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Seven Practical Recommendations for Designing and Conducting Qualitative Research in Medical Education

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ABSTRACT

Qualitative research seeks to provide context, nuance, and depth of understanding in regard to systems, behaviors, and/or lived experiences. As such, it plays a key role in many areas of medical education. Composed of myriad methods and methodologies, each of which may be valuable for some areas of inquiry but less so for others, qualitative research can be challenging to design, conduct, and report. This challenge can be conceptualized as ensuring that the study design, conduct, and reporting are "fit for purpose," following directly from a well-formulated research question. In this Perspective, we share seven important and practical recommendations to enhance the design and conduct of high-quality qualitative research in medical education: *1*) craft a strong research question, *2*) link the study design to this question, *3*) assemble a team with diverse expertise, *4*) prioritize information power when selecting recruitment and sampling strategies, *5*) collect data carefully, *6*) rigorously analyze data, and *7*) disseminate results that tell a complete story.

Keywords:
qualitative; research design; methods

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Because the science of teaching and learning is complex and context-dependent, understanding settings, social constructs, and personal experiences is essential. Thus, qualitative inquiry—the systematic collection and analysis of non-numeric data to understand complex systems, environments, processes, behaviors, reasoning, or lived experiences—plays a pivotal role in medical education research. Indeed, within *ATS Scholar*'s first 4 years, approximately one in every five original research publications has used qualitative methods. This pattern is similar to those seen in *Academic Medicine*, the *Journal of Graduate Medical Education*, and *Medical Education*, in which >33% of original research papers employed qualitative methods (1). It is therefore important that clinician-educators in pulmonary and critical care medicine have the right tools to conduct high-quality qualitative educational research.

Most quantitative research approaches are based in frequentist hypothesis testing and the quantification of outcomes, probabilities, and uncertainty. In contrast, the qualitative researcher seeks context, nuance, and depth of understanding rather than falsifiability. Common qualitative methods include interviews, focus groups, observation, and artifact analysis, which may be used in diverse approaches and methodologies such as thematic analysis, grounded theory, ethnography, phenomenology, or narrative inquiry (1–3). Each of these approaches may be valuable for some areas of inquiry but less so for others. We believe "fitness for purpose" (i.e., alignment with the goals of the study, the research question and its context, and the values and assumptions underpinning the research) is the best criterion by which to select and evaluate qualitative methodology.

In this Perspective, we share seven important and practical recommendations to enhance the design and conduct of high-quality qualitative research in medical education (Figure 1). These recommendations are not intended to provide a detailed methodological review of qualitative research; we refer the reader to the *Journal of Graduate Medical Education*'s "Qualitative Rip Out" series and *Academic Medicine*'s "Tools of the Qualitative Research Trade" for more detailed descriptions of specific qualitative methods (1, 4). Further, although we present these recommendations sequentially, researchers may move among these items iteratively and/or in a different order depending on their project's needs.

To illustrate how each of these recommendations might be applied in the real world, we have constructed the following hypothetical case, which we will follow longitudinally:

> Dr. Lopez is a critical care fellow who wishes to study resident team dynamics in the intensive care unit (ICU).

RECOMMENDATION 1: CRAFT A STRONG RESEARCH QUESTION

A well-crafted research question is the *sine qua non* of any scientific inquiry, no matter the methods. The research question provides the foundation for the study as a whole and each of its parts (i.e., introduction, methods, results, discussion, and conclusions). As such, the research question should generally be developed before determining whether qualitative research is appropriate. Research questions that align with qualitative research generally ask what an experience is like, how people interpret certain behaviors, or why people
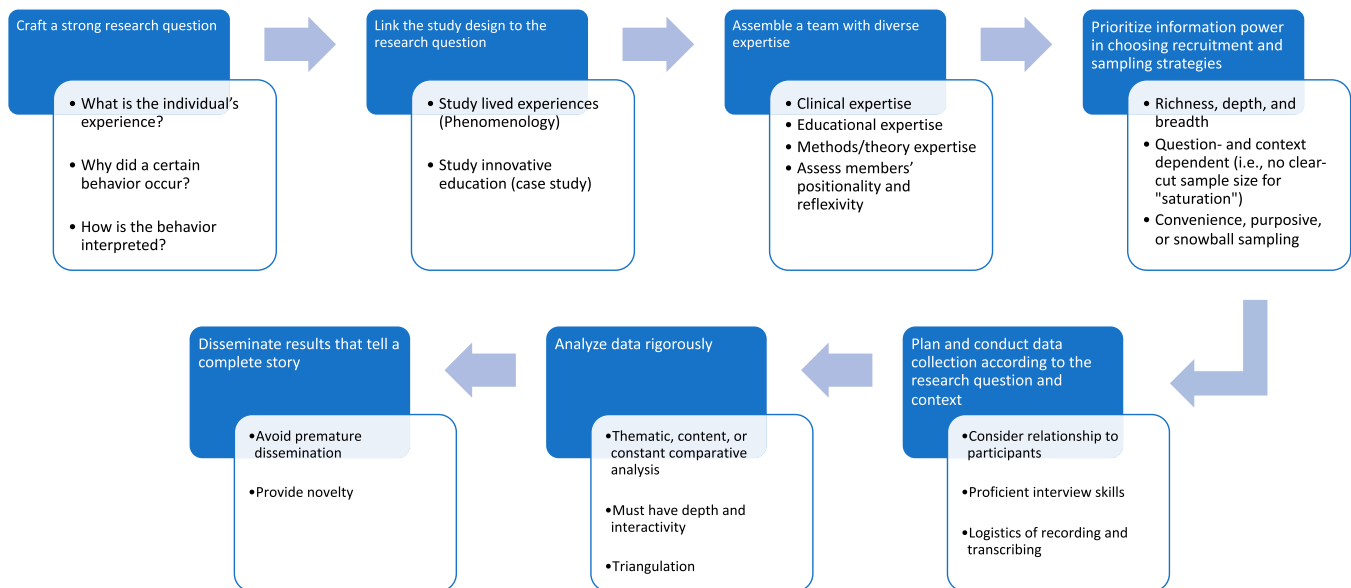
Figure 1. Seven practical recommendations for designing and conducting outstanding qualitative research in medical education.

interact in certain ways rather than asking how likely certain actions are to occur or what determines whether they do (5, 6).

In our view, "strong" and "well-crafted" imply clarity and importance, often alongside focus and answerability. The research question needs to address a gap in knowledge or practice, have practical implications for medical education, and advance or contextualize the existing literature (7, 8). Research question development lays the groundwork for forming the study approach, including methodology, sampling, recruitment, data collection, and analysis. Foundational activities during this phase include a comprehensive literature review (to determine if the work has already been done and to describe and/or analyze gaps to be addressed) and structured exercises to hone questions including "serial 'whys'" (e.g., "why would it be important to know this?") and iterative question refinement (9, 10).

Often, medical education research questions involve curriculum development, analysis of learning environments,

evaluation, or process improvements. For instance, Herzog and coworkers used thematic analysis and focus groups to understand residents' development and progression with entrustable professional activities within the medical ICU learning environment, identifying themes that might inform strategies for improved interprofessional collaboration, graded autonomy, and informal "learner as teacher" opportunities (11). Brady and coworkers performed focused ethnography and constant comparative analysis to characterize attending pulmonologist supervisory and didactic skills and behaviors during fellow-performed bronchoscopies (12). These examples, though by no means comprehensive, may help illustrate the broad value of qualitative approaches to health professions education in pulmonary and critical care medicine.

Dr. Lopez wishes to study resident team dynamics in the ICU; her mentor encourages a more focused research question. Dr. Lopez updates her research question to ask "how do ICU-level and

team-level cultural norms influence residents' perceptions and experiences of clinical errors?" She intends to address this new question through qualitative inquiry.

RECOMMENDATION 2: LINK THE STUDY DESIGN TO THE RESEARCH QUESTION

The study design serves as the blueprint for the entire research process, driving the choice of methodologies, methods, data collection tools, and approaches to data analysis. Each of these must be fit for purpose in terms of the research question, with specific tailoring to the unique context of the educational setting (13). For example, a phenomenological approach might be suitable for exploring the lived experiences of medical students on a particular clinical rotation, whereas a case study design could be more appropriate for exploring the implementation of a new educational program or curriculum (6, 14). Despite often-similar terminology, qualitative study designs may differ fundamentally from those of quantitative research (for instance, "observational" may be synonymous with "noninterventional" in quantitative research while describing, e.g., ethnography in qualitative research).

Identifying a study's conceptual or theoretical framework often runs concurrently with the development of the research question: moving from an educational challenge to a focused question generally requires the problem to be contextualized within existing knowledge about teaching and learning and to be explored from a particular conceptual "lens" such as motivation, cognition, or social learning. Theory can provide such a lens to the research team, focusing the way they examine a

problem, analyze data, and generate conclusions (15–17).

Dr. Lopez plans to use thematic analysis to explore team dynamics, psychological safety, and trainee perceptions of clinical errors in the ICU (18). She plans to conduct one-on-one semistructured interviews to enhance privacy for participants to share individual experiences without judgment from others.

RECOMMENDATION 3: ASSEMBLE A TEAM WITH DIVERSE EXPERTISE

Especially in medical education, qualitative inquiry demands a team with multiple perspectives. The research team should hold expertise in the clinical domain of relevance (e.g., pulmonary and critical care medicine) and the educational focus (e.g., curriculum design, assessment), as well as familiarity with the qualitative research methodology (and/or theory) that is planned based on the steps above. Because assembling the right team of experts is instrumental in ensuring the rigor and depth of the research, we encourage teams to partner with qualitative research experts longitudinally, starting at the study outset.

Such partnerships are often educational in and of themselves, especially for qualitative projects led by clinical trainees. With relatively low overhead and trainee-friendly time frames, many qualitative projects are feasible for fellowship research years. However, trainees may lack the skills necessary to conduct their research without oversight and teaching from content and methods experts.

Finally, positionality and reflexivity are important considerations during team formation (19, 20). Positionality requires each team member to describe their

personal and professional identities; reflexivity involves analyzing how these identities contribute to the study's conceptualization, design, and interpretations.

> Dr. Lopez meets with an expert qualitative methodologist at her institution and presents her research proposal and plan. In thinking through her positionality as a fellow, Dr. Lopez recognizes the value of including other colleagues from the ICU on the research team to offer insights on study design and bring diverse perspectives to data analysis. She also realizes that, as a fellow who supervises and evaluates residents, she holds a position of power that could deter residents from participating or responding openly and honestly to questions. The team decides to hire and train an experienced qualitative research assistant to conduct the interviews and contribute to the analysis. The team meets regularly to review and discuss their interpretation of interview transcripts.

RECOMMENDATION 4: PRIORITIZE INFORMATION POWER IN CHOOSING RECRUITMENT AND SAMPLING STRATEGIES

The success of qualitative research in medical education hinges on the ability to recruit participants who can provide valuable insights into the research question. This concept has been described as "information power," a facet of internal validity relating the breadth, depth, and comprehensiveness of empirical data toward new knowledge (21). In general, information power requires a sufficiently large and varied sample to explicate the study's aims; different research questions, populations, and study designs will thus require different sample sizes and sampling approaches to yield adequate information power.

The recruitment strategy must be practical and logistically feasible—a perfectly

designed study is of no use if participants cannot be found—but also aligned with the nature of the study, research question, and the characteristics of the target population (22). Researchers must carefully weigh methodological issues, participant characteristics, ethical considerations, and the logistics of recruitment to ensure the feasibility and effectiveness of the chosen approach. Recruitment in qualitative research often occurs over a period of time to allow the research team time to begin analysis and to consider, e.g., the quality of information, examples, and accounts contained in their data. Recruitment proceeds until the team decides they have sufficient information to construct rich descriptions, themes, theories, or models from their data.

The choice of sampling strategy should be intentional because it depends on the research question and the specific educational context of the study (22). Convenience sampling—gathering those easily accessible—is practical and expedient, but requires care to avoid sampling bias. In contrast, purposive sampling allows researchers to deliberately select participants with relevant experiences or characteristics, thereby enriching study data. Snowball sampling—asking a small number of purposively identified participants to recruit other eligible participants from their networks—may be particularly helpful for reaching hard-to-locate participants from marginalized situations or for leveraging key informants to maximize participation from different perspectives.

Recruitment decisions extend beyond those of sampling strategy. For instance, the study team must determine who will approach potential participants and how they will do so. This decision can be ethically fraught when involving power dynamics (e.g., a program director, as part

of a study team, approaches trainees in their program) or personal relationships (e.g., individuals may feel socially compelled to participate in their friends' studies). Another common recruitment challenge involves the burden of participating for those with busy clinical, educational, or other obligations. These barriers may be overcome with convenient scheduling (e.g., multiple options for interview times), modalities (e.g., offering in-person and virtual interviews), and incentives (e.g., food, gift cards) or monetary compensation if congruent with local norms.

> Dr. Lopez initially plans to ask her institution's residency program director to disseminate a study invitation by email to all residents who rotated in the ICU during the first coronavirus disease (COVID-19) surge. However, her advisors raise the possibility that current trainees might feel obligated to participate if invited by their program director. With her advisors' input, she updates this plan to involve the direct use of a residency alumni listserv instead of an invitation from the program director.

RECOMMENDATION 5: PLAN AND CONDUCT DATA COLLECTION ACCORDING TO THE RESEARCH QUESTION AND CONTEXT

The collection of qualitative data in medical education demands a meticulous and thoughtful approach. Researchers must employ methods that allow for a deep exploration of participants' experiences, perceptions, and behaviors. Common data collection techniques include interviews, focus groups, observations, and document analysis. The choice of methods should align with the research question and the study design, ensuring that the data collected are relevant and meaningful. For instance, interviews may be more appropriate for

sensitive topics (e.g., gender dynamics), whereas focus groups may surface a broad set of perspectives by encouraging interaction among participants. Critically, these dynamic approaches to data collection offer richness (i.e., detail, context, social-emotional nuance, and personal meaning) through follow-up questions, probing, and interaction. In contrast, "qualitative" analysis of free-text survey responses will rarely generate standalone insights or knowledge; these responses are typically brief (which risks losing depth and nuance) and noninteractive, which precludes probing and clarification (23). We recommend that, if such open-ended questions are planned, they be designed specifically to contextualize quantitative findings or develop specific areas for subsequent qualitative inquiry.

In addition to these methodological considerations, we advise close attention to several practical matters. First, who will collect the data, and what is their relationship to the study participants? Answering these questions should involve consideration of hierarchies and power dynamics as well as of skills in interviewing (e.g., establishing rapport, asking probing questions without leading), group facilitation, and logistical coordination (e.g., scheduling, recording, tracking, transcribing). Additionally, when and where will data be collected? Will this entail sufficient privacy for sensitive topics? Will the setting be appropriately quiet and free of interruptions and distractions? Is the setting accessible to all intended participants? Increasingly, virtual environments are being used to collect qualitative data, which may increase convenience but also requires special attention to technical and interpersonal issues (24). Regardless of the setting, data collection (e.g., video and audio recording

and transcription) must be tailored to the environment and the type of data being collected.

> Dr. Lopez initially hoped to convene in-person focus groups to encourage interactive conversation. However, because of logistical (aligning many participants' availability amid their clinical obligations) and privacy issues, she ultimately decides to arrange individual interviews. To maximize participation, she offers in-person and virtual interviews. A qualitatively trained research assistant from her mentor's laboratory conducts these interviews and audio-records them. Dr. Lopez drafts, pilot-tests, and updates the interview scripts, but does not conduct or observe the interviews out of concern that her presence might limit participants' candor.

RECOMMENDATION 6: ANALYZE DATA RIGOROUSLY

Rigorous and systematic analysis is essential for uncovering patterns, themes, and relationships within the collected data. The chosen analytic approach should be aligned with the study design, and the data-analysis process should be transparent and driven by the research question. Qualitative data analysis in medical education often involves techniques such as thematic analysis, content analysis, or constant comparative analysis (25–27). These methods facilitate the identification of themes and patterns from which researchers develop meaningful interpretations and present findings.

Perhaps the most essential elements of qualitative analysis are depth and interactivity. Surface-level questions lead to findings that are primarily descriptive (i.e., describing topics and categories of responses). In contrast, questions that ask for specific examples or stories, with focused probing for insights into participants' perspectives, tend to support

interpretive analyses that yield themes, models, or theories to explain processes or experiences. Qualitative rigor, then, often involves early and iterative engagement with the data to maximize each participant's contribution, the complexity of the information gained, and the depth of understanding delivered (23). As such, the field is moving from a narrow focus on thematic saturation (i.e., a data-collection threshold, such as a specific number of interviews beyond which additional data will not yield new information) to a broader emphasis on information power, including depth and breadth specific to the research question (28).

The organization and management of qualitative data are underdiscussed yet essential activities for high-quality research. Raw data, including audio/video recordings, images, field notes, or artifacts, should be preserved intact and stored securely. Best practices for storing digital media include appropriate security/privacy measures, making backups and storing them in separate locations, and using filenames with systematic naming conventions (e.g., participant ID, date, interviewer initials, site ID) (24). Although not "raw" in the same sense, verbatim or summary transcriptions require similar treatment and review for details such as accuracy and the removal of identifiers. These steps are generally necessary before data are ready to be analyzed and imported in software (if applicable).

Many qualitative approaches, such as thematic analysis, template analysis (29), and content analysis, involve coding data to identify and organize qualitative data elements around patterns, concepts, or themes (30). Some approaches (e.g., template analysis, content analysis) recommend organizing codes (labels used for units of meaning) within codebooks

containing definitions, specific inclusion/exclusion criteria, and clarifying examples to promote shared understanding of meaning among analysts. Codebooks often organize codes into a hierarchical structure (e.g., parent and child codes, primary and secondary codes) to show relationships among codes. Depending on the underlying research question and methodology, codebooks might be developed deductively (i.e., based on predefined concepts from existing theory), inductively (i.e., derived from the data themselves, independent of external theory), or through both of these approaches. Like other aspects of qualitative inquiry, codebook development is an iterative and flexible process, such that new or revised codes can be incorporated based on insights the emerge from the collected data (30).

There is ongoing debate regarding the appropriateness of measuring and reporting intercoder reliability—the quantified agreement between different coders as to how each data element is coded—in qualitative inquiry (31). Intercoder reliability measures are intended to demonstrate that analysis has maintained internal coherence, especially when multiple team members have participated in coding. However, for most code-based qualitative analysis (especially when the project seeks to develop or revise an approach, curriculum, or assessment), the ultimate goal is not coder agreement but rather articulation of concepts and themes (16). Agreement on code assignment does not guarantee agreement on the codes' interpretation. More important is discussion among the research team to construct a shared understanding of the data, the main concepts or themes, and the supporting evidence.

Triangulation, or combining multiple perspectives to interpret data through convergence, is relevant to many qualitative studies. Triangulation may involve different types of data (e.g., interview data and observation field notes), similar data types from different perspectives, or researcher triangulation (i.e., leveraging different perspectives and epistemological assumptions during analysis) (32, 33). Here, reflexivity reemerges in the analysis stage, in which rigor involves acknowledging and addressing researchers' perspectives, assumptions, and biases that influence their interpretation of findings.

Reporting guidelines such as the Consolidated Criteria for Reporting Qualitative Research (specific to studies using interviews or focus groups) or the Standards for Reporting Qualitative Research (relevant to any qualitative study design) have been developed to improve transparent reporting of the conduct and findings of qualitative research activities (34, 35). These tools may improve the rigor and transparency of qualitative research reporting when used longitudinally from study inception, as they can highlight specific considerations for design, data collection, analysis, and/or writing.

Although many quantitative manuscripts limit their results section to empirical data, the results of many qualitative studies involve the data and their interpretation. Direct quotations from interview or focus-group transcripts are frequently helpful for substantiating analytic findings, but generally do not suffice as results in isolation. Recording, transcribing, and reporting these quotations are important aspects of the analysis stage, but these activities must be in service of deeper analyses. We advise that quotations be selected for

reporting after analysis has been completed, such that each chosen quotation offers firsthand authenticity and representativeness of unique patterns or themes among the data (36).

> Dr. Lopez and one of her coinvestigators use commercially available qualitative analysis software to develop a codebook and independently analyze deidentified interview transcripts in detail. The two coders meet to discuss disagreements in coding, and a third faculty member helps them with difficult coding decisions. Several of these challenging decisions result in codes being added to the codebook. She iteratively examines the interviews to help identify themes, subthemes, and example quotations.

RECOMMENDATION 7: DISSEMINATE RESULTS THAT TELL A COMPLETE STORY

Disseminating research findings in medical education is not only a culmination of the research process but also a responsibility to contribute meaningfully to the academic community and the groups being studied. Premature dissemination can lead to incomplete or misleading conclusions, potentially harming the integrity of the research and its application in educational practice. Therefore, researchers must exercise patience and ensure that findings are robust, comprehensive, and capable of standing on their own, telling a full story based on the data, before dissemination. To this latter point, we would add that qualitative work may have local value during formative stages, but, to stand on its own as a peer-reviewed publication, it

must provide novelty to the field as a whole.

> One of Dr. Lopez's interview participants is a recently graduated resident who has become a critical care fellow at a different institution. In analyzing this interview transcript, Dr. Lopez is interested to read the participant's perceptions that ICU team culture differs based on institution-level resident autonomy. She recognizes that her findings may be enhanced by the consideration of additional complexity and institutional differences. She therefore develops a secondary aim of conducting analogous interviews at four different training programs and plans to complete these before publication.

CONCLUSIONS

The decision to use qualitative research methods to explore a medical education research topic should not be taken lightly. In this paper, we have proposed seven recommendations to improve the quality of qualitative research in medical education in pulmonary and critical care medicine by crafting the research question, linking the study design to the research question, assembling the right team of experts, prioritizing information power when selecting recruitment and sampling strategies, collecting data carefully, rigorously analyzing data, and disseminating results that tell a complete story. We hope this paper provides an introductory guide to qualitative research methods and recommend the more detailed resources in the References.

REFERENCES

1. Varpio L, Meyer H. A lesson from the qualitative rip out series: let go of expectations for universally applicable "gold standards" for qualitative research. *J Grad Med Educ* 2017;9: 154–156.

2. Ng SL, Baker L, Cristancho S, Kennedy TJ, Lingard L. Qualitative research in medical education. In: Swanwick T, Forrest K, O'Brien BC, editors. Understanding medical education. New York: John Wiley & Sons; 2018. pp. 427–441.

3. Sawatsky AP, Ratelle JT, Beckman TJ. Qualitative research methods in medical education. *Anesthesiology* 2019;131:14–22.

4. Paradis E. The tools of the qualitative research trade. *Acad Med* 2016;91:e17.

5. Creswell JW, Poth CN. Qualitative inquiry and research design: choosing among five approaches. Thousand Oaks, CA: SAGE Publications; 2016.

6. Creswell JW. Research design. Thousand Oaks, CA: SAGE Publications; 2024.

7. O'Brien BC, Ruddick VJ, Young JQ. Generating research questions appropriate for qualitative studies in health professions education. *Acad Med* 2016;91:e16.

8. O'Brien BC, Karani R, Park YS. Foreword: the moment of discovery: how do you know when you hit a question that's pure gold? *Acad Med* 2019;94(suppl):si–siii.

9. Warner RM, Kenny DA, Stoto M. A new round robin analysis of variance for social interaction data. *J Pers Soc Psychol* 1979;37:1742–1757.

10. Asch DA, Terwiesch C, Mahoney KB, Rosin R. Insourcing health care innovation. *N Engl J Med* 2014;370:1775–1777.

11. Herzog TL, Sawatsky AP, Kelm DJ, Nelson DR, Park JG, Niven AS. The resident learning journey in the medical intensive care unit. *ATS Scholar* 2023;4:177–190.

12. Brady AK, Town JA, Robins L, Bowen J. Bronchoscopy teaching without a gold standard: attending pulmonologists' assessment of learners, supervisory styles, and variation in practice. *Chest* 2021;160:1799–1807.

13. Wright S, O'Brien BC, Nimmon L, Law M, Mylopoulos M. Research design considerations. *J Grad Med Educ* 2016;8:97–98.

14. Rietmeijer CBT, Veen M. Phenomenological research in health professions education: tunneling from both ends. *Teach Learn Med* 2022;34:113–121.

15. Varpio L, Paradis E, Uijtdehaage S, Young M. The distinctions between theory, theoretical framework, and conceptual framework. *Acad Med* 2020;95:989–994.

16. National Cancer Institute Division of Cancer Control and Population Health Sciences Qualitative Research in Implementation Science (QUALRIS) group. Qualitative methods in implementation science. Bethesda, MD: National Institutes of Health; 2020 [accessed 2024 Mar 11]. Available from: https://cancercontrol.cancer.gov/sites/default/files/2020-09/nci-dccps-implementationscience-whitepaper.pdf.

17. McMillan W. Theory in health professions education research: the importance of worldview. In: Cleland J, Durning SJ, editors. Researching medical education, 2nd ed. New York: John Wiley & Sons; 2022. pp. 15–24.

18. Cohen L, Manion L, Morrison K. Research methods in education. London: Routledge; 2017.

19. McNair R, Taft A, Hegarty K. Using reflexivity to enhance in-depth interviewing skills for the clinician researcher. *BMC Med Res Methodol* 2008;8:73.

20. Hiller AJ, Vears DF. Reflexivity and the clinician-researcher: managing participant misconceptions. *Qual Res J* 2016;16:13–25.

21. Malterud K, Siersma VD, Guassora AD. Sample size in qualitative interview studies: guided by information power. *Qual Health Res* 2016;26:1753–1760.

22. Cleland JA, Alexander K, Poobalan AS. Sampling and recruiting participants. In: Rees EL, Ledger A, Walker KA, editors. Starting research in clinical education. New York: Wiley-Blackwell; 2023. pp. 47–57.

23. LaDonna KA, Taylor T, Lingard L. Why open-ended survey questions are unlikely to support rigorous qualitative insights. *Acad Med* 2018;93:347–349.

24. Santhosh L, Rojas JC, Lyons PG. Zooming into focus groups: strategies for qualitative research in the era of social distancing. *ATS Scholar* 2021;2:176–184.

25. Rees CE, Monrouxe LV, O'Brien BC, Gordon LJ, Palermo C. Foundations of health professions education research: principles, perspectives and practices. New York: John Wiley & Sons; 2023.

26. Braun V, Clarke V. Thematic analysis: a practical guide. Thousand Oaks, CA: SAGE Publications; 2021.

27. Varpio L, Martimianakis MA, Mylopoulos M. Qualitative research methodologies: embracing methodological borrowing, shifting and importing. In: Cleland J, Durning SJ, editors. Researching medical education, 2nd ed. New York: Wiley-Blackwell; 2022. pp. 115–125.

28. LaDonna KA, Artino AR Jr, Balmer DF. Beyond the guise of saturation: rigor and qualitative interview data. *J Grad Med Educ* 2021;13:607–611.

29. King N, Brooks JM. Template analysis for business and management students. Thousand Oaks, CA: SAGE Publications; 2016.

30. Saldana J. The coding manual for qualitative researchers. Thousand Oaks, CA: SAGE Publications; 2024.

31. O'Connor C, Joffe H. Intercoder reliability in qualitative research: debates and practical guidelines. *Int J Qual Methods* 2020;19:1609406919899220.

32. Tracy SJ. Qualitative research methods: collecting evidence, crafting analysis, communicating impact. New York: John Wiley & Sons; 2019.

33. Given LM. The Sage encyclopedia of qualitative research methods: A-L; vol. 2, M-Z index. Thousand Oaks, CA: SAGE Publications; 2008.

34. Tong A, Sainsbury P, Craig J. Consolidated Criteria for Reporting Qualitative Research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19: 349–357.

35. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–1251.

36. Cristancho S, Watling C, Lingard L. Three principles for writing an effective qualitative results section. *Focus Health Prof Educ Multi-Prof J.* 2021;22:110–124.