

The Case for a Shift in Pharmacists' Activities and Pharmacy Education —Based on Those in The English Speaking Western Countries—

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In Japan, pharmacists' activities for the most part consist of dispensing although in some University Hospitals they are directly involved in patient care. In the United States, pharmacists' activities have evolved over forty years in providing drug therapy and have now expanded to improvement in the patient's quality of life. In addition, a six-year pharmacy education program based on patient care is now in place nationally. Furthermore, World Health Organization (WHO) and International Pharmaceutical Federation (FIP) have made recommendations on pharmacists' activities. Shifting to a six-year pharmacy education in Japan has now been decided, and new approaches are being proposed. For pharmacists to serve society in their role as health care professionals, one needs to examine the activities they are expected to perform and pharmacy education necessary to develop these skills. In this paper, pharmacy education was examined by analyzing and comparing Western countries and Japan, with a focus on Canadian pharmacists' activities and pharmacy education in Alberta.

Key words—pharmacists' activities; pharmacy education; Canadian pharmacy education

INTRODUCTION

Pharmacists in Japan, for the most part, still perform the traditional activities of dispensing and the retail selling of medication.

In recent years, recognition of the pharmacists' role in patient focused care rather than just drug dispensing has occurred with an increase in the value of pharmacist. To enable pharmacists to perform these changing roles a six-year pharmacy education program will begin in 2006 for students entering pharmacy. This is consistent with developments in the U.S. where, there is now a six-year pharmacy program leading to a doctor of pharmacy degree (Pharm. D).^{1,2)} The concept of Pharmaceutical Care was adopted as a standard by the WHO Consultative Meeting in Tokyo in 1993.³⁾ The "Seven Star Pharmacist" was also recommended in the Consultative Meeting in Vancouver in 1997.^{3,4)} Furthermore, "Good Pharmacy Practice" was adopted by the FIP Council Meeting in Tokyo in 1993,³⁾ and the policy-statement of "Good Pharmacy Education Practice" was also adopted at the Council Meeting in Vienna in

2000.⁵⁾ This progressive change in the role of the pharmacist was accepted on a worldwide basis and is now the standard for professional performance. In light of this development it is now urgently required that Japan reexamine pharmacy practice and pharmacy education. The environment of pharmacists' activities and the content of pharmacy education in Canada and in the United States were examined. These pharmacy activities and educational content were then compared with those in Japan. Based on this, the preferred model of pharmacists' activities and pharmacy education were examined from the perspective of the pharmacists who work in health care setting.

METHODS

A literature search was made of the changes in the pharmacists' role and pharmacy education both in Japan and in the West, as well as the recommendations of WHO and FIP. A search was made of the medical literature database Japan Science and Technology Corporation (JICST), National Center for Science Information Systems-Electronic Library Service (NACSIS-ELS), National Library of Medicine (PubMed) Japanese, and general internet web site msn and infoseek. In addition, the manual "Iryo

no ninaite to site no shitsunotakai yakuzaishi yousei ni kansuru kenkyu (The study for training high quality pharmacist as health care professional)" and the manual "National Association of Boards of Pharmacy, Survey of Pharmacy Law" were reviewed.

Detail on the pharmacists' activities and pharmacy education in Canada was obtained from my experience at the University of Alberta as well as from the literature.

RESULTS

Comparison between Japanese Pharmacists' Scope of Practice and Western Since the change of pharmacists' activities and pharmacy education in Japan was described in a previous article,¹³⁾ the difference between Japanese and Western practice is examined and compared.

1) Pharmacists' Activities The Emperor Frederick II of the Holy Roman Empire in 1240 enacted the 5 Articles that for the first time clearly separated physicians' activities and pharmacists' activities. Pursuant to the 5 Articles, diagnostic activities by physician and dispensing activities by pharmacist were defined, and Iyaku Bungyo in Europe was begun to start at that time. In 1912, the twelve countries of the European Pharmaceutical Association established FIP, since then it has been actively involved in recommending policies for the most effective use of pharmacists in health programs. FIP has identified new roles for pharmacists and has begun to work with WHO resulting in WHO accepting the concept of Pharmaceutical Care and the "Seven Star Pharmacist" concept as was described in the Introduction.

In the 1960's, hospital pharmacy practice in the United States began to shift from dispensing to clinically oriented activities. This change in role has now been directed to ambulatory service, in the form of Pharmaceutical Care activities that include prognostic care and health maintenance as well as providing appropriate drug therapy for patients. Pharmacist's activities in the West vary but overall these activities have now rapidly changed.

In Japan, a drug seller (the present pharmacist) was granted dispensing authority by Government Controlled Medical Act in 1874, however, introduction of Iyaku Bungyo was far from widespread acceptance. Japanese pharmacists' activities consisted mainly of dispensing in hospitals and community pharmacies until the policy of Iyaku Bungyo was

declared by the Japan Medical Association in 1974. Clinical services have now been initiated in some of the University hospitals and are slowly spreading to other hospitals. In community pharmacy the Iyaku Bungyo rate has now reached approximately fifty percent but the pharmacists' activities have changed very little. With the introduction of the six year there is an urgent need to change pharmacists' role so that the students have an experiential program that reflects optimal patient care rather than traditional dispensing.

2) Pharmacy Education Formal education, which included medicinal products, began in Europe from 1095 to 1270 at established Universities which usually consisted of 4 faculties; theology, jurisprudence, arts and medicine, the curriculum was based on Roman and Greek knowledge that had been preserved in Arabian countries then brought to Europe during the Crusades. Later, in Paris, pharmacy education was begun by Nicolas Houels in 1576 based on a scientific approach to herbal products later a pharmacy school was established in 1777.^{6,7)} Then in 1803, pharmacy schools were established throughout France by the legislation.^{6,7)} Now, in Europe, fifteen countries of the European Union are establishing a unified pharmacist licensing requirement and standard pharmacy education. The requirements have the following 3 points: a minimum five-year pharmacy education and a minimum six-month internship, achievement in specific sciences and pharmaceutical sciences.

Concurrently, FIP accepted the policy statement of "Good Pharmacy Education Practice" in 2000. This statement requires the following: ① to focus on Pharmaceutical Care ② to require the essentials of Seven Star Pharmacist, such as Care giver, Decision maker, Communicator, Leader, Manager, Life-long learner and Teacher ③ to produce a sense of identity as a member of health care team ④ to innovate educational programs to reflect recent technological advance and university level of education ⑤ to participate actively in pharmacy education by pharmacy practitioner and Pharmaceutical Association ...etc.

In Japan, a department of pharmaceutical chemistry was attached to the Medical School of Daiichi University (present faculty of medicine Tokyo University) in 1873. However, in contrast with pharmacy education in the West, which was focused on pharmacy professional education, the education in Japan was based on chemical research. The education

committee of the Japan Pharmaceutical Association begun to consider changes to pharmacy education in the mid 1960's but the status of pharmacy education in Japan remains behind Western pharmacy education in educational content for educating pharmacists as health professionals. It is the purpose of the pharmacy education program to close this gap.

Comparison between Pharmacists' Role in Canada and in Japan Pharmacists' activities and pharmacy education in Canada, mainly following the experience in the United States, was examined and compared to those in Japan.

1) Medical System The pharmacists' role and pharmacy education in Canada reflect the health care system. Medical care in Canada is based on a family physician system not linked to a hospital, which is the same as in the United States. Generally, primary medical care is provided a family physician, and according to disease state, a patient is referred to a medical specialist or to a hospital by the family physician. With the exception of emergency patients, people who get sick would not normally seek medical treatment directly in large hospital. Large hospitals with high medical technology, such as University hospitals, commonly provide special treatment to patients through specialist physicians. In Japan, for most disease states, the selection of medical service fundamentally depends on the patient. This is fundamentally different.

In the Canadian health insurance system, payment to health providers is shared between private companies and public (federal and provincial) sector for insured services (physicians, diagnostic test and hospital care). However, for medication the government covers only seniors, over 65 years, social assistance recipients most others must pay for medication through employment benefits or by themselves, this is similar to the system in the United States. These systems are different from the incentive payment system that was adopted in Japan. It should also be added that the health insurance system in Japan covers the whole nation and is guaranteed by government.

Drug distribution to ambulatory patients, in Canada, as in the United States, has from the beginning completely implemented *Iyaku Bungyo*. As for ambulatory patients, prescribed medicines are dispensed at a community pharmacy usually located near the patient's home, in a shopping center or near physician's office (This is different from a clinic in Japan).

In Canada, most of hospitals do not have physician's offices, thus, the physicians visit patients in the hospital then go to their office in a medical clinic to see ambulatory patients. Pharmacies are not usually located in front of a hospital or medical care center as they are in Japan. In most pharmacies, over-the-counter medicines (non-prescription drug, self-medication products), herbal medicine, nutritional supplements, complementary medicines, home health supplies/equipment etc are mostly stored and displayed in pharmacies. This is in contrast to the Japanese pharmacies that do not have these products. There is little difference in facilities and equipment between Canada and Japan. In Japan, although *Iyaku Bungyo* rate has now reached approximately fifty percent, there are still numerous pharmacies located in front of hospitals or in medical care settings, which target only one medical care facility. It is likely that the difference of pharmacy system between Canada and Japan is due to differences in health care system, history and culture.

In Canada, the hospital pharmacy is mainly located in the basement, with satellite pharmacies in the patient care area. This fact makes a point of pharmacists' clinical activities in hospitals. In Japan, since dispensing medications for outpatients is a primary function for pharmacy, the hospital pharmacy is mainly located in the first floor adjoining the cashier and administration office near the main entrance. There are few hospitals with satellite pharmacy in the patient care area.

Pharmacy technicians are employed in Canada and the United States but not in Japan. To become a pharmacy technician in Canada, it is not necessary to have a certificate, although there are recommendations that this occur. The academic program for a person with a high school diploma is completion of 40-week program in a technical college (include 8-week practicum). Otherwise, training as a technician is obtained by participation in the distance program with access to computer with internet and e-mail capabilities, or by training in a community pharmacy. Formal academic programs qualify technicians to compound parenteral admixtures. Technicians' activities in a hospital consist of: calculating doses, dispensing medication, drug distribution, inventory maintenance, compounding medicinal drugs, preparing intravenous (IV's) etc (Table 1), thus the technician frees the pharmacist from many dispensing

Table 1. Transition in Pharmacist's Activities

(as of 1999)

Content of activities		Japan	Canada	
		Pharmacist	Pharmacist	Technician
① Authority for Pharmacist	Prescribing authority	×	×	
	Prescribing authority (for generic alternative drugs)	×	○	
	Prescribing authority (for similar effect drugs)	×	×	
	Prescribing authority (for refill prescription)	×	○	
② Dispensing activities	Receiving incoming prescription	○	○	×
	Inputting prescription data	○	○	○
	Dispensing	○	×	○
	Preparing IV (sterile products)	○	×	○
	Inspecting dispensing	○	○	×
	Drug distribution to patient care area	○	○	×
	Fill drugs (in patient care area)	○ or ×	×	○
	Supervise filled drugs in shelves	○ or ×	○	×
	Inventory management	○	×	○
	Order drugs	○	×	○
	Supervise ordering drugs	○	○	×
	Drug Information	○	○	×
③ Activities in a ward	Clinical-oriented activities	×	○	×
	Dispensing at satellite pharmacy		○	×

○: Yes, ×: non

jobs. On the other hand, in Japan, pharmacist must cover all dispensing jobs that technicians do in Canada. Therefore, it would be useful to have a technician or pharmacy assistant system in Japan to free the pharmacist to utilize their patient care skills.

2) Pharmacy Education The admission requirements of the faculty of pharmacy (in the case of University of Alberta) are:

- To complete the pre-pharmacy courses in the Faculty of Science, or
- To transfer credits from colleges and technical institutes in pharmacy courses, and
- To have English language proficiency

Pharmacy education in Canada consists of a four-year program following the completion of pre-pharmacy courses that are normally taken in one year prior to Pharmacy. Courses include: English, biology, chemistry and mathematics, in the United States, the pre-pharmacy requirement is normally two years then four years of pharmacy, that is, a four-year professional pharmacy education as it is in Canada. In the case of Japan, pharmacy education is programmed as a four-year period including foundation courses, although the academic year is longer (compared with 26–30 weeks in Canada to 37–40

weeks in Japan). Further, the scientific courses which are included in Japanese pharmacy education program, such as Biochemistry, Biological Science, Cell Biology, Chemistry, Environment Physical Science, Neuroscience, Pharmacology and Physiology, are taught in other faculties in Canada, such as faculties of Science and Medicine. That is to say, in Canada, pharmacy education is focused on pharmacy professional training from the first-year of pharmacy. A comparison with the Japanese pharmacy curriculum is presented in Table 2.

In comparing Canadian and Japanese pharmacy education, Canadian pharmacy programs have courses that are not available in Japan, such as patient counseling and social and administrative pharmacy. In the final year students are required to complete experiential education in the form of clinical rotations for 12 or more weeks. In Japan, practice based clerkship (both hospital and community pharmacy) although mandatory, is inadequate as there is a lack of suitable clinical settings (clinical sites) and a shortage of pharmacists with skills to provide a clinical practicum.

The Canadian educational content of third and fourth-year programs has valuable courses for in-

Table 2. Curriculum in the Faculty of Pharmacy in Canadian University
(Faculty of Pharmacy in University of Alberta as of 1999)

Grade	Course	In Japan
1st	Anatomy	○
	Introductory Biochemistry I	○
	Introductory Biochemistry II	○
	Introduction to the Profession of Pharmacy	○
	Pharmacy Dispensing Procedures and Pharmaceutical Calculations	○
	Introduction to Medicinal Chemistry	○
	Introduction to Quantitative Pharmaceutical Analysis	○
	Human Physiology	○
2nd	Pharmacology	○
	Pharmacy Administration	?
	Jurisprudence and Ethics	○
	Pharmaceutics	○
	Medical Chemistry	○
	Introduction to Disease Processes	○
Interdisciplinary Health Team Development	?	
3rd	Toxicity of Drug and Related Production	○
	Clinical Pharmacy	○?
	Introduction to Institutional Practice and Patient Counseling with the Emphasis on Non-Prescription Drugs	?
	Monitoring Drug Therapy on Patient Interview, Patient Counseling and Drugs Information	?
	Biopharmaceutics and Pharmacokinetics	○
	Therapeutics	○
	Antimicrobial Agent and Infectious Diseases	?
Radiopharmacy	○	
4th	Clinical Pharmacy Rotation	?
	Contemporary Issues in Pharmacy	?

? : Do not identify applicable course in Japan.

roduction into Japanese programs especially in practical education. The degree received by the graduate is the same as its in Japan, Bachelor of Science in Pharmacy. Graduates oblige to serve a period of internship (this varies from province to province) and to complete the Pharmacy Examination Board of Canada (PEBC) Qualifying Examination consisting of both an Objective Structured Clinical Examination (OSCE) and a written examination. Students will also complete a provincial examination of pharmacy provincial legislation. A similar process is required in the United States. Regarding career options (this point will be examined later again), employment of graduates is mainly in community pharmacy, some graduates take a residency in hospital pharmacy (residency is an educational program in a hospital for one year) or industrial pharmacy. Another option is to proceed to a Masters course or a Doctor of Philosophy (Ph.D) program, including program areas such as social and administrative pharmacy

which are not available in Japan.

The proposal for the "Pharmacy education model curriculum" was developed. This model curriculum is integrated with the proposals for "Pharmacy education model curriculum" by the Committee of private pharmaceutical University associations and "Pharmacy education core curriculum" by the sectional meeting of Deans of faculties of pharmacy in national and public Universities (Table 3). However, this model curriculum still mixes pharmacy professional courses. In addition, since this model curriculum is designed to prepare student for research, the program reflects a bias toward scientific research, with inadequate emphasis on professional courses since this model curriculum does not indicate the course names and only indicates the contents of these courses, it is difficult to compare with the courses offered in the faculties of pharmacy in Canada. Nevertheless, the courses, that are given in Canadian faculties of pharmacy such as communication skill and small group

Table 3. The Proposal "Pharmacy Education Model Curriculum" by the Pharmaceutical Society of Japan

A. Through all grades	Humanism	1) Existence and death 2) Pharmacist as health care professional 3) Patient relationship
B. Introduction	Exposure to pharmacy practice	1) Visits to pharmacy sites 2) Early experience practice
C. Pharmacy professional education		
To learn physical pharmacy	C-1 Properties of substances	1) Structure of matter 2) Properties of matter I 3) II 4) Forms of matter
	C-2 Chemical analysis	1) Chemical equilibrium 2) Detection and quantitative analysis 3) Clinical application of a analytical technique
	C-3 Biomolecular structure·imaging to determine conformation	1) Method of analyzing biomolecules 2) Conformation of biologically active molecules and interaction (active sites)
To learn chemical pharmacy	C-4 Chemical properties and reactions	1) Basic properties of molecules 2) Structure of organic compound 3) Functional moieties 4) Determination of chemical structure
	C-5 Synthesis of target molecule	1) Induction and conversion for functional moiety 2) Synthesis of complicated compounds
	C-6 Physical pharmacy and medicinal chemistry	1) Structure and properties of biomolecules 2) Properties pharmaceutical preparations
	C-7 Pharmacologic agents	1) Animal, herbal and mineral sources of drugs 2) Drugs of natural origin 3) Botanical/herbal medicine in modern medicine
To learn biological pharmacy	C-8 Origin of being	1) Human physiology 2) A cell as a basic unit of organism 3) Functional regulation of living body 4) Microbes
	C-9 Microbiological understanding for life	1) Constituent elements of a cell 2) Information carried by genes 3) Role of proteins in human physiology 4) Bioenergy 5) Physiologically active molecule and signal molecule 6) Manipulate genes
	C-10 Immunology	1) Biological protection 2) Damage of immune systems and applications of immune systems 3) Infectious disease
Health and environment	C-11 Public health	1) Nutrition and health 2) Social group and health 3) Disease and prevention
	C-12 Environment	1) Effect of chemical substances on living organism 2) Life environment and health
Drug and disease	C-13 Drug mechanism of action (pharmacodynamics and pharmacokinetics)	1) Drug action and biotransformation 2) Efficacy of a drug I 3) Efficacy of a drug II 4) Absorption, distribution and excretion 5) Pharmacokinetic analysis
	C-14 Pharmacotherapy	1) Pathophysiology 2) Disease and drug therapy (cardiac disease) 3) Disease and drug therapy (renal disease) 4) Disease and drug therapy (psychiatric disorder) 5) Antiinfectives, chemotherapy in oncology
	C-15 Drug information	1) Drug information 2) Patient information 3) Patient specific drug therapy
To produce drugs	C-16 Drug formulation	1) Physiochemical properties of dosage forms ingredients 2) Product formulation 3) DDS (Drug Delivery System)
	C-17 Drug development and production	1) Process of drug development and production 2) Development and optimization of a lead compound 3) Biomedical product and genomic information 4) Therapy 5) Biostatistics

Table 3. The Proposal "Pharmacy Education Model Curriculum" by the Pharmaceutical Society of Japan

(cont'd)

Pharmacy and society	C-18	Pharmacy and society	1) Legislation and regulatory systems affecting pharmacist 2) Social security system and pharmacoeconomics 3) Community pharmacy
D. Clerkship			
Hospital pharmacist and pharmacist in community pharmacy	D-1	Clerkship for hospital and community pharmacy	1) Prescription and dispensing 2) Solving dispensing problems 3) Drug administration and supply 4) Risk management 5) Instruction for drug-use and dealing with patients
	D-2	Experiential education in a hospital and community pharmacy (1) To master practice skills through a clerkship	1) Pharmacist as a health care professional 2) Manner as a pharmacist 3) Familiarize students to medication 4) Patient assessment 5) To document activity
		Experiential education in hospital and community pharmacy (2) Pharmacist's activities (hospital)	1) Dispensing in a hospital 2) Drug distribution and procurement 3) Management of information 4) Bed side practice 5) Prepare medication •check medication
	D-2	Experiential education in hospital and community pharmacy (3) Pharmacist's activities (hospital)	Summarizing clerkship
		Experiential education in a hospital and community pharmacy (4) Pharmacist's activities (community pharmacy)	1) Dispensing practice at a community pharmacy 2) Pharmacy product and their management 3) To access information and its management 4) Providing nonprescription medication for patients 5) Regional pharmacist services
	D-2	Experiential education in hospital and community pharmacy (5) Pharmacist's activities (community pharmacy)	Summarizing clerkship
E. For graduation	E-1	General pharmaceutical research	1) Research methodology 2) To acquire research activities 3) Encounter with the pathway (a close encounter of another kind)
	E-2	General pharmacy practice	

discussion, role play or presentation that are necessary to learn specific skills in pharmacists' activities, are worthwhile to introduce into Japanese pharmacy education. Additionally, OSCE, the use of which mimics patient interactions and deals with drug related problem evaluation examination, was adopted as part of PEBC after 2000 in Canada. It is not used in the United States for pharmacy graduates although it is used medical school examinations. With the introduction of the six-year pharmacy education program, it is appropriate adopting this type of examination in Japan.

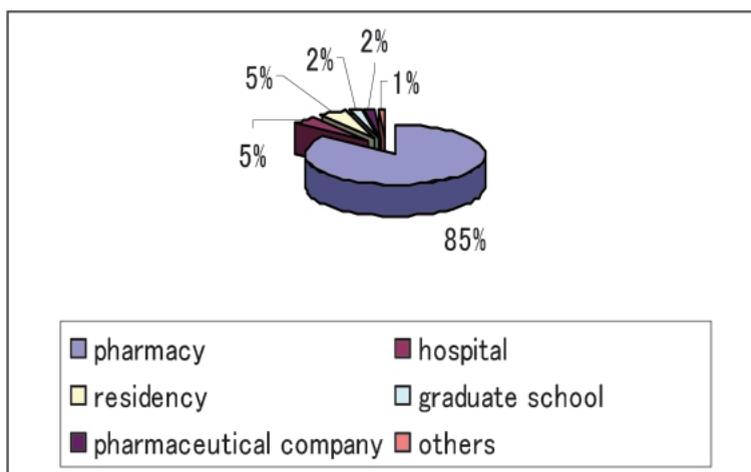
The employment of Canadian pharmacy graduates was; community pharmacy 85%, hospital 5%, residency 5%, graduate studies 2%, industry 2%, others 1% (Fig. 1).^{10,11} In comparison, in Japan, employment of pharmacy graduates in community pharmacy was 44%, in hospitals 22%, in pharmaceutical industry 21%, in universities 1%, graduate stu-

dies 1%, government or public administration 3%, and other 8%. Therefore, the career choice of pharmacy graduates in Japan was wider than in Canada (Fig. 2).¹²

A comparison of the number of pharmacy graduates on a per capita basis shows that Japan has twice as many as Canada, and other Western countries (Table 4). Also, the number of students admitted into each Japanese pharmacy school was approximately two hundred versus one hundred for Canadian schools. This means that there will be a large number of pharmacists available who can be utilized in many ways in the health care system.

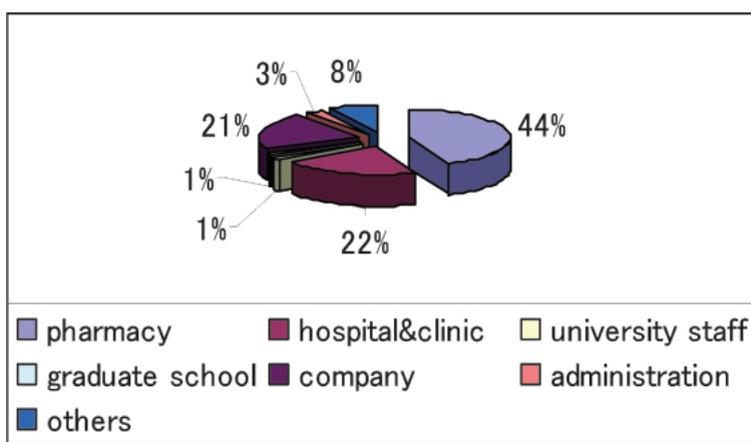
CONCLUSION

Based on the examination of pharmacy education and the pharmacists' role in Canada and the West, we wish to propose a strategy for the pharmacists' role in health care and for pharmacy education in Japan



(in the case of University of Alberta, as of 1998)^{9,10}

Fig. 1. Career Options for Pharmacy Graduate in Canada



(as of 2001)¹¹

Fig. 2. Career Options for Pharmacy graduate in Japan

Table 4. Population versus Number of Annual Pharmacy Graduates in the West and Japan

(as of 2001)

	Number of annual pharmacy graduates (approximately)	Number of the faculty/schools of pharmacy	Average number of graduates per one faculty or school	Total population (as of 1999)	Annual pharmacy graduates per population (per a hundred thousand)
Canada	1000	9	110	30,493,000	3.3/100000
Japan	8400	46	182	126,505,000	6.6/100000
United States	8000	83	96	273,133,000	2.9/100000
England	1500	16	93	58,744,000	2.6/100000
Germany	1900	23	82	81,421,960	2.3/100000
France	2250	23	98	59,099,000	3.8/100000

since the role and education of Japanese pharmacists have lagged those of the Western world and pharmacists' activities been not shifted to clinical-oriented activities, there is a need for change, these changes will have to overcome numerous problems regarding

pharmacists' activities and pharmacy education, such as inconsistency between health care setting and educational facilities, a standard curriculum for the six-year program, poor pharmacy management due to deregulation, and doubts as to the role of pharmacist.

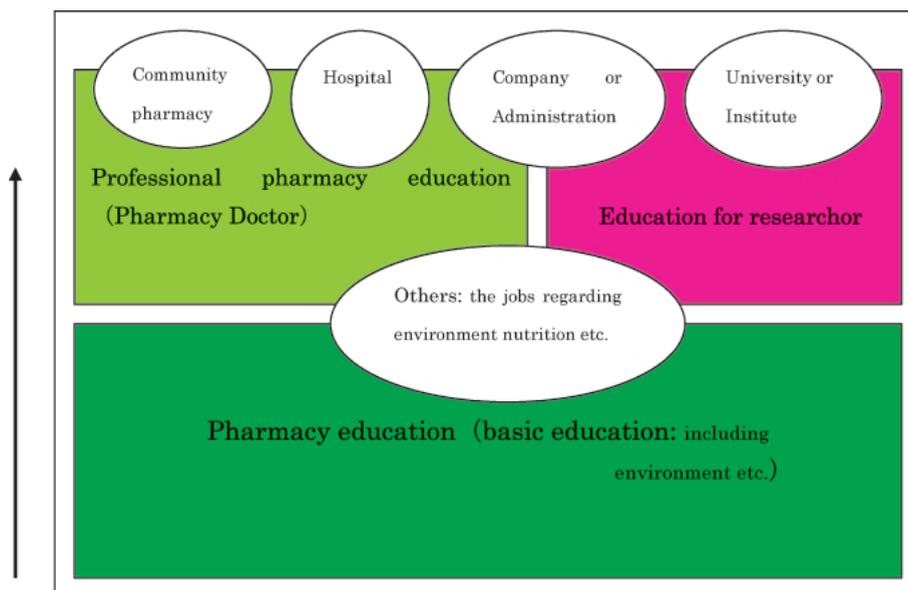


Fig. 3. Ideal Image for Future Pharmacy Education and Pharmacist Activities¹³⁾

These problems cannot be solved by pharmacist's individual efforts. Thus, it is useful to refer the content of Canadian pharmacy education and the pharmacists' role that are examined.

In order to improve the effectiveness of the pharmacist as a health care professional and to provide high quality health care, it is important to introduce a six-year pharmacy education program immediately. This will raise the level of care to that in other countries and meet international standards for pharmacy practice. There is also a need to examine pharmacy education in the future in the context of the oversupply of pharmacists and the need for expanding the scope of career choices and possible retraining.

The important challenge is to immediately revise the pharmacy education system by; developing pharmacists with advanced clinical skills, focusing on pharmacy practice education, and applying pharmaceutical knowledge towards improving health care.

We proposed a future pharmacy education in Fig. 3. This is one of the proposals for Japanese pharmacy education to establish a six-year program of later stage for over supplying pharmacy graduates and is not only pharmacy professional education but also including educational program as a researcher.

Further examination on "Rinsho yakugaku" and "Iryo yakugaku" that were indicated last paper¹³⁾ should continue. Canadian pharmacy professional education courses, such as "Social and administrative pharmacy", "Introduction to Institution Practice

and Patient Counseling with the Emphasis on Non-Prescription Drug", and "Monitoring Drug Therapy on Patient Interview, Patient Counseling and Drug Information", the use of clinical rotations in community and hospital pharmacy, and an education plan for practitioners to enable them to meet the teaching objectives of the academic program would be introduced and a plan would be prepared on how to introduce them.

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