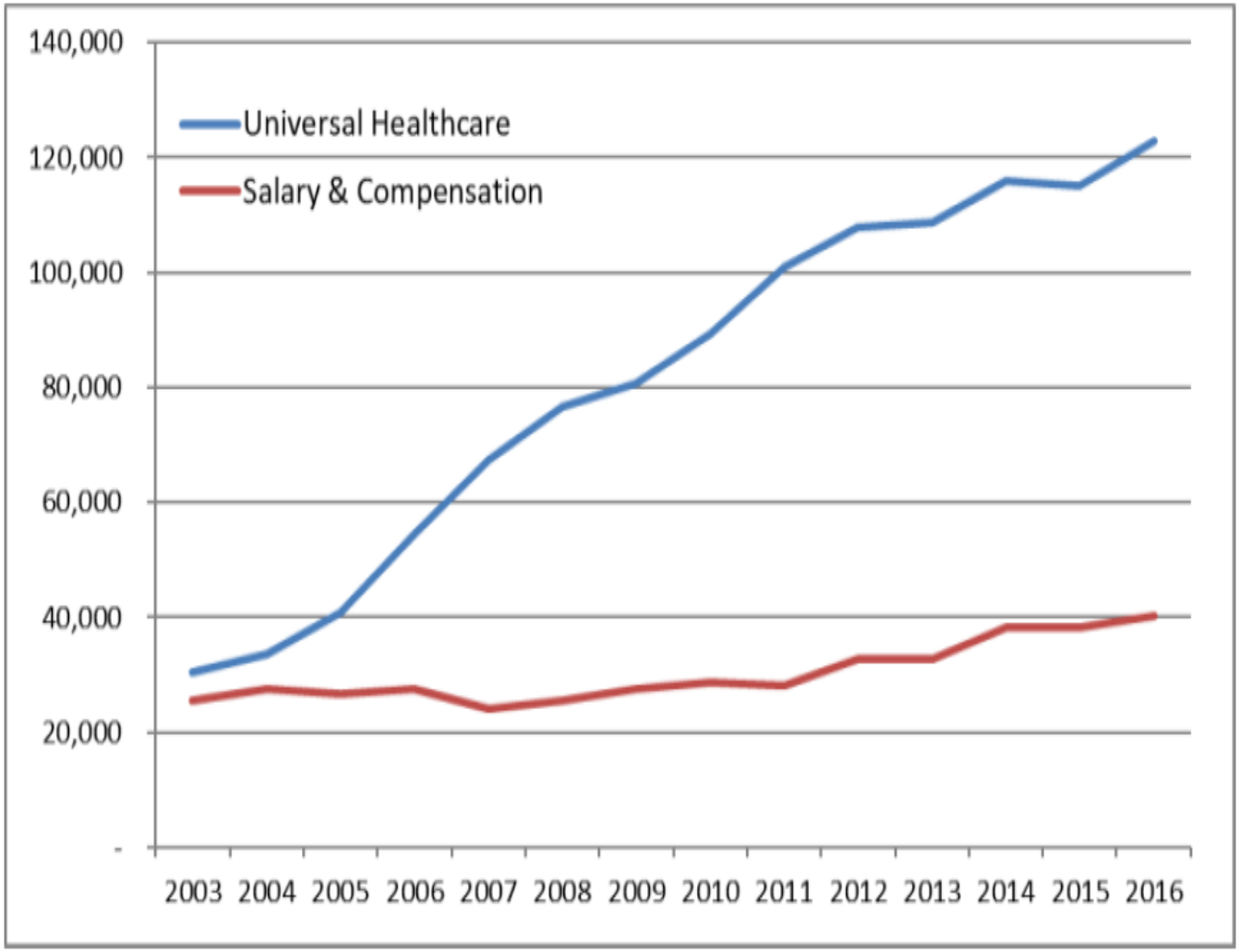
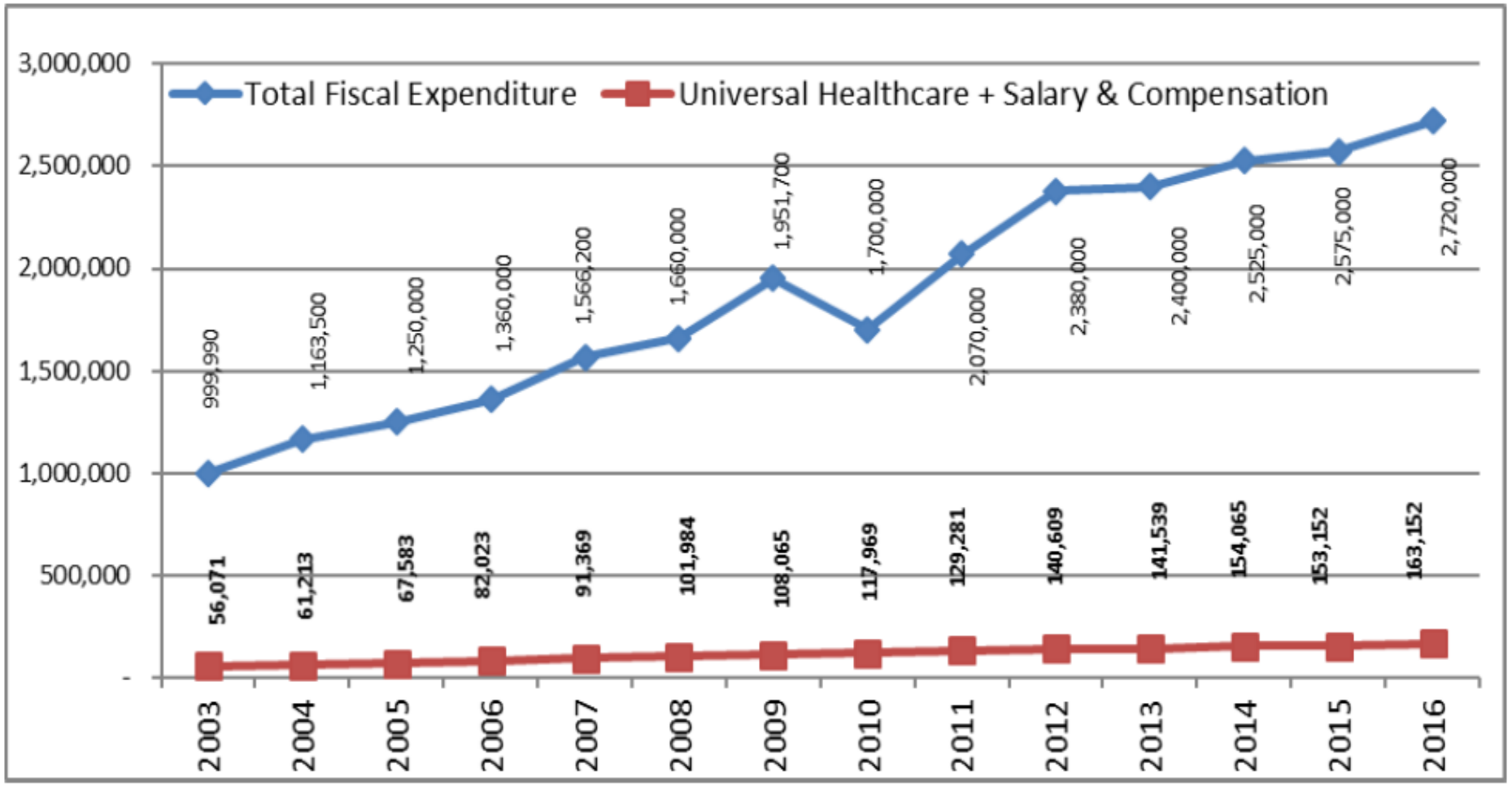


Figure 5.7: Comparison between the total fiscal expenditure and the budget allocated to Universal Healthcare and Personnel Compensation



Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES (cont'd)

- With the details of this information classified in the age range and the region of healthcare service, the outcome of projection indicated the interesting trends and combinations of future Universal Healthcare budget.
- It identifies the **national budget** to support the future **Universal Healthcare Service until 2030**.
- The future demographic structure of aging society will incur the rising budget on the healthcare of the **aging population**.

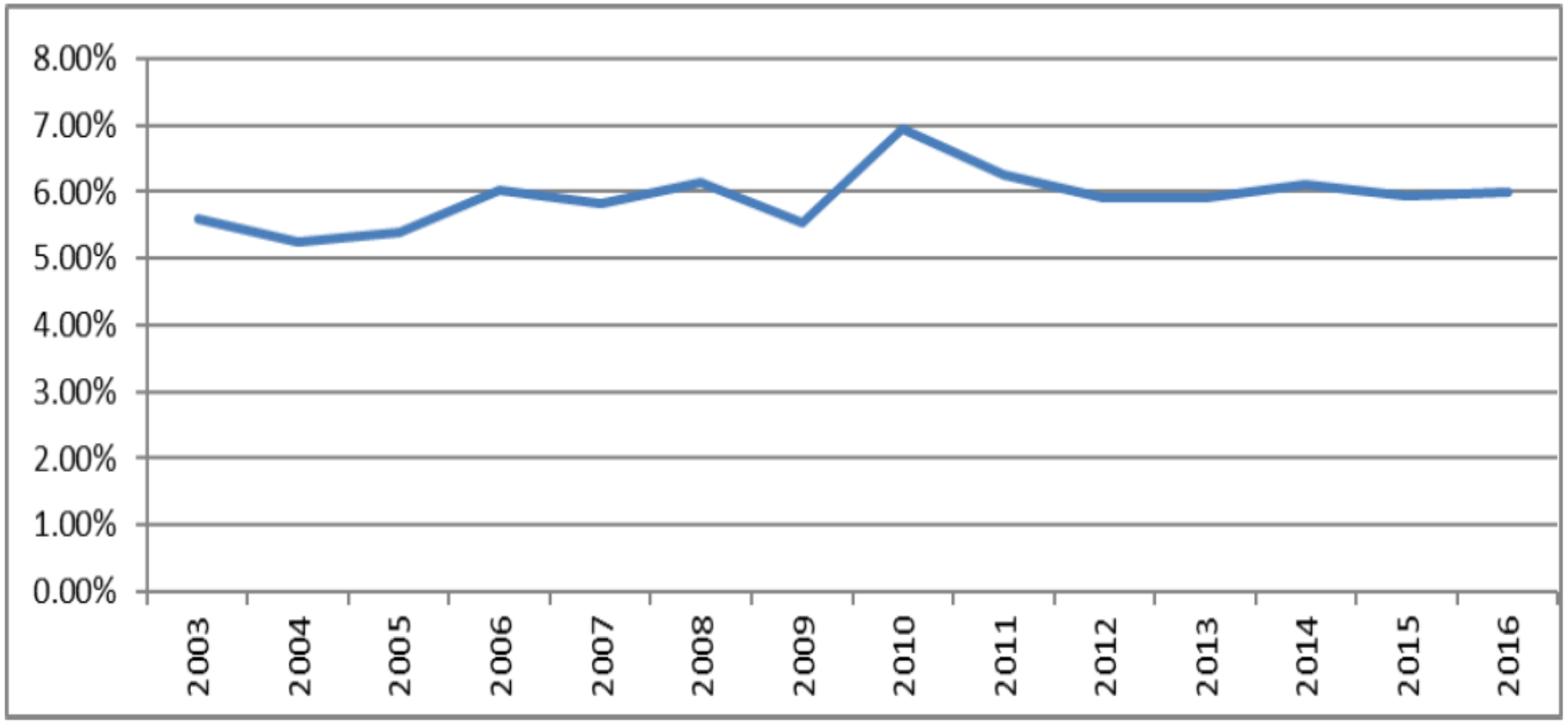
Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES (cont'd)

- The important trends of **future healthcare budget** with expenditure for the **aging population** are likely to **increase substantially.**
- In addition, this expenditure will become the largest portion (e.g. region 1,2,3,7 and 9). This projection signifies the urgent requirement for the future allocations of all related resources to support the region specific characteristics.

Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.8: Percentage of Universal Healthcare + Salary & Compensation per Total Fiscal Expenditure



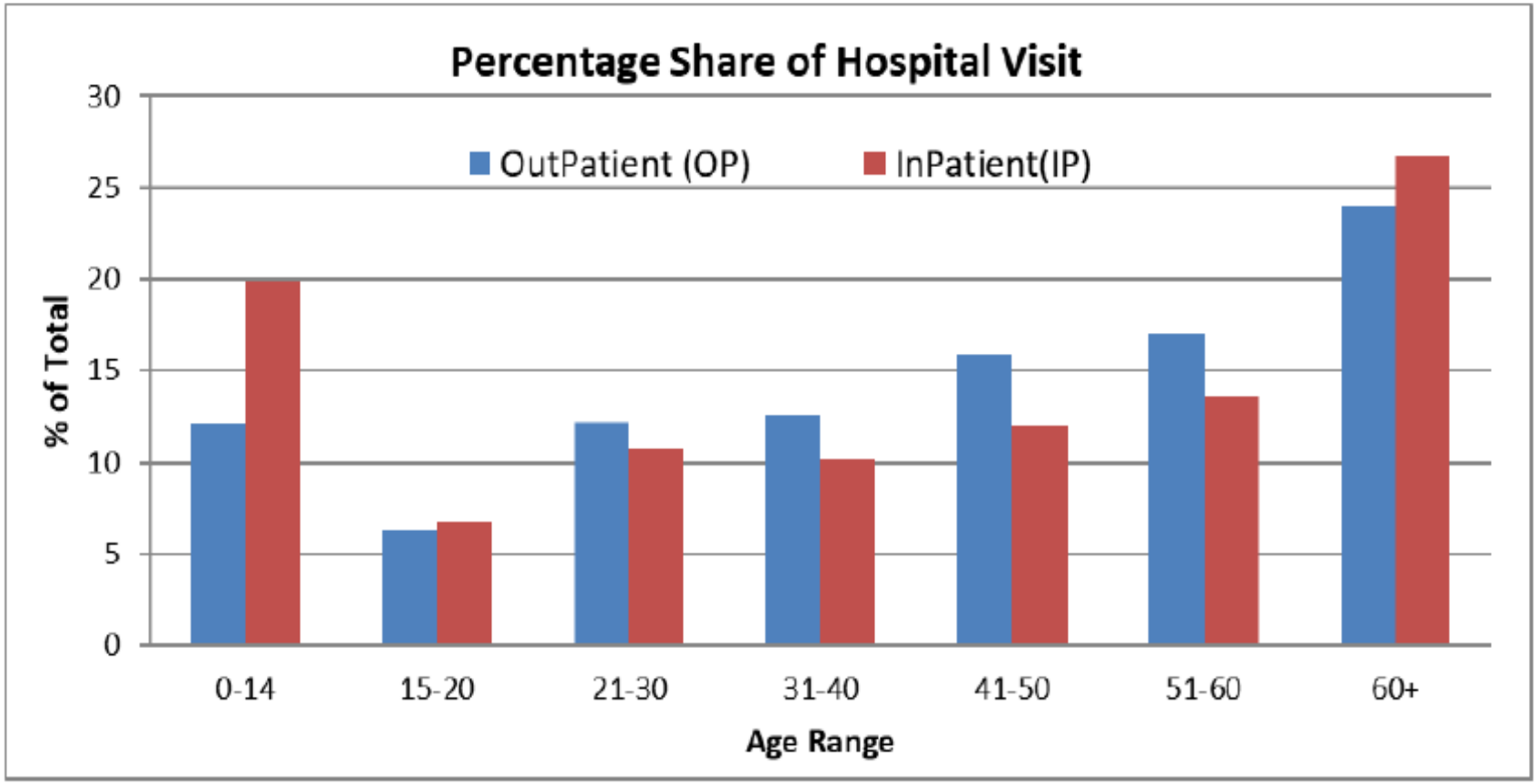
Source: National Health Security Office (NHSO)

3.NATIONAL BUDGET FOR UNIVERSAL HEALTHCARE SERVICES (cont'd)

- Fig 5.9 shows that the hospital visit by age range from 15-60 year old has a positive relationship.
- The dependency age range of 0-14 and 60+ year old has to be mentioned here.
- The in patient of the age 0-14 was 20 percent of all visits as compared with out patient of around 10 percent.
- The age burden of 60+ populations has a high percentage of visits both type as expected of around 25 percent.

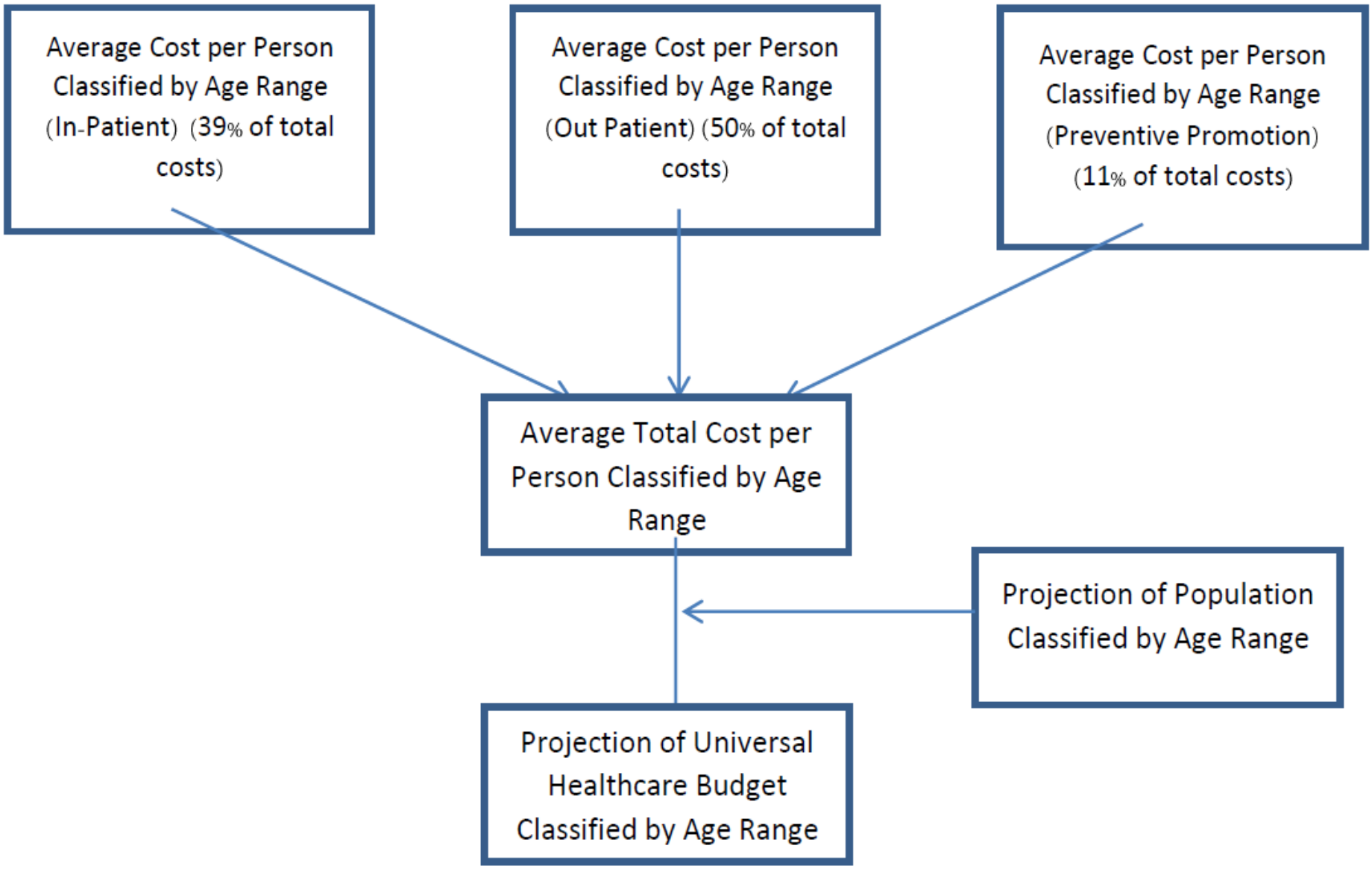
Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Figure 5.9: Proportion of Hospital Visit Classified by Type of Patient and Age Range



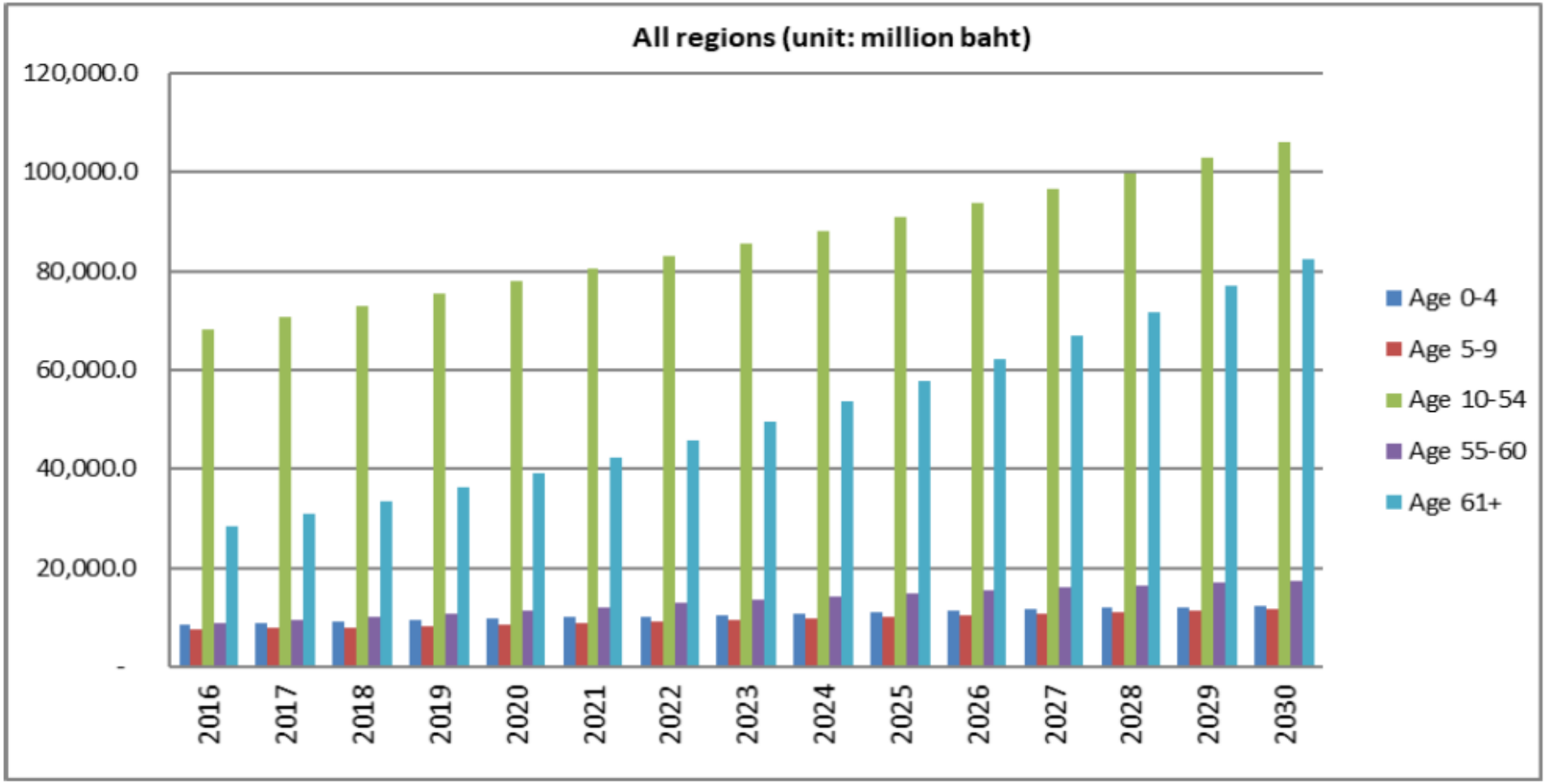
Source: National Health Security Office (NHSO)

Figure 5.10: Method of Projecting Universal Healthcare Budget



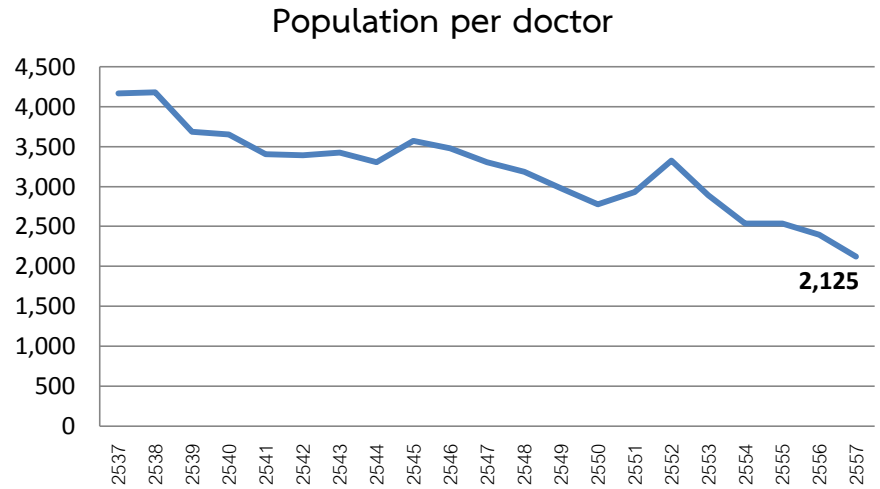
Source: National Health Security Office (NHSO)

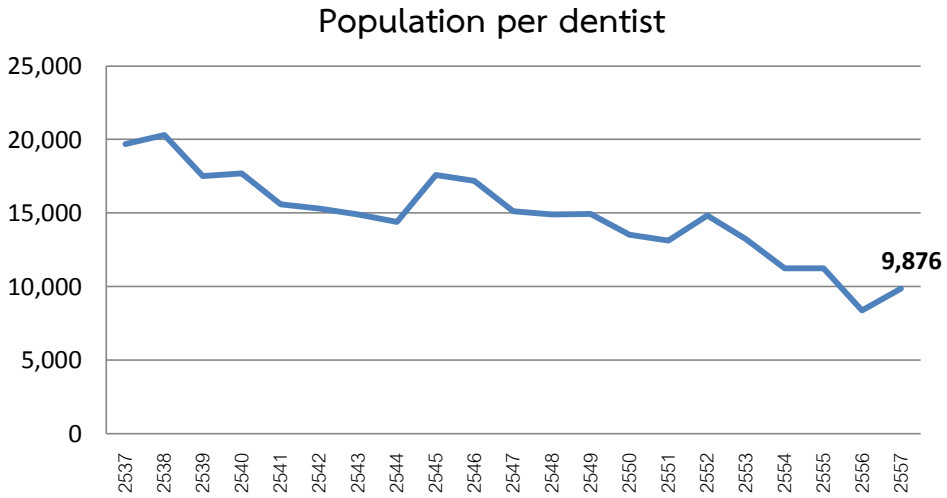
Figure 5.11: Projection of Nationwide Expenditure on Universal Healthcare Budget Classified by Region and Age

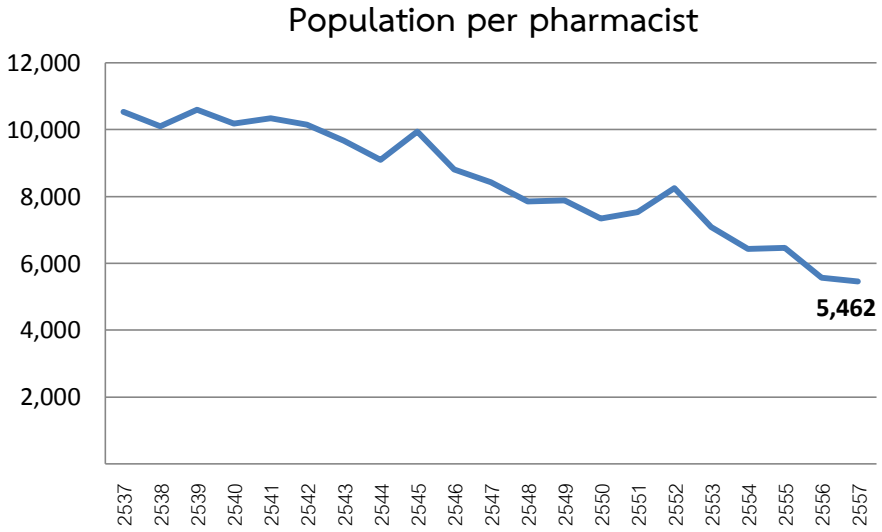


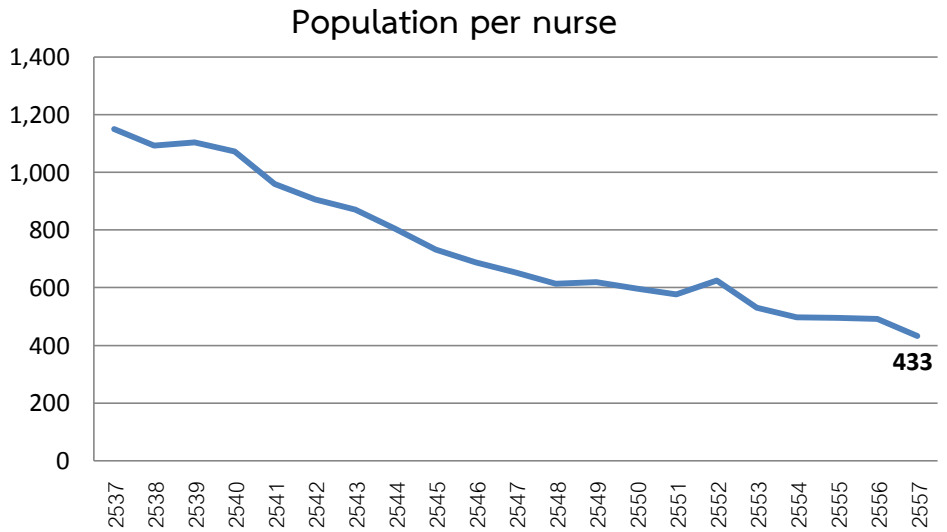
Source: https://www.jica.go.jp/jica-ri/publication/booksandreports/20180831_02.html

Ratios of Healthcare-related Human Resources in Thailand



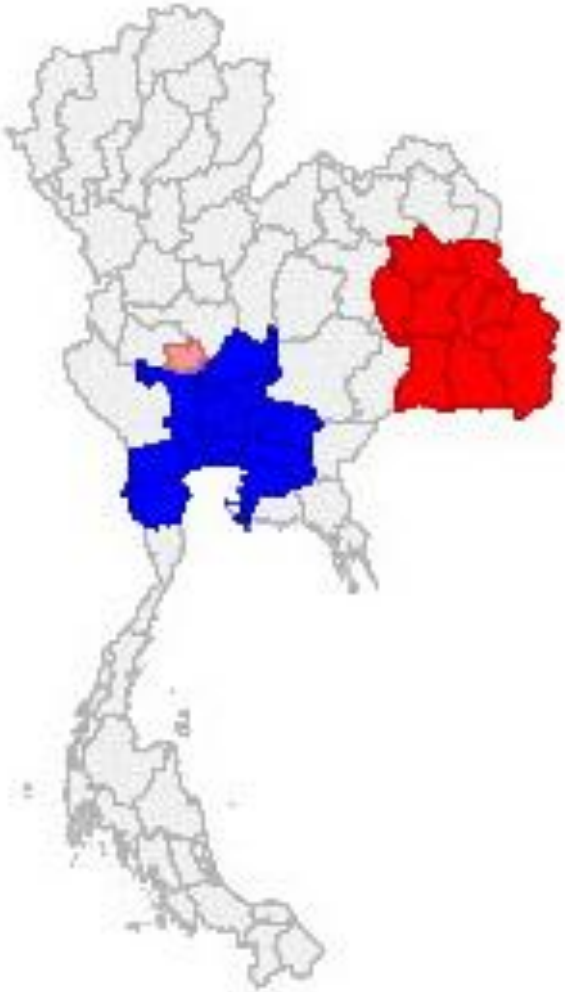


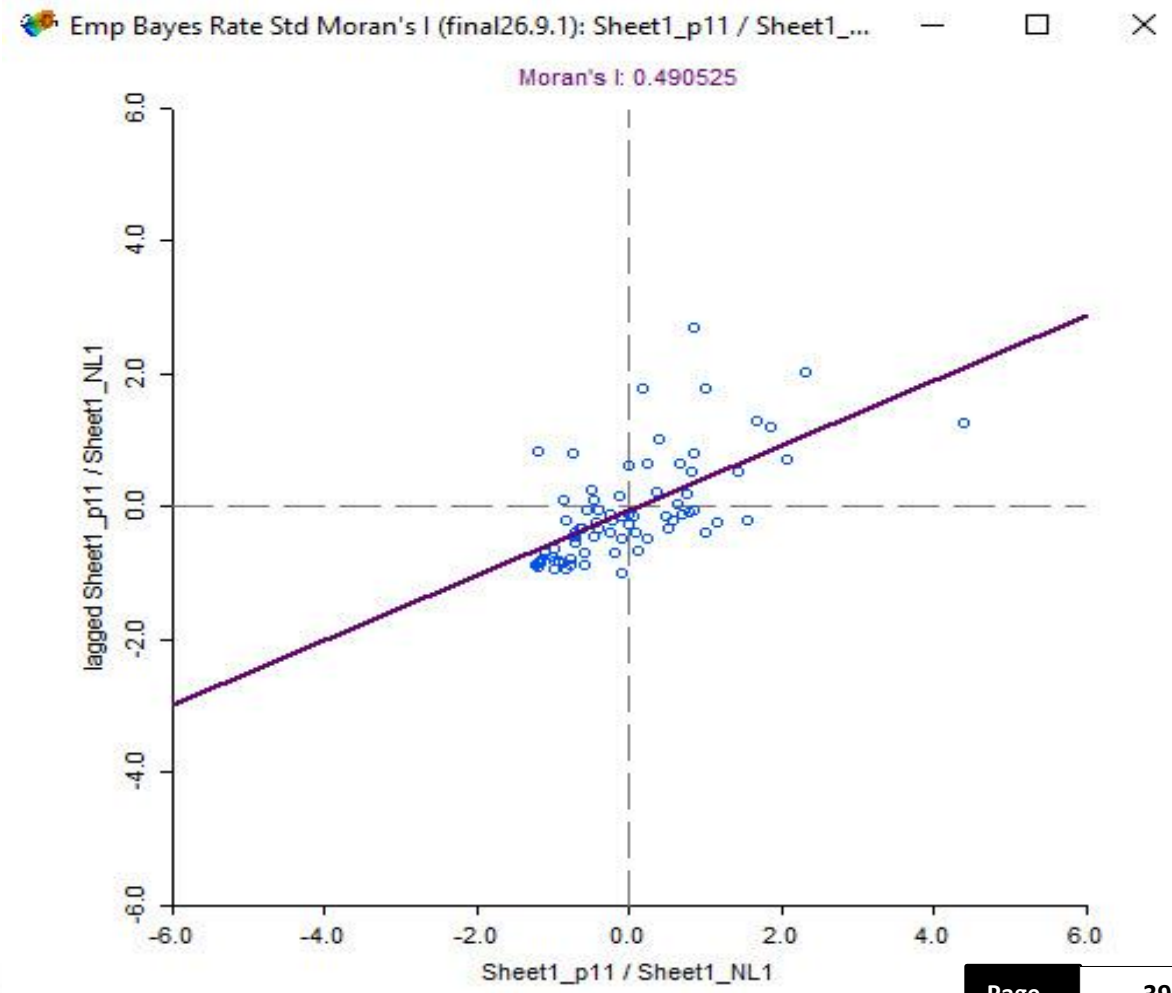




Source: Ministry of Public Health

Provincial Ratio of Population per Doctor (Spatial Distribution)





Provincial Ratio of Population per Nurse (Spatial Distribution)