

A Targeted Clinical Reasoning Remediation Program for Residents and Fellows in Need

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ABSTRACT

Background There is no standardized, widely accepted process for individualized clinical reasoning remediation.

Objective We describe a novel, targeted assessment and coaching process that allows for individualized intervention for residents and fellows struggling with clinical reasoning.

Methods Residents and fellows at the University of Virginia with performance concerns are referred to COACH (Committee on Achieving Competence Through Help) and assessed by a remediation expert. A subset is referred to a clinical reasoning remediation coach who performs an additional assessment and cocreates an individualized remediation plan. Following remediation, residents and fellows are reassessed by their respective programs. We report the frequency of struggle, remediation time invested, and academic outcomes.

Results From 2017 to 2022, 114 residents and fellows referred to COACH met inclusion criteria, of which 38 (33%) had a deficiency in clinical reasoning. Targeted assessment revealed the following microskill deficits: hypothesis generation (16 of 38, 42%); data gathering (6 of 38, 16%); problem representation (7 of 38, 18%); hypothesis refinement (3 of 38, 8%); and management (6 of 38, 16%). Remediation required a mean of nearly 23 hours per trainee. Of the 38 trainees, 33 (87%) are in good standing at the time of writing.

Conclusions Our unique program offers a feasible, targeted approach to clinical reasoning remediation based on our current understanding of the clinical reasoning process. Early hypothesis generation was the most common microskill deficit identified.

Introduction

Effective clinical reasoning is essential to successful clinical practice. Yet, it is common for graduate medical learners to require supplemental clinical reasoning skill development during training. In their landmark work, investigators from the University of Colorado reported that clinical reasoning was deficient in approximately 30% of residents, and 35% of postresidency learners, referred to a novel remediation program over a 6-year period.¹ Though much has been written about how to apply our understanding of cognitive psychology and decision-making to the teaching and practice of clinical reasoning, little published literature exists to guide individualized remediation of residents and fellows who struggle with clinical reasoning.

In 2014, Guerrasio and Aagaard developed a 10-step remediation plan based on then-current understanding

of the clinical reasoning process, employing a case-based model to teach hypothetico-deductive reasoning, pattern recognition, and comparison of illness scripts to learners across the continuum of education referred for remediation of clinical reasoning.² This work acknowledged the importance of information processing theories in designing a case-based approach to clinical reasoning remediation. Though ultimately successful for the majority of learners in their program, the same approach was used for all learners, and remediation was time-intensive. In the case of residents, mean one-on-one faculty time was 40 hours per resident.²

In the interim, our understanding of the clinical reasoning process has grown. Audétat and colleagues identified commonly encountered clinical reasoning difficulties among residents in the clinical environment and categorized them, thus creating a taxonomy for clinical teachers.³ These investigators have subsequently proposed strategies to address these difficulties in the clinical environment.⁴ Though definitions vary, this approach considers clinical reasoning as a process or skill with subcomponents, or microskills, that can be practiced.

There is a great need for practical guidance around clinical reasoning skill development that reflects our

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current understanding of the clinical reasoning pathway. Ideally, strategies should be individualized to improve efficiency of remediation. Building upon Geurraasio and Aagaard's prior work and our current understanding of the clinical reasoning process, we aim in this Educational Innovation article to describe a program for residents and fellows struggling with clinical reasoning. We employ a targeted assessment to determine the primary microskill of struggle, guiding individualized remediation using a deliberate practice model.

Methods

In 2016, we developed a remediation program at University of Virginia (UVA) Health known as COACH (Committee on Achieving Competence Through Help) to help graduate medical trainees who struggle with clinical performance. Trainees identified by their respective clinical competency committees (CCCs) as having performance concerns during residency or fellowship may be referred to COACH—either as a mandate or a suggestion—by their program director. Residents and fellows may also self-refer at any time. A subset of mandated referrals fall under graduate medical education (GME) policy as part of a formal remediation plan (provided as online supplementary data). Following referral, residents and fellows meet with a physician remediation specialist (0.5 clinical full-time equivalent [CFTE]) who performs a global biopsychosocial assessment^{1,5} to identify the primary clinical performance deficit: medical knowledge, clinical reasoning, organization and efficiency, professionalism, or communication (provided as online supplementary data).¹

Residents and fellows with a clinical reasoning deficiency (FIGURE 1) are then referred to a physician clinical reasoning remediation coach (0.15 CFTE) who performs an additional assessment to define the primary clinical reasoning microskill deficit. One remediation coach (A.S.P.) trained 2 additional remediation coaches (J.J.D., G.Y.), both selected from a GME clinical reasoning education committee, employing cocaching and interval frame of reference and performance dimension training over the course of 3 half-day sessions. This targeted assessment employs a case-based, think-aloud protocol (provided as online supplementary data) built on these microskills, which reflects the discrete steps of the clinical reasoning process adapted from Daniel et al⁶: hypothesis generation, data gathering, problem representation, hypothesis refinement/prioritized differential diagnosis, and management. At the conclusion of the first meeting, the remediation coach and resident or fellow cocreate an individualized plan that targets the primary clinical reasoning microskill of struggle.

KEY POINTS

What Is Known

Clinical reasoning is essential for practice and is often identified as a deficiency in residents and fellows requiring remediation, but the types of reasoning defects and remediation outcomes are less clearly understood.

What Is New

In this 5-year observational study that targeted the specific types of defects in referred trainees, one-third had clinical reasoning deficiencies which required a mean intervention time of 23 hours per trainee, with 87% of these achieving good standing in their program.

Bottom Line

This remediation approach, focused on specific reasoning deficit subtypes, was largely successful but required substantial time.

We use the terms “remediation” and “remediation coach” in this article to align with the terminology of our predecessors^{1,4}; however, in our program we avoid “remediation” unless referencing GME policy. While, by necessity, ours is not a purely developmental coaching model, COACH adheres as much as possible to the principles of coaching. Fundamentally, we support a developmental process, foster insight and a growth mindset, and work with the learner to identify strategies to manage their existing challenges.

Individualized remediation first occurs in the remediation coach's office, employing case-based exercises⁷ tailored to the results of the targeted assessment. This simulated environment provides a low-risk, low-stress setting to promote focused attention, reflection, feedback, and repeated practice consistent with the deliberate practice model.⁸ Since clinical reasoning is content-dependent, remediation must include several cases across a broad array of clinical conditions. Cases employ chief concerns and illness scripts specific to the resident's or fellow's specialty. The remediation coach begins with typical presentations of common problems that progressively increase in complexity and provides the resident or fellow with varied chief concerns and demographic information. As the resident or fellow thinks aloud, the remediation coach employs frequent “stops” to determine the reasoning behind their verbalized decisions while promoting reflection. For example, the resident or fellow may be asked to critique a series of problem representations they just created for completeness with parallel consideration of their interval prioritized differential diagnoses for a patient with dyspnea. Remediation time is consistently recorded by the coach for tracking purposes. Direct time is defined as time one-on-one with the resident or fellow while indirect time is preparation for coaching sessions.

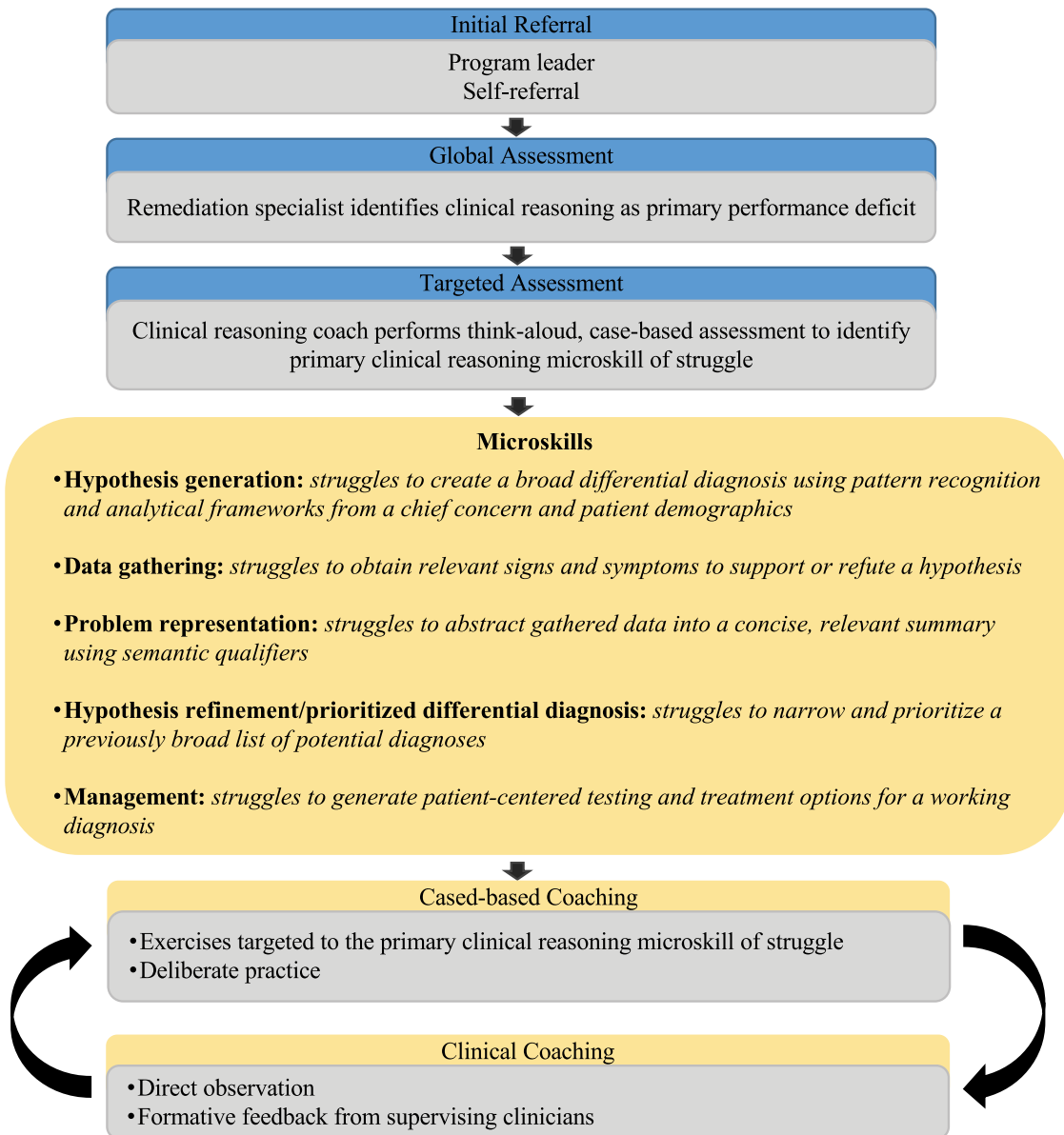


FIGURE 1
Clinical Reasoning Coaching Process for Struggling Graduate Medical Learners

Remediation continues in the clinical environment under direct observation of the remediation coach, when possible, and by clinical supervisors. With the resident's or fellow's permission, the remediation coach communicates directly with the clinical supervisors throughout their rotations to provide guidance and to collect formative feedback. To maintain the separation between remediation, during which a resident or fellow should feel comfortable making mistakes and asking for help, and formal assessment, this feedback is not shared with program leadership and is not used to inform milestone ratings. Remediation in the clinical environment is a critical aspect of clinical reasoning skill development, given the

situated nature of cognition and importance of context in clinical decision-making. The decision to conclude remediation is made jointly between the remediation program and program leaders. For graduate medical learners who engage with COACH as part of a formal remediation plan, the decision to end or extend the remediation period is made by program leadership with input from the CCC. Residents and fellows who meet the expectations set out in the initial referral and who no longer require remediation are considered to be "in good standing." Residents and fellows who require ongoing remediation are considered "not in good standing" while they are on formal remediation.

We report demographic and performance characteristics for residents and fellows struggling with clinical reasoning who were referred to COACH from July 2017 to July 2022 and, at the time of data analysis, were no longer at UVA or were still at UVA and consented for inclusion. Participants were tracked for remediation time invested and distinction of “in good standing” (ie, not on formal remediation) or “not in good standing” (ie, on formal remediation, as defined by GME policy), determined at the time of writing. This project was approved by the UVA Institutional Review Board.

Results

From 2017 to 2022, 114 residents and fellows met inclusion criteria, of which 38 (33%) had a primary deficiency in clinical reasoning. A description of these residents and fellows can be found in the TABLE. Most residents and fellows with a clinical reasoning deficit were referred by their program director (35 of 38, 92%) and during their intern year (22 of 38,

TABLE
Characteristics of Residents and Fellows Referred to a Clinical Reasoning Remediation Program, 2017 to 2022

Characteristics	n (%), N=38 ^a
Trainee type	
Resident	30 (79)
Fellow	8 (21)
Gender	
Female	12 (32)
Male	26 (68)
Underrepresented in medicine ^b	
No	27 (71)
Yes	11 (29)
Department	
IM/FM/PMR/neurology/dermatology ^c	25 (66)
Pediatrics	8 (21)
Surgery/surgical subspecialty	5 (13)
Referral	
Program director	35 (92)
Self	3 (8)
PGY at time of referral	
PGY-1	22 (58)
≥ PGY-2	16 (42)

Abbreviations: IM, internal medicine; FM, family medicine; PMR, physical medicine and rehabilitation; PGY, postgraduate year.

^a Residents and fellows with primary deficiency in clinical reasoning out of 114 meeting eligibility criteria.

^b Underrepresented in medicine is defined as a group consisting of Black, Hispanic or Latinx, Native American, and mainland Puerto Rican residents and fellows.

^c These specialties were grouped together given low n in some groups, to protect anonymity.

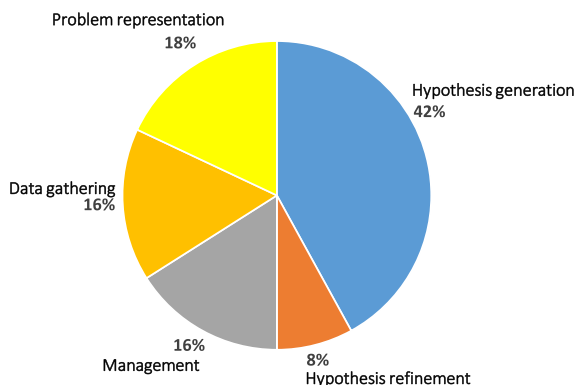


FIGURE 2
Distribution of Clinical Reasoning Deficits by Microskill

58%). Targeted assessment revealed primary clinical reasoning deficits among the following microskills: hypothesis generation (16 of 38, 42%); data gathering (6 of 38, 16%); problem representation (7 of 38, 18%); hypothesis refinement/prioritized differential diagnosis (3 of 38, 8%); and management (6 of 38, 16%; FIGURE 2). The average time involved for the remediation coach was almost 23 hours (minimum 10 hours; maximum 49 hours), including direct (mean 9.1 hours) and indirect (mean 13.8 hours) time per resident or fellow. These figures do not include time spent by supervising faculty who continue the remediation process in the clinical environment.

Following implementation of the individualized remediation plans, residents and fellows were independently reassessed by their respective CCC. At the time of writing, 21 of the 38 residents and fellows (55%) referred to COACH with a primary clinical reasoning deficit graduated in good standing, 12 (32%) remain in their training program in good standing, and 5 (13%) left their program not in good standing.

Discussion

Herein, we describe a feasible, individualized remediation program for graduate medical trainees in need of supplemental clinical reasoning training that employs a targeted assessment informed by our current understanding of clinical reasoning. The prevalence of clinical reasoning struggle in our cohort (33%) is similar to that previously described.^{1,9} Clinical reasoning remediation is time-consuming, and our mean total remediation time of 23 hours per resident or fellow (range 10-49), which includes direct and indirect time, is less than that reported by Guerrasio and Aagaard (mean 39.8 direct hours/resident).² It is possible that our targeted assessment allowed more expedient and precise identification of the deficit,

which shortened the remediation process. Our outcomes are positive for most residents and fellows and are similar to those reported by Guerrasio and Aagaard.²

The strength of our approach lies in the identification of clinical reasoning microskills to guide remediation. For example, hypothesis generation was the most common microskill deficit identified. Consideration of hypotheses before detailed data gathering is known to improve diagnostic accuracy, and key clinical signs and symptoms are more likely to be seen if one begins with the relevant diagnosis in mind.¹⁰ Our findings suggest that some learners do not enter residency or fellowship with this skill and may require additional training in the use of frameworks to build or broaden their list of diagnostic hypotheses. In addition to informing structured remediation programs, this microskill approach may guide clinical teachers in their real-time assessment and teaching of residents and fellows, similar to strategies described by Connor and Dhaliwal and Weinstein et al.^{11,12} In addition, the separation of coaching and formal assessment is critical to preserving a safe space for learners to learn and make mistakes.

Our study is limited by a small sample size and by the fact that it was conducted at a single center. Our data capture only those who were referred to our program and exclude residents and fellows who were still at UVA at the time of data analysis or who did not consent to inclusion. We did not assess for interrater reliability, response process validity, or internal structure of the assessment tool. We did not assess residents' and fellows' experience or impressions of the program. We were fortunate to have robust full-time equivalent support for our program, which is not available to all programs and may limit the generalizability of our program. Still, the practical nature of our approach and the ability to train additional remediation coaches supports feasibility.

This work paves the way for a qualitative study to explore the content of clinical performance evaluations and the potential relationship with the clinical reasoning microskill. For example, a resident or fellow may not perform well in urgent clinical situations, either due to their failure to recognize urgency or inability to create a rapid management plan. Management of the patient with a change in clinical status is a complex skillset that likely requires multiple microskills such as hypothesis generation and management reasoning. Results from such a study could guide educators in their direct observation and remediation of residents and fellows who struggle in these situations. Educators would benefit from a standardized approach to clinical reasoning assessment that does not require specialized expertise in

remediation. This approach would facilitate earlier detection of and intervention for struggling residents and fellows, including a library of clinical reasoning remediation tools that map to the skills required of a graduate medical trainee. Future studies should assess residents' and fellows' perceptions of coaching interventions, in particular to see if they are stigmatizing.

Conclusions

Clinical reasoning struggles among residents and fellows are common. Our unique program offers a feasible, targeted approach to clinical reasoning remediation based on our current understanding of the clinical reasoning process.

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