

Mentorship Programs in Residency: A Scoping Review

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ABSTRACT

Background Mentorship during residency training is correlated with improved outcomes. Many residency programs have implemented formal mentorship programs; however, reported data for these programs have not been previously synthesized. Thus, existing programs may fall short on delivering effective mentorship.

Objective To synthesize current literature on formal mentorship programs in residency training in Canada and the United States, including program structure, outcomes, and evaluation.

Methods In December 2019, the authors performed a scoping review of the literature in Ovid MEDLINE and Embase. The search strategy included keywords relevant to mentorship and residency training. Eligibility criteria included any study describing a formal mentorship program for resident physicians within Canada or the United States. Data from each study were extracted in parallel by 2 team members and reconciled.

Results A total of 6567 articles were identified through the database search, and 55 studies met inclusion criteria and underwent data extraction and analysis. Though reported program characteristics were heterogeneous, programs most commonly assigned a staff physician mentor to a resident mentee with meetings occurring every 3 to 6 months. The most common evaluation strategy was a satisfaction survey at a single time point. Few studies performed qualitative evaluations or used evaluation tools appropriate to the stated objectives. Analysis of data from qualitative studies allowed us to identify key barriers and facilitators for successful mentorship programs.

Conclusions While most programs did not utilize rigorous evaluation strategies, data from qualitative studies provided insights into barriers and facilitators of successful mentorship programs, which can inform program design and improvement.

Introduction

Rationale

The benefits of mentorship during residency training are well established.¹⁻⁵ Research has demonstrated a positive correlation between mentorship and professional development, productivity, and academic success.¹⁻⁵ Residents who identify mentors are more likely to be hired in their desired specialties and pass qualifying examinations.⁴ Mentorship is also valuable for resident well-being, increasing job satisfaction and reducing rates of resident burnout.⁶⁻⁸ Furthermore, mentorship can advance diversity, equity, and inclusion in medicine, as those underrepresented in medicine may experience unique benefits from mentorship.⁹⁻¹¹

Despite the established benefits of mentorship, reported access to mentorship during residency training varies between individual trainees and institutions.¹ Including formal mentorship programs in residency programs is a strategy to increase access

to mentorship. Formal mentorship programs are reported to exist in 50% to 82% of residency programs in Canada and the United States, most of which have been implemented within the last decade.¹²⁻¹⁵ Despite widespread implementation in residency programs, strategies to guide the development, implementation, and evaluation of formal mentorship programs have not previously been reviewed and synthesized. As a result, existing and future mentorship programs may fall short in their potential to meet residents' needs. We undertook a review of the literature to synthesize existing evidence on formal mentorship programs within residency programs. Scoping review methodology was utilized to broadly examine the literature and assess heterogeneity of existing studies, outcomes of interest, and knowledge gaps.¹⁶

Objective

The objective of this study was to synthesize the current literature on formal mentorship programs within residency programs in the United States and Canada to identify key barriers and facilitators for successful programs. Specifically, this study aimed to

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Editor's Note: The online version of this article contains the search strategy and data extraction tool used in the study.

describe the structure of formal mentorship programs, characterize resident experiences and outcomes, and describe tools and strategies used to evaluate outcomes from formal mentorship programs.

Methods

Protocol

We adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) checklist for scoping review guidelines.¹⁷ Our review protocol is provided as online supplementary data.

Eligibility Criteria

The study included residency or fellowship programs in the United States and/or Canada. We focused on these countries due to the common structure of residency training and postgraduate medical education. To be included, studies had to address the design, structure, implementation, evaluation, outcome, or resident/fellow experience with a formal mentorship program(s). Since one of the overarching objectives of our study was to inform improvements to mentorship programs in residency, we included only studies which aimed to benefit residents (as opposed to institutions) through their mentorship programs.

Any study type was eligible for inclusion, including surveys, observational studies, qualitative studies, abstracts, and commentaries. Full inclusion and exclusion criteria are shown in TABLE 1.

Information Sources

We searched Ovid MEDLINE (between 1940 and 2019) and Embase (between 1980 and 2019). We also performed hand searching of the reference lists of all included studies. The most recent search was executed on January 2, 2020.

Search

Our search strategy, included in online supplementary data, was developed in collaboration with a medical librarian and adapted from a previous systematic review by Pethrick et al.¹⁸

Selection of Sources of Evidence

References were imported into Covidence and deduplicated. Each abstract (or full article for those without an abstract) was independently screened by 2 authors for eligibility, and all disagreements were resolved by review from a third author.

TABLE 1
Full Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> ▪ Mentorship program for residents or fellows in United States or Canada ▪ Program established by residency/fellowship program or institution ▪ Study addressed structure, design, implementation, evaluation, outcome, or resident experience with mentorship program ▪ Program intended to benefit residents ▪ English language studies 	<ul style="list-style-type: none"> ▪ Program is external to residency program or institution ▪ Program intended to benefit institution (ie, increase residents going into specific specialty, increase institution's publication rates) ▪ Mentorship includes only supervision in the operating room setting

Data Charting Process

A data extraction tool was developed by 2 members of the study team (M.B.J., K.L.) based on preliminary review of included articles. The extraction tool was piloted by all study team members and revised based on their feedback and its usability. Data from each included article were extracted in parallel and reconciled by 2 study team members. All differences were resolved by consultation of the full-text article, and disagreements were resolved by consultation with a third author.

Data Items

We collected data on study type, setting, population, participant characteristics, program characteristics, and evaluation. A template of our data extraction tool with complete details of all collected variables can be found in the online supplementary data.

Critical Appraisal of Individual Sources of Evidence

We performed critical appraisal for all peer-reviewed studies using the following tools according to the study methodology: The Critical Appraisal Skills Programme Qualitative Studies Checklist was used for interview and qualitative data,¹⁹ and the appropriate risk of bias instruments provided by McMaster University's CLARITY Group were used to assess surveys, cohort studies, case control studies, and randomized controlled trials.²⁰⁻²³

Furthermore, our data extraction tool included a field for the authors to enter free text regarding study strengths and limitations, which were discussed and collated at the time of reconciliation. Critical appraisal was performed to understand the strengths and limitations of the current literature but did not inform inclusion or exclusion of studies.

Synthesis of Results

We performed descriptive numerical analysis for collected variables, including study, program, mentor, and evaluation characteristics. Additional analyses were based on common themes of interest that emerged during the full-text review and data extraction.

Results

Selection of Sources of Evidence

Results from our search strategy are shown in the FIGURE. Fifty-five studies fulfilled inclusion criteria and underwent data extraction by 2 authors (FIGURE). We did not identify any full studies via hand search of the reference list of studies identified by our initial search strategy.

Characteristics of Sources of Evidence

Characteristics of included studies are outlined in TABLE 2. The earliest study was published in 1995. Four studies (7%) focused on specific mentee populations²⁴⁻²⁷; 2 studies (4%) reported on

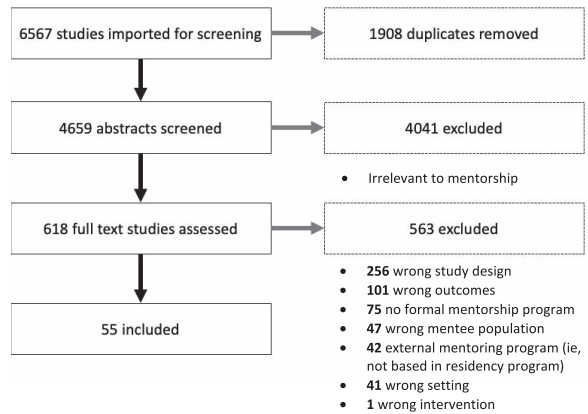


FIGURE
Flow Diagram of Included Studies

mentorship programs and included women trainees only^{24,25}; one study (2%) described a program that was reserved for fellows enrolled in a clinician educator program²⁶; and one study (2%) examined a mentorship program for international medical graduates.²⁷

TABLE 2
Characteristics of Included Studies

Study Characteristics	N (%)	References
Study methodology, n=55		
Survey	42 (76)	2, 3, 24, 25, 27-64
Descriptive	10 (18)	26, 65-72
Qualitative	4 (7)	61, 73-75
Randomized trial	1 (2)	76
Number of programs, n=55		
Single program	45 (82)	3, 24-34, 36-39, 41-45, 48, 49, 51, 52, 54, 56-62, 64-75
Multiple programs	10 (18)	2, 35, 40, 46, 47, 50, 53, 55, 63, 76
Program specialty, n=45		
Internal medicine and subspecialties	11 (24)	26, 27, 33, 34, 44, 58, 59, 61, 69, 71, 75
Surgical specialties	8 (18)	28, 31, 36, 38, 52, 57, 67, 70
Pediatrics and subspecialties	6 (13)	32, 39, 56, 62, 64, 68
Emergency medicine and subspecialties	5 (11)	25, 42, 49, 51, 72
Radiology and subspecialties	4 (9)	24, 29, 30, 37
Radiation oncology	4 (9)	3, 43, 45, 60
Radiology	4 (9)	24, 29, 30, 37
Psychiatry	3 (7)	41, 65, 73
Pathology	2 (4)	48, 54
Family medicine	1 (2)	66
Anesthesia	1 (2)	74
Mentor-mentee pairing, n=44		
Assigned to mentee by program	27 (61)	24, 27, 31-33, 36, 37, 39, 41, 42, 44, 49, 56, 58-60, 64-68, 70-74, 76
Selected by mentee	9 (20)	26, 34, 38, 51-54, 62, 63
Mixture of assigned and selected	8 (18)	2, 29, 30, 35, 40, 47, 57, 69

Mentor-Mentee Matching Strategies

Eleven (41%) of the studies^{24,28-37} that assigned mentors to mentees attempted to match residents with mentors on the basis of mentee characteristics, rather than random assignment. Strategies for matching mentors with mentees included the mentee's personal interests,^{24,28-31,34,35} gender identity,^{29,32,33,35} and career goals.^{24,29,30,33,34}

Included studies reported conflicting findings for assigned versus chosen mentors. One study in a combined internal medicine and pediatrics program compared random matching of residents with mentors to matching based on compatibility scores (assessing demographics, personal interests, values, and professional goals) and found no significant differences in results of a program evaluation survey a year after implementation.³⁷ A study of 27 radiology residents found that residents who self-selected their mentors (by requesting a specific faculty member) had higher frequency of meetings and higher satisfaction with the mentorship program compared to residents who were assigned a mentor, even when mentors were assigned to residents based on their preferred attributes.³⁸ Another study of 204 psychiatry residents across 12 residency programs reported that residents with self-selected mentors were significantly more likely to agree that their mentor had a positive impact on research and scholarly activity compared to residents with assigned mentors.³⁹ However, in a survey of 179 residents from 17 general surgery programs, Delisle et al found there was no difference in scores on the Mentorship Effectiveness Scale based on whether mentors were chosen or assigned.⁴⁰

Mentorship Program Characteristics

Mentor-to-mentee ratio was described in 37 studies (67% of total included), although no study compared the influence of these ratios on any outcome. Half of these studies examined a one-on-one, mentor-to-mentee ratio (49%, 18 of 37).^{26-28,31,32,34,36,38,41-50} In 6 of these studies (16%), there was more than one mentor available for each resident.^{33,36,51-54} In 7 of these studies (19%), a mentor had multiple mentees in a mentorship group.^{30,35,55-59} The remaining 6 studies (16%) reported variable mentor to mentee ratios.^{3,29,37,60-62}

Timing of meetings was reported in 15 studies (27% of total included). Eight of these studies (53%) reported that mentorship program meetings occurred during work hours,^{*} while 4 (27%) reported mentorship program meetings outside of work hours,^{25,30,41,64} and 3 (20%) reported a mixture of meeting times.^{24,32,60} Of the studies where meetings

took place during work hours, only 4 (50%) reported scheduling protected nonclinical time for residents to attend these meetings.^{44,46,47,50} Frequency of meetings most commonly occurred every 3 to 6 months[†]; however, other studies reported meeting weekly,⁵³ every 1 to 2 months,^{26,46,55,58,59,64} every 6 months,⁶⁰ or at variable intervals.⁶²

Meeting location was reported in 5 studies (9% of total included). Three of these (60%) reported meetings took place at the hospital or teaching site,^{46,50,55} one (20%) reported a mixture of meetings at formal (ie, mentor's office) or informal (ie, restaurant) settings,⁶⁰ and one (20%) reported meeting virtually via Skype.⁴¹ Of note, one (20%) study identified meeting in informal settings as a facilitator for mentorship.⁶⁰

Mentor Characteristics

Forty-two studies (76% of total included) reported on mentor characteristics. Of these, 34 mentorship programs (81%) utilized staff physician mentors,[‡] 3 (7%) used resident peer mentors,^{35,44,55} and 6 (14%) used a mixture of peer and staff physician mentors.^{30,50,56,58,59,64}

Recruitment of mentors was reported in 21 studies. Mentors were recruited on a volunteer basis[§] and/or invited to become mentors based on certain characteristics or credentials.^{31,33,36,58-61,66,69} Thirteen of the 39 single-program studies (33%) reported on providing mentors with instructional resources on mentorship^{||} and/or formal mentorship training.^{55,58-60,71,73} One survey of 80 neurological surgical programs noted that educational resources for mentors were provided in only 34% of programs.⁷⁴

Only 8 studies (15%) mentioned the issue of unsuccessful mentoring relationships and stated that there would be an option for residents to switch mentors if this occurred.^{28,29,36,45,65,68-70}

Program Goals, Evaluation, and Outcomes

Program goals were reported by 29 studies (53%) and included professional development,[#] career planning,^{28,29,33,63,69,72} scholarly activity,^{26,29,33,61,63,76} improving wellness,^{29,33,36,46,59,63} education,^{28,48,49,57,58} providing psychosocial support,^{28,35,50,53,69} providing networking opportunities,^{24,33,63} reducing burnout,^{36,46,55} aiding

*References 43, 44, 46, 47, 50, 52, 53, 63

†References 28-30, 38, 43, 45, 51, 54, 57, 60, 61, 63, 65-68

‡References 24-26, 28, 29, 31-34, 36-38, 41, 42, 45, 46, 49, 51, 53, 54, 57, 60, 61, 63, 65-73

§References 25, 30, 43-45, 55, 59, 63-65, 68, 71, 73

||References 27, 45, 48, 49, 54, 59-61, 68, 69, 71, 73

TABLE 3
Characteristics of Evaluations From Single-Program Studies (n=39)

Evaluation Characteristics	N (%)	References
Method		
Survey	34 (87)	24, 25, 27, 29, 30, 32-34, 36-39, 42-46, 49, 50, 53-56, 61, 63, 65, 66, 68, 69, 71-73, 76, 77
Qualitative	4 (10)	41, 52, 60, 70
Examination scores	1 (3)	48
Evaluation target		
Residents	31 (79)	24, 25, 27, 29, 30, 34, 36-39, 42-46, 48-50, 52, 53, 55, 56, 61, 65, 68, 69, 71-73, 76, 77
Residents and mentors	8 (21)	32, 33, 41, 54, 60, 63, 66, 70
Evaluation frequency		
Once	30 (77)	24, 25, 29, 32, 34, 37-39, 41, 43-45, 49, 50, 52-55, 60, 61, 63, 65, 68-71, 73, 76, 77
Pre- and post-program	9 (23)	27, 30, 33, 36, 42, 46, 48, 56, 66, 72

with transition to residency⁵⁰ or transition to practice,⁶⁸ and improving resilience.⁵⁵

There were 39 (71%) single-program studies that performed a formal evaluation of their respective mentorship programs.** Further details of program evaluations are shown in TABLE 3.

Synthesis of Results

Main findings from the 55 included studies are synthesized in TABLE 4. Most commonly, investigators used a survey at one time point to evaluate self-reported resident satisfaction with the program.^{††} Due to heterogeneous and generally low-quality survey methodology based on critical appraisal, we were unable to synthesize these results. Only 4 of the single-program studies (10%) reported using the evaluation results to inform program changes.^{29,56,66,69} Three (8%) used pre-existing instruments to study their programs; these included the Mentorship Profile Questionnaire,⁶¹ Mentorship Effectiveness Scale,^{40,61,78} Perceived Stress Scale (PSS),^{36,79} Maslach Burnout Inventory

#References 24, 27, 29, 31, 43, 60, 61, 66, 67, 75

**References 24, 25, 27, 29, 30, 32-34, 36-39, 41-46, 48-50, 52-56, 60, 61, 63, 65, 66, 68-73, 76, 77

††References 24, 25, 29, 34, 38, 39, 43-45, 49, 53, 55, 65, 68, 69, 71, 73, 76, 77

TABLE 4
Summary of Main Findings From Included Studies

Program Characteristics	Main Findings
Structure	Assignment of a staff physician mentor to resident physician mentee (1:1 mentorship dyad). Meetings occur every 3 to 6 months, usually during work hours.
Evaluation methods	Most commonly a satisfaction survey administered at single time point. Few studies performed qualitative analysis of focus group or interview data or used evaluation tools appropriate to stated to program objectives.
Resident experience/outcomes	Survey satisfaction data was not synthesized due to heterogeneous/low-quality data. See texts for outcomes from specific studies.

(MBI),^{36,80} WHO Quality of Life-BREF (WHOQOL-BREF),^{36,81} and Munich Evaluation of Mentoring Questionnaire.⁸² Given the limited data, it was not possible to determine the efficacy of mentorship program designs between different studies.

Three single-program studies (8%) matched the method of evaluation to the program objectives. Chandler and Borum described a program which aimed to enhance medical knowledge, and which assessed scores on the in-training examination before and after program implementation.⁴⁸ They reported an increase in mean scores on the examination the year after implementation and an increase in the training program's percentile rank compared with national average scores.⁴⁸ Zhang and colleagues³⁶ aimed to reduce burnout and improve well-being and performed evaluation with tools including the PSS,⁷⁹ MBI,⁸⁰ and WHOQOL-BREF.⁸¹ At 12 months following implementation of their mentorship program, participants reported statistically significant reduction in PSS scores; improved scores on the emotional, levels of depersonalization, and personal achievement domains of the MBI; and improvement in overall WHOQOL-BREF scores.³⁶ Saint Martin et al⁴⁶ aimed to address burnout and improve wellness, and evaluated wellness knowledge and utilization of wellness techniques before and after implementation of their program. Twelve months after program implementation, they reported improved scores on a wellness survey and improved self-reported rates of personal wellness knowledge and utilization of wellness techniques.⁴⁶

TABLE 5
Barriers and Facilitators of Successful Mentorship Programs

Program Characteristics	Barriers	Facilitators
Mentor pairing	Random assignment of mentors ⁶⁰	Flexible and natural process for matching mentors with mentees ⁶⁰ Opportunity for peer mentorship ⁷⁰
Meetings	Mentee scheduling and time constraints ^{47,53,54,58,61,66,69,76} Mentor time constraints ^{31,69}	Geographic proximity ⁶⁰ Meetings in informal settings ⁶⁰ Meeting early in residency and then at a minimum twice a year ⁷⁰
Mentor attributes	Lack of accessibility ⁷⁶	Approachable/accessible ⁷⁰ Interested, honest, trustworthy, nonjudgmental, caring, good listener, emphatic ⁷⁰
Mentee attributes	Uncertainty about career interests ⁷⁶ Feeling too overwhelmed to engage in program ⁷⁶ Lack of motivation/self-direction ⁷⁰	Receptive, self-motivated, socially responsible ⁷⁰
Relationships	Resident buy-in ^{58,74} Mentor buy-in ⁷⁴ Misalignment of expectations ⁷⁰ Unclear program objectives/structure ^{74,76} Power differential ⁷⁰	Compatible personalities and interests ⁷⁰ Compatible personal and career goals ⁷⁰ Clear communication of program objectives ⁶⁰ Resources and/or training for mentors ⁷⁰

The reporting of important methods details or results also limited our ability to compare studies. Across studies, the median number of participants was 40 (range 2 to 585). Participation rates were not reported in 14 of the 34 survey studies (41%).^{††} Of those studies that reported participation rates, the median response rate was 64% (range 14% to 100%).

Twelve studies explored barriers and facilitators to successful mentorship programs using surveys, focus groups, or interview data.^{§§} Compatibility between mentors and mentees was a common theme; flexible and organic pairing⁶⁰ as well as common personal interests, personalities, and goals were identified as facilitators of successful mentoring relationships.⁷⁰ Accessibility of the program was another theme; geographic proximity of meetings and approachable and accessible mentors were identified as facilitators,^{60,70} whereas scheduling and time constraints (for both mentors and mentees) were identified as barriers.^{|||} Mentee characteristics including engagement, buy-in, and self-motivation were facilitators of successful mentorship programs.^{58,70,74} A full list of barriers and facilitators from these studies is summarized in TABLE 5.

Three studies used inductive coding techniques to perform qualitative analysis of focus group or

interview data obtained from mentees^{60,70,76} and mentors.^{60,70}

Discussion

Summary of Evidence

This scoping review examined studies that described formal postgraduate medicine mentorship programs and, when reported, their associated evaluations and outcomes. We found that mentorship programs varied with respect to their stated objectives, design, structure, and evaluation. We synthesized the described barriers to and facilitators for successful mentorship programs to identify common themes (TABLE 5).

Only 3 studies utilized high-quality evaluation tools tailored to their program objectives.^{36,46,48} To best enhance knowledge on this subject and facilitate improvements in structure of formal mentorship programs, future studies in this field should tailor program evaluation strategies to program objectives.

Few studies reported on an option for switching mentors due to lack of compatibility.^{28,29,36,45,65,68-70} Previous literature has highlighted the importance of mentor-mentee compatibility.⁸⁶ However, due to the power differential, mentees may not feel comfortable asking for a new mentor or dissolving the relationship. As such, we suggest programs have a low barrier

^{††}References 2, 3, 27, 30, 32-36, 38-40, 43, 44, 46, 50, 51, 54, 55, 65, 66, 68-72, 76, 83-85

^{§§}References 31, 47, 53, 54, 58, 60, 61, 66, 69, 70, 74, 76

^{|||}References 47, 53, 54, 58, 61, 66, 69, 76

mechanism for mentees to switch mentors if the relationship with their initial mentor is unsuccessful, for example, a scheduled review with the mentorship program director.

Given that resident scheduling and time constraints were the most cited barrier to mentorship,^{##} facilitating protected time for mentorship meetings may increase accessibility. Other authors have emphasized mentor availability as a facilitator to mentorship.^{87,88} Programs can evaluate accessibility by collecting data on number and/or frequency of meetings attended, and whether meetings were missed due to scheduling conflicts.

Unclear goals and expectations of mentorship programs were identified as barriers to mentorship,^{60,70,76} and misalignment of goals and expectations between the mentor and mentee was reported to lead to negative mentorship outcomes for some residents.⁷⁰ Conversely, mentorship training and/or resources were identified as facilitators for successful mentoring relationships.⁷⁰ Previous literature suggests that clear communication of goals and expectations as well as formal instructional resources or training for mentors are facilitators of successful mentorship.⁸⁶

None of the studies specifically matched residents from historically excluded groups with mentors from similar demographics. Previous publications have reported that racial/ethnic concordance is of lower importance to mentees than other mentor characteristics⁸⁹ and does not adversely impact mentee satisfaction or success of a mentorship program.⁹⁰ We emphasize that, while residents from historically excluded groups likely benefit from mentorship,⁹⁻¹¹ it is unclear whether current programs narrow disparities by fulfilling unmet needs or widen disparities by continuing to underserve marginalized groups. Though this is beyond the scope of our review, we emphasize that principles of diversity, equity, and inclusion should be considered in design, implementation, and evaluation of formal mentorship programs.

Limitations

The main limitation of our study is the quality and heterogeneity of evaluations performed by included studies, which limited our ability to synthesize outcome data. Another limitation is that the search period ended in 2019 so does not include more recently published articles. Our search covered 79 years (1940-2019). We included only English language studies performed in the United States and

Canada, which may limit the generalizability of our findings.

Conclusions

To facilitate effective mentorship and overcome key barriers, the literature suggests programs (1) protect time for mentorship meetings; (2) set clear program goals and expectations; (3) provide mentors with resources and/or training; and (4) facilitate compatibility between mentors and mentees. Few mentorship program evaluations were tailored to stated program objectives, which represents a gap in this literature.

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