

# Comparison of Standardized Training for Clinical Pharmacists of Two Major Institutions in China

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**Abstract:** *By means of policy analysis, literature review and expert consultation, the development history, training process and evaluation criteria of the foundation of clinical pharmacists established by the Pharmaceutical Professional Committee of the Chinese Hospital Association and the Chinese Clinical pharmacy Society were compared. There are certain differences in enrollment management, training arrangements, and assessment standards between the two universities. On the basis of the present condition, the standardization and homogenization of clinical pharmacist training have been gradually improved and realized.*

**Keywords:** *Clinical pharmacists, Standardized training, The Chinese Hospital Association Pharmaceutical Specialized Committee, The Chinese Society of Clinical Pharmacy*

## 1. Introduction

Clinical pharmacists are the main providers of pharmaceutical services and rational drug use, and reasonable staffing of clinical pharmacists is the key to the development of pharmaceutical services<sup>[1]</sup>. At present, pharmacy services in Chinese hospitals, especially clinical pharmacy services, are generally undertaken by clinical pharmacists. However, due to the large number of medical institutions in China, there is a serious imbalance between the social public health demand for clinical pharmacists and the scale and quality of clinical pharmacist training<sup>[2][3]</sup>.

As the concept of “clinical pharmacy” is accepted by countries all over the world, the construction of clinical pharmacists has also received increasing attention. Many countries, including China, have established distinctive training models for clinical pharmacists, training a large number of high-quality clinical pharmacists to meet the needs of social public health for clinical pharmacists<sup>[4][5]</sup>. At present, the training methods of clinical pharmacists in China are mainly divided into two categories: on-the-job training and academic education in colleges and universities. The standardized training of clinical pharmacist bases established nationwide is an important way for on-the-job training of clinical pharmacists<sup>[6]</sup>. Based on the current situation in China, the standardized training of clinical pharmacists is mainly undertaken by the Chinese Hospital Association Pharmaceutical Specialized Committee (CHAPSC) and the Chinese Society of Clinical Pharmacy (CSCP). However, due to the different era backgrounds in which they were responsible for the training work, there are still some differences in the clinical pharmacist training systems established by the two institutions, and the real standardization, normalization, and homogenization of clinical pharmacist training needs to be investigated<sup>[7]</sup>.

At present, most of the existing research focuses on the standardized training system for clinical pharmacists established by CHAPSC<sup>[8]</sup>. There is little discussion on the training situation of CSCP, and there is no research on the differences in the training system between the two institutions, so it is difficult to provide relevant information. Provide a reference for further research. Therefore, this study compared and analyzed the differences in the standardized training of clinical pharmacists in the two institutions by consulting the documents and guidelines issued by the two institutions and searching relevant literature. Specifically, this study will elaborate on the development process of the training of the two institutions, student recruitment, training objectives, training content, assessment methods, and training management, and find out the current stage of CHAPSC and CSCP in carrying out clinical pharmacist training work. The differences are analyzed and the reasons are analyzed to provide a certain reference for the further development of related research.

## 2. Method

By searching CHAPSC official website (<http://ntbcp.drugsafe.cn/>), CSCP official website ([www.cnscsp.org/](http://www.cnscsp.org/)), and WeChat official account related to clinical pharmacist standardized training section, to obtain the latest training guidelines of the two institutions and policy. A series of content such as professional setting, enrollment requirements, training objectives, training content, and assessment standards of the standardized training of clinical pharmacists in the two institutions come from training guidelines and policies. In addition, the data on the scale of training bases of each institution comes from "National Academic Conference of the Chinese Society of Clinical Pharmacy 2020" and "2020 Annual Congress of Chinese Clinical Pharmacy & the 16th Chinese Clinical Pharmacist Forum".

## 3. Comparison of clinical pharmacist training between the CHAPSC and the CSCP

### 3.1 History

The standardized training of clinical pharmacists in China started relatively late. In November 2005, the General Office of the former Ministry of Health (now the National Health Commission) announced the list of 19 medical institutions as the first batch of base training pilots and entrusted CHAPSC to be responsible for the organization and management of the training base. In 2010, CHAPSC established a working expert committee and formulated the training outline and training base management rules for each specialty. By drawing on the advanced experience of international pharmacist training, CHAPSC has gradually explored a set of standardized training systems for clinical pharmacists suitable for China's national conditions. In 2017, under the approval of the medical management center of the former Health and Family Planning Commission (now the National Health and Health Commission), CSCP officially undertook the work of standardized training for clinical pharmacists, and carried out the construction of clinical pharmacist teacher centers and student centers nationwide, which also means The on-the-job training of clinical pharmacists began to be carried out by two different institutions, and the basic information of the two institutions' training is shown in Table 1. Based on CHAPSC's training work experience, as of 2021, CSCP has established 149 clinical pharmacist trainee centers and 36 teacher centers, and the training scale has begun to take shape.

Table 1: Basic information on the two institutions

Category	Pharmaceutical Affairs Committee of Chinese Hospital Association	CSCP of Chinese Medical Association
Start time	In 2006	In 2017
Certification body	Former Ministry of Health	Former Health and Family Planning Commission Medical Management Center
Organizational structure	Each provincial (municipal, district) level shall establish a professional committee for pharmaceutical affairs management, and set up a provincial expert committee for clinical pharmacist work to implement hierarchical management	Each provincial (municipal, district) level has set up CSCPs, and established provincial standardized training management offices for clinical pharmacists to implement hierarchical management
Training location	Training base	Center
Training scale	264 training bases	149 trainee training centers
	17 teacher training bases	36 teacher centers
	14,498 clinical pharmacists	491 clinical pharmacist trainees
	2071 clinical pharmacists	396 clinical pharmacists
Base management	Regular adjustment, 5-year cycle	Regular audits, 3-year cycle
Training cycle	Tongke full-time training for 6 months The training is 12 months in total	Stage 1: 3 months of comprehensive skills theory training Stage 2: 9 months of professional training in clinical practice
Certificate issuance	"Job Training Certificate"	The "Comprehensive Skills Training Certificate" and "Specialist Qualification Certificate" will be issued in stages

### 3.2 Training Process

#### 3.2.1 Professional Settings

CHAPSC and CSCP have their emphases in a professional setting. CHAPSC has two stages: General and Specialist. The general training period is 6 months, aiming at cultivating trainees' clinical thinking and the basic ability to provide clinical medication services; the specialist training period is 12 months, aiming at providing pharmaceutical services in different specialized fields for clinical pharmacists who have completed general training Skills training; CSCP has two types of comprehensive skills training and 17 professional pieces of training. Students apply in the form of "comprehensive skills + professional training", that is, comprehensive skills are mandatory, and professional training can choose one of the 17 majors. After choosing a major, students can sign up for two theoretical exams each year, and carry out the first stage of non-part-time theoretical study through the method of "mainly self-study and supplementary teaching". Only after passing the pass can they proceed to the second stage of part-time clinical practice training. The specific majors offered by the two institutions are shown in Table 2.

Table 2: Professional settings of the two institutions

Category	Pharmaceutical Affairs Management Committee	Clinical Pharmacy Society
Same specialty	Parenteral enteral nutrition, obstetrics, gynecology, respiratory medicine, anti-infective drugs, anticoagulant therapy, endocrinology, neurology, pain medication, pediatric medicine, nephrology, gastroenterology, cardiovascular medicine, ICU, psychiatry, oncology	Parenteral Enteral Nutrition, Obstetrics, and Gynecology, Respiratory Medicine, Anti-Infective, Anticoagulant, Endocrinology and Metabolism, Neurology, Pain, Pediatrics, Nephrology, Gastroenterology, Cardiovascular, ICU, Psychiatric, oncology
Different specialty	General Medicine, General Medicine, Immune System Drugs, Geriatric Medicine, Emergency Department	Organ transplantation, infectious diseases, first aid

Note: General practice training is only applicable to the training program of in-demand talents (clinical pharmacists).

From the table above, the professional coverage of the CHAPSC setting is wider and the applicable population is more. It is mainly different from the two specialties of geriatric medicine and general medicine. Among them, the newly established geriatric medicine specialty of CHAPSC focuses on the special physiological and pathological conditions of the elderly population, to promote the rational use of medicines for the elderly population. In line with the current aging process in China, it can better reflect the "patient-centered" personalized clinical drug thinking. As a major specialty offered by CHAPSC, general medicine majors generally focus on chronic disease management and anti-infective drug treatment. In medical institutions, they are mainly engaged in basic clinical pharmaceutical services, such as prescription reviews, medication explanations, and medication consultations wait. However, judging from the current training arrangement, there are still problems such as a relatively short training cycle, complicated learning tasks, and wide knowledge coverage in general science training. It is difficult for trainees to accept the huge knowledge system in a short period, making it difficult to guarantee the training effect. In response to this situation, Liu Qiusha et al. believe that academic surveys play an important role in general professional training<sup>[9]</sup>. During the training period, the teaching teacher should fully understand the background and foundation of the trainees, teach students with different foundations following their aptitude, and track the training dynamics and assessment results of the general science students throughout the process. Jin Zhiping and others believe that general training should pay more attention to the study of theoretical courses. Compared with specialist training, the theoretical foundation of some general training students is not solid enough, resulting in a low overall professional level and a lack of close connection between work and clinical practice<sup>[10]</sup>. This requires teachers to upgrade theoretical teaching methods and apply them in a variety of ways. Theoretical teaching methods to ensure the effect of general subject professional training.

#### 3.2.2 Admissions Management

The educational background, years of clinical work, and personal learning ability of the trainees will seriously affect the training effect, so the qualifications of the trainees need to be strictly checked when recruiting<sup>[11]</sup>. As early as 2009, the former Ministry of Health (now the National Health Commission) put forward clear requirements for the academic background of the trainees: graduates with a bachelor's degree or above in pharmacy or clinical pharmacy. However, considering the differences in the development stages of China's pharmaceutical higher education system and pharmaceutical service work, CHAPSC later proposed in the "Notice on Further Strengthening the Construction of the Clinical

Pharmacist System” in the “Supplementary Regulations on the Conditions for Enrolling Students in Clinical Pharmacist Training Bases” that the requirements for the trainees’ academic qualifications, years of service in medical institutions, and the level of the hospital where they are located are appropriately relaxed as a transition period to adapt to the training situation. For non-pharmaceutical, pharmaceutical preparations, pharmaceutical analysis, medicinal chemistry, and other majors, students who lack clinical knowledge and clinical practice ability will be admitted conditionally. The specific enrollment requirements of CHAPSC students are shown in Table 3.

Table 3: Admissions requirements of the Professional Committee on Pharmacy Management

Medical institutions	First degree	Second degree	Years of service	job title	specialized
Pharmacists in tertiary medical institutions	Clinical Pharmacy (Full-time undergraduate)	/	1 year	Pharmacists	General / Specialty
	Pharmacy, Pharmacology, Pharmaceutical Preparations, Pharmaceutical Analysis, Medicinal Chemistry (Full-time Undergraduate)	/	2 years	Pharmacists	General / Specialty
		Clinical Pharmacy (Master’s/PhD)	1 year	Pharmacists	General / Specialty
	Other majors (Full-time undergraduate)	Pharmacy, Pharmacology, Pharmaceutical Preparation, Pharmaceutical Analysis, Medicinal Chemistry, Clinical Pharmacy (Master’s/PhD)	2 years	Pharmacists	General / Specialty
		/	5 years	Pharmacist in charge	Tongko
	Pharmacy, Pharmacology, Pharmaceutical Preparations, Pharmaceutical Analysis, Medicinal Chemistry (Full-time Specialty)	Pharmacy, Pharmacology, Pharmaceutical Preparation, Pharmaceutical Analysis, Medicinal Chemistry, Clinical Pharmacy (Part-time Bachelor)	5 years	Pharmacist in charge	Tongko
Pharmacy, Pharmacology, Pharmaceutical Preparation, Pharmaceutical Analysis, Medicinal Chemistry, Clinical Pharmacy (Master’s/PhD)		5 years	Pharmacist in charge	Tongko	
Pharmacists in secondary hospitals and below	Clinical Pharmacy, Pharmacy, Pharmacology, Pharmaceutical Preparations, Pharmaceutical Analysis, Medicinal Chemistry (Full-time Specialty)	/	2 years	Pharmacists	Tongko
	Non-clinical pharmacy, pharmacy, pharmacology, pharmaceutical preparations, pharmaceutical analysis, medicinal chemistry (full-time specialty)	/	5 years	Pharmacist in charge	Tongko

Although to a certain extent, relaxing the enrollment requirements can effectively expand the training scale, correspondingly, the difference in the qualifications of the trainees will affect the training effect and pose a challenge to teachers. Therefore, to ensure the professionalism of the clinical pharmacy talent team in medical institutions, CHAPSC also pointed out in the “Supplementary Regulations” that from 2021 onwards, the enrollment standards for students should be gradually changed from the transition period to better guide the development direction of pharmacist vocational education, to clarify the academic orientation of clinical pharmacy talents in the hospital. Different from CHAPSC, CSCP requires students to have a major in pharmacy or clinical pharmacy when enrolling in each major, and also puts forward requirements on the personal ability of students: for example, they must pass the National University English Test Band 4. On the one hand, this restrictive condition raises the threshold for standardized training of clinical pharmacists, and on the other hand, it also puts forward requirements

for the unification of the current clinical pharmacy discipline education standards, which ensures the healthy development of clinical pharmacy discipline. In addition, both CHAPSC and CSCP implement the entrusted training system, that is, the base only accepts trainees from foreign units, and cannot train pharmacist trainees from their medical institutions, to improve the transparency of the training work and ensure the rigor of the training<sup>[12]</sup>.

### 3.2.3 Training Objectives

The overall goal of standardized training for clinical pharmacists set by CHAPSC and CSCP is consistent, both of which are aimed at cultivating clinical application-oriented talents with certain humanistic qualities who can provide pharmaceutical services in medical institutions. However, from the perspective of the training objectives of each major, there are corresponding emphases between the two. CHAPSC pays more attention to the cultivation of knowledge and skills in the clinical use of anti-infective drugs. In addition to setting up a separate anti-infective drug specialty, the training objectives of multiple specialties including general medicine all emphasize the professional knowledge and skills of anti-infective clinical application. Taking the ICU profession as an example, in addition to requiring the trainees to master the basic knowledge and skills of common diseases in the ICU profession, they also need to master the knowledge of anti-infectious diseases and the ability to apply drugs, such as drug application monitoring methods and index control. In contrast, CSCP has less emphasis on the clinical application of anti-infective drugs, the training goals set are more professional and unique, and most of the training goals are limited to the specialty. The specific training objectives are shown in Table 4.

Table 4: Training objectives of the two institutions (intensive care medicine)

Extent	CHAPSC	CSCP
understand	The etiology, pathogenesis, clinical manifestations, diagnostic points, treatment principles, and treatment methods of common diseases in ICU;	Some ICU disease severity judgment criteria and organ function assessment criteria, as well as related treatment methods
familiar	Clinical application monitoring methods and index control of anti-infective drugs	Medical knowledge and drug treatment plan of common diseases admitted to ICU
	The ICU specializes in pathophysiological changes, clinical manifestations, diagnosis, and treatment principles of common infectious diseases	
master	Professional knowledge and skills in the clinical application of commonly used anti-infective drugs	
	Analysis and evaluation of drug treatment regimens for common diseases in ICU	
	Treatment evaluation and pharmaceutical monitoring of commonly used anti-infective drugs in ICU	
	The pharmacokinetic and pharmacotherapeutic information of commonly used drugs in ICU can discover and solve common clinical drug problems	
have	Basic ability to provide pharmacy monitoring for patients receiving complex drug therapy	Conduct a comprehensive evaluation of patients, optimize the ability of treatment plans, and realize individualized treatment evaluation and plan formulation of patients
	The ability to continue clinical pharmacy work in the future.	Patients were evaluated at follow-up and treatment outcomes were continuously evaluated

### 3.2.4 Training Content

Before CSCP formally undertook the training of clinical pharmacists nationwide, there was only the "Clinical Pharmacist Training Outline" (hereinafter referred to as the "Outline") for each specialty issued by CHAPSC, which was relatively empty in content and lacked specific guidance for training. It is difficult for the base to form a unified teaching model. In 2017, CSCP organized and compiled the "National Clinical Pharmacist Training Series Textbooks" (hereinafter referred to as "Textbooks"). Based on the "Outline", it provided detailed guidance on the theoretical training and practical training content of each specialty. In terms of teaching methods, the "Textbook" proposes that the training base should adopt on-site teaching and problem-based learning (PBL) practical teaching methods. Improve students' clinical thinking and improve students' learning initiative and critical thinking ability<sup>[13][14]</sup>. In terms of

teaching arrangements, the “Textbook” sets up a weekly training plan for students, which clarifies the weekly learning items and task requirements of students during the training period, unifies the teaching mode, and standardizes the teaching progress to a certain extent.

However, CHAPSC and CSCP have not yet formulated a unified training guideline. Given that CSCP is responsible for the relatively short time for pharmacist training, formulating a unified and detailed training guideline can effectively improve the effectiveness of clinical pharmacist training and ensure the homogeneity of training quality<sup>[15]</sup>. Therefore, in the future, the two institutions may consider continuing to optimize the training content and rules on the original basis. Gradually apply unified training materials for the same training specialty. For different specialties set up by each other, we should learn from each other’s experience, strengthen the cooperation of their respective clinical pharmacist work expert committees, and provide more specific guidance on how to implement the training plan in the training base. On this basis, consider developing a unified training guide.

### **3.2.5 Training and Assessment**

As an important part of assessing the professional ability level of trainees, trainee training assessment is the most effective way to test the training effect. At present, the CHAPSC and the CSCP both adopt qualitative and quantitative assessment systems, and the quantitative indicators implement a percentage system, and the pass is 60 points. In terms of assessment items, the CHAPSC and the CSCP are also different. The training assessment of the CHAPSC is generally arranged after the trainees’ training and is mainly divided into trainees’ communication ability interviews, theoretical examinations, case analyses, and process reviews. Each project has clear requirements for examination indicators, assessment time, and difficulty. The training and assessment of the Clinical Pharmacy Association mainly include theoretical examination, homework review, and practical assessment. Among them, the practical assessment project, in addition to the on-site investigation of the professional knowledge and skills of the students, will also track the students’ provision of pharmaceutical services and patients’ satisfaction with the students through questionnaire surveys and telephone follow-ups. At present, the two institutions have not yet established a unified question bank, the case assessment also lacks standardized patients, and the homogeneity of training effects has yet to be investigated.

Although the CHAPSC and the CSCP have formulated corresponding assessment systems in their respective bases, the cross-institutional assessment standards have not yet been unified, which is due to the differences in professional settings of the two institutions on the one hand, and may also be attributed to the fact that the two institutions have their focuses on the formulation of training content, and it is difficult to test with unified standards. However, the inconsistency of training assessment standards greatly affects the homogeneity of training effects. In the future, the two institutions may consider jointly establishing a unified theoretical examination question bank according to their respective professional settings and training goals, and organize students to conduct centralized theoretical assessment. On this basis, each training base can also realize regional and cross-institutional joint examinations. It can not only promote the unification of training evaluation standards but also improve the transparency of the assessment process and better test the training effect of trainees.

### **3.2.6 Training Management**

As an important part of evaluating the professional ability of trainees, trainee training assessment is the most effective way to test the training effect. At present, both CHAPSC and CSCP adopt a qualitative and quantitative assessment system, and the quantitative indicators implement a 100-point system, with 60 points for passing. In terms of assessment items, CHAPSC and CSCP are also different. CHAPSC’s training assessment is generally arranged after the training of trainees, which is mainly divided into interviews on trainees’ communication skills, theoretical examinations, case analyses, and process reviews. There are clear requirements for the assessment indicators, assessment time, and difficulty level of each project. CSCP training assessment mainly includes three items: theoretical examination, homework review, and practical assessment. Among them, the practice assessment project, in addition to the on-site inspection of the professional knowledge and skills of the trainees, will also use questionnaires and telephone follow-up to track the pharmaceutical services provided by the trainees and the patient’s satisfaction with the trainees. At present, the two institutions have not yet established a unified question bank, and the case assessment also lacks standardized patients, and the homogeneity of the training effect remains to be investigated.

Although CHAPSC and CSCP have established corresponding assessment systems in their respective bases, the cross-institutional assessment standards have not yet been unified. Institutions have different emphases in the formulation of training content, and it is difficult to test with uniform standards. However, the non-uniformity of training assessment standards has greatly affected the homogeneity of training

effects. In the future, the two institutions may consider jointly establishing a unified theoretical examination question bank according to their respective professional settings and training objectives, and organize students to conduct centralized theoretical examinations. On this basis, each training base can also realize the joint examination within the region and across institutions. It can not only promote the unification of training evaluation standards but also improve the transparency of the assessment process and better test the training effect of trainees.

#### 4. Conclusions

Standardized training for clinical pharmacists Since the first batch of base training pilots started in 2006 after 17 years of practice and exploration, a relatively complete standardized training system for clinical pharmacists has been established, and a large number of high-quality clinical pharmacists have been trained to serve in hospital positions, which has initially met Increasing demand for rational drug use management and pharmaceutical technical services<sup>[16]</sup>. However, there are still some differences in the training system between CHAPSC and CSCP, which are currently in charge of training. To truly build a standardized, normalized, and homogeneous clinical pharmacist training base, relevant policymakers must coordinate and coordinate clinical pharmacist training. We will work together to continuously import a large number of high-quality clinical pharmacists to Chinese hospitals.

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