Post MD Education
UNIVERSITY OF TORONTO

# Best Practices in Evaluation and Assessment (BPEA)

# Managing Residents in Difficulty within CBME Residency Educational Systems


**Jonathan Pirie MD, Med, FRCSC**
Chair, Board of Examiners – Postgraduate, Faculty of Medicine, University of Toronto
Associate Professor, Department of Paediatrics, Faculty of Medicine, University of Toronto
Staff Physician, Paediatric Emergency Medicine, The Hospital for Sick Children

**Lisa St. Amant BSc(Hons)**
Research and Curriculum Coordinator, Education Integration Group
Post MD Education, University of Toronto

**Mariela Ruétalo**
Research Officer, Post MD Education, University of Toronto

**Susan Glover Takahashi MA(Ed), PhD**
Director, Education, Integration & Research
Associate Professor, Department of Family and Community Medicine, Faculty of Medicine, University of Toronto
Integrated Senior Scholar – Centre for Faculty Development & Post MD Education , University of Toronto


UT CBME / CBD

# Best Practices in Evaluation and Assessment (BPEA)
# Managing Residents in Difficulty within CBME Residency Educational Systems

**Jonathan Pirie, Lisa St. Amant, Mariela Ruétalo, Susan Glover Takahashi**

## 1. TABLE OF CONTENTS

# 1. Introduction

## 1.1. Purpose:

In January 2016, the Postgraduate Medical Education Office (PGME) formed a Best Practices in Evaluation and Assessment for Competency-Based Postgraduate Medical Education (BPEA) working group. Its purpose was to provide advice to the Postgraduate Medical Education Advisory Committee (PGMEAC) and Faculty of Medicine Council about best practices in resident program evaluation and assessment for competency-based postgraduate medicine at the University of Toronto.

As part of its mandate, the working group undertook several literature reviews of current practices in residency program evaluation and resident assessment guidelines for competency-based postgraduate medicine. The goal of this paper is to review the current literature on residents in difficulty.

## 1.2. Initial Objectives:

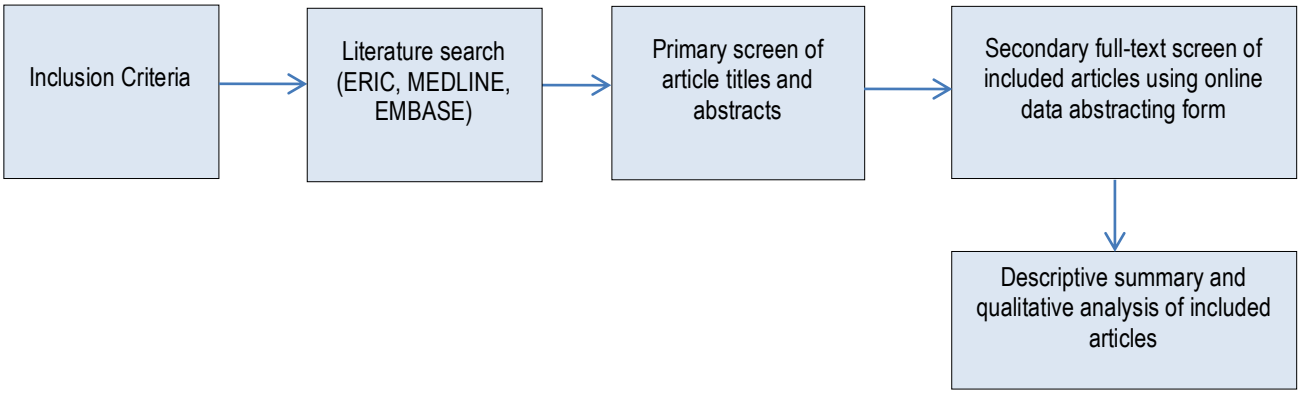
- Produce a definition and description to guide identification of residents in difficulty in Competency-Based Medical Education (CBME)
- Produce a definition and description to guide program-based remedial support or Board of Examiner (BOE) remediation
- Describe documentation needed to verify resident needs and program processes for BOE
- **Create a description of Promotion and Confirmation of Progress decisions**
  a) Volume and types of assessment data required to make promotion decisions (i.e. Postgraduate Year [PGY] levels) and confirmation of progress (i.e. Royal College of Physicians and Surgeons of Canada [Royal College] competency continuum)
  b) Principles guiding the collecting and summarizing of data
  c) Principles and processes for making decisions on promotions and confirmation.

# 2. Methods

## 2.1. Overview

Figure 1 shows the major steps in the methodology of our literature review, in chronological order. These steps are described in greater detail below.

**Figure 1. Overview of major steps in our review methodology**




## 2.2. Inclusion Criteria

We first established our article inclusion criteria to narrow the body of literature down to articles solely on our topic of interest. These three criteria are listed and described in **Error! Reference source not found.**.

**Table 1 List and description of review inclusion criteria**

| | INCLUSION CRITERIA | DESCRIPTION |
|---|---|---|
| **1** | Must be about postgraduate medical education | Includes any specialty / program area |
| **2** | Must be about residents in difficulty | Includes discussion on remediation and BOE cases (e.g. definitions and descriptions to guide the identification of residents in difficulty; discussions on remedial support or BOE remediation; discussions of documentation needed to verify resident needs and program processes for BOE) |
| **3** | Must offer information to inform structure and/or processes of competence | Structure includes guidelines, program design, promotion and progress;<br>Processes include features of competence (e.g. the CanMEDS Roles that are involved) |

## 2.3. Literature Search

We searched the electronic databases of ERIC, MEDLINE, and EMBASE with the aid of the Department of Family and Community Medicine (DFCM) librarian, using a search framework from a previous literature review conducted by two of the research team members (SGT, LSA). Examples of search terms include: “physicians,” “trainee,” “intern,” “remediation,” “performance assessment,” “medical,” “education,” and “residency” (along with all relevant wildcards, plural forms, and other term variations).

The last major literature review on remediation, conducted by Cleland et al., looked at articles from the period of 1984 to 2012, inclusive.[1] Thus, we chose to focus our scoping review on the most recent body of literature, published within the last 5 years (2011 to 2015, inclusive). Another reason for that focus was that residency education has only very recently moved purposefully toward implementing CBME systems.

## 2.4. Primary Screen

Three reviewers (LSA, MR, and SGT) were calibrated on the primary screening of article titles and abstracts to ensure screening consistency and to refine the screening criteria as necessary. The remaining article titles and abstracts were divided among members of the research team and screened independently.

## 2.5. Data Extraction Form

The team then brainstormed on the type of data to collect that would be relevant to our topic of interest, and to the aims of the BPEA working group at large. We constructed an online form to collect data of interest from included full-text articles.

The online data extraction form included the following criteria:

- Article information – author name, publication year, article type (i.e. primary research, review, commentary, etc.), author and study location(s)
- Article eligibility – secondary screen of full-text articles using inclusion criteria
- Learner demographics – PGY level, training program
- Area(s) of competence discussed – CanMEDS Roles, other
- Whether a competence framework was discussed and/or applied
- Structures to support competence that were discussed – e.g. guidelines for resident / program / hospital / university; design of individual resident educational plan/program
- Main findings related to the structures to support competence that were discussed (open-text data)
- Article purpose (open-text data)
- Other findings related to residents in difficulty, remediation, and/or BOE (open-text data)

See Appendix 3 for the complete list of data extraction criteria, their descriptions, and examples from the reviewed literature.

## 2.6. Secondary Screen and Abstracting

A second calibration exercise was performed with three reviewers (JP, LSA, and MR) on the screening of full-text articles and on the extraction of data from those included. This second calibration exercise helped us to ensure consistency among reviewers in the screening of full-text articles. We improved and expanded upon the data extraction criteria as a result.

The remaining full-text articles were divided among the team (JP, LSA ,and MR) to be screened and abstracted independently.

### 2.7. Descriptive and Qualitative Summary of Results

Data collected from eligible articles were summarized descriptively using IBM SPSS Statistics Software v24.

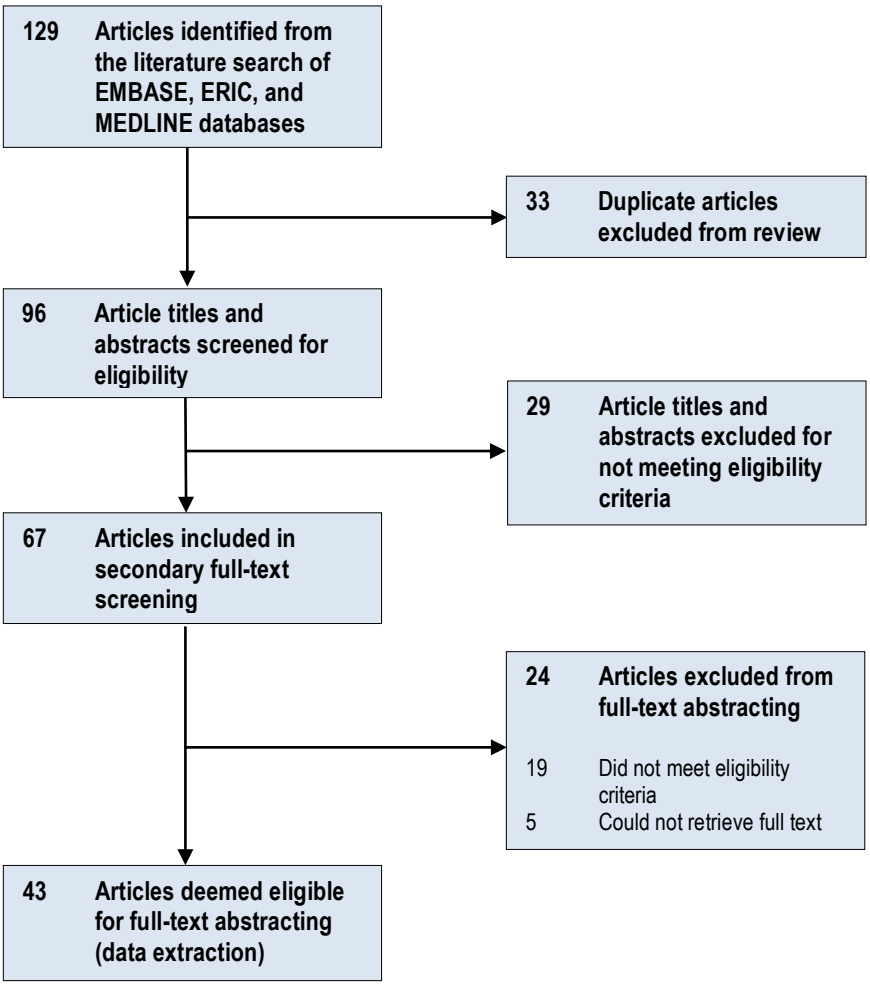
Qualitative data was collected about each article's purpose or objective(s); the main findings related to the structures to support competence that were discussed; and any other findings related to residents in difficulty, remediation, and/or BOE. All qualitative data were analyzed with NVivo v11 using summative content analysis methodology, as described by Hsieh and Shannon,[2] to identify major themes.

## 3. Results

### 3.1. Abstracting results

**Error! Reference source not found.** shows the literature review screening process and results. Of the 129 articles identified from our literature search, sixty-seven article titles and abstracts were included from the primary screen and went on to secondary screening. A total of 43 full-text articles were included from the secondary screen and underwent data extraction and analysis.

**Figure 2 Selection process used in a review of the literature published from 2011 to 2015 inclusive on remediation, BOE, and/or residents in difficulty in postgraduate medical education**




## 3.2. Descriptive Overview of Included Articles (n = 43)

This section outlines some key results in the review. It is important to note that frequency does not infer importance, but rather relates to topics of most interest to researchers and publishers.

- We searched the literature **published within the last 5 years**, from 2011 to 2015 inclusive. Most studies about residents in difficulty, remediation, and/or BOE were published in 2012.

- ***Most were primary research studies*** (n = 22, 51%). Only 2 review articles were captured (5%).

- Most articles were by American authors (n = 31, 72%) and/or were published in the USA (n = 29, 67%).

- ***Specialties most often*** discussed in association with residents in difficulty, remediation, and/or BOE were ***Emergency Medicine*** (n = 10, 23%), ***Surgery*** (n = 8, 19%), ***Family Medicine*** (n = 5, 12%) and ***Internal Medicine*** (n = 5, 12%). In about a quarter of the articles (n = 11), remediation was not discussed relative to or in association with a particular specialty.

- The most frequently discussed competency areas were Medical Expert (n = 25, 58%), Professionalism (n = 18, 42%), and Communicator (n = 7, 16%).

- ***Rarely was competency-based education explicitly discussed.*** Only six articles (14%) discussed a competency-based educational orientation or framework. No noticeable increase in articles discussing competency frameworks was observed over time, as might be expected with increasing global interest in CBME.

- ***"Guidelines for program" were the most frequent structures to support resident competence*** (n = 35, 81%). Other commonly discussed structures were: "Design of individual resident educational plan/program" (n = 10, 23%) and "Design of residency educational program" (n = 9, 21%). Many articles that discussed "guidelines for program" were primary research studies (n = 18/35, 51%).

- ***Rarely was "Promotion of resident systems" discussed*** (n = 2, 5%). "Promotion of resident systems" was defined as the system(s) in place for promoting residents from one stage of training or PGY year to the next (e.g. How are promotion decisions made? What data points inform the decision to promote residents? How is competence assessed?) (Appendix 3).

## 3.3. Qualitative Summary

Ten themes were identified from the content analysis of qualitative data collected on all 43 reviewed articles (Table 2). "Identification of deficiencies" (n = 19, 44.2%) and the "importance of defining and classifying resident problems or deficiencies as a first step to remediating them" (n = 10, 23.3%) were the two most common themes identified.

**Table 2. List and Description of Themes Identified from Qualitative Content Analysis**

| | Primary Themes | Secondary Themes | Description | Examples | Ref. |
|---|---|---|---|---|---|
| **1.** | Identification of residents in difficulty[3-21] (n = 19) | Assessment (n = 15) | Includes articles discussing the association between assessment tool type, accuracy or frequency, and the identification of | The utility of Standardized Direct Observation Tools (SDOT) and OSCEs to identify deficiencies in clinical performance (Medical Expert) | [3,6-18,21] |

| | Primary Themes | Secondary Themes | Description | Examples | Ref. |
|---|---|---|---|---|---|
| | | | residents in difficulty / in need of remediation | | |
| | | Faculty Development (n = 4) | Includes articles discussing how faculty development / training could help improve faculty's ability to diagnose resident difficulties / deficiencies | Through improving the knowledge and skills of faculty around proper assessment and feedback methods; teaching faculty how to define and classify deficiencies so they can be more readily identified in practice | 4-6,8 |
| | | Other (n = 3) | Other topics discussed in relation to the identification of resident deficiencies | Factors predictive of resident deficiencies / their need for remediation in the future (e.g. age of application to residency, having transferred from another institution)[18]; identification of deficiencies by creating and having a better understanding of the taxonomy of the "problem resident"[19,20] | 18-20 |
| **2.** | Defining and classifying resident deficiencies (n = 10) | | Discuss the importance of creating a framework for defining and classifying resident problems in an effort to design appropriate programs tailored to the issue(s) at hand. Addresses the questions of "What is the problem or deficiency?"; "What are its causes?"; "What signals a deficiency in this competency domain?"; etc. | Defining the problem through subjective and objective measures<br><br>Classifying problems by rating their severity, determining whether the problem is inherent or contextual, what the contributing factors are, etc. | 12,17,19,20,22-27 |
| **3.** | Improving assessment tools and/or methods for tracking the progress of residents undergoing remediation (n = 8) | | Improving the accuracy and/or frequency of assessment to better track residents' progress throughout their remediation | Advocating for more frequent formal and informal evaluations and feedback<br><br>Often found to improve resident learning outcomes | 6,8,10,19,27-30 |

| | Primary Themes | Secondary Themes | Description | Examples | Ref. |
|---|---|---|---|---|---|
| **4.** | Individualizing or tailoring of the remediation plan / program (n = 7) | To the resident (n = 7) | Many articles discuss the importance of tailoring remediation plans to the resident | Customizing the approach and structure and the resources needed for the remediation plan for each resident, with consideration given to the problem type and severity, and the resident's characteristics (such as their learning style, personality, and level of insight). | [10,26,31-35] |
| | | To the specialty (n = 1) | Different specialties may require special consideration when developing a remediation plan, due to the unique nature of their training program and/or special clinical/training environment(s) | Emergency Medicine interns are found to have a significantly higher chance of underperforming than those in other disciplines, thought to be possibly related to differences in assessment practices and/or training environments | [31] |
| **5.** | Defining terms relating to remediation (n = 5) | | Demonstrate the importance of having institutional-level consistency on the definitions of terms relating to remediation. This can help Program Directors, their faculty, and residents to better understand the expectations for training and the repercussions of not meeting them | Need to better differentiate and understand the difference between "need for improvement," "need for remediation" (formal vs. informal), and "need for probation" (notice of potential for dismissal) | [8,12,20,22,36] |
| **6.** | Demands of remediation on faculty (n = 5) | | Any strain to faculty as a result of their participation in the remediation of residents, including their time and effort spent and the complexity of their role(s) | Most refer to how time-consuming it is for faculty to participate in remediation programs and the great effort that is usually required | [10,13,29,37] |
| **7.** | Hidden curriculum (n = 2) | | Discuss the "hidden curriculum" in terms of attending role modelling, which can either positively or negatively impact residents | Faculty and residents need to be held to the same standards of professionalism (for example, studies find that residents are given passes on their behaviour relative to the learner's level of training) | [18,38] |

| | Primary Themes | Secondary Themes | Description | Examples | Ref. |
|---|---|---|---|---|---|
| **8.** | Associations with past performance (n = 2) | | Correlations observed between past performance (e.g. in medical school) and performance during residency | Performance in medical school may be predictive of performance in residency | [26,32] |
| **9.** | Pilot testing of plan / program (n = 2) | | Discuss the pilot testing of a novel remediation plan / program, including program description and program effectiveness and/or outcomes | Looking at the effects of a 4-month training program implemented in an Emergency Medicine residency program to improve residents' American Board of Emergency Medicine exam scores | [34,39] |
| **10.** | Roles and responsibilities of players involved in remediation (n = 2) | | Understanding and identifying the many "players" involved in remediating residents and identifying those in difficulty, and in defining their roles | Identifying the key individuals to be involved in the remediation process and specifying their roles for varying severities of resident problems. E.g. minor problems can be managed by the ward or department, whereas more serious problems might merit a formal investigation | [6,23] |
| **11.** | Other (n = 7) | | Topic areas that were less prominent in the literature reviewed | Critique of literature on remediation (review); PD survey of incidence / prevalence of resident problems and possible predictors; plan for improved self-reflection integrated into remediation programs; general description of remedial process; and benchmark scale for residency training | [1,39-44] |

The top two themes arising from our qualitative analysis are explored in greater detail below.

### 3.3.1. Identification of Residents in Difficulty

Early assessment and identification of resident problems is considered essential for the success of remediation efforts in terms of resident learning and behavioural outcomes. Early identification has the following impacts: minimizes the use of resources (deficiencies increase in severity the longer they persist in training, thus requiring more time and effort to remediate); reduces negative impacts to patient safety and quality of care (identifying and remediating resident problems earlier means less exposure of underperforming residents to patients); decreases negative effects on the functioning of health professional teams and the system at large (health professional teams are negatively affected by the actions of underperforming residents).

Many types of assessments were discussed that could be used to identify resident deficiencies, such as:

- In-training specialty exams, especially if occurring early in the learning experience or residency year[3]
- Innovative in-training assessment tools for providing formative feedback, such as the Clinical Skills Verification program described by Dalack and Jibson[7]
- Objective Standardized Clinical Examinations (OSCEs) to uncover knowledge gaps in trainees[9]
- Standardized Direct Observation Tools (SDOT)[45]
- Simulation laboratories[45]
- Simulated oral board cases[45]
- Post-curriculum multiple choice examinations, administered yearly[21]
- TriMetrix, a tool used to measure the behaviours and motivations of residents[16]
- Administering pre- and post-lecture questions to allow early identification of gaps in medical knowledge[14]
- General faculty evaluations[15]

In addition to early targeted assessments, almost a quarter of the articles also deemed faculty development to be important for the identifying residents in difficulty (21%, n = 4/19).[4-6,8]

### 3.3.2. Defining and Classifying Deficiencies

Separate from the identification of residents in difficulty is the need to have a literature-informed standardized classification system to categorize and define the many different kinds of resident deficiencies.

Defining and classifying resident problems includes rating the level of seriousness[23] and exploring potential causes of the deficiency[12] (e.g. mental health issues, cognitive disabilities).

Having standardized definitions and a means of classifying deficiencies is necessary for developing more uniform approaches to remediation that are targeted to improving the issue at hand.[27] It also allows Program Directors and faculty assessors to have a mental model or framework for identifying these deficiencies in practice.

Repeatedly, articles discussed the importance of defining and classifying as a necessary first step to understanding the best course of action to take in improving a resident's performance to meet the standards of the program, whether it is through informal coaching, mentoring and monitoring of progress, more formal remediation, or probation if the issue is non-remediable.

Some of the literature we reviewed offered categorizations and definitions of commonly occurring resident problems, or referenced other articles that did, such as surgical clinical performance,[19] professional behaviour, and competence and collaboration.[23,24,46,47] Information on these articles can be found in Appendix 2.

## 3.4. Summary of Remediation Practices from the Literature

1) **Methods of Monitoring of All** Residents' **Performances**
   a) Informal and formal methods for addressing concerning areas in residents
   b) Faculty development for giving feedback
   c) Formal methods for catching deficiencies in all competency domains

2) **Structural and Design Practices**
   a) Defining remediation terms (institutional)
   b) Creating a classification system for categorizing resident problems
   c) Clarifying if wellness issues are associated with resident performance
   d) Developing a system for classifying the level of seriousness of resident problems to help determine the best course of action, whether coaching, remediation, or probation (e.g. see the classification of levels of seriousness offered by Anderson et al.[23])
   e) Creating guidelines / assessment measures / protocols for identifying residents in difficulty

      *For example:*

      - The earlier, the better for identification of residents in difficulty
        - Identification requires early, accurate assessment of residents to track their progress
        - There must be clearly outlined, observable, and tangible objectives for residents to meet in all competencies
        - Program Directors are advised to take very seriously any suggestions of poor behaviour and performance in residents early in training, as it's usually during this period that residents put their best foot forward and faculty are more lenient / dismissive of problems in their assessments of residents. For this reason, even "neutral" comments / feedback / assessments from faculty need to be followed up by Program Directors during this period.
        - Review and consider adopting the 10 guiding principles for managing trainees in difficulty as outlined by Anderson et al.[23]

3) **Identifying Resident Problem(s)**
   a) Faculty are tasked with observing and evaluating residents' performances and identifying those learners found to be underperforming, or at risk of underperforming. Some faculty development is required to enhance faculty ability to diagnose resident deficiencies

4) **Define / Describe Resident Problem(s)**
   a) This involves investigation of reports made by faculty, or other health professional staff,[27] to better classify and define the resident's problem and its level of seriousness

5) **Tailor Plan to Individual's Needs**
   a) Modify the existing remediation plan / approach for customization to the individual resident in difficulty (personality, learning style, etc.) and the identified problem (e.g. clinical reasoning)
   b) For guidance, see Domen's eight steps for the development of a remediation plan[8]

6) **Define the Roles and Responsibilities of All Players Involved in Remediation**
   a) Remediation needs a team approach, including the resident, Program Director, faculty, postgraduate leaders, educational design resources, and coaches, including wellness, medical expert, communication, collaboration, and professionalism resources

7) **Remediate Resident**
   a) Create structured, transparent, educational programs, with additional supports such as coaching or mentorship
   b) Focus on primary problems first and limit remediation to a small number of areas at a time

8) **Assess Resident's Progress during Remediation and Determine Next Steps**
   a) Regular assessment, regular monitoring, and effective feedback are necessary for good remediation outcomes

## 4. Discussion and Implications

Transitioning to a CBME system requires many policy and practice changes both at the level of the residency program and in the institution. Our research group employed an evidence-informed approach to determining the best practices around resident remediation, and the management of residents in difficulty, by reviewing the literature in these topic areas. Only very recently has a more purposeful move toward CBME implementation occurred. Thus, we chose to focus our review on the last five years of published literature.

Identifying residents in difficulty, primarily through early and accurate assessment and faculty development, is thought to be a necessary first step in managing residents in difficulty. This requires clear performance benchmarks by competence area, clear definitions and classifications of commonly encountered resident problems, and clear guidelines for identifying specific issues (e.g. how to identify a professionalism issue; how to gauge its severity; determining in which context(s) it is observed). Programs, and their faculty, need to have an understanding of these criteria in order to ensure that residents in difficulty are being identified early and getting access to remediation and other supports as early as possible.

Assessments methods (e.g. advocating for more frequent formal and informal evaluation and feedback) and tools need to be improved for better tracking of each resident's progress during remediation.

There is benefit in tailoring remediation programs to both the specialty and the resident; however, the impacts of these efforts on faculty, health care teams, and patient care must be considered closely. Customization of remediation plans can be very resource-intensive. Thus, programs need to determine the appropriate amount of resources to devote to any one resident by considering the type of problem, its severity, and any pertinent resident characteristics (e.g. resident's personality, which may be more "hard-wired" and thus difficult to remediate).

Others have pointed to the refinement of postgraduate resident selection processes as a means of limiting the percentage of residents in their programs at risk of requiring remediation. Factors such as past medical school performance can predict learner difficulty later in postgraduate training. Thus it may be useful to consider such factors when screening applicants for entry to residency programs.

Programs will need to do some thinking around how the results of this review can best be applied to their program, due to the following points:

1. ***Most findings are not specific to CBME systems***

   Despite the increasing popularity of CBME systems globally, very few articles explicitly discussed CBME in the context of resident remediation and/or residents in difficulty. Nor did we observe an increase in articles discussing competency frameworks over time. A key implication of these findings is that universities and programs will need to translate the research findings around resident remediation to make them applicable and/or functional for their specific CBME frameworks.

   Systems to oversee the promotion of residents from year to year or phase to phase were also rarely discussed. This is worrying. As more and more programs aim to implement CBME, designing better systems for oversight of resident promotion will become a crucial element in ensuring each resident's competence throughout each stage of training.

2. ***Many of the articles may not be based in the same geographic context or be specific to a particular specialty***

   As most studies were either conducted in the United States and/or published by American authors, it will be important for readers to consider the generalizability of these results. For example, attention must be given to the different educational context(s) in which they were applied.

3. ***The literature focuses on identifying, characterizing, assessing, and remediating only certain types of resident problems***

   In about a quarter of the articles, remediation was not discussed relative to, or in association with, a particular specialty. Programs will have to consider whether the solutions offered here can be applied to their particular specialty. Nonetheless, even if one's specialty is not captured in this review, it might be useful to consider the practices of others so as to encourage innovative alternatives. The reviewed literature focused predominantly on the three competency areas of Medical Expert, Professionalism, and Communicator. This may be particularly useful if these are the sorts of resident problem areas that need to be managed locally.

While the findings of this review are largely based in traditional, time-based models of education, this review can still offer general principles that can guide the implementation of CBME systems for managing residents in difficulty.

## 5. References


1. Cleland JA, Leggett H, Sandars J, Costa MJ, Patel R, Moffat M. The remediation challenge: theoretical and methodological insights from a systematic review. *Medical Education.* 2013;47(3):242-251.
2. Hsieh H-F, Shannon SE. Three Approches to Qualitative Content Analysis. *Qualitative Health Research.* 2005;15(9):1277-1288.
3. Aldeen AZ, Salzman DH, Gisondi MA, Courtney DM. Faculty prediction of in-training examination scores of emergency medicine residents: A multicenter study. *Journal of Emergency Medicine.* 2014;46(3):390-395.
4. Audétat M-C, Dory V, Nendaz M, et al. What is so difficult about managing clinical reasoning difficulties? *Medical Education.* 2012;46(2):216-227.
5. Audétat M-C, Laurin S, Dory V. Remediation for struggling learners: putting an end to 'more of the same'. *Medical education.* 2013;47(3):224-231.
6. Audétat M-C, Voirol C, Béland N, Fernandez N, Sanche G. Remediation plans in family medicine residency. *Canadian Family Physician.* 2015;61(9):e425-e434.
7. Dalack GW, Jibson MD. Clinical skills verification, formative feedback, and psychiatry residency trainees. *Academic Psychiatry.* 2012;36(2):122-125.
8. Domen RE. Resident remediation, probation, and dismissal: basic considerations for program directors. *American Journal of Clinical Pathology.* 2014;141(6):784-790.
9. Gaviola G, Smith SE. Assessment of fellowship trainee clinical competency and growth with an objective standardized clinical examination within the musculoskeletal fellowship program: Initial experience. 2012 Annual Meeting of the Society of Skeletal Radiology; 2012; Miami Beach, FL, USA.
10. Guevara M, Grewald Y, Hutchinson K, Amoateng-Adjepong Y, Manthous C. Individualized education plans in medical education. *Connecticut Medicine.* 2011;75(9):537-540.
11. Jones AT, Biester TW, Buyske J, Lewis FR, Malangoni MA. Using the American Board of Surgery In-Training Examination to predict board certification: a cautionary study. *Journal of Surgical Education.* 2014;71(6):e144-148.
12. Katz ED, Goyal DG, Char D, Coopersmith CM, Fried ED. A novel concept in residency education: case-based remediation. *Journal of Emergency Medicine.* 2013;44(2):493-498.
13. Kedian T, Gussak L, Savageau JA, et al. An Ounce of Prevention: How Are We Managing the Early Assessment of Residents' Clinical Skills?: A CERA Study. *Family medicine.* 2012;44(10):723-726.
14. Platt MP, Davis EM, Grundfast K, Grillone G. Early detection of factual knowledge deficiency and remediation in otolaryngology residency education. *Laryngoscope.* 2014;124(8):E309-311.

15. Riebschleger MP, Haftel HM. Remediation in pediatric residency programs: A survey of pediatric program directors. *Academic Paediatrics.* 2011;11(4):e7.
16. Yost M, Gardner J, McMurtry Bell R, et al. Predicting academic performance in surgical training. *Journal of Surgical Education.* 2015;72(3):491-499.
17. Santen S, Taira T, Roberts N. How do we remediate the problem resident? *Annals of Emergency Medicine* 2012;60(5):S167.
18. Sanfey H, Darosa DA, Hickson GB, et al. Pursuing professional accountability: an evidence-based approach to addressing residents with behavioral problems. *Archives of Surgery.* 2012;147(7):642-647.
19. Sanfey H, Williams R, Dunnington G. Recognizing residents with a deficiency in operative performance as a step closer to effective remediation. *Journal of the American College of Surgeons.* 2013;216(1):114-122.
20. Taira T, Santen S, Roberts N. Developing a taxonomy of "problem residents". *Annals of Emergency Medicine.* 2012;60(5):S169.
21. Webb TP, Paul J, Treat R, Codner P, Anderson R, Redlich P. Surgery residency curriculum examination scores predict future American Board of Surgery in-training examination performance. *Journal of Surgical Education.* 2014;71(5):743-747.
22. Taira T, Roberts N, Santen S. Defining professionalism issues among "problem residents". *Annals of Emergency Medicine.* 2012;60(5):S167.
23. Anderson F, Cachia PG, Monie R, Connacher AA. Supporting trainees in difficulty: a new approach for Scotland. *Scottish Medical Journal.* 2011;56(2):72-75.
24. Barnhoorn PC. Resident remediation: Start from scratch: To the editor. *American Journal of Clinical Pathology.* 2015;144(3):525.
25. Mar C, Chang S, Forster B. Remedial training for the radiology resident: a template for optimization of the learning plan. *Academic Radiology.* 2015;22(2):240-246.
26. O'Neill LD, Norberg K, Thomsen M, et al. Residents in difficulty--just slower learners? A case-control study. *BMC Medical Education.* 2014;14:1047.
27. Papadakis MA, Paauw DS, Hafferty FW, Shapiro J, Byyny RL, for the Alpha Omega Alpha Honor Medical Society Think Tank. Perspective: the education community must develop best practices informed by evidence-based research to remediate lapses of professionalism. *Academic Medicine.* 2012;87(12):1694-1698.
28. Ghaemmaghami CA, Sudhir A, Woods WA. The incorporation of high-fidelity simulation in the evaluation of efficacy of a residency remediation plan. *Academic Emergency Medicine.* 2012;19(4 (Supplement 1)):S400.
29. Ketteler ER, Auyang ED, Beard KE, et al. Competency champions in the clinical competency committee: a successful strategy to implement milestone evaluations and competency coaching. *Journal of Surgical Education.* 2014;71(1):36-38.
30. Stirling K, Hogg G, Ker J, Anderson F, Hanslip J, Byrne D. Using simulation to support doctors in difficulty. *The Clinical Teacher.* 2012;9(5):285-289.
31. Aram N, Brazil V, Davin L, Greenslade J. Intern underperformance is detected more frequently in emergency medicine rotations. *Emergency Medicine Australasia.* 2013;25(1):68-74.

32. Puscas L. Otolaryngology resident in-service examination scores predict passage of the written board examination. *Otolaryngology - Head & Neck Surgery.* 2012;147(2):256-260.
33. Saloum D, Bialeck S, Motov S, Rose J, Aghera A. An effective remediation program to improve in-training exam scores. *Academic Emergency Medicine.* 2013;20(5 Suppl. 1):S56.
34. Sharma R, Sperling JD, Greenwald PW, Carter WA. A novel comprehensive emergency medicine in-training exam course can improve residency-wide scores. *Journal of Graduate Medical Education.* 2012;19:378-380.
35. Zbieranowski I, Takahashi SG, Verma S, Spadafora SM. Remediation of residents in difficulty: a retrospective 10-year review of the experience of a postgraduate board of examiners. *Academic Medicine.* 2013;88(1):111-116.
36. Weizberg M, Smith JL, Murano T, Silverberg M, Santen SA. What does remediation and probation status mean? A survey of emergency medicine residency program directors. *Academic Emergency Medicine.* 2015;22(1):113-116.
37. Guerrasio J, Aagaard EM. Methods and outcomes for the remediation of clinical reasoning. *Journal of General Internal Medicine.* 2014;29(12):1607-1614.
38. Barnhoorn PC, Domen RE. Resident remediation: Start from scratch: The author's reply. *American Journal of Clinical Pathology.* 2015;144(3):525-526.
39. Guerrasio J, Garrity MJ, Aagaard EM. Learner deficits and academic outcomes of medical students, residents, fellows, and attending physicians referred to a remediation program, 2006-2012. *Academic Medicine.* 2014;89(2):352-358.
40. Dupras DM, Edson RS, Halvorsen AJ, Hopkins RH, Jr., McDonald FS. "Problem residents": prevalence, problems and remediation in the era of core competencies. *American Journal of Medicine.* 2012;125(4):421-425.
41. Lacasse M, Théorêt J, Tessier S, Arsenault L. Expectations of clinical teachers and faculty regarding development of the CanMEDS-Family Medicine competencies: Laval developmental benchmarks scale for family medicine residency training. *Teaching and Learning in Medicine.* 2014;26(3):244-251.
42. Leung F-H, Ratnapalan S. A framework to teach self-reflection for the remedial resident. *Medical Teacher.* 2011;33(3):e154-157.
43. Roberts NK, Williams RG, Klingensmith M, et al. The case of the entitled resident: a composite case study of a resident performance problem syndrome with interdisciplinary commentary. *Medical Teacher.* 2012;34(12):1024-1032.
44. Taggarshe D, Mittal V. The utility of the ABS in-training examination (ABSITE) score forms: percent correct and percentile score in the assessment of surgical residents. *Journal of Surgical Education.* 2012;69(4):554-558.
45. House JB, Dooley-Hash S, Kowalenko T, et al. Prospective comparison of live evaluation and video review in the evaluation of operator performance in a pediatric emergency airway simulation. *Journal of Graduate Medical Education.* 2012;4(3):312-316.

46. Hodges BD, Ginsburg S, Cruess R, et al. Assessment of professionalism: recommendations from the Ottawa 2010 conference. *Medical Teacher.* 2011;33(5):354-363.
47. Scottish Executive. *Prevention — Better than Cure.* Edinburgh, Scotland 2001.

## 6. Appendices

## 6.1. Appendix 1: Annotated Bibliography

**Audétat, M.-C., C. Voirol, N. Béland, N. Fernandez and G. Sanche (2015). "Remediation plans in family medicine residency." Canadian Family Physician 61(9): e425-e434.**

Audétat et al. developed an instrument to evaluate remediation plans from different teaching sites. A total of 23 plans were analyzed across 10 teaching sites. The instrument was used to assess the content, process, and quality of remediation plans, as well as students' academic and rotation assessment results before and after their participation in the remediation plan. The authors identified criteria for good remediation plans, which included diagnosing and describing the deficiency,; stating the objectives and duration of remediation,; and having someone oversee and be responsible for the remediation process.[6]

Key theme: remediation plan criteria

**Domen, R. E. (2014). "Resident remediation, probation, and dismissal: basic considerations for program directors." American Journal of Clinical Pathology 141(6): 784-790.** [8]

This paper offers an 8-step approach to the development of a remediation or probation plan. For example, this article describes how faculty development on the assessment of core competencies and milestones is key to residents' success and can help ensure that resident deficiencies are identified early. Identifying resident deficiencies early is also facilitated through timely and truthful evaluations with effective feedback on performance. Other recommendations were that the remediation plan should only target the specific issue(s) identified for remediation; that the plan should have clearly defined goals with defined measures/assessments; and that there need to be realistic timelines for achievement, designated faculty/mentors to assist the resident, and regular meeting dates to assess progress.

Key themes: competency framework, competence committee, remediation/probation plan, deficiency identification

**Ketteler, E. R., E. D. Auyang, K. E. Beard, E. L.McBride, R. McKee, J. C. Russell, N. L.Szoka and M. T. Nelson (2014). "Competency Champions in the Clinical Competency Committee." Journal of Surgical Education 71(1): 36-38.**[29]

This article describes how a clinical competence committee (CCC), using the ACGME competency-based framework, was developed to guide remediation and the coaching of residents in difficulty.

Faculty “champions” were appointed by the Program Director and assigned ACGME competencies, based on their expertise in each area. The “champions” were found to be effective in coaching and in providing clear tangible objectives for residents to aim towards, providing indications of success or being “back on track.”

There were a total of 12 CCC members and meetings were held monthly. Having monthly meetings was said to prompt early discussion of residents in difficulty. The authors found that most residents identified to be in difficulty really required coaching (informal) rather than remediation (formal). Formal remediation was thus left for residents who did not progress with coaching.

The authors also found that faculty improved in their ability to assess residents and define the objectives centred on required competencies. They also became skilled in providing structured feedback *throughout* the rotation, rather than just at the end.

While *initially* time-consuming, faculty on the CCC learned, within the span of a year, how to review an entire class of residents in an hour. As a result of the CCC, expectations of residents became clearer and the milestones more observable and tangible. The CCC not only helped to better assess residents, but also improved rotations to ensure that they provided the clinical experiences necessary to help residents achieve all competencies.

Key theme: competency framework

**Lacasse, M., J. Théorêt, S. Tessier and L. Arsenault (2014). "Expectations of clinical teachers and faculty regarding development of the CanMEDS-Family Medicine competencies: Laval developmental benchmarks scale for family medicine residency training." Teaching and Learning in Medicine 26(3): 244-251.[41]**

The authors of this article set out to map CanMEDS-FM competencies to different developmental stages of training in Family Medicine (FM), by consulting experts using Delphi methodology. They found that most benchmarks under the Medical Expert, Collaborator, and Health Advocate Roles should be achieved in between 6 and 18 months of training. Competencies under the Manager Role, and most of those pertaining to the Scholar Role, should be achieved by the second year of residency or into their early practice. Competencies under the Professional and Communicator Roles should be achieved early in practice. This benchmark scale can be useful for teaching and evaluating residents, as well as for enabling better/earlier identification of residents in difficulty.

Key theme: competency framework

**Lacasse, M., J. Théorêt, S. Tessier and L. Arsenault (2014). "Expectations of clinical teachers and faculty regarding development of the CanMEDS-Family Medicine competencies: Laval developmental benchmarks scale for family medicine residency training." Teaching and Learning in Medicine 26(3): 244-251.[47]**

This report offers helpful information on investigating and tackling resident difficulties, and on assigning and defining roles and responsibilities in remediating issues, among other things. The authors claim that systems should be aimed toward recognizing early warning signs of resident problems in order to intervene before the problem has repercussions (e.g. to patient safety) and the problem becomes "hardwired," rather than focusing energies on "crisis management." Three categories of problems are listed and described (personal conduct, professional conduct, and professional competence).

Key themes: deficiency definitions and/or classification systems, deficiency identification

## 6.2. Appendix 2: Other Important Resources

**Audétat, M.-C., V. Dory, M. Nendaz, D. Vanpee, D. Pestiaux, N. Junod Perron and B. Charlin (2012). "What is so difficult about managing clinical reasoning difficulties?" Medical Education 46(2): 216-227.**[4]

Audétat et al. describe a model for faculty development that can help to improve early and accurate diagnoses of residents' deficiencies in the area of clinical reasoning.

Key themes: faculty development and support

**Audétat, M.-C., S. Laurin and V. Dory (2013). "Remediation for struggling learners: putting an end to 'more of the same'." Medical education 47(3): 224-231.**[5]

Audétat et al. describe a four-pronged approach to supporting clinical teachers in remediating residents. For example, they discuss faculty development efforts to introduce clinical teachers to conceptual frameworks and empirical findings around remediation strategies, as well as providing the teachers with training to develop their teaching and assessment skills.

Key themes: faculty development and support

**Anderson, F., P. G. Cachia, R. Monie and A. A. Connacher (2011). "Supporting trainees in difficulty: a new approach for Scotland." Scottish Medical Journal 56(2): 72-75.**[23]

Using their operational framework, Anderson et al. offer practical guidance to residency training programs for supporting residents in difficulty.

Key theme: operational framework

**Cleland, J. A., H. Leggett, J. Sandars, M. J. Costa, R. Patel and M. Moffat (2013). "The remediation challenge: theoretical and methodological insights from a systematic review." Medical Education 47(3): 242-251.**[1]

In the most recent literature review on remediation, conducted by Cleland et al., the quality of literature was found to be quite low (e.g. no controls, small sample sizes) making it difficult to delineate the most effective remediation methods. In addition, most remediation methods equate success with passing an examination or assessment(s). They do not offer further insight as to how much additional work or teaching is needed to develop residents' learning. More recently published articles were observed to be of higher quality.

Key theme: literature review on remediation

**Dupras, D. M., R. S. Edson, A. J. Halvorsen, R. H. Hopkins, Jr. and F. S. McDonald (2012). "Problem residents": prevalence, problems and remediation in the era of core competencies." American Journal of Medicine 125(4): 421-425.[40]**

Using the Accreditation Council for Graduate Medical Education (ACGME) framework, this article discusses the prevalence of "problem residents," the contexts in which they were identified, and the methods used by Program Directors to resolve them. The authors found that the majority of residents who were in difficulty had deficiencies in multiple competencies, requiring a comprehensive and multisource evaluation system.

Key theme: competency framework

**Ghaemmaghami, C. A., A. Sudhir and W. A. Woods (2012). "The incorporation of high-fidelity simulation in the evaluation of efficacy of a residency remediation plan." Academic Emergency Medicine 19(4 (Supplement 1)): S400.[28]**

This article describes a successful program of assessment for all of the ACGME competencies (e.g. through the use of written essay examinations, oral board-type examinations, and high-fidelity simulations). Oral board and simulation cases were evaluated using case-based critical action checklists and a Standardized Direct Observation Tool (SDOT). The authors argue that subjective measures are often used to assess the efficacy of a remediation program and that this is problematic.

Key theme: competency framework

**Guerrasio, J. and E. M. Aagaard (2014). "Methods and outcomes for the remediation of clinical reasoning." Journal of General Internal Medicine 29(12): 1607-1614.[37]**

Guerrasio and Aagaard assessed the effectiveness of a ten-step remediation program targeted toward clinical reasoning deficits. Their program, designed to be 4 to 6 weeks long, was found to have resident outcomes that were comparable to other programs that lasted 6 months. The shorter program duration was deemed beneficial, as this minimized the exposure of underperforming residents to patients, without compromising their performance outcomes. A caveat regarding this remediation program was that it was still time consuming for faculty participants

Key theme: remediation plan

**Hodges, B. D., S. Ginsburg, R. Cruess, S. Cruess, R. Delport, F. Hafferty, M. J. Ho, E. Holmboe, M. Holtman, S. Ohbu, C. Rees, O. Ten Cate, Y. Tsugawa, W. Van Mook, V. Wass, T. Wilkinson and W. Wade (2011). "Assessment of professionalism: recommendations from the Ottawa 2010 conference." Medical Teacher 33(5): 354-363.**[46]

Members of the International Ottawa Conference Working Group on the Assessment of Professionalism (IOC-PWG) conducted a critical discourse analysis of identified articles on Professionalism. Their analysis offers a classification of the prominent discourses in the literature on professionalism by scope (individual, interpersonal, societal/ institutional) and epistemology (theory behind discourse, i.e. objectivist/ positivist or subjective/ constructivist). The following three discourses on professionalism were identified: (1) Professionalism as an individual characteristic, trait, behaviour or cognitive process; (2) Professionalism as an interpersonal process or effect; and (3) Professionalism as a societal/institutional phenomenon. The authors offer recommendations for the assessment of each.

Key themes: deficiency definitions and/or classification systems

**O'Neill, L. D., K. Norberg, M. Thomsen, R. D. Jensen, S. G. Brondt, P. Charles, L. S. Mortensen and M. K. Christensen (2014). "Residents in difficulty--just slower learners? A case-control study." BMC Medical Education 14: 1047.**[26]

The aim of this study was to determine whether and which medical school performance indicators were predictive of difficulties during residency. This was a case-control study of specialist trainees identified to be in difficulty from one university. The authors discovered that the two variables of — "'time to complete medical school'" and "'number of re-examinations'" — predicted difficulties during residency. Average medical school grades were *not* found to be predictive.

Key themes: resident selection; deficiency identification

**Puscas, L. (2012). "Otolaryngology resident in-service examination scores predict passage of the written board examination." Otolaryngology - Head & Neck Surgery 147(2): 256-260.**[32]

This was a historical cohort study that identified significant associations between residents' Otolaryngology Training Examination (OTE) scores and their first-time American Board of Otolaryngology (ABOto) Written Qualifying Exam (WQE) scores. The OTE can therefore serve as a method for identifying residents at risk of failing their WQE. Those scoring in the bottom quartile for the OTE are at significantly greater risk of failing the WQE.

Key theme(s): deficiency identification

**Roberts, N. K., R. G. Williams, M. Klingensmith, M. Sullivan, M. Boehler, G. Hickson, M. J. Kim, D. L. Klamen, T. Leblang, C. Schwind, K. Titchenal and G. L. Dunnington (2012). "The case of the entitled resident: a composite case study of a resident performance problem syndrome with interdisciplinary commentary." Medical Teacher 34(12): 1024-1032.**[43]

In this case study, the authors state the importance of balancing the needs of residents in difficulty with the needs of the health care system. This is because remediation takes a lot of time and energy and can adversely affect the functioning of healthcare professional teams. The authors also advise taking early reports of resident problems seriously, as residents tend to be on their best behaviour early on and faculty are more lenient. Faculty are advised not to tolerate behaviour in residents that they would not tolerate in their colleagues. Lastly, institutional, systemic and systematic support is needed to address residents in difficulty.

Key theme(s): remediation plan; deficiency identification; health care system

**Sanfey, H., D. A. Darosa, G. B. Hickson, B. Williams, R. Sudan, M. L. Boehler, M. E. Klingensmith, D. Klamen, J. D. Mellinger, J. C. Hebert, K. M. Richard, N. K. Roberts, C. J. Schwind, R. G. Williams, A. K. Sachdeva and G. L. Dunnington (2012). "Pursuing professional accountability: an evidence-based approach to addressing residents with behavioral problems." Archives of Surgery 147(7): 642-647.**[18]

Sanfey et al. offer strategies for improving the resident selection process (in the context of identifying residents with behavioural issues), including the use of multiple mini-interviews, provocative OSCEs, and personality testing.

Key theme: resident selection

**Sanfey, H., R. Williams and G. Dunnington (2013). "Recognizing residents with a deficiency in operative performance as a step closer to effective remediation." Journal of the American College of Surgeons 216(1): 114-122.** [19]

The authors undertook a systematic approach to evaluating operative performance by analyzing over 1000 comments from expert raters on the perceived strengths and weaknesses of audio-videotaped resident performances.

Authors sought to categorize and describe common deficiencies in surgery. Five categories of deficiencies were identified: technical skills, forward planning, self-direction, situation awareness, and patient safety/judgment. The authors also offer specific tools and evaluation methods for assessing each category of deficiency in terms of both identification and monitoring of progress, and deficiency-specific methods for remediation (see Table 1 of the article for a helpful summary of these findings). Effective

feedback, deliberative practice, and specific performance targets were found to be essential components of operative training and remediation.

To help with the early identification of residents in difficulty, faculty are advised that engaging in regular discussions about residents' performance is necessary.

Key themes: competency framework, deficiency definitions and/or classification systems, deficiency identification

## 6.3. Appendix 3: List of abstracting criteria and their descriptions

**BPEA Literature Review on Residents in Difficulty, Remediation, BOE**

**Abstracting Criteria Definitions**

| Item # | Abstracting Criteria | Description | Examples |
|---|---|---|---|
| 1. | Reviewer initials | Four reviewers were involved in the secondary screening of articles: JP, LSA, MR, and SGT. | |
| 2. | Last name of first author | | |
| 3. | Publication year | | |
| 4. | ISSN or DOI number (if applicable/available) | | |
| 5. | Type of article | Article type includes commentaries, editorials, letters, history articles, review articles, primary research articles, and "other" (e.g. conference publications). | |
| 6. | After reviewing the full-text, does the article still meet our previous eligibility criteria? | Articles are deemed eligible if they:<br>(1) are about postgraduate medical education;<br>(2) are about residents in difficulty;<br>(3) offer information to inform structure and/or processes of competence.<br><br>If articles are not eligible OR the reviewer is "unsure," the reviewer is to describe their reasoning for either decision. | |
| 7. | Location of author(s)<br>(check all that apply) | Includes the following locations: USA, Canada, Europe, Australia and New Zealand, and "other" (for those not included in this list). | |
| 8. | Location of study<br>(check all that apply) | Includes the following locations: USA, Canada, Europe, Australia and New Zealand, and "other" (for those not included in this list). | |
| 9. | Learner PGY level(s)<br>(check all that apply) | Includes PGY1 to PGY5 and "other" levels of postgraduate education, such as a house officer (U.K.). | |
| 10. | Learner residency program / specialty | Select all programs/ specialties discussed in the article. "Other" to indicate any other programs/ specialties outside those listed in the abstracting form. | |

| Item # | Abstracting Criteria | | Description | Examples |
|---|---|---|---|---|
| 11. | What area(s) of competence were discussed? (check all that apply) | | Includes discussions of competence as it pertains to the Medical Expert, Communicator, Collaborator; Leader, Health Advocate, Scholar, and Professional CanMEDS 2015 Roles. There is also an "other" category for discussions of competence outside the CanMEDS Roles. | |
| 12. | What "structures to support competence" were discussed, as it relates to residents in difficulty, remediation and/or BOE? (check all that apply) | Guidelines for resident | Guiding principles, suggestions, and/or lessons for residents; what a resident should be doing to help support / develop / improve their competence. | Effective study habits / strategies; time management |
| | | Guidelines for program | Guiding principles, suggestions, and/or lessons to help support resident competence. | Planned meetings with residents to assess progress; suggestions to help programs identify, monitor, and/or remediate residents in difficulty |
| | | Guidelines for hospital / health facility | Guiding principles, suggestions, and/or lessons for hospitals / health facilities to help support resident competence. | Around hospital orientation materials – i.e. preparing residents for residency; includes discussions of international residency programs that are hospital-based and not accountable to the university (unlike many programs in Canada) |
| | | Guidelines for university | Guiding principles, suggestions, and/or lessons for the university (e.g. Postgraduate Medical Education and BOE) that help to support the competence of residents and the successful remediation of those in difficulty. | |
| | | Design of individual resident educational plan/program | Includes discussion on measures of competence, types of assessment tools, educational interventions, timelines. | |

| Item # | Abstracting Criteria | | Description | Examples |
|---|---|---|---|---|
| | | Design of residency educational program | Describes the features of an educational program as it relates to residents in difficulty, remediation, and/or BOE. | Program goals, assessment tools, coaches |
| | | Assessment tool(s) | Articles that specifically discuss (an) assessment tool(s) (e.g. tool type – MSF, mini-CEX, ITER, etc. – items/content, goals and objectives, validity, effectiveness) in terms of either identifying / predicting residents in difficulty, or evaluating residents in remediation. | |
| | | Promotion of resident systems (i.e. from one PG year to another) | Discussion of how residents are promoted (e.g. what assessment criteria, type, and quantity are considered; what determines pass/fail) and how this supports competence. | |
| | | Other | | |
| 13. | In follow-up to question 12, please provide further detail on the structure(s) to support competence mentioned in this article and discuss their relative value to our research question. | | How are these structures to support competence discussed? What are the implications? How do the structures discussed inform best practices in evaluation and assessment as they relate to residents in difficulty, remediation, and/or BOE? | |
| 14. | Was a competency-based educational orientation or framework used in this article (as defined and applied by the author)? | | Did the author(s) use / apply a competency-based educational orientation / framework in the article? Note that the "competency-based educational orientation / framework" is as per described / defined by the author(s). | |
| 15. | Please briefly state the purpose of the article. | | | |
| 16. | Please provide any additional observations or comments related to residents in difficulty, remediation, and/or BOE. | | | |