

REVIEW

# Pharmacy technician training in Mongolia: Past, present, and future

Purevsuren Sodnomtseren<sup>ID</sup>, Mandakhnaran Purevkhuu<sup>ID</sup>, Baigalmaa Dovchinsuren<sup>ID</sup>, Tugsbileg Sanjkhuu, Boditsetseg Badarch<sup>ID</sup>, Ariunaa Damdinsuren<sup>ID</sup>, Bolor Bayarkhuu<sup>ID</sup>, Otgonbat Batjargal<sup>ID</sup>, Myagmarsuren Badamtsetseg<sup>ID</sup>, Khatanbold Otgonbayar

School of Pharmacy, Mongolian National University of Medical Sciences, Mongolia

## Keywords

Mongolia  
Pharmacy practice  
Pharmacy technician

## Correspondence

Purevsuren Sodnomtseren  
School of Pharmacy  
Mongolian National University of  
Medical Sciences  
Mongolia  
purevsuren@mnums.edu.mn

## Abstract

The first official training of pharmacy technicians started in 1926 in Mongolia and pharmacy technicians were the only national pharmaceutical staff till the first national pharmacist graduated in 1954. Pharmacy technicians have played a valuable role in pharmaceutical care and service in Mongolia for the last century, which is still maintained nowadays. As of June 2022, one public university and one private medical institute implemented a pharmacy technician curriculum in Mongolia, and 512 pharmacy technicians had graduated in 2016-2020. Graduated pharmacy technicians are eligible to work in a community pharmacy, hospital, or pharmaceutical industry after being registered. They can also further their studies to get a B. Pharm. degree with an additional three years of training. As of 2020, a total of 2009 pharmacy technicians worked in Mongolia, 807 of them were employed in Ulaanbaatar and 1556 pharmacy technicians worked in the community pharmacies.

## Introduction

Mongolia is a central Asian country and divided into the capital city, Ulaanbaatar, and 21 *aimags* (provinces) which are further divided into 330 *soums* (sub-provinces) and *soums* into bags in terms of an administrative unit. As of 2020, the total population of Mongolia was 3357.5 thousand, with an increase of 60.7 thousand (1.8%), and the life expectancy at birth reached 70.71 years and increased by 0.3 points as compared to the previous year respectively (National Statistics Office, 2021). A total of 70% of the population lived in cities, and the remaining 30% resided in rural areas. The population of Mongolia is still young, as 31.9% of the overall population was aged under 15 years, 63.8% was aged 15-64 years, and 4.3% was aged 65 years and over in 2020 (Medicine and Medical Devices Regulatory Authority, 2021).

Mongolia has a rich history of more than 5000 years of Traditional Mongolian Medicine (TMM), and it is one of the most valuable heritages of the Mongolian people (Bold, 2022). TMM was the only available method of healthcare in Mongolia before Western medicine was

introduced at the beginning of the 19th century (Pitschmann, 2013). The Mongolian people developed traditions and knowledge to use plants, animal raw materials, and minerals in the treatment of diseases and prepared traditional medicines preparations from natural materials for centuries. Natural raw materials were identified, prepared from natural sources, washed, dried, soaked, processed, chopped, powdered, and traditional medicines formulations were prepared by mixing, extracting, burning, and other methods in TMM for centuries (Ministry of Health, 2021).

In the first years of the People's Revolution in 1921, the Government of Mongolia followed a policy to develop modern medicine along with Mongolian-Tibetan medicine and invited Soviet doctors and other health professionals. The resolution of the Military Council issued on August 15, 1921, to establish a hospital to serve the military and civilians was the first policy document of the Government of Mongolia to provide modern healthcare services to the population. The first pharmacy of Western medicines, established on 25 October 1923, was the cornerstone of Mongolian

current pharmaceutical facilities (Ministry of Health, 2021). The first official training of pharmacy technicians started in 1926, and pharmacy technicians were the only national pharmaceutical staff till the first national pharmacist graduated from the Moscow Medical Institute of the Soviet Union in 1954, and the first 33 pharmacists graduated from the Medical Institute of Mongolia (current Mongolian National University of Medical Sciences) in 1966 (Purevsuren, 2021).

For the last century, especially until Mongolia had national pharmacists, pharmacy technicians played a valuable role in pharmaceutical care and service in Mongolia, and their role is still maintained nowadays. In 2022, one public university (Mongolian National University of Medical Sciences) and one private medical institute (Enerel Medical Institute) implemented a pharmacy technician curriculum in Mongolia.

The aim of this paper is to provide an overview of the general understanding of past and present pharmacy technician training in Mongolia. Furthermore, it will provide insight into the current challenges and opportunities for pharmacy technician training which may influence further pharmacy technician training in Mongolia.

### **Pharmacy technician training – Past**

At the beginning of the development of modern medicine in Mongolia, there were no schools to prepare pharmaceutical professionals. In order to train the national staff of the pharmaceutical profession, Mongolians were trained by accompanying Soviet specialists who were working at the time in Mongolia. At first, they were accustomed to the pharmacy work, then got knowledge of pharmacy and trained in professional activities. They were trained to wash medicine bottles, clean pharmacies, package medicines, prepare medicines, and have literacy and numeracy skills after working hours (Tsetseglen, 2010). The official training for pharmacy technicians was conducted in the following educational entities;

1. The course training
2. Training at the Human Medical College
3. Training at the Medical Colleges
4. Training at several schools

#### ***The course training***

The opening of a sanitary and pharmacy technician course with 10 people at the Red Army in 1926 was the first training of national pharmacy technicians in Mongolia. In 1929, a temporary course was opened to

train pharmacy technicians, and seven apprenticed pharmacy technicians who trained in 1927 were included in the examination with the graduate students of the temporary course. In June 1937, a permanent course was opened to train pharmacy technicians (Tsetseglen, 2010), and by 1940, there were 38 pharmacy technicians in Mongolia (Purevsuren, 2021).

#### ***Training at the Human Medical College***

The smallest number of pharmacy technician students and graduates occurred in the first years of the pharmacy technician training at the Human Medical College, and it may be related to the circumstances of that time. On the one hand, after the 'People's Revolution', there was a need to teach literacy to the population, establish and develop modern education, health, and many other sectors in Mongolia, and train specialists in many professional sectors. On the other hand, although the development of the modern education system and professional training required human resources, the number of qualified personnel was relatively low, and the modern training, which was different from traditional training, may have required some time to get used to it.

The Human Medical College was established in 1931 and planned three years of training for four professions, including a pharmacy technician in 1933. In 1936, one pharmacy technician graduated; in 1940, 13 pharmacy technicians graduated from the Human Medical College (School of Nursing, 2019). In 1941, the pharmacy technician undergraduate training was officially opened at the Human Medical College, and in 1944, six pharmacy technicians graduated (Tsetseglen, 2010). Since 1945, the training for pharmacy technicians has been conducted for two years. The course for professional development of pharmacy technicians started in 1960 at the Human Medical College, according to the Health Minister's order (School of Nursing, 2019).

A pharmacy technician was trained at a Military Medical School in the Soviet Union from 1941-1945, and it was the first case of a pharmaceutical professional who had been trained abroad (Ministry of Health, 2021).

#### ***Training at the Medical Colleges***

The Medical College in Ulaanbaatar was the main educational entity for undergraduate and postgraduate training of pharmacy technicians. Although the Medical colleges were established in Dornogobi aimag in 1962 and in Gobi-Altai aimag in 1967, and The College of Nursing was established in Darkhan-Uul aimag in 1969, they didn't conduct the training for pharmacy

technicians till 1998. The training for pharmacy technicians became three years of training in 1972 (School of Nursing, 2019).

For Mongolia, the period since 1990 has been one of rapid political, economic, and social change. Politically, the country had moved from a single-party to a multiparty, and the communist government modelled on the Soviet model had moved to democracy. Economically, it moved through a transition from a centrally planned and command economy to a market economy. The education sector was by structural adjustment policies, and the strong economic crisis had serious consequences for higher education in Mongolia. Facilities and equipment presented major problems across all levels of education in Mongolia and buildings and other facilities were in poor repair due to a lack of funds for maintenance (Weidman, 1998). The political change of the 1990s had a strong impact on higher education. When Mongolia transitioned to democracy, values of autonomy and academic freedom of universities were redefined and reflected in legal documents (Munkh-Erdene, 2008) and there was a reform in the education system (Gantogtokh, 2018). Some universities, institutes, and colleges were restructured and some were closed down.

The training for pharmacy technicians had stopped for some years and the last pharmacy technicians graduated from the Medical College in 1993 due to the close down of the Medical College (Purevsuren, 2021).

### **Training at several schools**

The College of Nursing was established in Mongolia in 1985. All heritages of the Medical College were transferred to the College of Nursing in 1997 according to the Joint Order of Science and Education, and Health and Social Welfare (School of Nursing, 2019). A number of schools had started pharmacy technician training due to the trend of shortage of professionals in connection with the closure of the pharmacy technician training, and on the other hand, due to the increasing demand for pharmacy technicians with the development of the private sector.

The College of Nursing became a part of the Medical University of Mongolia (current Mongolian National University of Medical Sciences) in 1997 and started the training for pharmacy technicians in 1998 with 40 students. The Medical University also opened a temporary course for pharmacy technicians from medical professionals with Diploma Degree in 2000 due to the shortage of pharmacy technicians in Mongolia.

The Medical College at Dornogobi *aimag* started the training for pharmacy technicians in 1998, the Medical College at Gobi-Altai *aimag* started in 1999, and the

Medical College at Darkhan-Uul *aimag* (former the College of Nursing) started in 2000.

The School of Pharmacy was established in 2003 on the basis of the Department of Pharmacy when the Medical University was restructured into the Health Sciences University of Mongolia (HSUM). The Medical Colleges at Dornogobi, Gobi-Altai, and Darkhan-Uul *aimags* became the branch Schools of HSUM in 2010.

HSUM was restructured into the Mongolian National University of Medical Sciences (MNUMS) in 2014, and the Department of Pharmacy technician, the main education unit for pharmacy technician training in Mongolia with a long history, had been transferred from the School of Nursing to the School of Pharmacy of the MNUMS according to this restructuring. Since 2014, the School of Pharmacy of MNUMS has been the main school for pharmacy technician training and leads the curriculum revision, implementation and accreditation, competence framework development, and pharmacy technician development in Mongolia.

A Monos College, the first private College for pharmacy education, was established in 2000, and this college conducted training for pharmacy technicians from 2009-2014. Totally 88 pharmacy technicians graduated from Monos College in 2011-2014 by four graduations. An Enerel private Medical College started the training for pharmacy technicians in 2015.

The Ministry of Labor and Social Protection was responsible for the training of pharmacy technicians till 2020, and the Ministry of Education and Science is now responsible.

## **Pharmacy technician training – Present**

### **Healthcare system**

The healthcare service of Mongolia is divided into public health and medical care services (The State Great Khural, 2011) and the medical care service is further divided into family healthcare service, specialised care service, emergency care, ambulance service, specialised nursing care service, and rehabilitation care services (The State Great Khural, 2016).

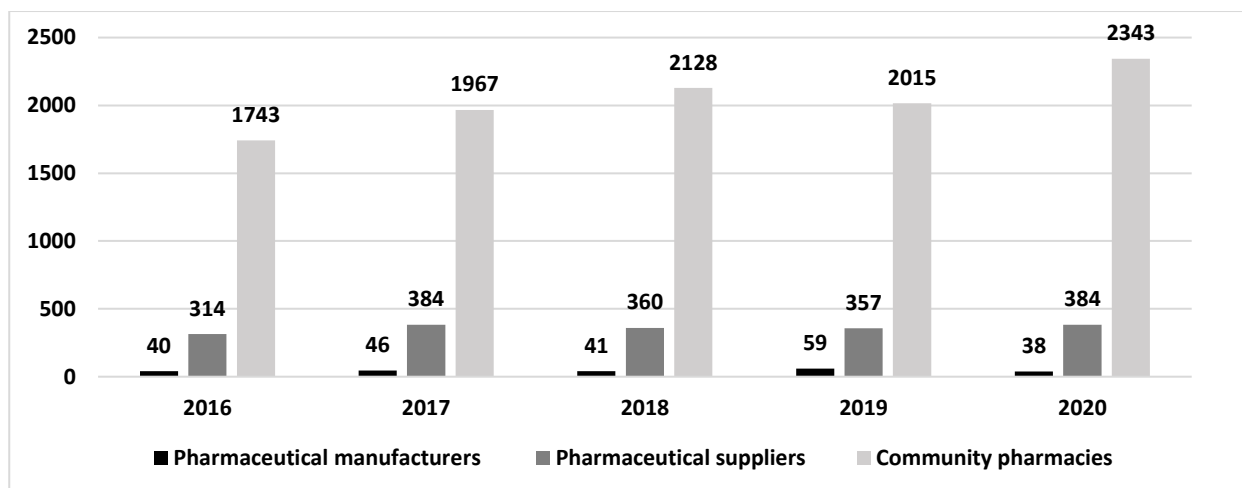
The medical care service is delivered to the population by two levels of care services, primary, and referral levels, and is organised according to the administrative divisions. Primary level care service is provided through family and soum health centres, and specialised hospitals and centres, regional diagnostic and therapeutic centres, general and maternal hospitals, clinics are responsible for referral-level care service

(The State Great Khural, 2011). Family health centres provide primary medical care services in Ulaanbaatar and other cities, and in aimag centres. In rural areas, primary healthcare service is provided through the soum health centre.

The health facilities system of Mongolia consists of state-owned, private, and mixed-owned health facilities that are in charge of public health, medical care service, pharmaceutical supply, health education, research, and training (Center for Health Development, 2021). Some ministries and Ulaanbaatar Railway, a Mongolian Russian Joint venture company, have their own Central hospitals. In 2021, a total of 4952 health facilities were operational in Mongolia. Out of that, there were 13 specialised hospitals, 15 national specialised centres, five regional diagnostic and treatment centres, 16 *aimag* general hospitals, four district general hospitals, nine public health centres, six rural general hospitals, 321 soum health centres, 208 family health centres, 239 private hospitals with inpatient bed and 1491 private clinics (Center for Health Development, 2022).

### Pharmacy situation in Mongolia

According to the Law on Medicine and Medical devices, Mongolian pharmaceutical facilities consist of pharmacies, pharmaceutical suppliers, and manufacturers (The State Great Khural, 2010). All pharmaceutical facilities must comply with Mongolian national standards of General requirements for pharmaceutical facilities, which describe the classification, management and organisation, personnel, premises, equipment, operations and requirements, and duties of specialists of pharmaceutical facilities. The Mongolian pharmaceutical sector is fully privatised except pharmacies of public hospitals and the number of pharmaceutical facilities is increasing yearly. As of 2020, a total of 2765 pharmaceutical facilities were operating, out of which 84.7% were pharmacies; 13.9% were pharmaceutical suppliers, and 1.4% were pharmaceutical manufacturers as shown in Figure 1.



Adapted from Pharmaceutical sector indicators 2020, Medicine and Medical Devices Regulatory Authority, 2021

**Figure 1: Number of pharmaceutical facilities from 2016-2020**

In total, 38 licensed pharmaceutical manufacturers operated on the country level, including the manufacture of medicines and medical devices, biologically active products, and disinfectants, and 24 of them were medicines manufacturers in 2020. A total of 384 pharmaceutical suppliers (overlapped) operated in the following areas: medicines suppliers (258), medical devices suppliers (294), medical equipment suppliers (184), suppliers of biologically active products (102), suppliers of laboratory diagnostics and reagents (78), prostheses suppliers (45) and disinfectant

suppliers (12) in 2020 (Medicine and Medical Devices Regulatory Authority, 2021).

Two types of pharmacies, community and hospital pharmacies, deliver pharmaceutical care services to the people of Mongolia. According to the MNS 5260:2015 "General requirement for pharmacy", the community pharmacies are classified into the first and second category pharmacies according to their types of operation (Mongolian Agency for Standard Metrology, 2015). Drug revolving funds operate as community pharmacies to deliver services to the rural population at the soum level. These funds were first established in

soums as a local property around 1994 to address problems with availability, affordability, and quality of essential medicines at that level, and over the years different organisational models were implemented to solve the problems such as financial sustainability and quality of services. Drug revolving funds have been privatised in the last years. Community pharmacies operate the activities such as compounding and dispensing medicines, organising and participating in activities to promote the rational use of medicines, and improving the health education of the public. In 2020, a total of 2343 pharmacies were operating nationwide, of which 234 (10%) were the first category pharmacies, 1798 (76.7%) were the second category pharmacies and 311 (13.3%) were Drug revolving funds. In the capital city, 1343 (57.3%) pharmacies operated while 1000 (42.7%) pharmacies operated in the local areas

(Medicine and Medical Devices Regulatory Authority, 2021).

### **Training and curriculum**

Students who wish to study to be pharmacy technicians must complete 12 years of secondary school and pass the General Entrance Exam. Four Schools (School of Pharmacy in Ulaanbaatar, branch Medical Schools at Dornogobi, Gobi-Altai, and Darkhan-Uul *aimags*) of MNUMS and one private Medical Institute (Enerel Medical Institute) implement a pharmacy technician curriculum of three years. The pharmacy technician curriculum is outcome-based and the main components are fundamental sciences and pharmaceutical sciences, as shown in Table I.

**Table I: The curriculum for pharmacy technicians, MNUMS**

Year	Subjects
1 <sup>st</sup> year	Biology, Physics, Medical Chemistry, Organic Chemistry, Analytical Chemistry, Mongolian History, Computer Information Technology, Professional English, Communication Skills, Fundamentals of Ethics, Mongolian Language and Literature, Physical Education
2 <sup>nd</sup> year	Microbiology, Biochemistry, Anatomy, Physiology, Pathology, Botany, Medicinal Plants, Traditional Mongolian Medicine, Pharmaceutical Chemistry-I, Medical Devices, Pharmaceutical Technology-I, Public Health
3 <sup>rd</sup> year	Pharmaceutical Technology-II, Galenic Technology, Pharmaceutical Industry Technology, Pharmacy management, Drug market Research, Clinical Pharmacology, Clinical Pharmacy, Pharmaceutical Chemistry-II

The pharmacy technician curriculum of MNUMS had been revised a total of eight times and the last revision focused on patient-centred pharmaceutical care. The National Council for Education Accreditation was established in Mongolia in 1998. The National Council for Education Accreditation accredited the pharmacy technician curriculum in 2012 and 2019, respectively.

MNUMS started the development of competence frameworks for each profession in 2014 and competence frameworks for the B. Pharm. curriculum implemented by MNUMS were approved in 2016. These frameworks were the first competence frameworks for medical professionals in Mongolia. The development of competence frameworks for the Diploma in Pharmacy (Pharmacy technician) also referred to as D.degree started in 2017 and the pharmacy technician competence framework consisting of five domains was developed by the School of Pharmacy and approved in 2018 (Mongolian National University of Medical Sciences, 2019). Here are the domains of the competency framework:

**Organisation of care practice:** A pharmacy technician is a specialist who respects the laws and ethics in his professional activities and provides quality and safe pharmaceutical care.

**Pharmaceutical expertise:** A pharmacy technician is a specialist who possesses the necessary knowledge, skills, and attitudes to provide patient-centred pharmaceutical care and be able to assist pharmacists.

**Communication:** A pharmacy technician creates constructive, proactive, and positive relationships with patients, their families, caregivers, pharmacists, other medical professionals, and administrative personnel.

**Interdisciplinary collaboration:** Pharmacy technicians collaborate with pharmacists, colleagues and other healthcare professionals, and administrative personnel to ensure adequate patient-centred pharmaceutical care.

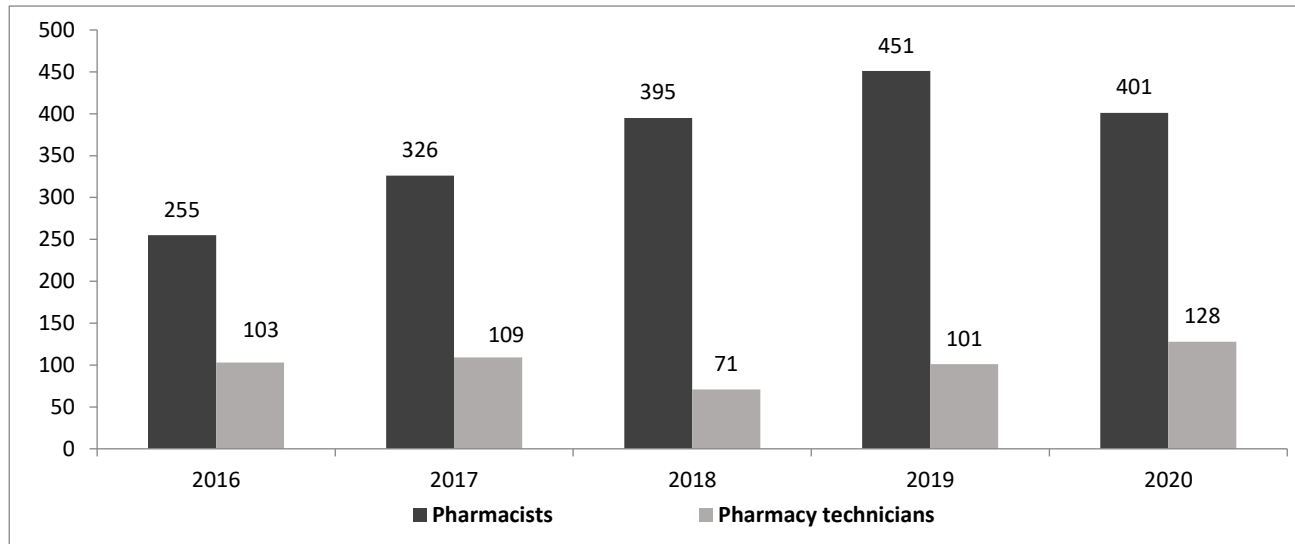
**Personal development:** Personal development as a competency domain was characterised as the ability to reflect on and improve one's own knowledge and skills.

### **Employment**

The need for pharmacy technicians is increasing with the expanding number of pharmaceutical facilities in Mongolia. Graduated pharmacy technicians are eligible to work in community pharmacies, hospitals (either public or private), and pharmaceutical industries after being registered, or also possible to further study towards getting a B. Pharm. degree with an additional

three years of training. In Mongolia, the percentage of employment of graduated pharmacy technicians and pharmacists is 100% unless they don't want to work for personal reasons. From 2016-2020, 512 pharmacy technicians graduated, and on an average of five years'

data, 87.5% of them graduated from MNUMS. The number of graduated pharmacy technicians was relatively lower than the number of pharmacists as shown in Figure 2.



Adapted from Pharmaceutical sector indicators 2020, Medicine and Medical Devices Regulatory Authority, 2021 with revision

**Figure 2: The number of pharmacy and pharmacy technicians graduates from 2016-2020**

In 2020, a total of 2639 pharmacists and 2009 pharmacy technicians worked nationwide and the ratio of pharmacist to pharmacy technician was 1.31:1 in Mongolia. Compared to the previous year, the number of pharmacists increased by 15% while the number of pharmacy technicians decreased by 13% (Medicine and Medical Devices Regulatory Authority, 2021).

Pharmaceutical sector indicators reported by Medicine and Medical Devices Regulatory Authority provided the pharmaceutical sector data. As of 2020, a total of 2009 pharmacy technicians worked in Mongolia, as shown in Figure 3, of which 807 (40.17%) pharmacy technicians were employed in Ulaanbaatar and 1202 (59.83%) in the local area. An amount of 1556 (77.45%) pharmacy technicians worked in community pharmacies, 137 (6.82%) at pharmaceutical suppliers, 148 (7.37%) at soum health centres, 165 (8.21%) at hospitals, and 3 (0.15%) at other facilities (Medicine and Medical Devices Regulatory Authority, 2021). The decrease in the number of pharmacy technicians working in the health system may be related to the number of pharmacy technicians furthering their education for a B. Pharm. degree.

According to legislation, only a pharmacist is licensed to manage a pharmacy in the cities and in *aimag* centres, but a pharmacy technician can manage a pharmacy at the soum level (Mongolian Agency for Standard

Metrology, 2015), due to some features of the country. Mongolia has extremely low population density over a large territory and the rural area lacks qualified personnel. In 2020, 1832 (69.42%) pharmacists worked in Ulaanbaatar and 807 (30.58%) in the local areas, including *aimag* centres and *soums*. Pharmacists were unavailable in most *soums*.

The Mongolian National Standards on Structure and activity of the soum and village health centres (Mongolian Agency for Standard Metrology, 2013) and on General requirements of pharmacy (Mongolian Agency for Standard Metrology, 2015) provide pharmacy technician staff positions at that level. However, the joint order of the Ministry of Health and Ministry of Finance on the methodology of financing soum and village health centres does not include pharmacy technician staff positions (Ministry of Health and Sports, 2015). Due to this situation, many soum health centres don't have pharmacy technicians. Although this situation may not affect the number of pharmacy technician students or graduates, it may affect the quality and safety of pharmaceutical care and the role of pharmacy technicians in healthcare service at the soum level. Previously, pharmacy technicians worked in a pharmacy and in addition to the soum health centre. A soum health centre operates at 10–15 beds for inpatient care, basic surgery, and delivery

services (Jigjidsuren A, 2019) and bed utilisation was 42.5% in 2021 (Center for Health Development, 2022). In 2020, 148 pharmacy technicians worked in the *soum* health centre (Medicine and Medical Devices Regulatory Authority, 2021). It means 182 *soum* health centers didn't have pharmacy technicians, which may affect the quality and safety of pharmaceutical care service in rural areas.

Pharmacy technicians can work as a compounding or sales staff in the pharmaceutical industries. In the industry, pharmacy technicians assist pharmacists and mainly work in store management, logistic tasks, and auxiliary tasks in offices. Pharmacy technicians are also able to work in hospitals and they are mostly responsible for the preparation and compounding of prescriptions ordered by the doctor (Gereltuya Dorj et al., 2018) and also participate in the activities of medicines information, promotion of rational use of medicines and adverse drug reaction reporting (Ministry of Health, 2012). The main role of pharmacy technicians in the community pharmacy is dispensing and compounding of medicines, and they also perform tasks of medicines information, checking prescriptions and stock-related activities such as receiving and registering products (Mongolian Agency for Standard Metrology, 2015).

Globally, the roles and scope of work for technicians vary greatly according to the country and practice areas within that country (Koehler, 2017) and the roles of pharmacy technicians identified in the literature show the expansion from the traditional role of dispensing to patient-centred care. Generally, the pharmacy technicians play a role in procurement, receiving donations of medicines, distribution and dispensing of medicines, packing and repacking of medicines, disposal of medicines, budget and reimbursement, medicines information and counselling, medication history including medication reconciliation, medication therapy management, preparation or compounding of medications, and immunisation (Koehler, 2017; Mattingly, 2017).

### Pharmacy technician training - Future

The following challenges and opportunities will affect not only perspectives of pharmacy technician training, but also the job position and roles of pharmacy technicians in the healthcare service of Mongolia.

#### Challenges

There is a shortage of pharmacy technicians in Mongolia due to an increase in the number of pharmaceutical facilities and a decrease in interest to study to become a pharmacy technician. The number

of students studying to become pharmacists is increasing in Mongolia with the expanding number of Universities and Colleges offering the pharmacy curriculum. Students prefer to study for five years to become a pharmacist, instead of studying for three years to become a pharmacy technician. Due to the small number of pharmacy technician students and low tuition fees, some private schools closed pharmacy technician training.

Public sector salaries are lower than those of the private sector, so the interest in working for the public sector is limited for pharmacy technicians. Pharmacists and pharmacy technicians work in the same job position for dispensing medicines in a community pharmacy, and because of salary differences, the private sector is interested in hiring pharmacy technicians. All these factors will decrease the interest to work as a pharmacy technician.

Although the pharmacy technician training programme has shifted to patient-centred care and service, in reality, pharmaceutical care and service are still product-oriented, especially in community pharmacies in Mongolia. Even in hospitals, patient-centred care and service are not promoted and a multi-professional healthcare team has not been formed. On another side, the workload of pharmaceutical professionals working in hospitals is overloaded due to the small workforce in hospital pharmacies in connection with the limited financing of hospitals. All these factors may slow the advancement of education to meet future practice needs and influence inspiration to work as pharmaceutical professionals.

#### Opportunities

The Mongolian Government adopts the Sustainable Development Goals of the United Nations and implements the "Vision-2050" long-term development policy of Mongolia, and aims to improve the health education of the population, promote the rational use of medicines, support the health facilities with capacities of providing quality, safe and equal "patient-centred care and services" to the public, improve the quality and availability of care and service in rural areas and provide the quality and safety of medicines and medical devices within these policies (The State Great Khural, 2020). With the need to advance the healthcare system in Mongolia, the Government of Mongolia supports the development of clinical pharmacy and the introduction of patient-centred care and multi-professional healthcare team in hospitals.

The Ministry of Health encourages the pharmacy practice to be patient-centred and not product-oriented, the pharmacy workforce to be an active part of the multi-professional healthcare team, and to

enhance the competence of graduates in advancing healthcare services. The progress is slow, but inspiration is high.

There are several opportunities to expand pharmaceutical facilities' activities, especially in community pharmacies. Community pharmacy in many countries provides a wide range of services such as product-focused service, including the compounding of medicines and collecting expired medicines, improving the use of medicines, primary care and public health services of vaccination, health promotion initiatives, smoking cessation, HIV test, harm reduction services, and other advanced services beyond dispensing (FIP, 2017). Mongolian community pharmacies can expand their competence by adopting the provision of these services. However, medicines use review, medication therapy management, medication reconciliation, and collecting expired medicines service implementation should be prioritised.

The workforce education and training in Mongolia should focus on meeting the need of the practice. The curriculum must support patient-centred and multi-professional healthcare to produce pharmaceutical professionals with enough competence to contribute to direct patient care in all settings. Relevant stakeholders, such as policymakers, academics, employers, and graduated professionals should work together to improve the curriculum to meet the need of future practice and the country's needs for quality, safe and equal "patient-centred care and services" and public health improvement in connection with "Vision-2050". International cooperation will make an important contribution to improving the curriculum and education, developing the pharmaceutical sector, and expanding the role of pharmaceutical professionals.

Although there are no statistics on the demand for pharmacists and pharmacy technicians in Mongolia, it can be seen from the minimum number of those professionals indicated in the legislation and the number of health facilities. According to the legislation, the minimum number of pharmacy technicians for community and hospital pharmacies is 1-2 (Mongolian Agency for Standard Metrology, 2015). In 2020, there were 2343 community pharmacies, 298 public and private hospitals, and 322 soum health centers in Mongolia. Due to the increasing demand for pharmacy technicians in Mongolia, some private universities are interested in conducting pharmacy technician training. For example, Etugen University is preparing to start the training in September 2022. In Mongolia, the new curriculum must be covered in the pre-accreditation stage before being implemented. The pharmacy technician curriculum of Etugen University was pre-

accredited in March 2022 by the National Council for Education Accreditation. Furthermore, Continuing Professional Development (CPD) programmes are available for pharmacy technicians and the School of Pharmacy. MNUMS conducts several CPD programmes for pharmacy technicians.

## Conclusion

Over the last century, pharmacy technician training in Mongolia, which began with a training course in 1926, has evolved with curriculum revision done eight times. The last revision of the curriculum focused to prepare pharmacy technicians with the competence to provide patient-centred care. This curriculum is in line with the future direction of pharmaceutical care and service in Mongolia. Nowadays, public and private schools conduct three years of training, and annually, about 100 pharmacy technicians have graduated in 2016-2020. Over the last 100 years, pharmacy technicians had played a valuable role in the Mongolian health sector, especially in the pharmaceutical sector and their role is still maintained nowadays. Although there is an increasing demand for pharmacy technicians, the interest in studying this profession is decreasing. There is a need to inspire an interest in further training and improving the working conditions of graduated pharmacy technicians.

## Conflict of interest

The authors declare no conflict of interest.

## Source of funding

The authors did not receive any funding.

## References

- Bold, Sh. (2022). Brief History and Development of Traditional Mongolian. Retrieved June 2022. Available at: [https://www.wipo.int/edocs/mdocs/tk/en/wipo\\_ipk\\_bkk\\_09/wipo\\_ipk\\_bkk\\_09\\_topic6\\_1.pdf](https://www.wipo.int/edocs/mdocs/tk/en/wipo_ipk_bkk_09/wipo_ipk_bkk_09_topic6_1.pdf)
- Center for Health Development. (2021). Health indicators 2020. Retrieved July 2022. Available at: [http://hdc.gov.mn/media/uploads/2021-08/Eruul\\_mendiin\\_uzuulelt\\_2020.pdf](http://hdc.gov.mn/media/uploads/2021-08/Eruul_mendiin_uzuulelt_2020.pdf)
- Dorj, G., Sunderland, B. V., Sanjjav, T., Gendenragchaa, B., Dorj, G., Hendrie, D., & Parsons, R. (2018). Country Report:



- Pharmacy education and practice in the context of Mongolia. *Pharmacy Education*, **18**, p 212–216. <https://pharmacyeducation.fip.org/pharmacyeducation/article/view/496>
- Gantogtokh, O (2018). Higher Education Systems and Institutions, Mongolia. In J.C.Shin, P.Teixeira (Ed.), *The Encyclopedia of International Higher Education Systems and Institutions* (pp 1–6). Springer, Dordrecht. [https://doi.org/10.1007/978-94-017-9553-1\\_505-1](https://doi.org/10.1007/978-94-017-9553-1_505-1)
- International Pharmaceutical Federation-FIP (2017). Pharmacy at a glance – 2015-2017. The Hague. The Netherlands: International Pharmaceutical Federation. Retrieved July 2022. Available at: <https://www.fip.org/file/1348>
- Koehler, T., Brown, A. (2017). A global picture of pharmacy technician and other pharmacy support workforce cadres. *Research in Social and Administrative Pharmacy* **13**, 271-279. <https://doi.org/10.1016%2Fj.sapharm.2016.12.004>
- Mattingly, AN., Mattingly, TJ. II. (2017). Advancing the Role of the Pharmacy Technician: A Systematic Review. *Journal of the American Pharmacists Association*. <https://doi.org/10.1016/j.japh.2017.10.015>
- Medicine and Medical Devices Regulatory Authority. (2021). Pharmaceutical sector indicators 2020. Retrieved June 2022. Available at: <https://mmra.gov.mn/?id=200306>
- Ministry of Health (2012). An order of the Minister of Health. The new job description model for nurses and medical specialists. Number 183. Retrieved August 2022. Available at: <https://moh.gov.mn/uploads/files/02e4949d15c5b1ea27702cf49fb3d587.pdf>
- Ministry of Health and Sports (2015). Joint order of the Minister of Health and Sports and Minister of Finance. The financing methodology of Soum and Village Health Center. Number 498/345. Retrieved June 2022. Available at: <https://legalinfo.mn/mn/detail/12513>
- Ministry of Health. (2021). A 100-year history of the development of Modern Medicine in Mongolia. Ulaanbaatar: Soyombo Printing
- Mongolian Agency for Standard Metrology. (2013). Structure and activity of the soum and village health centers. MNS 5081:2013. Retrieved June 2022 from <https://estandard.gov.mn/standard/v/4512>
- Mongolian Agency for Standard Metrology. (2015). General Requirement for Pharmacy. MNS 5260:2015. Retrieved June 2022. Available at: <https://estandard.gov.mn/standard/v/4838>
- Mongolian National University of Medical Sciences. (2019). Competency of pharmacy technician. In Division of Training Policy and Coordination, Competency of professionals (pp.119-152)
- Munkh-Erdene, Lkhamsuren. (2008). Reforming state university governance: Public status and shared governance. Policy paper. Open Society Forum. Retrieved August 2022 from [http://pdc.ceu.hu/archive/00006324/01/Reforming\\_State\\_University\\_Mongolia.pdf](http://pdc.ceu.hu/archive/00006324/01/Reforming_State_University_Mongolia.pdf)
- National Statistics Office. (2020). Mongolian Statistical Yearbook. Retrieved June 2022. Available at: [https://1212.mn/BookLibraryDownload.ashx?url=Yearbook2020.all\\_link..pdf&In=Mn](https://1212.mn/BookLibraryDownload.ashx?url=Yearbook2020.all_link..pdf&In=Mn)
- Pitschmann, A., Purevsuren, S., Obmann, A., Natsagdorj, D., Gunbileg, D., Narantuya, S., Kletter, Ch., Glasl, S. (2013). Traditional Mongolian Medicine: history and status quo. *Phytochemistry Reviews*, **12**, 943-959. <https://doi.org/10.1007/s11101-013-9321-5>
- Purevsuren, S. (2021). One sexagenarian cycle of School of Pharmacy, Mongolian National University of Medical Sciences. Ulaanbaatar: Munkhiin useg Printing
- School of Nursing. (2019). School of Nursing - 90 years. Ulaanbaatar: Khos Tugul Printing
- The State Great Khural of Mongolia. (2010). Law on Medicine and medical devices 2010. Retrieved July 2022. Available at: <https://legalinfo.mn/mn/detail/85>
- The State Great Khural of Mongolia. (2011). Law on Health 2011. Retrieved July 2022. Available at: <https://legalinfo.mn/mn/detail/49>
- The State Great Khural of Mongolia. (2016). Law on Medical care service 2016. Retrieved July 2022. Available at: <https://legalinfo.mn/mn/detail/11929>
- The State Great Khural of Mongolia. (2020). "Vision-2050" long-term development policy of Mongolia. Retrieved July 2022. Available at: <https://legalinfo.mn/mn/detail/15406>
- Tsetseglen, G. (2010). Drug quality control and development in Mongolia. Ulaanbaatar: Tsomorlig Printing
- Weidman, J.C., Regsurengiin, B., Javzan, S., Tsendjav, J., Suren, D. (1998). Mongolian higher education in transition. Planning and responding under conditions of rapid change. *Tertium comparationis*, **4**(2), 75-90. <https://doi.org/10.25656/01:2884>