The R2C2 Model in Residency Education: How Does It Foster Coaching and Promote Feedback Use?

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Abstract

Purpose
The authors previously developed and tested a reflective model for facilitating performance feedback for practice improvement, the R2C2 model. It consists of four phases: *r*elationship building, exploring *r*eactions, exploring *c*ontent, and *c*oaching. This research studied the use and effectiveness of the model across different residency programs and the factors that influenced its effectiveness and use.

Method
From July 2014–October 2016, case study methodology was used to study R2C2 model use and the influence of context on use within and across five cases. Five residency programs (family

medicine, psychiatry, internal medicine, surgery, and anesthesia) from three countries (Canada, the United States, and the Netherlands) were recruited. Data collection included audiotaped site assessment interviews, feedback sessions, and debriefing interviews with residents and supervisors, and completed learning change plans (LCPs). Content, thematic, template, and cross-case analysis were conducted.

Results
An average of nine resident–supervisor dyads per site were recruited. The R2C2 feedback model, used with an LCP, was reported to be effective in engaging residents in a reflective, goal-oriented

discussion about performance data, supporting coaching, and enabling collaborative development of a change plan. Use varied across cases, influenced by six general factors: supervisor characteristics, resident characteristics, qualities of the resident–supervisor relationship, assessment approaches, program culture and context, and supports provided by the authors.

Conclusions
The R2C2 model was reported to be effective in fostering a productive, reflective feedback conversation focused on resident development and in facilitating collaborative development of a change plan. Factors contributing to successful use were identified.

T he number of studies addressing the provision of feedback in medical education continues to increase,[1] and their results support viewing feedback as a complex social interaction, influenced by the feedback provider, feedback receiver, and context. Features seen to be especially important to the provision of feedback include actively engaging providers and recipients in the feedback

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interaction and addressing factors that influence feedback credibility and use, such as relationships, context, and culture.[2–8]

Two recently implemented initiatives in medical education, competency-based medical education (CBME)[9–11] and programmatic assessment of learners,[12] have the potential to improve the practice of feedback by promoting frequent observation of learners, feedback conversations, and coaching for improvement. Both also rely on learners' active engagement in understanding their performance data, accessing feedback, and directing their development. Finally, they promote the longitudinal compilation of performance data to coach the learner's continuing development (assessment *for* learning) and to make evidence-based decisions about the learner's progress (assessment *of* learning).[11–15]

The addition of the term "coaching" to the feedback lexicon is significant

because it places feedback in a different light. Coaching is developmental, and philosophically it moves feedback away from its historic tie to assessment and moves it closer to learning.[9,15,16] Drawing from the sports world, its intent is to help individuals develop both effectively and efficiently and to perform at their best.[17,18] Within education, coaching is also learner centered and has dual goals: to achieve immediate improvement in the specific activity at hand, and to build skills for longitudinal self-monitoring and self-directed learning.[19]

In earlier research with practicing physicians, we developed and tested a reflective model for facilitating performance feedback for practice improvement, the R2C2 feedback model.[20] This model consists of four phases: *r*elationship building, exploring *r*eactions to the feedback, exploring understanding of feedback *c*ontent, and *c*oaching for performance change.[20] It was founded on three theoretical perspectives: humanism, informed self-assessment,

and the science of behavior change. Each phase, informed by theory and research, guides the feedback conversation and includes specific open-ended questions to promote self-reflection and self-direction (see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A522).[20,21] The coaching phase also includes a separate structured learning change plan (LCP) to guide future learning and subsequent reflection (see Supplemental Digital Appendix 2 at http://links.lww.com/ACADMED/A523).

A small pilot study identified implementation challenges and demonstrated positive reactions to the use of the R2C2 model, but was limited because it occurred at one residency site with only a few residents and supervisors.[22] The purpose of this study was to examine the use of the R2C2 model in residency education across multiple sites and programs. Our objectives were:

1. To explore the effectiveness of the R2C2 feedback model and its four phases in promoting engagement with feedback data and use of the data for improvement across five sites and residency programs; and

2. To determine and explain factors that appeared to influence the use and effectiveness of the model across the sites.

Method

Research design

Our research was guided by the UK Medical Research Council framework for studying complex interventions[20,23] and realist evaluation.[20,24] The Medical Research Council framework recommends undertaking exploratory studies to ensure understanding and accounting for factors that influence the outcomes of an intervention (e.g., the R2C2 model) before conducting comparative effectiveness studies. Realist evaluation studies the social system and context in which an intervention occurs as well as the intervention itself.[20,24] It seeks to answer this question about an intervention: "What works for whom and under what conditions?" It also fits methodologically with exploratory studies within the Medical Research Council's framework. We selected case study methodology as the research design[25] to study the influence of context on use of the R2C2 model within and across five cases (i.e., residency programs and sites).

Recruitment

We recruited five residency programs (family medicine, psychiatry, internal medicine, surgery, and anesthesia) from three countries (Canada, the United States, and the Netherlands). We selected the general geographic sites based on the location of research team members (i.e., we required that a team member be located at each site). We then selected the five residency programs to include a range of disciplines and diversity in their implementation of CBME (Table 1). We recruited resident–supervisor dyads from each program, drawing on the supervisors who would normally conduct assessment and feedback meetings with the respective resident (in most instances, this meant that the supervisor and resident were familiar with each other, though in a few instances the supervisor and resident did not know each other beforehand). We recruited supervisors through the program director and regular administrative meetings, and we recruited residents through presentations at regular teaching sessions and meetings. We developed an information page describing the research project for each of these groups. Our goal was to recruit 10 dyads per site to enable saturation of themes.

Procedures and data collection

We conducted the study in three stages: preparation, model testing, and model refinement. The preparation stage included two activities. The first was a site assessment structured interview with each program director via telephone or Skype, led by one of the authors with two or three others observing. The interview included questions about the program, its context, and assessment and feedback practices. Interviews were 30 to 60 minutes, audiotaped, and transcribed verbatim. The second preparation activity was an educational intervention (workshop or individual teaching session) to prepare supervisors to use the R2C2 model and LCP, conducted by one of the authors or a trained research associate. The intervention included a description of the R2C2 model and the opportunity to practice using it in assessment scenarios, with a proposed workshop or session length of 1.5 hours. During the intervention, we provided the participants with the R2C2 brochure, which contains sample open-ended questions for each phase (see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/A522), and the LCP, which provides a structure for planning improvement and future learning (see Supplemental Digital Appendix 2 at http://links.lww.com/ACADMED/A523).

For the model testing stage, supervisors at each site used the R2C2 model and the LCP to conduct two feedback sessions with each resident three to six months apart, based on the program's feedback approach, and using the program's performance reports. An on-site research associate conducted separate semistructured debrief interviews with residents and supervisors after each feedback session to explore their reactions to use of the R2C2 model and LCP (see Supplemental Digital Appendix 3 at http://links.lww.com/ACADMED/A524). Both the debrief interviews and feedback sessions were audiotaped and transcribed verbatim. Completed LCPs were collected, and brief qualitative data from them were compiled.

For the model refinement stage, we summarized findings to guide additions and revisions to the model.

The study period was July 2014–October 2016 with the following timelines:

- General project preparation: ethics approval, tool refinement, initial recruitment: July 2014–January 2015,

- Preparation (site assessment interviews): January–August 2015,

- Preparation (on-site educational interventions): from about one month to a few days prior to model testing at each site,

- Model testing: timing of initiation varied across sites (March 2015–June 2016), and testing lasted about six months at each site, and

- Model refinement: August–October 2016.

Data analysis

We conducted data analyses systematically and iteratively throughout the study, using content,[26] thematic,[27] template,[28] and cross-case analyses[25] depending on the nature of the data being analyzed. That is, we used:

Table 1
Overview of Cases, Including Countries, Residency Program Descriptions, and Number of Study Participants[a]

Characteristic	Case A	Case B	Case C	Case D	Case E
Country	United States	Canada	Netherlands	Canada	Canada
Residency program	Internal medicine	Family medicine	Surgery	Psychiatry	Anesthesia
Assessment approaches used during the program's participation in this study	• Mini-CEX • Patient surveys • Resident portfolio • Annual OSCE • New national milestones evaluation every 6 months	• Daily field notes[b] • ITERs[c] • Self-assessments • Resident portfolio	• Formal report after each surgical procedure • MSF • Resident portfolio	• Supervisor collects data from those working with resident • ITERs[c] • Series of observed activities (e.g., mock oral of a patient interview)	• ITERs • MSF • Daily online encounter document[b] • New progress report every 3 months
Assessment approaches used in this study	See the above cell	See the above cell	MSF	Mock oral	See the above cell
Feedback approaches[d]	• Formal 6-month milestones • Informal review at 3 months	• Formal 16-week reviews, with benchmarking and goal-setting • Informal review at 8 weeks	• Formal review at 3 months • Informal review during surgical procedure	• Formal review at 6 months • Informal review at 3 months	• New academic advisor role, responsible for quarterly reviews and coaching
Was CBME implemented within a year of program's participation in this study?	Yes, CBME milestones process just implemented	No, CBME approach implemented 10 years ago	No, CBME not implemented before study	No, CBME not implemented before study	Yes, CBME approach described above just implemented
Number of study participants[e]					
Residents	10	9	14	9	3
Supervisors	2	6	2	8	3

Abbreviations: Mini-CEX indicates mini-clinical evaluation exercise; OSCE, objective structured clinical examination; ITER, in-training evaluation report; MSF, multisource feedback; CBME, competency-based medical education.
[a]In a July 2014–October 2016 study aiming to explore the effectiveness of the R2C2 feedback model and its four phases in promoting engagement with feedback data and use of the data for improvement across five sites and residency programs, and to determine and explain factors that appeared to influence the use and effectiveness of the model. The four phases of the R2C2 feedback model are *r*elationship building, exploring *r*eactions to the feedback, exploring understanding of feedback content, and coaching for performance change.
[b]Daily field notes and online encounter documents are written narrative feedback on observed clinical activities.
[c]ITERs are in-training evaluation reports completed by the resident's preceptor/supervisor at the end of each rotation in Canadian residency programs. They include Likert-type rating scales and narrative comments.
[d]In all programs, clinical faculty also provided daily informal verbal feedback.
[e]Supervisors provided feedback to residents one-to-one, except for Case C, where both of the supervisors attended the feedback interviews with each resident.

• content analysis for site interview transcripts to identify contextual features of each program and for LCPs to identify the nature of the changes residents wanted to make,

• thematic analysis for debriefing interview transcripts with residents and supervisors to understand their reactions to and use of the R2C2,

• template analysis for feedback session transcripts to determine the phases of the R2C2 model that were used and to identify sample phrases for each phase, and

• cross-case analysis as a final comparison of results derived from the above analyses across the five cases to determine similarities and differences and factors influencing these similarities and differences.

Table 2 further describes the data we collected, the types of analyses used for each data source, and the reason for using that type of analysis.

Prior to analysis, all data were deidentified and assigned a code based on the site and participant (supervisor or resident). Data documents, grouped by case, were stored on a password-protected Internet site at Dalhousie University, as were analyzed transcripts and narratives, tables, and spreadsheets created to summarize findings from the analyses.

For each case, we divided ourselves into pairs to analyze data for each supervisor–resident dyad (i.e., transcripts from the two feedback sessions and from the debriefing interviews following each session) to fully explore each dyad's feedback interactions. We discussed

our written dyad analysis summaries, composed by each pair after they analyzed their assigned transcripts, and held case meetings by telephone or web conferencing to compare and confirm findings across dyads. We then compiled a summary for each of the five cases.

To conduct comparisons across cases and confirm overall findings, we held a face-to-face analysis meeting in April 2016, with those unable to attend participating by web conferencing. During May–October 2016, we conducted web conference meetings to finalize confirmation of factors influencing use of the model and to identify emerging revisions to the R2C2 model, drawing on theory and evidence.

We used standard qualitative procedures for ensuring the rigor and

Table 2
Data Collected and Type of Analysis for Each Data Source[a]

Data collection method (type of data collected)	Type of analysis and purpose
Site interviews with program directors (qualitative and numerical data)	Content analysis to identify individual program and contextual features.
Feedback session transcripts (qualitative data)	Template analysis (used when an "a priori" coding structure is available; in this study, the a priori coding structure was the four stages of the R2C2 model) to determine the phases of the R2C2 model that were used, identify sample phrases used in each phase, and capture novel and emerging data.
Debrief interview transcripts (qualitative data)	Thematic analysis to discover supervisors' and residents' perceptions of the model overall and its phases and, in particular, benefits, limitations, influential factors, and suggestions for improvement.
Learning change plan data (brief qualitative data)	Content analysis to identify the nature of the learning changes residents planned to make and to what degree the learning change plans were used.
Results by case (qualitative and numerical data)	Cross-case analysis to determine similarities and differences across the five sites and factors influencing these similarities and differences.

[a]Used in a July 2014–October 2016 study aiming to explore the effectiveness of the R2C2 feedback model and its four phases in promoting engagement with feedback data and use of the data for improvement across five sites and residency programs, and to determine and explain factors that appeared to influence the use and effectiveness of the model. The four phases of the R2C2 feedback model are *r*elationship building, exploring *r*eactions to the feedback, exploring understanding of feedback *c*ontent, and *c*oaching for performance change.

trustworthiness of analysis procedures and results.[29,30] These included the use of author pairs to analyze each transcript and discuss their interpretations and findings with each other and then with the larger team. At each level of analysis, differences were identified and resolved by discussion and by returning to the data as required. Summaries prepared by the pairs were shared with the whole team, and critical discussions of findings were encouraged. To minimize bias, we did not analyze transcripts from our own site. We also endeavored to be reflective and reflexive by being attentive to and disclosing personal involvement in and opinions about the R2C2 model and about assessment and feedback, which may have influenced our analysis.[31,32]

Ethical approval for this study was provided by Dalhousie University Health Sciences Research Ethics Board, Halifax, Nova Scotia, and as required by each site.

Results

We recruited 45 residents (3–14 per site) and 21 supervisors (2–8 per site), resulting in an average of 9 resident–supervisor dyads per site (Table 1).

Programs varied in assessment and feedback approaches and in the extent to which they had formally implemented CBME (Table 1).

Our analyses (Table 2) helped us understand the use and effectiveness of the R2C2 (including the LCP), and factors influencing its use and effectiveness across the five cases. Criteria for determining effectiveness included:

- residents' reflection on and engagement with their assessment data,

- identification of opportunities for improvement and development of an LCP, and

- outcomes of the LCP.

The following sections provide findings on these criteria, as well as on usefulness with residents at varying levels of performance and factors influencing use and effectiveness of the R2C2.

Residents' reflection on and engagement with their assessment data

Across all sites, almost all supervisors and residents reported that the R2C2 model facilitated resident engagement in

a reflective feedback conversation about their assessment data and in using the data to plan improvement. The open-ended questions in each of the four model phases encouraged residents' critical reflection and self-assessment. List 1 provides the goal of each phase and sample questions and phrases supervisors used. Almost all residents reported that the facilitative format increased their comfort and ability to honestly share concerns and needs for improvement:

> … it was so different. I guess you're less likely to be defensive because a lot of it was just identifying my own weaknesses. Like he helped me to come to that conclusion instead of doing it for me … he prompted me to self-critique. (E-R2)

> I think just an open and genuine discussion about the whole process and not feeling judged and just making it a safe environment … having a supervisor that you're able to have a genuine conversation with. (D-R1)

In addition, all supervisors observed that the model and open-ended questions fostered residents' active engagement in the feedback discussion, particularly in planning for their improvement:

> … to turn the next page of the discussion over to them [residents] in a global sense was different for me. That's the part that stood out for me, to increase their participation and lessen passivity. (B-S2)

Identification of opportunities for improvement and development of an LCP

All participants particularly valued the coaching phase and observed that it was the most unique feature compared with traditional feedback models. Focusing on using assessment data to improve through setting and achieving goals was reported as most helpful. Almost all participants noted that the R2C2 sample coaching questions and items on the LCP helped create a concrete plan and changed the orientation of the feedback conversation from "assessment and judgment" to "development":

> Traditionally feedback focused on what the person didn't do well. But that doesn't give the person much insight into how to improve. So sitting down to talk about the specific strategies … like who the learner can seek help from, definitely helps. (B-R8)

> It's not about weakness but about improving. It doesn't necessarily mean that you're performing poorly, it's because you want to further yourself in a certain area. (B-R4)

List 1
Examples of Phrases Supervisors Use in Each Phase of the R2C2 Model[a]

Phase 1: Relationship Building
Goal: To engage the resident and build a positive relationship.
- "How are you doing and how are you enjoying it?"
- "What do you like most about your work?"
- "Tell me what you do really well, where you would pat yourself on your back."
- "Tell me about your feedback experiences so far on this unit."

Phase 2: Exploring Reactions to the Feedback
Goal: To explore the resident's reaction to their assessment report.
- "You saw the data on your evaluations; what do you think?"
- "Are there some things that struck you about this evaluation?"
- "Was there anything you didn't understand?"
- "Was there anything in the report that surprised you?"

Phase 3: Exploring Understanding of Feedback Content
Goal: To explore the content of the report and identify gaps or areas the resident should focus on.
- "Are there specific things that you'd like to work on?"
- "What are some areas where you see you might improve?"
- "It all looks quite good, but is there something you're interested in focusing on?"
- "I noted comments about technical skills; what did you think of those?"

Phase 4: Coaching for Performance Change[b]
Goal: To support the resident's development of a plan to address the identified gap.
- "What would your goal be?"
- "What will get in the way of your being able to do it?"
- "How will you measure if you've made a change?"
- "What would be your timeline?"

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[b]Includes use of the learning change plan.

Supervisors across the five sites, however, used the LCP variably to support coaching. At three sites, they required residents to complete a written LCP, while in two, they only used it to guide the coaching discussion. In both situations, the supervisors reported that it helped structure coaching and development of an action plan. Most residents agreed:

> It's been a good model for reflecting on what specifically I can do to improve my interviewing. The change plan actually reminds me to focus on things I can work on. Sometimes feedback is not that specific or I just don't think how I'm going to follow through. It helps to use the plan to get it done. (D-R3)

The majority of residents and supervisors also reported that the R2C2's focus on getting better created collaboration in developing an action plan, and that they valued this collaboration. For example, residents described this as follows:

> We came up with the goals together. She allowed me to brainstorm around those goals. (D-R2)
>
> What I liked about it, when discussing the goals, is the supervisor asked, "What can we do? Can you achieve your goals?" It gave me motivation to actually get there. (C-R2)

Outcomes of the LCP

Topics identified as goals in the written LCPs varied widely, including participating in research, improving differential diagnoses, being more assertive, communicating more clearly with patients, better managing work–life balance, and improving knowledge of common diagnoses. However, supervisors and residents reported returning to the goals and LCPs from the first session in only about half of the second session feedback interviews. Those who did spoke of the benefits of doing so; it provided a way to evaluate the planned

activity and a longitudinal view of progress. As one supervisor explained in the second interview with a resident, "You have to see and respond to what you did the first time to be effective" (B-S3). In debrief interviews, supervisors who did not return to the goals and LCPs in the second session reported forgetting to do so because it was not identified as a specific step on the R2C2 brochure. Most residents whose supervisor did return to the LCP reported progress related to their plan, and where progress was not made, supervisors engaged the resident in a discussion about the barriers to progress.

Usefulness with residents at varying levels of performance

Although all residents appeared to be meeting their program expectations, some appeared to be excelling and some struggling. Many supervisors reported that it was beneficial to use the R2C2 and LCP with those who were excelling, as they provided substance and structure for the feedback conversation. As one supervisor noted: "It gets you to the next level … it gives you more to say. Normally I would have just said, 'Hey, you're doing really well!'" (A-S2)

We identified three dyads in which a resident appeared to be struggling. In each instance, both the resident and supervisor reported on the usefulness of the R2C2 model and LCP in enabling the resident to gain insight into their progress and ways to improve. However, the subsequent development of a specific plan for improvement appeared to depend on the skill of the supervisor in coaching the resident and in using the LCP; two supervisors appeared to be skilled and one less so.

Factors influencing use and effectiveness of the R2C2

Although the model was generally perceived positively, there was variability in supervisor and resident reactions and use across sites and programs. However, this variability did not appear to arise from differences in specialty per se but from six more general factors: supervisor characteristics, resident characteristics, qualities of the resident–supervisor relationship, program assessment approaches, program culture and context, and the supports we provided (Table 3). We explored these factors at each site and attempted to compare

Table 3
Factors Influencing Use and Effectiveness of the R2C2 Model and Learning Change Plan (LCP)[a]

General factors	Specific examples
Supervisor characteristics	• Commitment and engagement. • Experience as a clinical supervisor (all of the supervisors in this study had 10–25 years of experience, except for one who had less than 5 years of experience). • Personal feedback style: The R2C2 is a learner-centered approach designed to engage the resident, facilitate reflection, and guide informed self-assessment. It may be more easily taken on by supervisors who naturally use such a facilitative approach and more challenging for those who naturally use a more directive approach.
Resident characteristics	• Familiarity with compiling and reviewing their own assessment data and reports. • For one site where competency-based medical education (CBME) had just been implemented with a novel and extensive progress report and no formal strategy for enabling residents to interpret it, the R2C2 feedback discussion was welcomed as a collaborative process for understanding their reports and developing action plans.
Qualities of resident–supervisor relationship	• Presence of an open, supportive relationship. • Familiarity (i.e., the extent to which the resident and supervisor knew each other, worked together in the clinical setting, and had previous feedback conversations). However, the effect of familiarity was variable; while it appeared to positively influence most relationships, at one site it appeared to create the perception that less formal feedback was needed. At another, supervisors who did not know the resident beforehand demonstrated that they could develop trust very quickly using the model.

Program assessment approaches	• Types of assessment approaches selected for use with the R2C2:
	  o At one site, multisource feedback assessing communication and professional skills was the approach selected. Coaching on these nonmedical expert roles appeared novel and challenging.
	  o At another program, the mock oral was the assessment approach selected for study. This approach required using the R2C2 model to facilitate oral feedback on an observed performance, instead of written assessment reports, which required reorganization and rethinking on the part of supervisors and residents. However, reflection on oral feedback and using the oral feedback to plan change was found to be effective. Supervisors and residents at this program made suggestions for future use following direct observation.

Program culture and context	• The culture and context of each site differed. In addition to being a different program with different assessment and feedback approaches, the following were noted with respect to integration of the R2C2:
	  o At two programs, the R2C2 was initiated at the same time that CBME was being formally initiated and the need for a feedback and coaching process to aid residents in using their feedback for improvement had been identified. The R2C2 appeared to be easily integrated at these programs.
	  o At the other three programs, the R2C2 was added on to existing assessment and feedback approaches and was not fully integrated into the assessment–feedback system. For these programs, the R2C2 appeared to be more cumbersome to fit in.

Supports provided by the authors	• Preparatory supervisor workshop or session. • Handouts: R2C2 brochure and LCP. • Presence of an author and/or research associate.

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their influences across sites. Several specific factors appeared to be especially beneficial. For example, one beneficial supervisor factor was the degree of fit between the learner-centered facilitative approach of the R2C2 model and the supervisor's natural feedback approach and style. Another beneficial factor was the extent to which the R2C2 model and LCP were integrated into the program's assessment and feedback approaches and implementation of CBME. A third beneficial factor was the familiarity of the resident and supervisor dyad. Although most dyads appeared to have prior work experience and knew each other, a few did not. However, through the phases of the R2C2 model, those supervisors who did not know the resident beforehand appeared to be able to readily build a constructive relationship. Finally, supervisors reported the educational intervention prior to using the R2C2 model and having copies of the R2C2 brochure and LCP at hand during their feedback interviews as positive supports for using the model. Alternately, some noted that there was inadequate guidance regarding the need to return to the original LCP in the second feedback session and how to do this.

Discussion

The R2C2 model, combined with the LCP, was reported to be effective in enabling a rich discussion about performance data, fostering reflection, and supporting coaching and collaborative development of a change plan across five residency programs in three countries, with each program using different assessment and feedback approaches.

Of the three criteria used to evaluate effectiveness (residents' reflection on and engagement with their assessment data, identification of opportunities for improvement and development of an LCP, and outcomes of the LCP), the first two were the most consistently reported across sites. Residents appeared to be active, reflective participants in the feedback conversation and in using their assessment data, and supervisors appeared to be able to coach residents in identifying

performance gaps and in setting goals for change. Especially valued by both residents and supervisors were the foci on coaching and improvement and on collaborative codevelopment of a change plan in response to the data. Factors contributing to success were, at each site, the presence of an author and/or a research associate, preparatory supervisor workshop or session, and specific resource materials (R2C2 brochure and LCP), as well as how well the model aligned with the supervisor's natural feedback style and the program's culture and context. Four of the programs used the R2C2 model as originally designed for feedback discussions on written assessment reports, and one site used it to guide the discussion directly following a one-hour observation of a patient interview. Although supervisors and residents at this site made suggestions for future use following direct observation, they appeared to be able to use the model effectively to enhance reflection and development.

Less consistent across sites were the written completion of the LCP and assessment of outcomes of the plan during the second interview session. Even when plans were not recorded on the LCP, using the LCP still appeared to aid coaching and discussion of a change plan. Contributing factors to not returning to the plan during the second interview were omission of instructions for using the LCP in the R2C2 brochure and limited instruction in the preparatory interventions about returning to the original LCP in the second feedback session.

Although many factors seemed to influence successful use of the R2C2 model, foremost appeared to be the resident–supervisor relationship (as reflected in our findings on residents' reflection upon and engagement with their assessment data and identification of opportunities for improvement), which the first phase of the model focuses on building. By asking open-ended questions, supervisors seemed to be able to create a safe learning environment and express commitment to residents and their development. Invested, credible supervisors[2,4–7] and a supportive, open culture[33–36] are integral to positive learning and coaching in medicine[8] and education.[16,19]

Foundationally, the principles of programmatic assessment and CBME direct our attention to actively engaging learners in their assessment, feedback, and development activities.[9,13,15] Such approaches are grounded in developmental learning perspectives, such as Dreyfus's[37] five-stage model (novice, advanced beginner, competent, proficient, expert) and Ericsson's[38,39] model of deliberate practice. In both, assessment for learning, instruction, feedback, and subsequent practice are integral to developing competence. Medical education is gradually adopting a system in which ongoing, longitudinal formative assessment and coaching, combined with summative assessment at sentinel progress points, are integral.[15] The R2C2 model for feedback and coaching, and a format such as the LCP to guide development plans, may be helpful in this transition.

Although this study has a number of strengths, there are limitations. The sites, residents, and supervisors volunteered to participate. Both residents and their current supervisor had to agree to participate, which in some cases delayed or limited recruitment. The quality of the site-specific assessment reports and data could not be ascertained. This is a concern because the quality of assessment data and reports influences the quality of feedback and coaching conversations.

The study provided valuable lessons about the process of implementing the R2C2 and LCP. Although they seemed to be helpful regardless of the stage of CBME and the program's assessment and feedback approaches, we learned that effective implementation requires specific supportive strategies[40,41]:

- Recognition that coaching is not just a new skill for supervisors but also a new way of thinking, requiring an educational partnership with residents and collaboratively enabling their development and self-directed learning. Providing preparation and ongoing support to foster supervisors' adoption of such a model, as well as to develop their coaching skills, is critical.[18,19]

- Incorporation of the LCP explicitly into the R2C2 model. For the coaching phase, this means adding instructions for using the LCP as a coaching aid. It also means adding an additional phase at the beginning of the model for subsequent assessment meetings with instructions to return to the prior LCP and evaluate progress in achieving the goals listed in it, resulting in a continuing improvement cycle.[42]

- Provision of simple, clear feedback and coaching aids such as the R2C2 brochure and LCP to aid knowledge translation and use.[19,40,41]

The most valued features of the model included:

- The use of open-ended questions, which promoted a respectful supervisor–resident relationship focused on residents' development,

- The way it oriented the feedback conversation toward coaching and residents' use of assessment data, and

- The way it encouraged supervisor–resident collaboration and codevelopment of residents' goals and change plans.

Future research should include more deliberate study of the impact of the R2C2 and LCP across the spectrum of resident performance, particularly with those who are struggling. What influences successful use of the model in these situations? Another research direction is to further explore the outcomes of coaching and the LCP: Are residents able to implement their LCPs and assess the results of them? Are supervisors able to facilitate this process? Do these activities contribute to residents' development of competence?

In summary, use of the R2C2 model and LCP seemed to contribute to the engagement of residents in their performance data and feedback discussions. It also seemed to contribute to the development of a trusting, collaborative supervisor–resident relationship that facilitated residents' critical reflection, identification of areas for improvement, and codevelopment of LCPs.

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