# Competency-Based Continuing Education for Clinical Reasoning in General Practitioners: An Exploration and Differential Analysis (Postprint)

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## Abstract

Objective: To address practical issues in general practitioners' work, enhance their job competency, and explore the cultivation of general practice clinical reasoning.

Methods: Based on literature review and evaluation feedback from previous continuing education workshops on general practitioners' practice competencies, the curriculum management was reformed through optimized design and assessment. A post-training evaluation was conducted via Wenjuanxing among 200 general practitioner trainees from different community institutions in Shanghai participating in the eighth session, assessing the overall and multi-level improvements in their general practice clinical reasoning and job competency.

Results: The questionnaire survey response rate was 86%. Among the surveyed general practitioners, 88.95% held bachelor' s degrees, 61.05% had intermediate professional titles, and 23.26% were undergoing residency training. Regarding overall improvement in clinical reasoning ability after training, 52.33% and 21.51% of general practitioners reported moderate and substantial improvement, respectively. For overall job competency, 56.00% and 22.09% reported moderate and substantial improvement, respectively. Specifically, 77.91% of general practitioners reported moderate or greater improvement in overall job competency through general practice clinical reasoning instruction, with no statistically significant differences in competency improvement across the 11 basic characteristic dimensions involved ($P>0.05$). Compared with general practice clinical reasoning instruction, the research training module resulted in moderate or greater improvement in job competency for 66.28% of participants, showing a statistically significant difference ($P<0.05$). The improvement in clinical reasoning ability and job competency after training was higher among attending physicians and above (81.36%, 85.59%) than among residents (57.41%, 62.96%), and

higher among practicing physicians not in residency training (80.30%, 83.33%) than those in residency training (52.5%, 62.5%) (P<0.01). In training areas including image interpretation, general clinical reasoning, and diagnosis and treatment of common dermatological and ENT diseases, the improvement in job competency was greater among attending physicians and above compared to residents, and greater among practicing physicians not in residency training compared to those in residency training (P<0.05).

Conclusion: Optimized general practice continuing education training significantly improves both clinical reasoning and job competency. In designing training to enhance general practitioners' clinical reasoning and job competency, attention should also be paid to the integration of various knowledge and skills in the training, as well as the practical experience foundation and accumulation of the trainees.

## Full Text

## Preamble

**Continuing Education Exploration and Differentiation Analysis of General Practitioners' Clinical Diagnostic Thinking Based on Job Competency**

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## Abstract

**Objective:** To address practical work challenges faced by general practitioners (GPs) and enhance their job competency through targeted training in clinical diagnostic and treatment thinking.

**Methods:** Based on literature review and evaluation feedback from previous continuing education workshops on GP practicing ability, we optimized the course design and assessment methodology. Using Wenjuanxing (a Chinese online survey platform), we conducted post-training evaluations of 200 GPs from

various community institutions in Shanghai who participated in the eighth workshop cohort, assessing improvements in their clinical diagnostic thinking and overall job competency across multiple dimensions.

**Results:** The questionnaire response rate was 86%. Among respondents, 88.95% held bachelor' s degrees, 61.05% had intermediate professional titles, and 23.26% were undergoing standardized residency training. Regarding overall improvement in clinical diagnostic thinking, 52.33% reported substantial improvement and 21.51% reported major improvement. For overall job competency, 56.00% reported substantial improvement and 22.09% reported major improvement. Specifically, 77.91% of GPs demonstrated substantial or greater improvement in job competency through the clinical diagnostic thinking training, with no statistically significant differences across the 11 competency dimensions ($P>0.05$). Compared with clinical diagnostic thinking training, the research training module yielded substantial or greater improvement in 66.28% of participants, representing a statistically significant difference ($P<0.05$). Improvements in both clinical diagnostic thinking and job competency were significantly higher among attending physicians (81.36%, 85.59%) compared with residents (57.41%, 62.96%), and higher among practicing GPs not in standardized training (80.30%, 83.33%) compared with those in training (52.5%, 62.5%) ($P<0.01$). For training in image interpretation, clinical diagnostic thinking, and management of common dermatologic and ENT conditions, attending physicians and practicing GPs not in standardized training showed significantly greater competency improvement than residents and trainees ($P<0.05$).

**Conclusion:** Optimized continuing education programs significantly enhance both the clinical diagnostic thinking and job competency of GPs. Future training design should emphasize integration of knowledge and skills, consider participants' practical experience foundation, and account for experiential accumulation.

**Keywords:** job competency; GP clinical diagnostic thinking; medical continuing education

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## 1. Introduction

General practice, as an independent secondary discipline, provides proactive, comprehensive, continuous, coordinated, and personalized healthcare services. As optimal providers of high-quality primary care, general practitioners (GPs) assume comprehensive health responsibilities throughout the entire care pro-

cess, serving simultaneously as clinicians, educators, communicators, managers, gatekeepers, and coordinators.

China introduced the concept of general practice in the 1980s and gradually explored community health services. In 2011, the State Council issued "Guiding Opinions on Establishing a General Practitioner System," proposing a "5+3" training model combining undergraduate education with standardized residency training. Continuing education plays a crucial role in enhancing the quality of current practicing GPs, with various regions implementing diverse training formats based on local needs.

After more than a decade of exploration and research since introducing the general practice model, China has established national general practice training centers, with most provinces and municipalities conducting standardized or transitional training for GPs. However, given the national context of weak foundations, uneven personnel quality, and insufficient overall technical expertise, GP education faces numerous challenges and difficulties. Particularly in enhancing comprehensive clinical practice capabilities, several pressing issues remain, including:

### 1.1 Incomplete Mastery of Knowledge and Skills by GPs

The current GP workforce exhibits uneven quality, failing to fully meet community needs for comprehensive patient care, disease prevention, and health promotion that integrate biological, psychological, and social dimensions.

### 1.2 Training Content Insufficiently Aligned with Community Clinical Practice Needs

First, course content lacks specificity, making it difficult to motivate learners. Second, training content is overly repetitive and disconnected from community practice. Third, insufficient diversity exists in training content, which typically focuses on clinical disease diagnosis and treatment while rarely addressing equally important areas such as disease prevention, health management, and community-based research.

### 1.3 Inadequate Teaching Faculty

General practice suffers from insufficient faculty numbers and a lack of community preceptors. Some community physicians possess rich practical experience but lack teaching skills, while clinical training bases are dominated by specialist faculty with weak general practice philosophies, failing to adequately demonstrate generalist thinking patterns and medical characteristics in clinical teaching.

### 1.4 Lack of Assessment and Feedback Mechanisms, Reducing Training to Formalities

In summary, China' s current continuing education programs for GPs, including standardized residency training and job-transition training, must closely align with the central goal of enhancing comprehensive quality and meeting job requirements—namely, job competency—and explore the development of a competency-based general practice education system. In contrast, developed countries have essentially established complete general practice education and training systems, including degree education, standardized training, and postgraduate continuing education, featuring mature, coherent, and standardized systems with rigorous preceptorship and regular assessment mechanisms.

The World Organization of National Colleges, Academies, and Academic Associations of General Practitioners/Family Physicians (WONCA) identifies six core competencies for GPs: primary care management, patient-centered care, specific problem-solving skills, comprehensive service capability, community-oriented service, and holistic care provision.

Aligned with these competency elements, general practice continuing education must extend beyond knowledge and concepts to cover and promote practical general practice skills. These comprehensive abilities in diagnosing, caring for, managing, and communicating with community patients are all realized through clinical diagnostic thinking. GPs require stronger history-taking and physical diagnosis capabilities, clinical reasoning and judgment skills, and the ability to solve problems across disciplines, fields, and levels with broad scope, while integrating bio-psycho-social medical thinking to reduce missed and misdiagnoses and address practical clinical problems. Therefore, strengthening and cultivating GPs' clinical diagnostic thinking is particularly crucial.

This study, aligned with WONCA competency elements and aimed at solving practical work problems for GPs, explores the cultivation of clinical diagnostic thinking through optimized implementation and evaluation of a GP practicing ability workshop course.

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## 2. Methods

### 2.1 Optimization Design of the GP Practicing Ability Workshop Continuing Education Course

The first seven cohorts of the GP Practicing Ability Workshop emphasized comprehensive skill development related to GP work capabilities, offering five modules across 30 class hours: "ECG Interpretation," "Community Common Disease Imaging Interpretation," "Chronic Disease Community Management and Rehabilitation Guidance," "Community Common Disease Diagnosis and Treatment," and "Community Research Capability," with emphasis on integrating theory and practical teaching. Feedback from the seventh cohort indicated that while

participants found the course beneficial, they noted limitations in practical application, particularly regarding the chronic disease management module, which was criticized for insufficiently vivid theoretical instruction, lack of novelty, and inadequate practicality.

We conducted literature searches in CNKI, Web of Science, and other Chinese and international databases using the keywords "general practice job competency" and "general practice diagnostic thinking," reviewing and organizing relevant literature to clarify the characteristics of diagnostic thinking abilities related to GP job competency, covering WONCA' s six core competencies and corresponding 11 basic characteristics.

Based on this foundation, we implemented the following optimization design for the eighth GP Practicing Ability Workshop:

**(1) Teaching Methodology Optimization:** Based on literature review and feedback from seventh cohort participants regarding teaching techniques, we optimized instructional formats to address GP job competency-related clinical diagnostic thinking training needs. Using WONCA' s six core competencies and 11 basic characteristics as problem-solving frameworks, we systematically organized the unique thinking processes in general practice clinical diagnosis and treatment, mapping them to relevant teaching content (including general practice diagnostic thinking principles; community common symptoms such as dizziness, cough, psychological issues, multimorbidity, and undifferentiated diseases; and SOAP documentation) and techniques, particularly advances in general practice diagnostic technology. Details are provided in Table 1 .

**(2) Faculty Optimization:** Faculty development constituted a crucial component of course optimization, with adjustments made according to general practice clinical diagnostic thinking teaching requirements:

1) **Faculty Structure:**
   - Transitioned from specialist faculty teaching disease management guidelines to general practice faculty teaching clinical diagnostic thinking
   - All faculty were senior GPs with student teaching and university lecturing experience, actively practicing general medicine with accumulated practical disease management experience
   - General practice clinical diagnostic thinking courses were led by general practice faculty, with flexible involvement of community preceptors and GP trainees for community case demonstrations, meeting diverse methodological and technical requirements
2) **Faculty Training and Assessment:**
   - Enhanced faculty training: Including standardized understanding of GP job competency and clinical diagnostic abilities, collective lesson preparation (completing teaching plans and trial lectures), and course evaluation feedback adjustments
   - Strengthened faculty assessment: Including faculty selection, lesson

preparation requirements and evaluation, course supervision records, and post-course student evaluation feedback

### 2.2 Evaluation of the Optimized GP Practicing Ability Workshop Continuing Education Course

We conducted a questionnaire survey of the eighth workshop cohort, distributing and collecting responses from 200 participants via Wenjuanxing after course completion. The survey included basic participant information and the degree of improvement in clinical diagnostic thinking ability and job competency (no improvement, some improvement, substantial improvement, major improvement).

Clinical diagnostic thinking ability encompassed: undifferentiated disease management, key points in diagnosing and treating common general practice diseases (internal medicine), key points in diagnosing and treating common general practice diseases (non-internal medicine), chronic disease management, general practice diagnostic strategies, humanistic principles, doctor-patient communication, research capability, ECG interpretation, imaging interpretation, laboratory test interpretation, and SOAP documentation.

Job competency was assessed using WONCA' s six core competencies and corresponding 11 basic characteristics, detailed in Figure 1 [Figure 1: see original paper].

### 2.3 Quality Control

To ensure questionnaire authenticity and accuracy, we informed participating GPs about the survey' s purpose and significance via WeChat groups before distribution, retained personal information and contact details of respondents, and verified data completeness and accuracy.

### 2.4 Statistical Methods

After excluding invalid or unreasonable data, we exported results in Excel 2016 format and performed descriptive statistical analysis using SPSS 10.0. Categorical data were expressed as relative numbers and percentages. We conducted frequency statistics for different improvement levels and used chi-square tests for inter-group comparisons, with $P<0.05$ indicating statistical significance.

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## 3. Results

### 3.1 General Characteristics of Evaluated GPs

We distributed 200 questionnaires, receiving 172 valid responses (86% response rate). Among participants, 72.91% were female, mean age was 36.12$±$8.52

years, 61.05% held intermediate professional titles, 88.95% had bachelor' s degrees, and 56.98% were full-time GPs. Detailed characteristics are presented in Table 2 .

### 3.2 Improvement in GPs' Clinical Diagnostic Thinking Ability After Training

Regarding overall improvement in clinical diagnostic thinking, 52.33% reported substantial improvement and 21.51% reported major improvement. Improvements across specific dimensions are detailed in Table 3 .

### 3.3 Improvement in GPs' Job Competency After Training

For overall job competency, 56.00% reported substantial improvement and 22.09% reported major improvement. Specific improvements across the 11 basic characteristics corresponding to WONCA core competencies are presented in Table 4 .

### 3.4 Improvement in Clinical Diagnostic Thinking and Job Competency Across Different GP Groups

Significant statistical differences ($P<0.01$) were observed in substantial or greater improvement in clinical diagnostic thinking and job competency between residents and attending physicians, and between standardized training participants and practicing GPs. No significant differences existed among other groups ($P>0.05$), as detailed in Table 5 .

### 3.5 Impact of Course Modules on GP Job Competency Improvement

The clinical diagnostic thinking module yielded substantial or greater improvement in job competency for 77.91% of participants. Compared with this, the research training module achieved 66.28%, representing a statistically significant difference ($P<0.05$), while other modules showed no significant differences ($P>0.05$). Details are presented in Tables 6 , 7 , and 8 .

### 3.6 Differential Impact of Course Modules on Job Competency Across GP Groups

Research training impact on job competency showed statistically significant differences by gender ($P<0.05$). For image interpretation, clinical diagnostic thinking, and common dermatologic and ENT disease management, attending physicians and practicing GPs not in standardized training demonstrated significantly greater competency improvement than residents and trainees ($P<0.05$), as detailed in Table 9 .

## 4. Discussion

### 4.1 Optimized Continuing Education Significantly Improves GP Diagnostic Thinking and Job Competency

This study demonstrated that after training, 52.33% and 21.51% of GPs reported substantial and major improvement, respectively, in clinical diagnostic thinking, while 56.4% and 22.09% reported substantial and major improvement in overall job competency. Moreover, over 50% of participants reported substantial or greater improvement across multiple dimensions, including key points in common disease management, chronic disease management, diagnostic strategies, doctor-patient communication, humanistic principles, ECG and imaging interpretation, laboratory test interpretation, and SOAP documentation. Similarly, over 50% showed substantial or greater improvement across all six WONCA core competencies and 11 basic characteristics. These findings indicate that optimized continuing education course design and evaluation significantly promote GP diagnostic thinking and job competency. Literature reports highlight that general practice requires unique diagnostic thinking methods that need active development and strengthening, while current training in problem-oriented diagnostic thinking remains insufficient in China. Studies also document inadequate faculty numbers and professionalism, and discrepancies between GP professional backgrounds and actual job requirements. These findings suggest that GP education and training management must emphasize faculty selection, innovative teaching content and formats, and problem-oriented diagnostic thinking training to enhance GP diagnostic thinking and job competency.

### 4.2 Diagnostic Thinking Training in Optimized Programs Promotes All Dimensions of Job Competency

This study found that training in diagnostic thinking produced substantial or greater improvement across all 11 basic characteristics corresponding to the six WONCA core competencies, with no statistically significant differences among dimensions ($P>0.05$). This indicates that innovative diagnostic thinking training in optimized continuing education programs broadly promotes all aspects of job competency, including first-contact care, early intervention, continuous and holistic patient-centered services, strong doctor-patient relationships, community orientation, and clinical decision-making. Enhanced diagnostic thinking facilitates functional improvement, enabling GPs to better adapt to community service requirements. Research reports that GP satisfaction with standardized training curricula varies from a competency perspective, noting issues such as insufficient teaching specificity and limited improvement in community-oriented service capabilities. These findings suggest that clinical diagnostic thinking training helps GPs solve practical problems and holds significant value for actual job competency.

### 4.3 Optimized Training Shows Effectiveness Across Different GP Backgrounds but Requires Integration and Experience Consideration

This study demonstrated substantial or greater improvement in diagnostic thinking and job competency across different genders, urban/suburban locations, and administrative roles ($P>0.05$). Research indicates that GPs with practicing qualifications share similar training content in clinical skills and thinking, creating homogeneous competency characteristics despite different positions. This suggests that optimized continuing education content is effective and applicable across diverse backgrounds. Additionally, no significant differences existed based on prior participation in standardized training or previous workshops ($P>0.05$). A survey of Shanghai GPs who completed standardized training revealed that only 5.3% felt previous training fully met their needs, while 57.24% and 34.21% reported varying degrees of knowledge and skill deficits despite completing three years of training, citing insufficient teaching coverage and lack of specialized faculty. The newly designed "clinical diagnostic thinking" module, taught by GP faculty, demonstrates its important role in promoting job competency and suggests that continuing education programs, including standardized training, should strengthen focus on diagnostic thinking development.

Among course modules, clinical diagnostic thinking training (77.91%) outperformed research training (66.28%) in improving job competency ($P<0.05$). Studies summarizing Chinese GP competency indicator systems rank medical knowledge, clinical skills, teaching ability, and practice-based learning/improvement among the top 10 indicators, without specifically mentioning research competency. This suggests that continuing education must integrate diverse knowledge and skills to enhance job competency, while research training may require greater attention, time investment, and practical integration to improve service, learning, and improvement capabilities. The gender difference in research training impact ($P<0.05$) may relate to participant composition and research foundation, though the 1:2.58 male-to-female ratio could influence results. Studies have identified gender differences in self-assessed research ability among medical graduate students.

This study also revealed differences in improvement based on professional title and career stage, with attending physicians and practicing GPs not in standardized training showing greater gains than residents and trainees ($P<0.01$). Similar patterns emerged for image interpretation, clinical diagnostic thinking, and dermatologic/ENT disease management ($P<0.05$). These findings suggest that diagnostic thinking course design and competency training must consider participants' knowledge foundation and integrate theory with practice to achieve better targeting and effectiveness.

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## 5. Conclusion and Future Directions

This optimized continuing education exploration demonstrates significant improvements in GP diagnostic thinking and job competency and highlights their importance and close relationship. Future training design should emphasize integration of diverse knowledge and skills while considering participants' practical experience foundation and accumulation.

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## References

[1] Zhu Shanzhu. Introduction to General Practice[M]. 4th ed. Beijing: People' s Medical Publishing House, 2013.

[2] Guo Yuanmei, Jia Xuemei, Zhu Junyong, et al. Current status and countermeasures of general practice continuing education in China[J]. Chinese Medical Continuing Education, 2020, 9: 717-720.

[3] ACGME. What We Do[EB/OL]. (2017-7-1)[2018-8-5]. https://www.acgme.org/What-We-Do/Overview.

[4] Wang Zhengang. Learning and reflections from participating in ACGME faculty training[J]. Chinese Journal of Graduate Medical Education, 2018, 2(4): 270-273.

[5] Zhang Xiaoqing. Methods and innovation for cultivating GPs' problem-oriented diagnostic thinking[J]. Chinese Journal of Graduate Medical Education, 2019, 3(1): 24-26.

[6] Ju Xiangli, Pei Dongmei. Discussion on influencing factors and countermeasures for general practice faculty development[J]. China Continuing Medical Education, 2020, 20: 91-93.

[7] Cheng Zhaohui, He Zhifei, He Ai, et al. Status and influencing factors of job competency among community GPs in Chongqing[J]. Medicine and Society, 2020, 9: 72-76.

[8] Yang Sen, Shi Jianwei, Ge Xuhua, et al. Effectiveness of standardized training curriculum from a competency perspective[J]. Chinese General Practice, 2020, 31: 3994-3999.

[9] Qian Zhilong, Ge Yuanyuan, Lu Ping, et al. Homogeneity and heterogeneity of job competency among community GPs in different clinical positions[J]. Chinese General Practice, 2020, 23(28): 3576-3582.

[10] Wang Jian, Yang Hua, Zhao Qi, et al. Analysis of continuing medical education needs among Shanghai GPs who completed standardized training[J]. Chinese Journal of General Practitioners, 2018, 17(1): 33-38.

[11] Wei Yun, Wang Feiyue, Wang Meirong, et al. Research progress on evaluation indicator systems for Chinese GPs' job competency[J]. Chinese General

Practice, 2021, 24(19): 2394-2400.

[12] Zhang Yangyang, Wang Weiwei, Lü Mengwei, et al. Investigation and analysis of research capability among medical postgraduate students[J]. Basic Medical Education, 2020, 22(2): 154-159.

*Note: Figure translations are in progress. See original paper for figures.*