# Core Competency-Based 360-Degree Evaluation System in Clinical Postdoctoral Training: Post-print

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## Abstract

Objective With the proposal of the "Consensus Framework for Core Competencies of Resident Physicians" , higher demands have been placed on the teaching system developed around it. This study aims to explore the establishment of a process-oriented evaluation system that better aligns with the characteristics of medical talent cultivation. Methods Through literature review methodology, we reviewed and drew upon advanced experiences from domestic and international sources, and constructed a 360° evaluation system based on core competencies, relying on the theoretical foundation of the 360° evaluation method. Results We describe, analyze, and discuss the preliminary implementation process of this system in clinical medicine postdoctoral training programs. Conclusion The 360° evaluation system based on core competencies emphasizes process assessment and feedback, which can effectively and targetedly help resident physicians improve their competencies, laying a foundation for further exploration and improvement of the medical talent evaluation system.

## Full Text

## Application of a Core Competency-Based 360° Evaluation System in Clinical Postdoctoral Training

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**Abstract**

**Objective:** With the release of the "Consensus on Core Competency Framework for Residency Education," there is an urgent need to modify current education systems toward competency-based medical education. This paper aims to explore and establish a process evaluation system that better aligns with the characteristics of medical resident training.

**Methods:** Drawing upon adequate experiences from both domestic and international contexts and grounded in the theory of "360-degree feedback," we established a competency-based 360-degree evaluation and feedback system.

**Results:** We describe, analyze, and discuss the preliminary implementation of this system within the Clinical Postdoctoral training program.

**Conclusion:** The core competency-based 360° evaluation system emphasizes process evaluation and feedback, which can effectively and targeted help residents improve their abilities and lay a foundation for further exploration and improvement of the medical talent evaluation system.

**Keywords:** 360-degree feedback; resident; standardized training; Clinical Postdoctoral trainee; core competency

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## 1. Background and Objectives

Early medical school assessments primarily relied on traditional exam-oriented education, employing closed-book examinations that were singular in form and neglected trainees' ability to flexibly apply knowledge and innovate [1]. Subsequent evaluation methods gradually diversified to include theoretical knowledge, clinical procedural skills, and instructor assessments, yet these remained highly subjective [2] and lacked formative and goal-oriented approaches.

The 360-degree feedback evaluation method was first proposed by Edward Ewen and colleagues in the 1980s and implemented at Intel Corporation in the United States [2]. Also known as "multi-rater feedback," "multisource feedback," or "multisource assessment,"the "360°"concept positions the evaluatee at the center, with multiple evaluators who have close working relationships—including superiors, peers, self-evaluation, subordinates, and relevant collaborators—providing comprehensive assessment information [3-4]. Unlike traditional evaluation forms, the 360° evaluation method mobilizes sufficient information sources to assess the individual, organically combining objective indicators with subjective evaluations to better accommodate complex and dynamic work environments and requirements.

The value of applying the 360° evaluation method to assess comprehensive individual capabilities has been gradually validated, and it has been successively introduced into clinical skills assessment for medical students and nursing professionals, as well as evaluations of humanistic qualities and doctor-patient communication [5-7]. Since 2007, with the joint launch of the Resident Competency Assessment Toolkit by the Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Medical Specialties (ABMS), 360° assessment has formally become one of the important tools for resident competency evaluation. Multiple hospitals in China have referenced advanced American experiences to develop and pilot 360° evaluation systems [8]. Building upon these excellent experiences, the effective integration of the 360° evaluation method with core competency for residents holds significant meaning for establishing and innovating the evaluation and feedback system for clinical postdoctoral trainees.

The "Clinical Postdoctoral Training Program" at Peking Union Medical College Hospital was approved by the Ministry of Human Resources and Social Security in April 2016 to officially recruit clinical postdoctoral fellows. During the three-year program, trainees undergo intensive and comprehensive cultivation centered on "core competency for residents" based on the "Beijing Standardized Residency Training" framework. To truly cultivate outstanding physicians who meet the people' s health development needs, the Clinical Postdoctoral Training Program has simultaneously introduced "core competency" as a training objective while exploring the establishment of a comprehensive, systematic evaluation and feedback system that aligns with this training goal.

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### 2.1 Construction of Evaluators

The core competency-based 360° evaluation method positions the clinical postdoctoral trainee as the evaluation center. Evaluators primarily include: (1) superior evaluators: mentors, clinical teaching faculty, and medical education administrators; (2) peer evaluators and self-evaluation: the trainee themselves and other residents/clinical postdoctoral fellows at the same level; (3) subor-

dinate evaluators: medical students and interns; and (4) other collaborators: nursing staff, medical technical departments, and patients. To ensure implementation effectiveness, generally one or more superiors participate in the evaluation, while peer and subordinate evaluators each number three or more [5], as illustrated in [Figure 1: see original paper].

The key to evaluator selection lies not in having sufficiently diverse roles or large numbers, but rather in ensuring that evaluators have genuine contact with and understanding of the trainee. Each department selects different evaluator roles based on specialty characteristics. For example, clinical departments such as internal medicine, surgery, and obstetrics/gynecology have extensive contact with nursing staff and patients, who can be randomly selected as evaluators. However, platform departments such as radiology, ultrasound, and nuclear medicine may select medical technical personnel with whom they have closer contact as evaluators.

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### 2.2.1 Using "Core Competency for Residents" as Evaluation Dimensions

"Core competency" refers to the abilities required for a specific position, reflecting an individual' s comprehensive capabilities including underlying and deep-level traits [9]. In 2018, Peking Union Medical College Hospital, in conjunction with the China Elite Teaching Hospitals Alliance for Residents, pioneered the "Consensus on Core Competency Framework for Residents," incorporating "Professionalism," "Medical Knowledge and Skills," "Patient Care," "Communication and Collaboration," "Teaching Ability," and "Lifelong Learning" [10]. The Clinical Postdoctoral Training Program constructs 360° evaluation dimensions based on "core competency for residents," with more explicit evaluation objectives that facilitate the practical application of the 360° evaluation method.

In practice, we have found that not every evaluator needs to assess all dimensions. For instance, the dimension of "Teaching Ability" can be most directly evaluated through "subordinate medical students," with additional relevant feedback obtainable from "mentors" and "peer residents." However, evaluators such as "patients" and "medical education administrators" are not appropriate for assessing the "Teaching Ability" dimension.

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### 2.2.2 Developing "Personalized" Evaluation Indicators Based on Specialty Characteristics

The "core competency for residents" framework cannot directly serve as evaluation indicators, though its competency characteristics are directly related to evaluation indicators. Research has found that competency models differ across industries and cultural environments [3]; similarly, we believe that even within

the same competency dimension, evaluation indicators vary for different positions.

Under the premise of the "Consensus on Core Competency Framework for Residents," each specialty develops assessment questions based on the six core competencies according to its own work requirements and characteristics—that is, "personalized" evaluation indicators with specialty-specific features. Using internal medicine [11], surgery, and ultrasound medicine as examples, different evaluation indicators were developed around the "Patient Care" dimension, as shown in . The table includes both shared and differentiated indicators based on specialty characteristics.

**TABLE:1** Comparison of 360° Evaluation Indicators Based on Core Competency Across Different Departments (Examples of "Patient Care" Dimension)

| Department | Evaluation Indicators |
|---|---|
| **Internal Medicine** | 1. Ability to correctly collect medical history and physical examination data, gather examination materials, and summarize and analyze primary clinical problems2. Ability to formulate diagnoses and differential diagnoses based on clinical information and develop subsequent treatment plans3. Ability to correctly implement treatment protocols and follow up, observe, analyze, and respond to treatment reactions4. Proficiency in clinical procedures while ensuring patient safety5. Ability to safely and effectively transfer patients within the healthcare system6. Ability to request and implement consultation opinions |
| **Surgery** | 1. Ability to comprehensively and systematically collect medical history, concisely summarize and report case characteristics with focus and specificity2. Proficiency in performing systematic surgical-related and general physical examinations in a standardized manner3. Ability to write surgical records with standardized, substantive content and organize medical records systematically4. Ability to conduct comprehensive yet prioritized clinical management and treatment thinking5. Ability to interpret medical orders and auxiliary examination results |

| Department | Evaluation Indicators |
|---|---|
| **Ultrasound Medicine** | 1. Ability to correctly collect medical history, gather and analyze laboratory and examination data, and summarize primary clinical problems2. Ability to correctly perform ultrasound examinations with proficient technique and high patient comfort3. Attention to patient safety and privacy protection during examinations4. Respect for patients and families, effective communication, and ability to accurately and concisely introduce patient conditions and subsequent plans |

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### 2.2.3 Transforming Qualitative Descriptions into Quantitative Evaluations with Detailed Scoring Criteria

Scientific scoring criteria must be developed for different evaluation indicators, with detailed explanations for different rating levels to achieve a systematic transformation from "qualitative description to semi-quantitative scoring to quantitative evaluation." We reference a 5-point scale format, assigning 5-point ratings to qualitative descriptions of each indicator and providing semi-quantitative scores for each level of ability. Specifically, 1 point corresponds to "needs improvement," 3 points indicates "ability to independently manage patients and meets basic training requirements," and 5 points represents "exceptionally outstanding performance." Throughout the 360° evaluation process, continuous collection of semi-quantitative scores for each evaluation indicator is accumulated into a final quantitative evaluation result, reflecting the trainee' s final score on each competency indicator.

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### 2.3 Implementation of Evaluation Process and Feedback

The 360° evaluation is currently applied in daily assessments and annual evaluations of clinical postdoctoral trainees, with each specialty' s teaching secretary responsible for designating evaluators for different trainees, regularly distributing evaluation questionnaires, and collecting data. Several important considerations must be noted. First, before implementing the 360° evaluation, all evaluators should receive unified training detailing the evaluation purpose and requirements to familiarize them with evaluation items and scoring standards through simulated demonstrations, thereby ensuring evaluation homogeneity [5]. Second, evaluators should remain anonymous during the evaluation process to reduce assessment errors caused by "favoritism factors" [12].

The 360° evaluation method emphasizes results analysis and follow-up feedback. By combining evaluation items with scoring results from different evaluators, the department assessment committee can conduct targeted feedback and discussions with trainees, effectively communicating competency evaluation results. Feedback personnel must also have work contact with the trainee to provide evaluation opinions combined with real clinical cases, enabling trainees to understand and accept feedback more concretely. The objective and comprehensive evaluation results from 360° assessment help trainees fully understand their current competency status to develop improvement plans, thereby facilitating faster competency enhancement.

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### 3.1 Importance of Pre-Evaluation Training to Ensure Evaluation Homogeneity

During the initial application of the 360° evaluation system in the Clinical Postdoctoral Training Program, we found that most teaching faculty tended to give relatively high scores, making it difficult to distinguish whether trainees were truly excellent or whether instructors failed to strictly follow the specific descriptions of rating levels [11]. Additionally, consistency among different evaluators assessing the same competency varied, which may reflect genuine differences in trainee performance across contexts but also suggests potential inadequate evaluator training. When score variations in a 360° evaluation result are substantial, we must consider whether these results truly reflect the trainee—that is, whether the results are credible. Therefore, to enhance the reference value of 360° evaluation data, unified pre-evaluation training and simulated demonstrations are particularly crucial.

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### 3.2 Effective Utilization of Evaluation Results to Form an "Evaluation-Feedback-Improvement" Cycle for Continuous Competency Enhancement

360° scoring results can be used to create radar charts across different competencies to visually reflect residents'developmental profiles. The specific presentation format of radar charts can be adjusted and innovated according to specialty characteristics. For example, in internal medicine, scoring nodes represent different rotation departments, and over time, scores gradually approach each vertex, demonstrating the progressive development of competencies—this represents a method for displaying long-term competency changes using 360° evaluation results. In radiology, scoring nodes represent different evaluator groups, allowing radar charts to show the degree of competency performance across different dimensions—this represents a method for short-term competency evaluation. See [Figure 2: see original paper] and [Figure 3: see original paper]. Regardless of the radar chart presentation format, the goal is to better communicate 360° eval-

uation results to trainees to develop more targeted improvement plans, observe long-term competency growth, and achieve continuous competency enhancement.

## 4. Conclusion

Through the construction of evaluators, evaluation indicators, evaluation standards, and follow-up feedback processes, we have preliminarily explored and established a core competency-based 360° evaluation system and completed initial implementation. We believe this system has been well-applied in the Clinical Postdoctoral Training Program, demonstrating strong feasibility in both formative and summative assessments. This work lays a solid foundation and provides important reference information for further exploration and improvement of medical talent evaluation systems.

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