

Research in Social and Administrative Pharmacy

Commentary

Title: Future expectations for Japanese pharmacists as compared to the rest of the world

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Abstract

Background: It is important to share information about other countries' pharmacists in order to medically cooperate with other countries effectively. However, there has not been much harmonization in relation to the medical practices of various countries.

Objectives: This study investigates the dispensing systems and the work done by pharmacists in the United Kingdom, Germany, France, Thailand, and Malaysia. We aimed to compare these countries' medical practices in order to develop a cohesive vision for the future of Japanese pharmacists.

Methods: An academic study was conducted using the relevant literature in the field. Hospitals and pharmacies in Thailand and Malaysia were also visited and interviews were conducted therein.

Results: All five of the countries studied had dispensing assistants. Pharmacists in Japan have duties of inventory control, drug dispensing, and providing medication advice. In contrast, these assistants working in other countries are responsible for some aspects of dispensing and inventory control, allowing the pharmacists to spend their time and competency in instructing patients on how to take their medication. Because of this, pharmacists were actively involved with health promotion intervention in the United Kingdom, Germany, and France.

Conclusions: We wish that the work done by Japanese pharmacists would transition from primarily dispensing drugs to patient care, advice, and counseling in order to enrich overall health promotion and health/nutrition counseling.

Keywords Role of the pharmacist, Dispensing system, Pharmacy assistant, Team medical care, Health promotion,

1. Introduction

Pharmacists are experts in dispensing medicine and providing relevant medical advice. Recently, the pharmaceutical field has transformed itself from a product- and task-oriented (dispensing) profession to a patient-oriented profession (provision of care, advice, and counseling).¹ In Japan, hospital pharmacists presently participate in team-based healthcare services by providing pharmaceutical services in wards and at patients' bedsides in an attempt to better understand patients' disease states and appropriate medical treatment.

On the other hand, community pharmacists dispense prescriptions for outpatients, recommend non-prescription drugs, and perform various other related activities. As a result, community pharmacists must perform medication history management and check for drug interactions to ensure the proper use of medicine and safety.² In addition, in response to the increasingly aging society, the Long-Term Care Insurance Act was enacted in 2000, giving pharmacists the ability to join as medical staff members. Recently, several developed countries have reported similar new roles for community pharmacists in the multidisciplinary provision of health promotion.

For example, in the United States, Collaborative Drug Therapy Management (CDTM)³ is popular for anticoagulation therapy, diabetes, and hyperlipidemia. Pharmacists monitor diseases, change prescriptions, and deliver drugs in pharmacies according to their contracts with doctors. Furthermore, community pharmacies have the advantage of extended business hours and convenient locations. Therefore, community pharmacists routinely provide immunizations in order to improve influenza coverage.⁴ In the United Kingdom (UK), the Patient Group Direction (PGD).⁵ is changing the way pharmacists sort and deliver specific prescriptions, to better regionalize patient care. This change, in

particular, affects emergency contraception, tobacco cessation programs, etc.

Additionally, pharmacists can get qualified as Independent Prescribers (IPs).⁶ to perform diagnoses and prescribe medications for chronic diseases through specialized training.

Furthermore, the UK government is currently supporting the transferal of the management of minor ailments from general practitioners (GPs) to pharmacies, termed community pharmacy minor ailments schemes⁷⁻⁹; this has recently been introduced in Nottingham City¹⁰). In Germany, 24-hour prescription provision is possible, and pharmacists work on rotating schedules in each district. Pharmacists are active in many different prevention programs, and there is great interest in pharmacy-based preventive care counseling.¹¹ These types of programs include blood pressure measurement, blood glucose measurement, cholesterol measurement, prevention of vein thrombosis, osteoporosis prevention, general nutrition counseling, and vaccination counseling.

Medical care and the role of the pharmacist are expected to change more rapidly in the coming years. It is important to share information about pharmacist tasks in other countries to foster a stronger sense of medical cooperation. However, to date, there has not been much harmonization in pharmacists' practices across various countries. This study investigates the dispensing systems and the work done by pharmacists in the UK, Germany, France, Thailand, and Malaysia. Furthermore, this review will compare the pharmaceutical occupation in Japan with that of these five countries.

The historical background section summarizes population distribution, causes of death, total pharmacist/pharmacy/pharmacy assistant numbers, pharmacy education, and medical insurance. The dispensing system section summarizes the medicine supply; the presence or absence of refills, repeat prescriptions, and dispensing doctors; and the regulatory classification of the medicine. This review clarifies the differences in the

dispensing systems and the work done by pharmacists between Japan and five other countries. Moreover, the present review suggests several future directions for pharmacists in Japan.

2. Methods

We targeted the three developed countries—UK, Germany, and France—and two developing countries—Thailand and Malaysia. Our academic study was conducted using the relevant literature. Hospitals and pharmacies in Thailand and Malaysia were also visited, and interviews were conducted to gather information on the medical insurance systems, pharmacists' preferred dispensing systems, and the duties of the pharmacists and pharmacy assistants.

Information concerning the trends in the scope of the pharmacy business was exchanged with local pharmacists in the UK and Germany via e-mail. Statistical data originated from the UN's World Population Prospects: The 2010 Revision; World Health Statistics 2013; World Health Organization 2013; 2012 FIP Global Pharmacy Workforce Report; and the 2013 FIP Ed Global Education Report. A chart comparing Japan with the previously mentioned countries was created based on the contents of this investigation.

3. Results

3-1 Historical background

Figure 1 shows the demographic composition of each country (UN, World Population Prospects: The 2010 Revision). Demographic changes were represented by a pot-shaped curve (in Japan, UK, and Germany), a bell-shaped curve (in France), and a pyramid-shaped curve (in Malaysia and Thailand; Fig.1). As for the age distribution of

the population, Japan had 31% over 60 and 13% under 15 years old; the UK had 23% over 60 and 17% under 15; Germany had 26% over 60 and 13% under 15; France had 23% over 60 and 18% under 15; Thailand had 13% over 60 and 20% under 15; and Malaysia had 8% over 60 and 30% under 15 (World Health Statistics 2013).

The top 10 disease-related causes of death in the different countries are shown in Table 1 below (World Health Organization 2013). In Japan, UK, Germany, and France, the top 3 disease-related causes of death were cardiovascular disease, cancer, and cerebrovascular disease, whereas in Malaysia and Thailand, infection and neonatal diseases were among the highest.

The pharmaceutical situations of each country are shown in Table 2 (2013 FIP Ed Global Education Report and the 2012 FIP Global Pharmacy Workforce Report). There were 276,517 pharmacists in Japan, 50,664 in the UK, 78,322 in Germany, 73,259 in France, 28,272 in Thailand, and 8,993 in Malaysia. The five countries excepting Japan had dispensing assistants. The pharmacy technician provides essential support to the pharmacist in areas including prescription entry, third-party insurance management, staff/patient scheduling, dispensing, and inventory control.¹²

There were 71,970 total pharmacies in Japan, 13,264 in the UK, 21,860 in Germany, 25,426 in France, 11,592 in Thailand, and 2,330 in Malaysia. The number of certified pharmacy graduates per year was 9,912 in Japan, 2,800 in the UK, 1,868 in Germany, 3,000 in France, 1,680 in Thailand, and 1,208 in Malaysia.

3-2 Medical insurance system

A description of the health care systems for each country is shown in Table 3.

(1) Japan

Japan's universal health insurance system was established in 1961. Under this system, all citizens are required to join the public health insurance system according to their occupation. There are several types of health insurance, such as that for office workers and government employees, the National Health Insurance system (serving self-employed and farmers), and a medical insurance system specifically for the elderly aged 75 and over. This last system was intended for people who are 75 years old or over or who are between 65 and 75 and are bedridden.

In 1974, the separation of dispensing and prescribing medications started in the wake of increased prescription charges (reaching 500 yen). However, in 2012, the national average extramural dispensing percentage remained at 66.1% (Fig.2). Highest percentages by prefecture were Akita (82.7%), Kanagawa (78.8%), and Niigata (76.7%). The lowest percentages by prefecture were Fukui (37.8%), Wakayama (42.4%), and Kyoto (46.7%).

(2) United Kingdom

In the UK, under the government-managed National Health Service (NHS), which is financed by taxes, all citizens can receive medical services free of charge.¹³ The content, budgeting, and guidelines for medical services are set and operated by each Primary Care Trust (PCT, or local insurance trade association), of which there are about 150 in total. After all citizens select a GP, they are entered into the system to receive medical services. Pharmacy services are broken down into three classifications: (a) Essential Services, (b) Advanced Services, and (c) Enhanced Services. Essential Services are provided by all community pharmacies contracted by the NHS. These services include prescription dispensing, repeat dispensing, disposal of unwanted medicine, promotion of healthy lifestyles, and supply of appliances. Advanced Services require pharmacists

to take certifications through lifelong learning courses and university courses. These services include medicines use review (MUR), appliance use review, stoma appliance customization, and New Medicine Service. An MUR is a consulting service that allows patients who have problems with their medications to request prescription changes from the prescribing doctor after consulting with a pharmacist, who confirms the patient's medication status and side effects. Enhanced Services are services granted to each district by the PCT, such as outside hours, health checks, protective vaccinations (influenza vaccines and cervical cancer prevention), smoking cessation programs, and hormonal contraception.¹⁴ (Table 4).

(3) Germany

The foundation of Germany's public health insurance system was the law enacted by Otto von Bismarck in 1883. Following this, the Empire Insurance Ordinance was enacted in 1911 in an attempt to protect the population from diseases, and this forms the root of the compulsory insurance system (district disease safe: AOK; companies disease safe: BKK; brethren disease safe: IKK; and staff alternative disease safe: AKE). The universal health insurance system was established in 2009, after which roughly 90% of the population has taken out public health insurance, and 10% has taken out private health insurance. Outpatient care is conducted by an insurance doctor who has a contract with the disease safe programs. First, patients must see a family doctor, after which they are evaluated by a specialist, as necessary.

(4) France

Under the universal health insurance system, medical insurance is classified according to occupation: the general system (*regimes general*), self-employed insurance system (*regimes non salaries*), special system (*regimes speciaux*), and agricultural society

1 mutual aid system (*regimes agricoles*). In order to receive insurance benefits, patients
2 must register to see a "family doctor." If necessary, they visit a specialist called a
3 cooperation physician. In the case of outpatient medical care, the insured person pays
4 for the full amount of medical fees, in principle. After that, they send the doctor's
5 receipt (including the pharmacy cost, if there is a prescription drug) to the sick fund, and
6 are reimbursed. On the other hand, in the case of inpatient care, the patient's payment to
7 the facility is only fee they must pay; the rest are in-kind benefits.

8 (5) Thailand

9 The health care system in Thailand has three parts: (d) government employment, (e)
10 social insurance, and (f) universal coverage. Government employees can receive
11 medical services free of charge, without the burden of insurance premiums. However, in
12 cases where patients demand to be seen by a doctor in a private hospital or to use
13 original drugs, medical costs are paid out of pocket. Office workers prepay insurance
14 costs to NHSO in order to receive medical services free of charge when they visit the
15 hospital. As for the general public, visits are first made to a clinic. After that, they visit
16 the hospital, if necessary. In addition, Thailand has a Medicine List, which offers
17 different benefits in terms of the ranges of drugs that can be used, depending on the type
18 of insurance coverage.

19 (6) Malaysia

20 There is no public health insurance in Malaysia. Malaysians can visit the government
21 hospitals and clinics at a price of about 0.25 euros (about 1 Ringgit: Malaysia monetary
22 unit), which is paid by the government. However, public officials and those with low
23 incomes can receive medical services free of charge. Private hospitals are developing
24 business projects that target high-income and high-net-worth foreigners.

3-3 Pharmacists' dispensing systems

The dispensing system of the pharmacists in each country is shown in Table 5. The supply of pharmaceutical products and the dispensing process in Japan differ from the adopted packaging unit (i.e., "box out") system used in the UK, Germany, France, Thailand, and Malaysia. The counting dispensing system refers to a system wherein medicine is counted out for each individual patient. The box out system refers to delivering already-packaged medicine to the patient. Packaging units are set in accordance with the adaptation. For example, most medicines are packaged in units of 28 tablets, or 30 tablets for chronic disease, because it is standard to administer medication for one month. Most antibiotics, on the other hand, have units of 5 or 7 tablets per box. Then, the dispensing assistant attaches a label printed to the medication, including the patient's name and instructions for taking the medication.

In the UK, dispensing of medicine in the form of powders, liquids, and ointments has been banned (the mixture dispensing business is not been performed, save for in educational hospitals). Children and patients with dysphagia are supported by ready-made foaming agents or chewable tablets. Refill or repeat prescription has been adopted in four of the countries, excluding Japan and Germany. Prescription refills refer to whether a pharmacist can dispense a given medicine repeatedly within the valid refill prescription period. Repeat prescriptions refer to the ability to dispense a given medicine for patients with chronic illnesses in combination with the "parent prescription" and "child prescription."

The UK and France have legally permitted prescription rights for pharmacists; however, Japan, Germany, Thailand, and Malaysia have not permitted such rights. In recent years,

there has been a movement toward pharmacists being actively engaged in: (1) making prescription suggestions for avoiding side effects and ensuring the efficacy of the medicine, and (2) formulating hospital protocol for proper use of time in consultations with the doctor. The division of prescriptions in the UK is shown in Table 6. Prescriptions are classified into one of four types: Green (prescribed by GPs), Blue (prescription of controlled drugs such as methadone), Yellow (prescribed by dentists), and Lilac (prescriptions by pharmacists and nurses recognized as “auxiliary prescriptions” and “independent prescriptions”). Pharmacists in the UK have been recognized as being responsible for “auxiliary prescriptions”—that is, changing the amount of drug supplementation based on the prescription and doctor’s diagnosis—and “independent prescriptions”—that is, carrying out prescriptions and diagnosis in a specialized field. This pharmacist responsibility is explicitly stated in Vacherot Low’s (HPST low) Article 36 in France. For dispensing doctors in Japan, “dispensing is a monopoly business of the pharmacist.” However, it is a recognized fact that dispensing doctors are bound by law—specifically, Article 22 of the Medical Practitioners Law, Article 19 of the Pharmacists Act, and Article 21 of the Dental Practitioners Law. The UK, Germany, and France do not have basic dispensing doctors, save for special cases limited to the patients living in such rural and remote areas. This been observed in private clinics and hospitals in Malaysia and Thailand as well.

3-4 Regulatory classification of medicine

The classification of medicine in each country is shown in Table 7. In Japan, it is classified into two types: (A) prescription drugs and (B) over-the-counter drugs. Depending on the risk degree of the side effects, pharmaceuticals are classified

1 according to different schedules: Schedule I (pharmaceutical products with especially
2 high risk: sale possible only by pharmacists); Schedule II (pharmaceutical products
3 with relatively high risk); and Schedule III (pharmaceutical products with relatively
4 low risk). In the UK, the drugs are classified into three types: (C) Prescription-Only
5 Medicine (POM); (D) Pharmacy Medicine (P); and (E) General Sales List Medicine
6 (GSL). POM is dispensed according to a doctor's prescription. P is sold under the
7 supervision of a pharmacist, and is also known as "behind-the-counter" drugs. It is
8 possible to sell GSL in supermarkets, convenience stores, and gas stations that do not
9 have pharmacists. These are also termed "over-the-counter" drugs.

10 However, in the absence of a supervising pharmacist who is able to sell POM, P and
11 GSL can be sold in pharmacies because sales methods are defined such that the
12 medicine handled in the pharmacies of health care provider facilities should be sold
13 with supervising pharmacist guidance and supervision to the patient. In Germany, drugs
14 are classified into three types: (F) "needed prescription drugs" (*Verschreibungspflichtig*),
15 (G) "pharmacy-indicated drugs" (*Apothekenpflichtig*), and (H) "free-sale products"
16 (*Freiverkauflich*). Pharmacy-indicated drugs are available without prescriptions, but
17 they cannot be sold outside pharmacies. Free-sale products are sold in drugstores and
18 supermarkets, and in many cases are herbal preparations.

19 In France, drugs are classified into two types: (I) PMO (*Prescription Medicale*
20 *Obligatoire*) and (J) PMF (*Prescription Medicale Facultative*). PMO refers to
21 prescription drugs, while PMF are available without a prescription (refunds are possible
22 via health insurance payments if they have been prescribed). In Thailand, drugs are
23 classified into four types: (K) specially controlled medicines, (L) dangerous medicines,
24 (M) ready-packed pharmaceuticals, and (N) home remedies. Specially controlled

1 medicines can be sold only with prescriptions by pharmacists. Dangerous medicines can
2 be sold without prescription, but only by pharmacists. Ready-packed medicines can be
3 sold without prescriptions. Home remedies are common medicines for minor ailments.
4 No license is needed to sell them. In Malaysia, drugs are classified into three types: (O)
5 Group B, (P) Group C, and (Q) Non-Poisonous Drugs. Group B refers to medicine that
6 pharmacists dispense based on doctor prescriptions. Group C refers to medicine sold
7 according to the management and guidance of the pharmacist, and does not require a
8 prescription. It is necessary to fill out the patient's name and address at the time of
9 purchase. NP refers to over-the-counter drugs.

11 *3-5 Dispensing system in Thailand*

12 The prescriptions define drug prices and provide a method for reducing medical costs in
13 government hospitals. Community health care facilities or drugstores provide
14 out-of-hospital prescriptions. In addition, this system carries out free-of-charge oral
15 examinations, non-smoking programs, blood pressure measurements, and blood glucose
16 leadership, and nutritional guidance, all funded by the Community Pharmacy
17 Association.

19 *3-6 Dispensing system of Malaysia*

20 The prescriptions are received at a patient's address and result from a disease diagnosis
21 occurring in a government hospital. In addition, the patient waiting time is less than 30
22 minutes. A bell rings if the limit exceeds about 20 minutes. Delivery of pharmaceutical
23 products is also carried out.

24 In both Malaysia and Thailand, dispensing assistants performs the actual dispensation,

such as choosing the medicines and handing them to the patient. On the other hand, pharmacists ensure patient safety in pharmaceutical administration by looking through the patient's medical files at the hospital. However, there is a limit to the pharmaceutical repertoire of the dispensing assistant. Specifically, to manage safety, pharmacists must dispense high-risk drugs. In most regions, pharmacists are not residents; however, pharmacists in the chain pharmacies in urban areas are generally residents, although this has been affected by the pharmacist shortage.

4. Discussion

From the results presented in Table 1, it is clear that the health care system differs across each country. This is partly because the disease structure differs between developing and developed countries. As the results in Table 2 show, Japan has the highest numbers of pharmacists, pharmacies, and pharmacist training schools compared to the other countries. In other countries, there are dispensing assistants and professional schools for dispensing assistants. Rouse *et al.* defined a pharmacy technician as "... an individual working in a pharmacy who, under the supervision of a licensed pharmacist, assists in pharmacy activities that do not require the professional judgment of a pharmacist."¹⁵

The increasing need for pharmacy technicians is related to the myriad changing dynamics in the healthcare system over the past decade. A growing demand for clinically focused pharmaceutical care, greater use of prescription drugs, a renewed emphasis on medication safety, and the growth of retail pharmacies have made the need for experienced, trained pharmacy technicians an important component to consider when attempting to support understaffed pharmacies.¹⁶ Whereas pharmacists carry out the flow of inventory management, dispensing, and medication instruction in Japan,

1 with a competent dispensing assistant, pharmacists would be able to spend more time
2 and focus their abilities on patient care opportunities, as in the other countries studied.
3 Therefore, hiring more dispensing assistants will increase the efficiency of medical
4 services and reduce the burden faced by the pharmaceutical business. There is a real
5 need for developed countries to expand individual consultations by pharmacists by
6 shifting typical pharmacist duties to the dispensing assistants.

7 Patients cannot see a doctor in a hospital or a specialist if they are not introduced by
8 their family doctors in the UK, Germany, or France. Individuals typically have to wait a
9 few months to receive treatment, with the exception of severe or emergency cases.¹⁷

10 Evidence shows that 40% of GPs' time is spent dealing with patients who have minor
11 illnesses and that almost two-thirds of those consultations result in a prescription for
12 medicine or advice which could have been obtained in a pharmacy.¹⁸ The UK
13 government is currently supporting moves to transfer the management of minor
14 ailments from GPs to pharmacies, including "community pharmacy minor ailments
15 schemes."¹⁰ Increasing trust should continue to build said schemes, although there are
16 some important issues (e.g., the restricted formulary, the lack of privacy in some
17 pharmacies) that need to be addressed to improve and develop the service further.¹⁹ In
18 Germany, pharmacists reported being active in many different prevention subjects, and
19 there is a great interest in pharmacy-based preventive care counseling.¹¹

20 In the survey, many customers showed a great interest in topics that have a high
21 prevalence or socioeconomic burden, like cardiovascular diseases, immunization status,
22 or diabetes mellitus. Most pharmacists offer blood pressure measurements as well as
23 blood glucose and cholesterol level measurements. Community pharmacies may be able
24 to influence individuals who are not patients via commercial over-the-counter drug

purchases.²⁰

The pharmacist plays a crucial role in early contact with preventive care. Regarding the dispensing system, the advantage of the box-out system can be measured in terms of its good quality control and ease of dispensation (Table 5). This could lead to prevention of dispensing errors and more efficient overall operations. The advantages of refill or repeat prescriptions were considered to be not having to send the patient to the hospital and making it possible for a doctor to spend more of their time examining critically ill patients. The disadvantage of this prescription system is that there is a possibility that side effects and discovery of disease change may be delayed with prolonged prescriptions. Dispensing doctors have often been reported to overprescribe to earn more profit and for making dispensing errors.²¹ Therefore, this was considered to be an important factor in the potential for near-misses in improper medicine use in Japan, Thailand, and Malaysia.

Because there are no pharmacies or hospitals in rural and remote areas, there is a reduced medical supply. This causes problems such as a lack of or incorrect medication lists, expired medications, drug interactions (including those involving over-the-counter medications), adverse drug events, adherence deficiencies, and potentially inappropriate medications. Medication adherence was significantly improved by incorporating pharmacists as members of health care teams in direct patient care.²² Full cooperation in practitioner–pharmacist interactions is, therefore, necessary.²³

There are some medicines that can be purchased from pharmacists without prescriptions in Thailand and Malaysia (Table 7). This is considered beneficial in terms of patient convenience, but it may lead to negative health effects. Non-prescribed antibiotics may be used inappropriately due to a lack of health professional supervision.²⁴ For example,

1 in Lao People's Democratic Republic,²⁵ non-prescribed antibiotics are mostly used for
2 treating the common cold, a viral condition for which antibiotic treatment is
3 ineffective.²⁶ As a result, self-medication with antibiotics may be associated with
4 undesirable effects, such as decreased effectiveness and worsening clinical conditions,
5 and it is one of the main causes of antimicrobial resistance.²⁷

6 Pharmacy health promotion services have been widely used in developed countries, thus
7 broadly increasing the roles of the pharmacy/pharmacist (Table 8). In addition to
8 monitoring patients with chronic diseases, pharmacies provide preventive care services
9 and health maintenance. For this reason, it is suggested that the community pharmacy
10 functions as a consultation service for healthy individuals. Compared to other countries,
11 Japan's pharmacies have fewer health promotion services. In recent years, it has become
12 possible to perform tests of blood glucose levels, HbA1c, and hepatic functions for
13 preventing lifestyle-related diseases. From the above results, it is clear that the
14 pharmacist is engaged in dispensing medication instructions and supervisory dispensing
15 in developed countries (the UK, Germany, and France). In addition, out-of-hospital
16 prescriptions need to be promoted. A wide range of health promotion activities has been
17 made possible by government support. There is a great need for pharmacists to increase
18 their abilities and enhance confidentiality practices, to ensure patient privacy.
19 Furthermore, they should expand their advertisements of appropriate services and
20 education about service delivery. On the other hand, the pharmacist ensures patient
21 safety by performing pharmaceutical administration via accessing patient medical files
22 in hospitals in developing countries (Thailand and Malaysia). Additionally, in-hospital
23 prescriptions need to be more widely promoted. There is a chance of failure in
24 out-of-hospital prescription dispensing because of the current pharmacist shortage, poor

relationships between pharmacists and physicians, lack of access to patient information, and a general lack of funds.²⁸

Therefore, pharmacists' activities should center around hospitals. In addition, pharmacies do not position their services as frontline primary healthcare providers, which is considered one of their main flaws. Developing countries such as Thailand and Malaysia are generally more limited in their traditional roles of drug dispensing and limited medication advice as compared with developed countries. In the future, it will be necessary to consider developing more detailed pharmaceutical schemes in Thailand and Malaysia.

5. Conclusion

It is hoped that pharmacists would make the transition from dispensing drugs as part of patient care to offering advice and counseling to patients in order to improve health promotion and health/nutrition counseling.

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Conflicts of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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Figure legend

Table 1 The top 10 causes of death

Table 2 Comparison of pharmacy

D: Diploma, B: Bachelor, M: Master, P: Vocational Doctorate (Pharm.D)

C: Community Pharmacy, H: Hospital Pharmacy, I: Industry, O: Other

Table 3 Medical insurance classification

Table 4 NHS Services provided by community pharmacies in United Kingdom

*GPhC-General Pharmaceutical Council

Table 5 Dispensing system

○: recognize, △: some recognize, ✕: no recognize

Table 6 Prescription category in the United Kingdom

Table 7 Regulatory classification of medicine

Table 8 Health promotion services

Fig.1 Population distribution

Fig.2 Extramural dispensing percentage in Japan

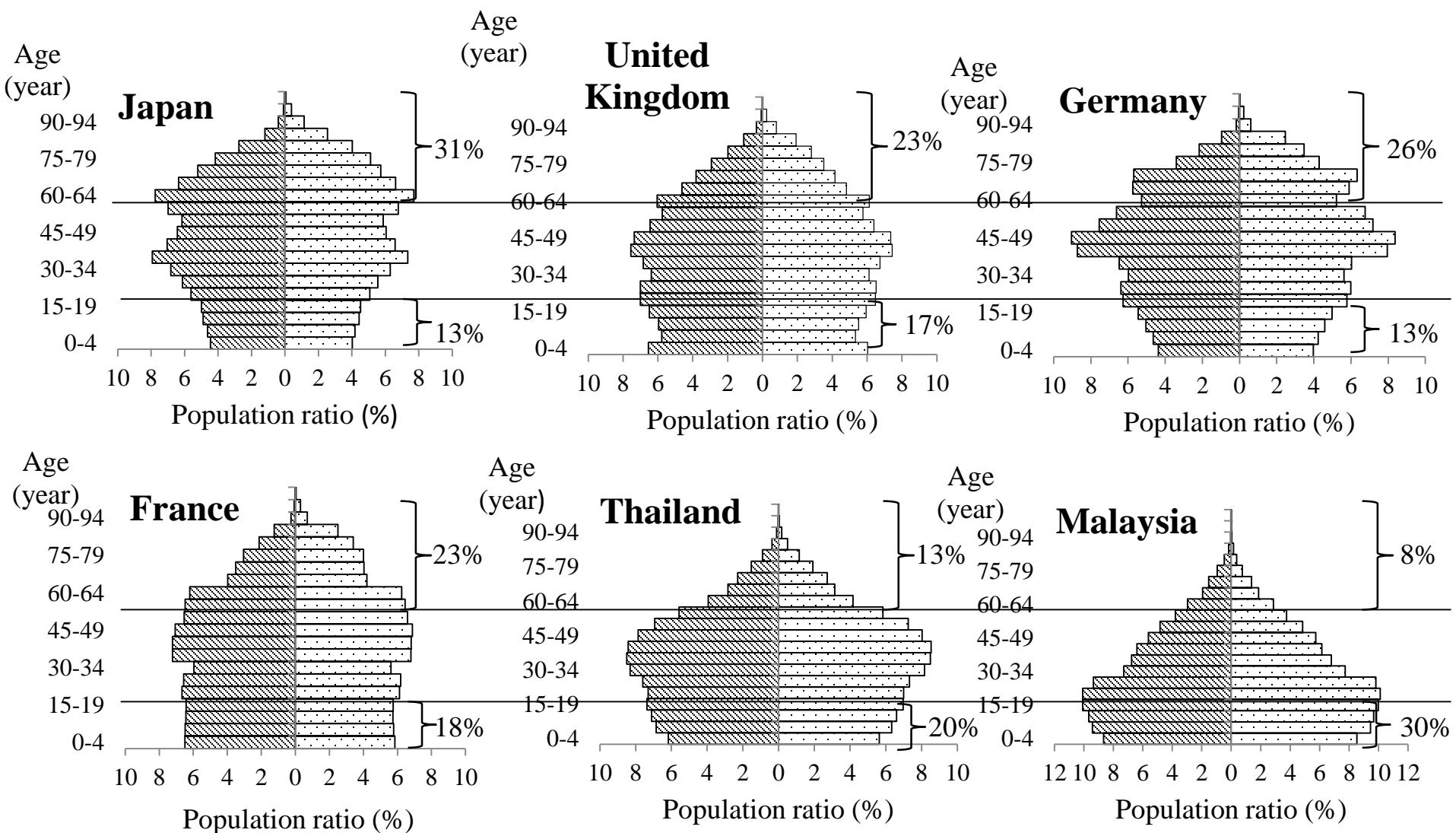


Fig.1 Population distribution

Source: UN, World Population Prospects: The 2010 Revision (2010 data), world health statistics 2013 (2011 data)

Table1 The top 10 causes of death

High-income country		Low-and	middle-income countries
Rank	Japan, United Kingdom, Germany, France	South-East Asia Region Thailand	Western Pacific Region Malaysia
1	Cardiovascular diseases	Cardiovascular diseases	Cardiovascular diseases
2	Cancers	Infectious diseases	Cancers
3	Neurological and sense organ conditions	Injuries	Respiratory disease
4	Respiratory disease	Respiratory disease	Injuries
5	Injuries	Cancers	Infectious diseases
6	Infectious diseases	Neonatal conditions	Endocrine, blood, immune disorders, diabetes mellitus
7	Digestive diseases	Digestive diseases	Digestive diseases
8	Endocrine, blood, immune disorders, diabetes mellitus	Endocrine, blood, immune disorders, diabetes mellitus	Neonatal conditions
9	Genitourinary diseases	Genitourinary diseases	Genitourinary diseases
10	Mental and behavioral disorders	Neurological and sense organ conditions	Neurological and sense organ conditions

Source: World Health Organization 2013 (2011data)

Table2 Comparison of pharmacy

	Japan	United Kingdom	Germany	France	Thailand	Malaysia
Human resources						
Pharmacists	276,517	50,664	78,322	73,259	28,272	8,993
Pharmacy technician	0	21,000	52,882	—	5,126	3,409
Establishments						
Total pharmacies	71,970	13,264	21,860	25,426	11,592	2,330
Education						
Pharmacies graduates/year	9,912	2,800	1,868	3,000	1,680	1,208
Schools						
Pharmacy	74	26	22	24	19	17
Pharmacy technicians	0	—	93	70	17	33
Academic programme						
Degree Type	B	M	B	D, P	B, P	D, B
Length (years)	6	4	5	4, 5	5, 6	3,4
Practical training						
Practice	C,H	C,H,I	C,H,I	C,H,O	C,H,I,O	C,H,I,O
Total length (months)	5	12	12	8	6	12

D: Diploma, B: Bachelor, M: Master, P: Vocational Doctorate (Pharm.D)

C: Community Pharmacy, H: Hospital Pharmacy, I: Industry, O: Other

Source: 2012 FIP Global Pharmacy Workforce Report, 2013 FIP Ed Global Education Report

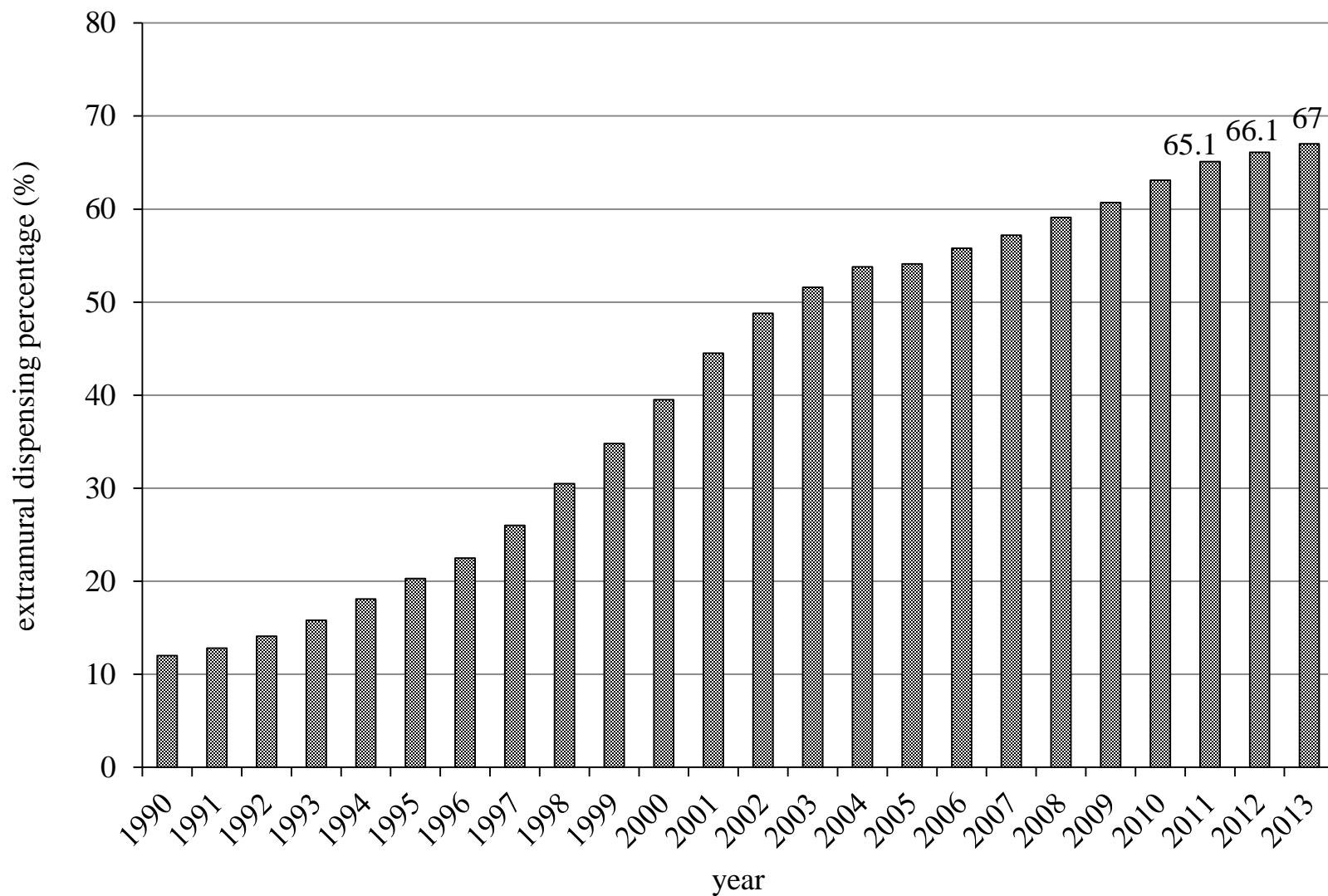


Fig.2 Extramural dispensing percentage in Japan

Source: Japan Pharmaceutical Association 2013

Table3 Medical insurance classification

Country	Type	
Japan	Bismarck*	Social insurance, National health insurance, Medical insurance system for the elderly aged 75 or over: Universal health insurance
United Kingdom	Beverage#	NHS (National Health Service Act of 1946) Essential Service, Advanced Service, Enhanced Service
Germany	Bismarck*	Public medical insurance, Private medical insurance: Universal health insurance
France	Bismarck*	Regimes general, Regimes non salaries, Regimes speciaux, Regimes agricoles
Thailand	-	Government employ, Social insurance, Universal coverage
Malaysia	-	By government spending budget, people can be guaranteed inexpensive medical care in government hospital.

* Bismarck: Social security system (Depending on income, people pay.)

Beverage: Operated by tax (In principle, people pay a certain fee.)

Table4 NHS Services provided by community pharmacies in United Kingdom

Service Component	Service level with English NHS pharmacy contract		
	Essential	Advanced	Enhanced
Funding	National	National	Local
Regulation	Compulsory registration with GPhC*	Accreditation of premises and pharmacist	Varied, determined locally
Examples	Prescription dispensing	Medicines use review	Outside hours
	Repeat dispensing	Appliance use review	Health check
	Disposal of unwanted medicine	Stoma appliance customization	Protective vaccination
	Promotion of healthy lifestyles	New Medicine Service	Smoking cessation
	Supply of appliances		Hormonal contraception
Distribution	All pharmacies	86% of pharmacies	Varied

Source: Choosing health through pharmacy (Department of Health, 2005)

*GPhC-General Pharmaceutical Council

Table5 Dispensing system

Country	Medicine supply	Refill or Repeat prescribe	Pharmacist prescribe	Dispensing doctor
Japan	Blister pack One dose pack	×	×	△
United Kingdom	box	○	○	×
Germany	box	×	×	×
France	box	○	○	×
Thailand	box/one dose pack	○	×	△
Malaysia	box/one dose pack	○	×	△

○: recognize, △: some recognize, ×: no recognize

- 1) What dispensing are repeatable within the validity period of the one prescription.
- 2) UK: “Auxiliary prescription” based on the physician's prescription.
“Independent prescription” is carried out in a specialized field.
France: Article 36 of Law Bajuro
- 3) Japan: A dispensing doctor is recognized by the escape clauses of Article 22 of the Medical Law.
UK, Germany, France: rural and remote
Thailand, Malaysia: Private hospital and Clinic hospital

Fig.3 Prescription category in the United Kingdom

Color	Prescription
Green	General Practitioner (GP)'s prescribe
Blue	Prescription of controlled drug such as methadone
Yellow	Dentist's prescribe
Lilac	Prescription of pharmacists, nurses recognized "Auxiliary prescription" and "Independent prescription"

Table6 Regulatory classification of medicine

Japan	United Kingdom	Germany
Pharmacy only drugs	Prescription only medicine	Needed prescription drugs (Verschreibungspflidhtig)
Non-Prescription drug ScheduleI	Pharmacy medicines	Pharmacy indicator (Apothekenpflichtig)
ScheduleII		
ScheduleIII	General sales list medicines	Free sale products (Freiverkauflich)
France	Thailand	Malaysia
Presctipyion Medicale Obligatoire	Specially controlled medicines	Group B
	Dangerous medicine	Group C
Prescription Madicale Facultative	Ready-packed pharmaceuticals	Non-Poisonous
	Home remedies	

Table7 Health promotion services

Countries	Health promotion services
Japan	Smoking cessation support, Hypertension/Diabetes screening, Asthma screening, Cholesterol measurement, Blood pressure measurement, Blood glucose measurement, General nutrition counselling, Home care
United Kingdom	Smoking cessation support, Hypertension/Diabetes screening, Asthma screening, Weight management, Screening risky alcohol use, Emergency contraception, Immunization, Home care
Germany	Smoking cessation support, Hypertension/Diabetes screening, Asthma screening, Weight management, Cholesterol measurement, Blood pressure measurement, Blood glucose measurement, Prevention of vein thrombosis, Osteoporosis prevention, General nutrition counselling, Vaccination counselling, Home care
France	Smoking cessation support, Hypertension/Diabetes screening, Asthma screening, Weight management, Emergency contraception, Home care
Thailand	Hypertension/Diabetes screening, Weight management, Nutrition and physical activity, Sexual health services, Cardiovascular risk screening
Malaysia	Weight management, Diabetes counselling, Complementary medicine counseling, Asthma counselling, Nutrition and physical activity, Home care