Research during training complements learning, helping to develop and reinforce core competencies. Research is also associated with enhanced career satisfaction and superior clinical performance. Al\textsuperscript{1,2} Although scholarly activity is a required component of postgraduate medical education, enthusiasm for and participation in research by trainees is suboptimal.\textsuperscript{2–5} At least 2 gastroenterology fellowship programs have described curricular innovations to enhance research training resulting in measurably increased scholarly output.\textsuperscript{6,7} Although programmatic efforts to promote research are welcome, they are often insufficient. Several obstacles limit the ability of trainees to experience the benefits of research.\textsuperscript{2,4,5,8} Chief among these is inadequate mentorship.\textsuperscript{4,5,8} There are 2 major explanations for this problem. First, only a limited number of faculty have the qualifications and time to fulfill the demands of mentoring trainees and junior colleagues. This issue is of particular importance to gastroenterology. Stagnant research funding and declining reimbursement for core clinical activities have raised the price of protected time, making the addition of unfunded research obligations untenable. In addition, not all mentors are created equal. It should not come as a surprise that various forms of “mentorship malpractice” have been recently identified.\textsuperscript{9} But viewing research through a mentor-centric lens leaves out the key role played by trainees in building and shaping their own successful relationships.

The Need to Develop a Mentee-centric Research Model

Several forces exacerbate the limited supply of effective mentors, further restricting access to research opportunities for many trainees. First, trainees often lack the skills or confidence to determine a study question alone and may not know how to start the research process. This fosters a sense of dependence on others for research. Second, trainees often need multiple mentors. Given our journals’ contemporary standards, publishable research often requires a team, including data analysts and statisticians. No one mentor can easily fulfill each role. Third, trainees and mentors often value incompatible research aims. Trainees often value readily publishable projects, seeking something tangible to show on the job market. This generates tremendous anxiety, creating a sense of urgency and false priorities, including finding projects that offer less career development such as those with preexisting institutional review board (IRB) approval or opportunities for limited data entry in exchange for middle authorship. Finally, in the context of competing priorities for their time, the opportunity cost of mentorship makes it a considerable investment for the mentor. A mentor’s perception of return on investment could be affected by prior negative experiences with trainees, such as those who have approached them on the eve of their research block requesting a topic or those who have failed to follow through on their agreed upon obligations. Committed trainees can thus be unfairly stereotyped and turned away, preventing the formation of mentee–mentor relationships. However, despite these disadvantages and even without formal research training, meaningful scholarly activity is still possible, provided that the trainee possesses the correct skills and disposition.

The Art of Menteering

We define menteering as the set of skills by which a trainee learns to navigate the research system and become resourceful. A menteer does not request a research topic. A menteer determines their own interests and motivations, finding inspiration for research questions in their clinical experiences. They read constantly, to determine the rationale for a consultant’s recommendation, to define test characteristics for the studies they order to better inform their decision making, and to comprehend a patient’s complication. Where answers are lacking, they strike forward. Menteers recognize their limitations, prize teamwork,
learn from others, and seek out collaborations, transforming most relationships, including those with co-fellows and other peers, into mentorship experiences. Mentees follow-up and set realistic timelines with mentors, but do not take it personally when life intervenes and collaborators disappear. When difficulties are encountered, they persist, even developing IRB protocols or beginning their own review articles before requesting assistance from faculty. Where statistical support is not readily available, the menteer turns to textbooks and online instruction.

Finally, mentees are introspective. Although inexperience can make research daunting, mentees learn by doing. They embrace the risk of failure and study their missteps. Key formative early experiences in menteering include developing a research question that turned out to represent a basic misunderstanding, analyzing the same data twice with 2 different results and spending hours painstakingly searching a database for the cause, and being rejected by a journal. Rejection can produce quantum leaps of understanding as trainees learn through peer review the unrecognized limits of their study as well as the preferred statistical methods for analysis.

Menteering, it should be emphasized, is not mutually exclusive from and likely enhances the value of traditional mentee–mentor relationships. Menteers welcome the opportunity to be mentored. However, mentees learn to “manage up,” by setting the agenda for meetings and by explicitly defining their expectations and needs. Mentors respond positively to mentees’ demonstrable commitment and provide advice that is practical in proportion to their idea’s development. By navigating roadblocks to research, by “learning the ropes,” the menteer prepares for mentorship by developing their self-knowledge, learning what excites them, and enhancing their clinical learning by developing research questions while evaluating patients.

**Menteering in Practice**

During fellowship training, a GI fellow experienced a complication—aspiration pneumonitis—during an endoscopy to relieve an esophageal food bolus impaction. A literature review seeking to better understand the expected procedural complication rate as well as ways to minimize complications, including the optimal sedation plan and timing of therapeutic endoscopy, revealed limited available data for guidance. He reported the complication to the division’s quality improvement officer, who recommended performing a root cause analysis for presentation at the divisional morbidity and mortality conference. The ensuing lively discussion attracted the interest of multiple prospective mentors, who encouraged the fellow to proceed with a research paper.

To help navigate the institution’s burdensome IRB application, another fellow provided their successful, expedited IRB application as a template, allowing for timely submission of paperwork. While seeking ideas for data acquisition from other fellows, it was determined that billing codes could potentially identify study subjects. With the help of senior clinicians, a connection was made with a billing specialist who agreed to generate a cohort of patients undergoing endoscopy for esophageal obstruction. He worked with a co-fellow and senior mentor to develop shell versions of tables 1 through 3 to catalogue before beginning chart review the necessary variables needed to thoroughly describe the cohort and perform the analyses of interest. To do this, the tables of prior studies of food bolus impaction were surveyed and novel hypotheses were brainstormed (including the impact of season on the rate of presentation).

Before receiving the data, the fellow wrote the introduction and methods sections, sharing drafts with a co-fellow who would edit. When data collection was completed, the fellow downloaded a free statistical software package from the medical school, and successfully filled out the shell tables using assistance from the software’s help file, online searches for instruction, and help from a co-fellow with some statistical experience.

He shared a rough draft of his paper with 2 mentors, requesting their critical input and co-authorship. Both provided substantial criticism that required a reorganization of the introduction and discussion, as well as additional analyses. After the initial submission, the manuscript received a delayed rejection after 3 weeks without review. The senior mentor suggested an appropriate journal for the next submission. The fellow used EndNote to efficiently reformat the citations. The resulting resubmission was met by several constructive reviews in a revise and resubmit decision that both indicated flaws in the statistical approach and the need for additional analyses. The manuscript was improved, resubmitted, and subsequently accepted. Altogether, 6 months passed from the time of the complication to manuscript acceptance.

**How Can We Promote Effective Menteering?**

Fellowship programs should adopt several strategies to facilitate research during training. The roles and responsibilities of trainees, mentors and program directors in a mentee-centric research paradigm are delineated in Figure 1.

**Make Research Resources Available and Accessible**

Programs should collect in a central location (eg, a Wiki) with access to templates for IRB applications and quality improvement waivers, guidance for how to obtain clinical data (eg, hospital data warehouses, publicly available datasets) and statistical support (consultative services and software), and provide access to institutionally licensed programs like EndNote, STATA, and GraphPad.

**Make Teaching Count Twice**

Didactic conference discussants should be called upon to describe their approaches to research and articulate how they perform literature reviews to answer their own clinical questions and prepare for presentations.
We encourage trainees to develop an idea as far as they can before meeting with potential mentors. Trainees should prepare a 1-page introduction identifying the importance of their topic and a brief literature review outlining their concept of the gaps in knowledge addressed by their research idea. Although their review may require further focus, this is part of the learning process. This exercise helps trainees to clarify their positions and communicates determination when it is shared with collaborators and potential mentors. Trainees should also discuss and seek feedback on their interests from peers as well as senior clinicians or researchers; peers both share the same perspective in trying to navigate their own professional development and can also offer unbiased questions or concerns on the topic.

Support Pragmatic Study Designs

Although fellows are responsible for initial idea development, given the interest to facilitate publication, programs should counsel pragmatic study design, providing resources that address needs for projects that are publishable within a fellow’s timeframe. These include but are not limited to data mining for retrospective cohort studies (resources for which are often available at the institutional level and can be arranged with limited additional cost)\cite{11,12} access to administrative datasets, collaboration with hospital librarians for systematic reviews, and funding a portion of a statistician’s time to help fellows with analytic strategies.

Conclusion

Research during training is a deeply valuable experience. Beyond career development, research lends agency to trainees—to intellectualize difficult experiences, to take on an increasingly active role in patient care by validating approaches to the management of their patients’ afflictions, and to publish a lasting tribute to the patients from whom they drew motivation and inspiration. To maximize participation, a ground-up model of research is needed. We propose a culture of menteering.

References


Figure 1. The roles and responsibilities of mentees, mentors, and program directors in a ground-up research paradigm. In a ground-up research paradigm, the fellow must prepare extensively for mentorship; mentors must be open-minded, honest, and available; and program directors must provide the resources and structure with which trainee-led research can thrive.

Refocus Expectations

Mentors and training programs must refocus their expectations for trainee-led research. Rather than a task to complete before the end of training, research is a means for trainees to enhance their learning and open doors. An overvaluation of publication over the process of research pressurizes the training environment and may increase the risk of burnout. This environment, in turn, hinders the trainee from finding a research question for which they are genuinely passionate. Many academic training programs have built-in protected time and flexibility for research that is often unavailable for junior faculty. Fellowship is thus a unique opportunity for deep and unrestricted learning, to develop one’s interests and passions in the process of finding a niche. Many career development award recipients have a limited track record of publications by the end of fellowship. What matters about research for trainees is finding and developing the ideas that inspire them.

Ask Mentees to Put it in Writing

We encourage trainees to develop an idea as far as they can before meeting with potential mentors. Trainees should prepare a 1-page introduction identifying the importance of their topic and a brief literature review outlining their concept of the gaps in knowledge addressed by their research idea. Although their review may require further focus, this is part of the learning process. This exercise helps trainees to clarify their positions and communicates determination when it is shared with collaborators and potential mentors. Trainees should also discuss and seek feedback on their interests from peers as well as senior clinicians or researchers; peers both share the same perspective in trying to navigate their own professional development and can also offer unbiased questions or concerns on the topic.


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