The Necessity and Training Strategies for Expanding Sub-specialized Responsibilities of General Practitioners in China: A Post-print Study on the Continuous Development of General Practitioner Sub-specialties Based on the Delphi Method

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Abstract

Abstract

Background: The development of extended responsibilities in sub-specialized fields for general practitioners (GPs) in China is still in its infancy, facing challenges such as insufficient standardization in training and a lack of unified assessment and certification mechanisms. No consensus has yet been reached within the industry across management, teaching, and clinical practice regarding the necessity, pathways, and models for cultivating sub-specialty competencies in GPs.

Objective: Taking international extended responsibilities in sub-specialized fields of general practice as a reference and integrating the domestic "general-specialist collaboration" work model, this study employs the Delphi expert consultation method and questionnaire surveys to explore the necessity, primary pathways, and training methods for developing sub-specialty competencies in GPs.

Methods: The research team initially proposed an item pool for GP sub-specialty competency training based on literature analysis and previous survey results regarding the development of general-specialist collaborative medical capabilities in Shanghai community health service centers. From March to July 2024, the Delphi expert consultation method was adopted, inviting 60 experts for two rounds of consultation to determine the items concerning the role and necessity of GP sub-specialty competencies. Simultaneously, expert

preferences regarding training pathways and models were surveyed to design questionnaire dimensions, including: training methods, timing/stages of training, scope of knowledge and skills, professional direction preferences, and assessment/certification bodies.

Results: The effective recovery rate for both rounds of expert consultation questionnaires was 100.0%, with expert authority coefficients of 0.92 and 0.94, and Kendall' s coordination coefficients of 0.146 and 0.165, respectively ($P < 0.001$). After two rounds of consultation, a set of items regarding the role and necessity of cultivating GP sub-specialty competencies was finalized, consisting of 3 first-level items and 15 second-level items. Regarding the role and necessity: the mean importance scores for the 3 first-level items (the role of developing sub-specialty competencies in primary care; the synergy and complementarity between basic general practice and disease-specific/specialist sub-specialty work; the necessity of cultivating sub-specialty competencies in GPs) ranged from 4.90 to 4.93, with full-score rates of 88.3% to 91.7% and coefficients of variation (CV) of 0.05 to 0.06; the mean importance scores for the 15 second-level items ranged from 4.42 to 4.98, with full-score rates of 45.0% to 98.3% and CVs of 0.03 to 0.13. Regarding training pathways and models: 96.7% (58/60) of experts chose specialist advanced studies at qualified tertiary medical institutions, and 93.3% (56/60) chose the apprenticeship model (mentorship by experts from qualified tertiary medical institutions); 78.3% (47/60) of experts selected the attending physician title stage, while 11.7% (7/60) selected the resident physician stage following the completion of standardized residency training.

Conclusion: The cultivation of extended responsibilities in sub-specialized fields for GPs is a necessary practical logic for the development of primary healthcare. The "attending physician stage" should be established as the starting point for sub-specialty development, with "advanced studies in tertiary hospitals combined with a mentorship system" as the current strategy. Priority should be given to developing sub-specialties in dermatology and rehabilitation, while efforts should be made to stimulate and cultivate sub-specialized fields that are non-hospital-centric.

Full Text

The Necessity and Training Strategies for Expanding Responsibilities in General Practice Niche in China: A Study on the Continuous Development of General Practitioners' Sub-specialties Based on the Delphi Method

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Abstract

Background The expansion of responsibilities within general practice niches in China is currently in its nascent stages. The field faces significant challenges, including a lack of standardized training and the absence of unified assessment and certification mechanisms. Furthermore, a professional consensus has yet to be reached across management, education, and clinical practice regarding the necessity, pathways, and models for developing sub-specialty capabilities among general practitioners (GPs).

Objective Drawing on international frameworks for expanded responsibilities in general practice and considering the domestic "integrated general-specialist"(GP-Specialist) work model, this study employs the Delphi method and questionnaire surveys to explore the necessity, primary pathways, and training modes for cultivating GP sub-specialty capabilities.

Methods The research team initially developed an item pool for GP sub-specialty training based on literature analysis and previous surveys regarding the development of integrated medical capabilities in Shanghai community health service centers. From March to July 2024, two rounds of Delphi consultations were conducted with 60 experts to determine the role and necessity of sub-specialty capabilities. Simultaneously, expert preferences regarding training pathways and models were surveyed. The questionnaire dimensions included training methods, timing, scope of knowledge and skills, professional direction preferences, and certifying bodies.

Results The effective response rate for both consultation rounds was 100.0%. The expert authority coefficients were 0.92 and 0.94, while the coordination coefficients were 0.146 and 0.165, respectively ($P < 0.001$). The final framework consisted of 3 primary items and 15 secondary items. Regarding the role and necessity of sub-specialty training, the mean importance scores for the 3 primary items ranged from 4.90 to 4.93, with full-score rates between 88.3% and 91.7% and coefficients of variation (CV) between 0.05 and 0.06. For the 15 secondary items, mean scores ranged from 4.42 to 4.98, with full-score rates between 45.0% and 98.3% and CVs between 0.03 and 0.13. Regarding training pathways, 96.7% (58/60) of experts preferred specialist rotations at qualified tertiary medical institutions, and 93.3% (56/60) favored a mentorship model. Additionally, 78.3% (47/60) identified the "attending physician" stage as the optimal time for training, while 11.7% (7/60) preferred the resident stage immediately following standardized residency training.

Conclusion Cultivating expanded responsibilities in general practice niches is a necessary logical progression for the development of primary healthcare. The "attending physician stage" should be established as the starting point for niche development. Current strategies should prioritize "tertiary hospital rotations combined with mentorship," with an initial focus on sub-specialties such as dermatology and rehabilitation, while actively fostering non-hospital-centric niche areas.

Keywords: General practitioners; Sub-specialty; Medical service ability; Delphi method; Extended roles

Introduction

As the "gatekeepers" of resident health, the professional competence of general practitioners (GPs) directly impacts the implementation of the hierarchical medical system and the improvement of national health levels. Currently, even when facing common illnesses, patients often seek "specialized diagnostic techniques" or "renowned doctors," reflecting a psychological demand for superior clinical outcomes [**?**]. Consequently, the traditional general practice model focused solely on basic medical services struggles to meet the multi-layered and specialized health needs of the population. GPs who can provide specific disease diagnosis or health management services alongside their foundational generalist skills are increasingly favored by residents [**?**, **?**].

Prior to 2015, the international community typically used the term "General Practitioners with Special Interest" (GPwSI) to describe doctors who possessed expertise in a specific clinical area while maintaining their generalist role. However, this model lacked unified certification and competency standards [**?**]. In 2015, the Royal College of General Practitioners (RCGP) replaced GPwSI with the concept of "General Practitioners with Extended Role" (GPwER). This was defined as a GP who undertakes roles beyond the standard scope of general practice within different contractual or environmental settings, supported by a national framework for accreditation and competency assessment [**?**]. By pursuing further education and practice after completing basic training, GPs can develop expertise in a specific general practice "niche," enabling them to provide more precise and efficient specialized services at the primary care level [**?**]. This continuous professional development within a niche has become a self-regulated behavior in the careers of modern GPs [**?**].

In China, as the government emphasizes the enhancement of primary medical services, community health centers are actively developing specialized techniques on a generalist foundation. This model, often termed "integrated general-specialist" (GP-Specialist) care, has led to a growing focus on developing "sub-specialty capabilities"among GPs [**?**]. The core connotation of "GP sub-specialty capability" is essentially consistent with the GPwER concept: it refers to experienced GPs who, driven by personal interest and institutional planning, achieve professional proficiency in a specific direction (such as chronic disease management) through standardized training, thereby fulfilling the goal of being "both a generalist and a specialist" [**?**].

However, compared to developed countries, the development of GP sub-specialties in China is still in its infancy, facing challenges such as insufficient standardization and a lack of unified training and certification mechanisms. Therefore, systematically exploring and establishing a training pathway that

fits China' s national conditions is of significant practical importance for promoting the high-quality development of general medicine. This study addresses two primary research questions: (1) What is the necessity of GP sub-specialty development in China' s current primary care context, and how should the boundaries and synergy between sub-specialties and basic services be established? (2) From a stakeholder perspective, how should key training elements (including timing, models, and certification bodies) be configured to create an operationalized, standardized pathway?

1. Methods

This study utilized a mixed-methods design combining bibliometric analysis, a review of previous empirical research, the Delphi expert consultation method, and a cross-sectional questionnaire survey.

1.1 Development of the Item Pool 1.1.1 Literature Search We searched Chinese databases (CNKI, Wanfang, VIP, and CBM) using terms such as "general practitioner," "sub-specialty," "specialized disease," and "extended roles." For English databases (Web of Science, PubMed), we used keywords like "general practitioners," "special interests," "extended roles," and "training programme." The search period spanned from 1991 to 2023. Based on relevance to GP sub-specialty training, 25 articles were ultimately included. We extracted key statements regarding the value and implementation of sub-specialty training and structured them into an initial framework.

1.1.2 Summary of Preliminary Research The research team previously investigated the status of GP-Specialist clinics in Shanghai (2021–2022) and analyzed the comprehensive effectiveness of integrated medical capability development (2023–2024) [**?**, **?**]. These findings indicated that GP-Specialist clinics significantly enhance primary care capabilities and provided empirical evidence for refining the sub-specialty training items.

1.1.3 Formulation of the Initial Item Pool Through quality evaluation and comparative analysis of the literature and empirical data [**?**], the team selected representative core items. After internal discussion, an initial pool was formed consisting of 3 primary items and 10 secondary items, focusing on the role, complementarity, and necessity of GP sub-specialty development.

1.1.4 Design of Survey Dimensions To address practical aspects that lack consensus, we designed survey dimensions covering training methods, timing, scope of knowledge and skills, professional preferences, and certification bodies.

1.2 Expert Consultation Process 1.2.1 Questionnaire Design The questionnaire comprised three parts: (1) Expert demographic information; (2) The main body, which used a 5-point Likert scale (5 = "Very Important" to 1 = "Very Unimportant") for the Delphi items and multiple-choice questions for the

training pathway survey; and (3) A self-assessment of expert authority, based on familiarity with the topic and the basis of their judgment.

1.2.2 Expert Selection We recruited 60 experts with experience in GP subspecialty training, including clinical and research experts (21), primary health administrators (9), and community health center managers (30). Inclusion criteria required over 5 years of experience in general medicine or 3 years in primary care management, a bachelor' s degree or higher, and an intermediate professional title or above.

1.2.3 Implementation Two rounds of Delphi consultations were conducted between March and July 2024. Consensus was defined as a mean importance score $\geq$ 3.50, a full-score rate $\geq$ 20.0%, and a coefficient of variation (CV) $\leq$ 0.25. Feedback from the first round was used to modify, add, or delete items before the second round.

1.3 Statistical Analysis Data were analyzed using Excel 2016 and SPSS 27.0. Descriptive statistics were used for demographic data and pathway preferences. Expert authority was assessed via the authority coefficient (Cr), and opinion coordination was evaluated using the CV and Kendall' s coordination coefficient (W). $P < 0.05$ was considered statistically significant.

2. Results

2.1 Expert Demographics The 60 experts included 29 males (48.3%) and 31 females (51.7%). Most were aged 41–50 (51.7%) or over 50 (46.7%). Educational backgrounds included doctoral (20.0%), master' s (38.3%), and bachelor' s (40.0%) degrees. A majority (70.0%) held senior professional titles. The distribution covered six major regions of China, ensuring broad representation.

2.2 Expert Authority and Coordination The effective response rate for both rounds was 100%. The expert authority coefficients were 0.92 and 0.94 for the two rounds, respectively, indicating high reliability. Kendall' s W increased from 0.146 in the first round to 0.165 in the second ($P < 0.001$), showing that expert opinions converged toward a consensus.

2.3 Item Selection and Modification In the first round, all items met the inclusion criteria, but 13 experts provided qualitative feedback. Based on this, one primary item was reworded for clarity, three secondary items were refined, and five new secondary items were added to address aspects like referral efficiency and the high-quality development of family doctor services. In the second round, all 3 primary and 15 secondary items achieved high scores and low CVs, forming the final framework .

2.4 Training Pathways and Models Regarding training methods, 96.7% of experts favored rotations in tertiary hospitals, and 93.3% supported a men-

torship model . Notably, community-based experts showed higher support for obtaining degrees through academic education (93.3%) compared to hospital-based experts (71.4%). For the timing of training, 78.3% of experts identified the "attending physician" stage as the most appropriate .

2.5 Knowledge Scope and Professional Directions All experts agreed that GPs should master the knowledge and skills required for primary-level diagnosis and treatment of specialized diseases, and 98.3% emphasized mastering referral standards . Regarding professional directions, the top choices were dermatology (95.0%), rehabilitation (88.3%), pediatrics (85.0%), and pain management (85.0%). However, a "perspective gap" was observed: community experts strongly supported technical fields like ophthalmology and basic surgery (over 80%), while hospital-based experts were more cautious (38.1%-57.1%) .

2.6 Assessment and Certification For certification, 81.7% of experts recommended provincial professional associations, and 80.0% suggested tertiary institutions approved by provincial health commissions. Community experts showed a stronger preference for official administrative endorsement (93.3%) compared to their counterparts in hospitals and universities .

3. Discussion

This study highlights a "dual-natured" consensus in the development of GP subspecialties in China. While there is a solid strategic foundation—experts across all levels agree on the necessity of sub-specialties and the prioritization of non-invasive fields like dermatology—there remains a "structural tension" regarding implementation.

The high importance scores for sub-specialty development confirm that it is no longer an optional luxury but a necessity for managing "multimorbidity" in primary care [**?**]. As chronic disease management shifts from simple medication maintenance to complex health interventions, the traditional "breadth"of general practice must be supplemented by "depth" to handle complex cases and improve clinical decision-making [**?**]. This aligns with the international trend of using GPwER as a core strategy to enhance primary care capacity [**?**].

The consensus on the "attending physician stage" as the starting point is crucial. It reinforces the principle of "generalism first, specialization second," ensuring that sub-specialty skills are built upon a solid foundation of comprehensive care. This prevents premature fragmentation of the GP role and provides a pathway for professional growth during the "plateau phase" of an attending physician' s career, similar to the Post-CCT pathways in the UK and Australia [**?**, **?**].

The preference for tertiary hospital rotations and mentorship (over 90%) reflects the reality of China' s medical landscape, where high-quality resources are concentrated in large hospitals. This model ensures the quality and homogeneity

of training, addressing the primary concerns of both practitioners and patients [**?**].

However, the "perspective gap" regarding invasive procedures (e.g., surgery, ophthalmology) reveals a tension between "service accessibility" and "quality safety." Community centers, facing pressure to retain patients, are eager to provide more technical services, while hospital experts worry about the lack of sterile conditions and legal risks in primary care [**?**]. This suggests that for invasive sub-specialties, a cautious, pilot-based approach within integrated medical unions is necessary, rather than a rapid, broad rollout.

Finally, the strong desire for "academic degrees"and "official certification"among community GPs reflects the specific institutional constraints in China, where professional titles and educational credentials are tied to career advancement [**?**]. To ensure the sustainability of sub-specialty programs, the training must be integrated into the existing professional hierarchy, potentially linking clinical rotations with equivalent degree applications.

4. Conclusion

The development of GP sub-specialties is a vital logical step for the evolution of primary healthcare in China. This study recommends establishing the "attending physician stage" as the planning starting point and adopting a "tertiary hospital rotation plus mentorship" strategy. Initial efforts should focus on high-demand, low-risk areas like dermatology and rehabilitation, while also fostering "non-hospital" niches such as psychological support, social prescribing, and AI-driven health management. By aligning institutional goals with individual GP interests, China can successfully transition its GPs from "gatekeepers"to "trusted health managers."

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