Texas Tech Health El Paso
Medical Education

Scholarly Activity and Research Program Student Handbook:

A Guide to Getting Started

Foster School of Medicine
Texas Tech Health El Paso

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MEET THE TEAM

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WHAT IS SARP?

Mission

The mission of the Scholarly Activity and Research Program (SARP) is to promote the self-efficacy and professional identity development of future physician-scientists by providing mentorship opportunities, didactic and experiential learning in research activities, providing financial support for travel funding and grant support for internal research by Foster School of Medicine (FSOM) medical students and Texas Tech Health El Paso faculty.

Vision

The vision of SARP is to promote a positive environment for didactic and experiential learning in research to promote the self-efficacy and professional identity development of future physician-scientists and by infrastructure development, establishment of thematic research pipelines, promoting multidisciplinary research collaboration, integrating education and research, launching a distinction program in molecular medicine, promoting scholarly activities, securing funding and support, and continued evaluation and adaptation.

Overview

The Foster School of Medicine Scholarly Activity and Research Program (SARP) Course allows medical students to design and execute independent research or scholarship under the guidance of faculty mentors (Texas Tech Health El Paso faculty or approved faculty associated with other institutions). A wide variety of topics and research areas are available in three broad categories, allowing for a project to be tailored to a student's background and interests: 1) basic clinical and translational research; 2) epidemiology, community-based, behavioral, public, and environmental health; and 3) medical humanities, qualitative research, and medical education research. All projects must comply with federal and institutional requirements (e.g., IRB, IBC and IACUC).

The overall goal of the SARP Course is to engage and educate medical students about the process of addressing a scholarly or research question. This hands-on experience will increase the student's awareness and appreciation of the importance of research in providing the basis for evidence-based medical knowledge. This course will expose students to new ideas and mentorship and help them develop skills to strengthen their medical training and broaden their perspective on how new knowledge is obtained and disseminated. The SARP Course encourages students to seek a deeper understanding of biology and disease processes through a scholarly approach that will make them stronger physicians and valued members of the medical community.

The SARP Course is completed during a student's time at FSOM. Research or scholarship pursued before matriculating to the FSOM cannot be used directly to fulfill this requirement; however, a student can continue working on earlier projects or with a previous mentor. In this

case, clear documentation explaining how the SARP activities are extensions of any prior work must provide sufficient detail about the continuation of work as an FSOM student. Students participating in group projects (where two or more students work with a single mentor) should identify a distinct hypothesis or research question that can distinguish their contribution and provide for an independent SARP Final Report and SARP Poster. Please note that case reports and narrative reviews are not acceptable SARP Course Projects; however, systematic reviews and metanalyses are appropriate as they are based on a research question and should follow PRISMA guidelines. (https://www.prisma-statement.org/)

Educational Methods and Learning Experiences

The SARP Course focuses on the student/mentor relationship. Once a good match is made, the mentor is expected to closely guide the student in developing the Project Plan, be actively involved in executing the project, and help the student develop the Final Report and Poster. To optimize the mentor/student experience, a faculty mentor is restricted to a maximum of five new MS1 students each year.

SARP mentors will review each assigned component of the SARP Course (Project Plan, Final Report and Poster) and provide the student with narrative feedback. The criteria for assessing these assignments are based on the SARP Course Goals and Objectives outlined below.

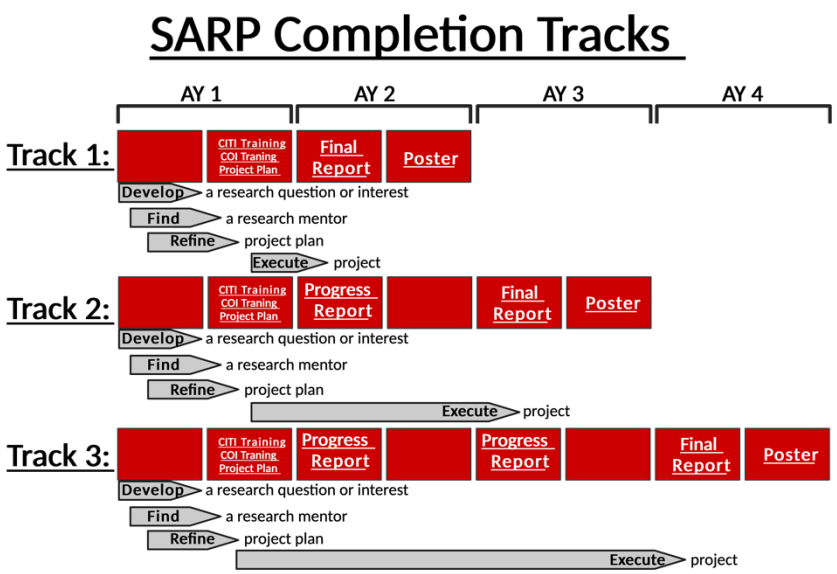


Figure 1

Components of SARP

The SARP requirement is a 3-credit course consisting of three 1-credit components:

- One credit is for the selection of a mentor, preparation, and submission of a Project Plan and completion of CITI Training; completing two Progress Reports for Track 2 completion or completing four Progress Reports for Track 3 completion.
- Selection of a mentor and preparation of the Project Plan is due at the end of the first year.
- One credit for project execution and submission of the Final Report
- One credit for a Poster Presentation.

WHAT ARE RESEARCH AND SCHOLARSHIP?

Research and *scholarship* are related but distinct concepts in the academic world. Both involve a commitment to pursuing knowledge and understanding but differ in focus, methodology, and outcomes.

Research

Research is a systematic investigation to discover new knowledge, solve specific problems, or contribute to the existing body of knowledge in a particular field.

Characteristics:

Systematic and Methodical: Involves structured methods and procedures to gather data, test hypotheses, and analyze results.
Originality: Seeks to generate new knowledge, insights, or innovations that are unknown.
Empirical Evidence: Often relies on empirical data collected through experiments, observations, surveys, or other methods.
Specific Goals: Aimed at answering specific research questions or testing hypotheses.
Publication and Peer Review: Results are typically published in academic journals and subjected to peer review to ensure validity and reliability.
Types:
Basic Research: Focuses on fundamental principles and theories without immediate practical applications.
Applied Research: Aimed at solving practical problems or developing new technologies or treatments.
Clinical Research: Involves studies on human subjects to understand health and disease, often leading to clinical trials.
Translational Research: Bridges the gap between basic science and clinical application.

Scholarship

Scholarship encompasses a broader range of academic activities that contribute to the understanding, interpreting, and disseminating knowledge. It includes research, teaching, learning, and the application of knowledge.

Characteristics:

Broad Scope: Encompasses a wide variety of intellectual activities, including research, teaching, writing, and public engagement.
Integration and Synthesis: Involves integrating existing knowledge, synthesizing information from various sources, and developing new interpretations or perspectives.
Dissemination: Focuses on sharing knowledge through publications, lectures, presentations, and other forms of communication.
Educational Role: Often involves teaching and mentoring students, developing curricula, and contributing to educational practices.

Critical Analysis: Involves critically evaluating existing knowledge, theories, and practices.
Service and Application: Includes applying knowledge to solve real-world problems, contribute to professional practice, and engage with the broader community.

Key Differences

Research is primarily focused on creating new knowledge. Scholarship is broader, including the creation, integration, application, and dissemination of knowledge. Research involves conducting experiments, collecting data, analyzing results, and writing research papers. Scholarship can include many activities, such as teaching, writing textbooks, developing new teaching methods, engaging in public discourse, or applying knowledge to practice.

Table 1. Summary of Different Characteristics of Scholarship and Research

	Scholarship	Research
Definition	The pursuit of academic knowledge and understanding through study and critical analysis.	The systematic investigation and study of materials and sources to establish facts and reach new conclusions.
Purpose	To develop a deep understanding and knowledge in a particular field.	To discover new information, validate existing knowledge, or solve specific problems.
Scope	Broad, often encompassing the synthesis of existing knowledge and theories.	Narrow, focused on specific questions or hypotheses.
Methodology	Critical analysis, literature review, theoretical exploration.	Experimental, observational, qualitative, quantitative methods.
Outcome	Development of theories, models, and comprehensive understanding.	Empirical data, new findings, validated theories, practical solutions.
Nature of Work	Often reflective, analytical, and theoretical.	Empirical, data-driven, and experimental.
Primary Activities	Reading, analyzing, critiquing, synthesizing existing works.	Conducting experiments, surveys, observations, data collection.
Dissemination	Academic journals, books, essays, reviews.	Research papers, conference presentations, reports, scientific journals.
Evaluation Criteria	Depth of analysis, originality of thought, contribution to understanding.	Accuracy of data, validity of results, reliability of methodology.

Time Frame	Often longer-term, continuous process.	Can be shorter-term, project-based.
Impact	Influences academic discourse, education, and theoretical frameworks.	Direct impact on industry practices, technological advancements, and societal issues.

Intersection

While distinct, research and scholarship often intersect. High-quality research contributes to scholarship by adding to the body of knowledge, which scholars then disseminate through teaching and other forms of communication. Conversely, scholarship can inform and inspire new research questions and methodologies. Both research and scholarship are vital in the context of medical education and practice. Research drives medical advancements and innovations, while scholarship ensures that this knowledge is effectively communicated, applied, and built upon to improve healthcare outcomes.

RESEARCH ETHICS AND INTEGRITY IN MEDICAL RESEARCH

Introduction

Research ethics and integrity are fundamental components of conducting sound and credible research, particularly in the medical field. As future healthcare professionals, medical students must understand and adhere to ethical principles to ensure the welfare of participants, the credibility of research findings, and the advancement of medical science. This chapter will provide an in-depth exploration of research ethics and integrity, focusing on the responsibilities and challenges faced by medical students involved in various types of research.

Informed Consent

Informed consent is a cornerstone of ethical research. It ensures that participants are fully aware of the research's nature, purpose, risks, and benefits before agreeing to participate.

Transparency: Researchers must provide clear and comprehensive information about the study.
Voluntariness: Participation should be voluntary, without any coercion or undue influence.
Comprehension: Researchers should ensure that participants understand the information provided, which may require adapting the communication approach based on the participants' background and language proficiency.

Confidentiality

Protecting the privacy of research participants is crucial. Researchers must take appropriate measures to safeguard personal information and ensure that data is anonymized whenever possible.

Data Protection: Implementing secure data storage and handling procedures.
Anonymization: Removing or coding identifiers to prevent the tracing of data back to individual participants.

Beneficence and Non-Maleficence

Researchers are obligated to maximize benefits and minimize harm to participants.

Risk-Benefit Analysis: Carefully assessing the potential risks and benefits of the research.
Minimizing Harm: Implementing strategies to reduce physical, psychological, and social risks to participants.

Justice

The principle of justice demands fair and equitable treatment of all research participants. Equitable Selection ensures that the selection of participants is fair and not biased. Access to benefits ensures that the benefits of research are distributed fairly among all groups.

Institutional Review Boards (IRBs) and Ethical Approval

Before commencing any research involving human participants, medical students must obtain ethical approval from an Institutional Review Board (IRB) or equivalent ethics committee. IRBs review research proposals and ensure that ethical standards are maintained. Preparing and submitting a detailed research proposal for review, including protocols for informed consent, data protection, and risk management, varies from institution to institution.

Conflicts of Interest

Conflicts of interest (COIs) can arise when personal or financial interests potentially influence the conduct of research. Researchers must disclose any potential COIs to their institution and in publications.

Misconduct

Research misconduct, including fabrication, falsification, and plagiarism, undermines the integrity of scientific research. Research Misconduct can lead to retraction of publications, loss of credibility, and legal or academic consequences. One key to preventing research misconduct is to promote a culture of honesty and transparency in research. Avoiding research misconduct is crucial to growth and development in establishing your professional identity as a medical student and physician scientist.

Definitions:

Fabrication: Making up data or results.
Falsification: Manipulating research materials, equipment, or processes to misrepresent results.
Plagiarism: Using others' ideas or words without proper attribution.

Case Studies

Case Report 1: Informed Consent Violation
John, a third-year medical student, is conducting a research project on the effects of a new drug on blood pressure. He recruits participants from a local clinic. Due to time constraints, John skips the detailed informed consent process, giving participants a brief overview instead. The ethical issues contained within this case include failure to obtain proper informed consent. Participants are not fully aware of the study's risks and benefits especially when potential for harm to participants exists. The study is reported, and an investigation reveals the breach. John's project is suspended, and he faces disciplinary action. The institution emphasizes the importance of comprehensive informed consent.

Case Report 2: Data Fabrication
Emily, a medical student, is struggling to meet the deadlines for her research on the effects of a diet plan on diabetes management. To make the results appear significant, she fabricates data. The ethical issues contained within this case include falsification of data. The falsification of data compromises the integrity of the research and the resulting misleading conclusions could affect patient care. A peer review uncovers inconsistencies. Emily's supervisor investigates, revealing the fabrication. Emily is expelled from the program, and the institution implements stricter data verification processes.

Case Report 3: Plagiarism
Michael, a second-year medical student, is working on a literature review for a research project. Pressed for time, he copies substantial sections from published articles without proper citation. The ethical issues contained within this case include, plagiarism, lack of originality and intellectual dishonesty. The plagiarism is detected through software checks. Michael receives a formal reprimand and is required to attend a workshop on academic integrity. His research privileges are suspended for a semester.

Case Report 4: Conflict of Interest
Samantha, a medical student, is conducting research funded by a pharmaceutical company that produces the drug being studied. She does not disclose this funding source in her research publication. The ethical issues contained within this case include conflict of interest, potential bias in research outcomes. Upon publication, the undisclosed conflict is discovered. Samantha's paper is retracted, and she is required to disclose all funding sources in future research. The institution revises its guidelines on conflict of interest disclosures.

Case Report 5: Coercion of Participants
Tom, a fourth-year medical student, is conducting a study on patient adherence to medication. To ensure high participation, he pressures patients during their clinic visits, making them feel obliged to join. The ethical issues contained within this case include coercion of participants, violation of voluntary participation principle, psychological stress on patients. Patients report feeling coerced. An ethics review board halts the study, and Tom is given counseling on ethical recruitment practices. The institution strengthens oversight on participant recruitment.

Case Report 6: Misuse of Confidential Information
Linda, a medical student, accesses patient records for her research on chronic illness management. She shares identifiable patient information with her peers to get their input on the study. The ethical issues contained within this case include breach of patient confidentiality that results in unauthorized sharing of sensitive information. A patient files a complaint upon discovering the breach. Linda faces disciplinary action, and the institution enforces stricter controls on data access and handling. All students receive additional training on confidentiality.

Case Report 7: AI-Generated Manuscript

David, a third-year medical student, is overwhelmed with multiple academic commitments and research projects. To manage his workload, he uses an AI tool to generate the manuscript for his research on the efficacy of a new surgical technique. He presents the AI-generated text as his own work without disclosing the use of AI. The ethical issues contained within this case include misrepresentation of authorship, lack of transparency about the use of AI in generating research content, potential inaccuracies or biases in the AI-generated text, and ultimately undermining the academic and research integrity. During the peer review process, reviewers notice inconsistencies and question the originality of the manuscript. An investigation reveals the extensive use of AI in creating the text. David faces academic sanctions, and the manuscript is retracted. The institution implements new guidelines requiring disclosure of AI use in research and writing.

Case 8: Unauthorized Manuscript Submission

Alex, a final-year medical student, was eager to publish research to strengthen his CV for residency application. Driven by his ambitions, he submitted several manuscripts to journals, listing himself as the corresponding author without informing the principal investigator (PI) or the co-authors. In addition, Alex frequently misrepresented his affiliations in the author information, falsely claiming associations with prestigious institutions. This behavior raised significant ethical concerns, including the unauthorized submission of manuscripts, misrepresentation of author affiliations, breach of trust with the PI and co-authors, and violation of academic honesty and integrity principles. Such actions also risked damaging the reputations of the institutions involved. One of the co-authors discovered the unauthorized submissions when they were browsing their google scholar profiles to update their CV. An internal investigation was launched, revealing Alex's misconduct. Consequently, the journals retracted the submitted manuscripts, and Alex was expelled from the medical program for his unethical behavior. To prevent similar incidents in the future, the institution introduced mandatory workshops on research ethics and professional conduct for all students.

Conclusion

Adhering to ethical principles and maintaining integrity in research is paramount for medical students involved in any type of research. Understanding and implementing informed consent, confidentiality, beneficence, non-maleficence, and justice are essential. Obtaining ethical approval, managing conflicts of interest, and avoiding research misconduct further ensure the credibility and reliability of research findings. By upholding these standards, medical students can contribute to advancing medical science while safeguarding the rights and welfare of research participants.

WHAT TYPES OF RESEARCH ARE AVAILABLE?

Medical students have the opportunity to engage in a variety of research types, each contributing uniquely to the field of medicine.

Basic Science Research

Basic science research involves studying fundamental biological processes and mechanisms. This type of research is conducted primarily in laboratories and aims to understand how living organisms function at the molecular, cellular, and genetic levels.

> **Examples:** Investigating the molecular pathways of cancer, studying the genetic basis of diseases, or understanding the immune system's response to infections.
> **Skills Required:** Laboratory techniques (e.g., PCR, Western blotting, flow cytometry, cell culture), data analysis, critical thinking.

Clinical Research

Clinical research involves studies that directly involve patients or human subjects to evaluate medical, surgical, or behavioral interventions. The goal is to improve patient care and treatment outcomes.

> **Examples:** Clinical trials testing new medications, observational studies on disease progression, or outcomes research evaluating surgical procedures.
> **Skills Required:** Patient interaction, including recruiting, data collection, understanding of clinical protocols, and ethical considerations.

Epidemiology Research

Epidemiology research focuses on the distribution and determinants of health-related states or events in populations. It aims to identify risk factors for diseases and to develop strategies for prevention and control.

> **Examples:** Studying the incidence and prevalence of diseases, identifying risk factors for chronic illnesses, or evaluating the effectiveness of public health interventions.
> **Skills Required:** Statistical analysis, data interpretation, knowledge of public health principles, critical thinking.

Community Based Participatory Research

This type of research involves working with communities to understand and address their health needs. It often includes participatory methods, in which community members are actively involved in the research process.

Examples: Assessing health needs in underserved populations, evaluating community-based health programs, or studying the impact of health education initiatives.
Skills Required: Communication, cultural competence, data collection, community engagement techniques.

Behavioral Health Research

Behavioral health research studies the interaction between behavior, mental and physical health. It aims to understand how behaviors influence health outcomes and how to modify behaviors to improve health.

Examples: Research on smoking cessation programs, studies on mental health interventions, or exploring the relationship between lifestyle factors and chronic diseases.
Skills Required: Understanding of psychological theories, data analysis, patient interaction, and intervention design.

Environmental Health Research

Environmental health research investigates how environmental factors affect human health. This includes studying the effects of pollutants, climate change, and occupational hazards.

Examples: Studying the health effects of air pollution, assessing the impact of climate change on public health, or investigating occupational health risks in certain industries.
Skills Required: Environmental science knowledge, data analysis, risk assessment, and understanding of public health policies.

Medical Humanities Research

Medical humanities research explores the intersection of medicine with the humanities, including literature, history, ethics, and the arts. It aims to provide a deeper understanding of the human experience in healthcare.

Examples: Studying the history of medicine, analyzing medical narratives in literature, or exploring ethical issues in healthcare.
Skills Required: Critical analysis, writing, understanding of humanities disciplines, ethical reasoning.

Medical Education Research

Medical education research focuses on improving medical training and education methods. It aims to develop and evaluate new teaching strategies, curricula, and assessment tools.

Examples: Research on simulation-based learning, studies on the effectiveness of online medical education, or evaluating new assessment methods for medical students.

Skills Required: Educational theory knowledge, data collection and analysis, curriculum development, and teaching experience.

HOW DO I COME UP WITH A RESEARCH QUESTION?

Coming up with a research question as a medical student involves a combination of curiosity, understanding of existing literature, and practical considerations.

Steps to Develop a Research Question

- Reflect on your interests within medicine—this could be a specific disease, patient population, treatment method, or aspect of healthcare. Consider experiences from clinical rotations, lectures, and personal observations that sparked your curiosity. Review recent articles, reviews, and meta-analyses in your area of interest.
- Identify gaps in knowledge, controversies, or emerging areas where further research is needed. Narrow down your broad area of interest to a specific topic. For example, instead of focusing on "cardiovascular disease," you might narrow it down to "the impact of diet on cardiovascular health in adolescents."
- Discuss your ideas with faculty members, advisors, and peers. They can provide valuable insights, suggest resources, and help refine your topic. Given your resources and time constraints, mentors can also help ensure your question is feasible.
- Assess the availability of data, resources, and subjects needed to conduct your research. Ensure that your question is manageable within the timeframe and scope of your medical studies. To refine your question, use frameworks such as PICO (Population, Intervention, Comparison, Outcome) for clinical research or FINER (Feasible, Interesting, Novel, Ethical, Relevant) criteria.

Characteristics of a Good Research Question

A good research question should be clear and unambiguous. Avoid vague terms and ensure that others easily understand the question. A research question should be focused and specific. It should target a particular aspect of a problem rather than being broad and general. Ensure that the research question can be realistically answered given the available time, resources, and expertise. Consider whether you can access the necessary data, subjects, and equipment. The question should address a gap in the existing literature or offer a new perspective. Novel research questions contribute to advancing knowledge in the field. The research question must be ethically sound and respect the rights and well-being of participants. Ensure that your study design complies with ethical guidelines and has the necessary approvals. The question should be relevant to current issues in medicine and healthcare. It should have the potential to impact clinical practice, patient outcomes, or health policy. The question should be structured to be answered through research methods, whether qualitative, quantitative, or mixed methods. It should lead to measurable outcomes or clear findings.

Examples of Good Research Questions

Clinical Research: "What is the efficacy of a new antihypertensive drug compared to existing treatments in lowering blood pressure in patients with stage 1 hypertension?"

Public Health: "What are the barriers to vaccination uptake among low-income communities, and how can targeted interventions improve vaccination rates?"

Medical Education: "How does the use of simulation-based training in medical school affect the confidence and skills of students in performing clinical procedures?"

Epidemiology: "What are the long-term health outcomes of children exposed to secondhand smoke in utero and during early childhood?"

Quality Improvement: "How does implementing electronic health records impact the efficiency and accuracy of patient care in a busy urban clinic?"

Refining Your Research Question

Developing a research question is often iterative. You may need to revise your question multiple times based on feedback and further literature review.

WHAT MAKES A GOOD HYPOTHESIS?

A good hypothesis is a fundamental part of the scientific method and a foundation for experimentation and research. A hypothesis must be testable through experimentation or observation. It should be possible to design experiments that can confirm or refute it. A hypothesis should be structured in a way that it can be proven false. This means there must be a potential outcome that would show the hypothesis is incorrect. A good hypothesis is clear and specific, outlining the expected relationship between variables. Vague hypotheses are harder to test and validate.

A hypothesis should be grounded in existing research and theories. A hypothesis often stems from a literature review or previous findings. The simpler a hypothesis, the better. It should not be overly complex and focus on a single relationship or effect.
A hypothesis should make predictions about the expected outcome of the experiment or observation. A hypothesis should be logically consistent. The reasoning behind the hypothesis should be sound and based on established scientific principles.

Example of a Good Hypothesis

Let's say you are studying the effect of sunlight on plant growth. A good hypothesis might be: If plants are exposed to more sunlight, they will grow taller than plants that receive less sunlight.

Testable: You can measure plant growth under different sunlight conditions.
Falsifiable: It's possible that plants do not grow taller with more sunlight.
Specific: It specifies the variable (sunlight) and the expected outcome (growth).
Based on Existing Knowledge: It builds on the understanding that sunlight is crucial for photosynthesis.
Simple: It focuses on one variable's effect.
Predictive: It predicts the outcome of increased sunlight exposure.
Logical: The reasoning is consistent with known scientific principles.

UNDERSTANDING VARIABLES

In biomedical research, correctly identifying and understanding different types of variables is crucial for designing robust studies, analyzing data accurately, and interpreting results effectively. This chapter explains independent, dependent, and nested variables, providing relevant biomedical examples to illustrate their roles and relationships.

Independent Variables

An independent variable is a factor manipulated or categorized to observe its effect on a dependent variable. It is the presumed cause in a cause-and-effect relationship.

Dependent Variables

A dependent variable is the outcome or response that is measured to assess the effect of the independent variable. It is the presumed effect in a cause-and-effect relationship.

Nested Variables

A nested variable is a type of variable that is hierarchically structured within another variable. Nested variables often occur in complex experimental designs where sub-groups are created within the main groups.

Examples

Clinical Trial of a New Drug: In a study investigating the effect of a new antihypertensive drug, the independent variable would be the treatment (e.g., drug vs. placebo).

Independent Variable: Type of treatment (new drug or placebo)
Dependent Variable: Blood pressure levels

Dietary Intervention Study: In research examining the impact of a low-sodium diet on blood pressure, the independent variable is the diet type.

Independent Variable: Type of diet (low-sodium vs. regular diet)
Dependent Variable: Blood pressure levels

Exercise and Mental Health: In a study assessing the impact of exercise on mental health, the independent variable is the exercise regimen.

Independent Variable: Exercise regimen (high-intensity vs. low-intensity vs. no exercise)
Dependent Variable: Levels of anxiety and depression
Definition

Multi-Center Clinical Trial: Consider a clinical trial conducted across multiple hospitals to test a new drug for lowering blood pressure. Patients (nested variable) are nested within hospitals (main variable).

Main Variable: Hospital (Hospital A, Hospital B, Hospital C)
Nested Variable: Patients within each hospital

Independent Variable: Treatment type (new drug or placebo)
Dependent Variable: Blood pressure levels

Genetic Studies: In a study investigating genetic differences in drug metabolism, individual genetic profiles (nested variable) are nested within broader population groups (main variable).

Main Variable: Population group (e.g., European, Asian, African)
Nested Variable: Individual genetic profiles within each population group
Independent Variable: Genetic marker
Dependent Variable: Drug metabolism rate

Conclusion

Understanding independent, dependent, and nested variables is essential for designing effective biomedical research studies. Recognizing these variables and their relationships allows researchers to structure their experiments correctly, choose appropriate statistical analyses, and draw valid conclusions from their data. By applying these concepts, medical students can enhance the rigor and impact of their research endeavors.

THE MENTOR-MEDICAL STUDENT RELATIONSHIP

Research and scholarship are integral parts of medical education and professional development. A successful research experience requires a productive and collaborative relationship between mentors and medical students.

The Role of a Mentor

Advisor

The mentor provides expert guidance on research design, methodology, and the scholarly process. This includes helping the student formulate research questions, develop study protocols, and navigate the complexities of data analysis. The mentor supports the student in identifying and accessing necessary resources, including funding, data, and research tools.

Teacher

The mentor educates the student on essential research skills and knowledge. This includes training in specific techniques, understanding ethical considerations, and developing critical thinking skills. Providing constructive feedback is a key role. The mentor reviews the student's work regularly, offering insights and suggestions to improve the quality and rigor of the research.

Role Model

The mentor demonstrates professional and ethical behavior, serving as a role model. This includes showing integrity in research practices, fostering a respectful and inclusive environment, and balancing research with other professional responsibilities.

Expectations of the Mentor

Accessibility

Mentors should be available for regular meetings and discussions. They should respond to the student's queries in a timely manner and provide consistent support throughout the research process.

Encouragement and Constructive Feedback

Creating a supportive and encouraging atmosphere is crucial. The mentor should motivate the student, celebrate successes, and provide emotional support during challenges. The mentor offers constructive and developmental feedback, helping the student refine their research questions, methodologies, and presentations. This feedback should be specific, actionable, and aimed at fostering growth.

Responsibilities of the Mentor

Guidance and Resources

Help the student develop a clear research plan, including specific goals, timelines, and milestones. Assist the student in securing necessary resources such as funding, access to data, and research tools.

Professional Development
Encourage and support the student's participation in conferences, workshops, and networking opportunities. This exposure helps in broadening the student's understanding and professional network. Ensure that the research adheres to ethical guidelines and institutional policies. The mentor is responsible for guiding the student through the ethical review process and ensuring compliance with all relevant regulations.

The Role of a Student

Learner
The student is primarily a learner, acquiring the knowledge and skills necessary for conducting research and scholarship. This involves active engagement in learning opportunities provided by the mentor.

Researcher
The student actively engages in the research process, including data collection, analysis, and interpretation. This hands-on involvement is crucial for developing practical research skills.

Collaborator
The student works effectively with the mentor and other members of the research team. Collaboration and communication are key to the success of the research project.

Expectations of a Student

Proactive Engagement
The student should take initiative in the research process, seeking guidance and feedback when needed. This includes identifying areas where they need additional support and actively pursuing learning opportunities.

Time Management
Managing time effectively is essential. The student must balance research activities with other academic and clinical responsibilities, ensuring that each receives appropriate attention.

Commitment
Demonstrating dedication to the research project is crucial. The student should meet deadlines, maintain a high standard of work, and show persistence even when faced with challenges.

Responsibilities of the Medical Student

Preparation

The student should come prepared to meetings with progress updates, questions, and discussion points. Another responsibility is regularly documenting and tracking the progress of the research project. This includes maintaining a log of completed tasks, ongoing activities, and future plans. The student should stay updated on relevant literature and advancements in the field. This involves regularly reading and summarizing new research articles and integrating this knowledge into the project.

Skill Development

The student should actively seek opportunities to develop research skills, such as statistical analysis, literature review, and scientific writing. The student should utilize resources provided by the mentor and seek additional training as needed.

Dissemination of Research

The student should contribute to disseminating research findings through presentations, publications, and other scholarly activities. This is a crucial part of the research process and helps advance medical knowledge.

Professionalism and Ethical Conduct

The student must show respect to the mentor and all members of the research team. This includes valuing diverse perspectives and contributions, and maintaining a collaborative and supportive environment. Clear and professional communication is essential. The student should communicate regularly with the mentor, provide updates on progress, and promptly address any issues or concerns. The student should be reliable and dependable, meeting deadlines, attending scheduled meetings, and following through on commitments. The student must maintain confidentiality of all research data and findings, adhering to institutional policies and ethical standards. Any breaches of confidentiality should be reported immediately to the mentor and appropriate authorities. The student must demonstrate integrity in all aspects of their research activities, including accurate reporting of data, acknowledgment of sources, honesty in all communications and actions, and adhering to ethical guidelines and institutional policies.

HOW DO I FIND A RESEARCH MENTOR?

Finding a research mentor as a medical student is crucial in advancing your academic and professional career. Here are some strategies to help you identify and connect with a potential research mentor:

Identify Your Research Interests

Start by defining your areas of interest within the medical field. A clear idea of what you want to research will help you find a mentor whose interests align with yours.

Research Potential Mentors

Look for faculty members, researchers, and clinicians working in your area of interest. Check the profiles of faculty members in their departments or related departments. Look for authors of research papers that align with your interests. Attend relevant conferences, seminars, and lectures to meet researchers and learn about their work.

Network

Ask your professors, college mentors, academic advisors, or clinical supervisors for recommendations. Talk to fellow students who have engaged in research to get suggestions and introductions. Join medical student organizations or professional societies that can provide networking opportunities.

Evaluate Potential Mentors

Ensure their research aligns with your interests. Consider their experience in mentoring students and their availability to provide guidance. Look for mentors with a good reputation in the field and a track record of successful mentees.

Make Contact

Reach out to potential mentors with a professional and well-prepared approach. To make contact, send a concise, respectful email introducing yourself, expressing your interest in their research, and explaining why you seek their mentorship. Attach your CV and mention any relevant experience or skills. If you don't receive a response within a few weeks, send a polite follow-up email.

Prepare for the Meeting

If a potential mentor agrees to meet with you, prepare thoroughly. Please read some of their published papers and be ready to discuss their research. Have questions about their research, expectations for mentees, and potential projects you could work on. Clearly articulate your research interests and career goals.

Assess the Fit

During the meeting, assess whether the mentor is a good fit for you. Consider if your working styles and personalities are compatible. Ensure their expectations align with your availability and goals. Evaluate the level of support and resources they can provide.

Formalize the Mentorship

If you both agree to proceed, formalize the mentorship. Discuss and set clear goals and expectations for the research project. Outline a timeline for the project, including milestones and deadlines. Schedule regular meetings to discuss progress, receive feedback, and address any challenges.

Tips for a Successful Mentorship

Be Proactive: Take initiative in your research and maintain regular communication with your mentor.
Be Open to Feedback: Be receptive to constructive criticism and use it to improve your work.
Stay Committed: Show dedication and commitment to the research project and your mentor's guidance.
Follow-up: A polite follow-up email can show your continued interest if you don't hear back within a few weeks.
Express Gratitude: Acknowledge and appreciate your mentor's time and effort.

WHAT IS A LITERATURE REVIEW AND HOW DO I DO ONE?

A literature review is a critical component of the research process, particularly in the early stages of developing a research question. It involves systematically searching for, evaluating, and synthesizing existing research related to a specific topic. For medical students and researchers, conducting a thorough literature review provides a solid foundation to build a meaningful and well-informed research question.

A literature review helps researchers understand the existing knowledge on a particular topic. It provides insights into what has already been studied, the methodologies used, and the findings and conclusions drawn by other researchers. By reviewing existing research, researchers can identify gaps or areas that have not been sufficiently explored. These gaps present opportunities for new research questions and studies that can contribute to advancing knowledge in the field. A comprehensive literature review also ensures that researchers do not duplicate existing studies unnecessarily.

Define Your Research Question

Start by clearly defining the research question or topic you want to explore. A well-defined question will guide your search and help you stay focused.

Search for Relevant Literature

Use multiple sources to find relevant literature:

Databases: Use academic databases like PubMed, Google Scholar, JSTOR, and PsycINFO.
Libraries: Access university library resources.
Reference Lists: Check the reference lists of key articles for additional sources.

Develop a Search Strategy

Create a list of keywords and phrases related to your topic. Use Boolean operators (AND, OR, NOT) to refine your search. For example, use keywords such as "climate change," "global warming," "environmental impact" or search strings such as "climate change AND global warming," "climate change OR environmental impact" to refine search results.

Another strategy for a literature review is to incorporate Medical Subject Headings (MeSH) terms, which are standardized sets of terms used to index and organize biomedical information. Developed and maintained by the National Library of Medicine (NLM), MeSH terms facilitate efficient and precise searching within the vast databases of biomedical literature, such as PubMed. This chapter provides an overview of MeSH terms, their importance, structure, and how to effectively use them in biomedical research. Use the MeSH database on PubMed to identify appropriate MeSH terms for your topic. Enter your search term and review the suggested MeSH terms.

Evaluate the Sources

Critically evaluate the sources for relevance, quality, and credibility. Does the source directly address your research question? Is the source peer-reviewed or published in a reputable journal? Are the authors credible and recognized experts in the field?

Organize the Literature

Organize the selected literature in a way that makes sense for your review. Common methods include:

Thematic Organization: Group studies by themes or topics.
Chronological Organization: Arrange studies by publication date.
Methodological Organization: Group studies by research methods used.

Summarize and Synthesize

Summarize the key findings of each study. Then, synthesize the information to identify patterns, trends, and gaps in the research. This step involves:

Comparing and Contrasting: Highlight similarities and differences between studies.
Identifying Gaps: Point out areas where more research is needed.
Connecting to Your Research: Relate the literature to your research question.

Write the Literature Review

Structure your literature review with a clear introduction, body, and conclusion:

Introduction: Introduce the topic, state the purpose of the review, and outline the scope.
Body: Present the literature in a structured manner (thematically, chronologically, or methodologically). Summarize and synthesize the findings.
Conclusion: Summarize the main findings, highlight significant gaps, and suggest directions for future research.

Cite Your Sources

Properly cite all your reviewed sources using the appropriate citation style (APA, MLA, Chicago, etc.). This ensures academic integrity and allows readers to locate the original sources.

More Tips for a Successful Literature Review

- **Stay Organized**: Keep track of your sources and notes.
- **Be Critical**: Evaluate the quality and relevance of each study.
- **Be Comprehensive**: Include a wide range of sources to cover the topic thoroughly.

- **Stay Current**: Include recent studies to ensure your review is up-to-date.

By following these steps, you can conduct a thorough and effective literature review that provides a solid foundation for your research.

HOW CAN ENDNOTE HELP COMPILE A BIBLIOGRAPHY?

EndNote is a powerful tool for managing bibliographies and references. Here's a step-by-step guide to help you use EndNote effectively (for more detailed training on EndNote, please visit the Texas Tech Health El Paso library for more information:

Install EndNote

Obtain EndNote from the TTUHSC El Paso library. Follow the installation instructions for your operating system.

Create a Library

Open EndNote: Launch the EndNote application.
New Library: Go to File > New and create a new library. Name your library and save it to a convenient location.

Add References

There are several ways to add references to your EndNote library:

Manual Entry

New Reference: Go to References > New Reference or click the New Reference button.
Select Reference Type: Choose the appropriate reference type (e.g., Journal Article, Book).
Enter Details: Fill in the bibliographic details manually. Click Save when done.

Import from Databases

Search in Database: Use PubMed, Google Scholar, or your institution's library.
Export References: Look for an option to export citations (e.g., in RIS or EndNote format).
Import into EndNote: In EndNote, go to File > Import > File. Select the file you exported and import it.

Direct Export

Database Export: Some databases allow direct export to EndNote. Look for an option to Export to EndNote and follow the prompts.

Organize References

Groups: To organize your references, create groups. Right-click on My Groups and select Create Group. Name the group and drag references into it.
Smart Groups: Use Smart Groups to automatically organize references based on search criteria. Right-click on My Groups and select Create Smart Group.

Use EndNote with Word

Install EndNote Plugin: Ensure the EndNote plugin is installed in Microsoft Word. It usually installs automatically with EndNote.
Insert Citations: Open your Word document. Place the cursor where you want to insert a citation. Click EndNote in the Word toolbar, then Insert Citation. Search for the reference and insert it.
Format Bibliography: Use the Style dropdown in the EndNote toolbar in Word to select a citation style (e.g., APA, MLA, Chicago). EndNote will format your bibliography according to the selected style.

Sync and Share Libraries

Sync Library: To sync your library across devices, create an EndNote account and log in through Edit > Preferences > Sync.
Share Library: Share your library with colleagues through File > Share. Enter the recipient's email address.

Backup Your Library

Regular Backups: Regularly backup your EndNote library to avoid data loss. Go to File > Compressed Library (.enlx) to create a backup file.

Tips for Effective Use

Regular Updates: Keep EndNote and its styles updated to ensure compatibility and accuracy.
Customize Fields: Customize reference fields to suit your needs by going to Edit > Preferences > Reference Types.
Learn Shortcuts: Familiarize yourself with EndNote's shortcuts and features to increase efficiency.

Troubleshooting Common Issues

Plugin Issues: If the EndNote toolbar doesn't appear in Word, go to Word's File > Options > Add-ins. Check if EndNote Cite While You Write is active.
Duplicate References: Use References > Find Duplicates to locate and manage duplicate references.

HOW TO DISSEMINATE YOUR RESEARCH

Research dissemination is sharing research findings with the broader scientific community and the public. Effective dissemination ensures valuable knowledge reaches those who can benefit from it, including researchers, clinicians, policymakers, and patients. This chapter covers key aspects of research dissemination, focusing on publishing in high-quality journals, presenting at reputable conferences, and avoiding duplication of research.

Preparing an Abstract

An abstract is a concise summary of a research paper, providing an overview of the study's objectives, methods, results, and conclusions. It is often the first part of a paper that readers and reviewers encounter, making it crucial for capturing their interest and conveying the essence of the research.

Choose a title that reflects the content and significance of your research. Introduce the research topic and state the primary objectives. Describe the study design, participants, interventions, and analytical methods. Summarize the key findings, including any statistical significance. Present the main conclusions drawn from the results and their implications.

Use clear and straightforward language to ensure the abstract is easy to understand. Avoid jargon and complex sentences. Most journals or conferences have specific word limits for abstracts (typically 150-250 words). Adhere to these limits while ensuring all critical information is included. Include only the most important details about the study. The abstract should provide a snapshot of the research without going into extensive detail. Write in an active voice to make the abstract more engaging and direct. Emphasize what makes your study unique and why it is important.

Writing an effective biomedical abstract is a crucial skill for medical students. A well-crafted abstract provides a clear and concise summary of the research, highlighting its objectives, methods, results, and conclusions. Following the key components and tips outlined in this guide, medical students can write compelling abstracts that effectively communicate their research findings to the scientific community.

Submitting an Abstract

Submitting abstracts to a research conference is critical in sharing your work with the broader academic community. When submitting an abstract to a conference, several key factors should be considered to enhance your chances of acceptance and ensure that your submission stands out. Ensure your research aligns with the conference's themes, topics, or tracks. Tailor your abstract to emphasize the aspects most relevant to the conference audience. Understand the conference's target audience and write your abstract in a way that will be engaging and informative to them. Ensure all authors have made significant contributions to the research and reviewed and approved the abstract submission. Adhere to ethical guidelines and policies

regarding duplicate submissions, plagiarism, and conflicts of interest. Indicate your preference for the type of presentation (oral, poster, etc.)

Presenting Posters or Platform Talks at Conferences

Choose conferences that provide the best platform for your research. Ensure the conference's theme aligns with your research area. Consider the reputation and prestige of the conference within your field—select conferences that attract researchers, clinicians, and policymakers interested in your topic. Poster and oral (platform) presentations are two common formats for presenting research at conferences. Posters are often suitable for preliminary or exploratory research, while oral presentations may be better for completed studies with significant findings. Regardless, each format has its unique characteristics, advantages, and requirements. Always discuss submitting abstracts to conferences with your mentor.

Poster Presentations

Research is presented on a large poster, typically displayed on a board. Posters can also be presented in a virtual manner. Make sure to follow the conference guidelines when preparing your poster. Posters include text, figures, tables, and images to convey the research findings. Posters are generally larger, with dimensions specified by the conference organizers. They are designed to be visually appealing and easily read from a distance. Poster sessions allow for direct, informal interactions between the presenter and attendees. Presenters can explain their work in detail, answer questions, and engage in discussions with interested individuals. Posters are usually displayed for an extended period, often throughout the conference or during a designated poster session. Presenters typically stand by their posters for a specified period to discuss their work with passersby. Posters attract a diverse audience, including experts, students, and professionals from various fields. This format allows for a wide range of feedback. An effective poster involves careful design, including layout, color schemes, and concise text. Posters need to be printed and transported to the conference. Presenters should be prepared to give a brief overview of their work, usually lasting a few minutes, and answer questions.

Oral Presentations

Oral presentations, sometimes referred to as platform talks or platform presentations, are usually presented through a series of slides using software like PowerPoint, usually delivered in a lecture-style format. Oral presentations have a defined structure, including an introduction, methods, results, and conclusion, with each section covered in detail. Interaction is typically limited to a brief question-and-answer session at the end of the presentation. The presenter answers questions from the audience. The setting is often more formal than a poster session and takes place typically in a lecture hall or conference room. Oral presentations are assigned a specific time slot, usually ranging from 10 to 20 minutes, followed by a short Q&A period. Presenters must adhere strictly to the allotted time to ensure the session runs smoothly. The audience for oral presentations tends to be more focused and specific, often consisting of individuals with a strong interest in the presented topic.

Scope of Conferences

The scope of conferences can be categorized into local, regional, national, and international levels, each offering distinct opportunities and challenges. Local conferences are typically organized by medical schools, hospitals, or local medical societies and involve participants from the immediate geographic area. They are smaller in scale, providing a more intimate setting for networking with local professionals, faculty, and peers. Regional conferences draw attendees from a broader geographic area, such as a group of neighboring states or a specific part of the country. They offer broader exposure and more extensive networking opportunities compared to local events. National conferences attract participants from across the country and are usually organized by national medical associations or specialty societies. Presenting at a national conference is prestigious, providing extensive networking opportunities with leading experts and peers nationwide. International conferences involve participants from multiple countries worldwide and are organized by international medical organizations and societies. These conferences offer the highest level of exposure and networking on a global scale, allowing presenters to connect with international experts and peers and gain insights into global trends and innovations in their field. Each level of the conference offers unique benefits, and the choice of which to attend should be based on the relevance of the conference to the research topic, the stage of the research, networking opportunities, and logistical considerations such as travel and costs.

Preparing a Manuscript

A well-prepared manuscript with a good research question, hypothesis, and study design increases the chances of acceptance. Follow the journal's submission guidelines regarding format, structure, and referencing style. Write clearly and concisely, ensuring the introduction, methods, results, and discussion sections are well-organized and informative. Include clear, high-quality figures and tables that effectively present your data. Conduct a comprehensive literature review to contextualize your findings and highlight their significance. Always work with your mentor when preparing your manuscript.

Authorship

Authorship is a significant aspect of biomedical research, as it confers credit and accountability for the work presented in scientific manuscripts. The criteria for authorship, the order of authors, and the responsibilities associated with being an author are crucial for maintaining the integrity and ethical standards of scientific research. In biomedical research, authorship should be based on substantial contributions to the study. Often, authorship is discussed early on in the research process with the research team. The International Committee of Medical Journal Editors (ICMJE) provides widely accepted criteria for authorship, which include:

- Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data
- Drafting the article or revising it critically for important intellectual content
- Final approval of the version to be published
- Agreement to be accountable for all aspects of the work

All four criteria should be met for an individual to qualify as an author. Individuals who contribute to the research but do not meet all these criteria should be acknowledged appropriately.

Responsibilities of Authors

All manuscript authors have several key responsibilities to ensure the integrity and quality of the research and manuscript. Authors must ensure that the data presented are accurate and that the findings are reported honestly. Authors should disclose potential conflicts of interest that could influence the research or its interpretation. Authors must ensure the research adheres to ethical standards, including obtaining necessary approvals and informed consent. Proper acknowledgment should be given to individuals who contributed to the research but do not meet authorship criteria.

Order of Authors

The first author usually makes the most significant contribution to the research and writing of the manuscript. For example, a student who conducted the experiments and wrote the initial draft of the manuscript. The last author often holds a senior position, such as the principal investigator or research supervisor, who provides overall guidance and support. Co-authors or second author are often listed based on their relative contributions, however this is not always true. Sometimes, these authors are listed alphabetically or based on some other structure specified by a particular journal. In many respects any author not listed as first or last can be seen as “middle authors.” The last author often holds a senior position, such as the principal investigator or research supervisor, who provides overall guidance and support. Being a corresponding author is a role of significant importance in the publication of biomedical research. It involves a range of responsibilities, from coordinating the submission process to ensuring compliance with ethical standards and maintaining communication post-publication. This role is often taken by the last author.

Disputes and Issues in Authorship

Disputes over authorship can arise, and it is essential to address them transparently and fairly. Disagreements about authorship order or inclusion should be resolved through discussion and, if necessary, mediation by an independent party. Ghostwriting (where someone not credited writes the manuscript) and guest authorship (where someone is credited without a significant contribution) are unethical practices.

Publishing a Manuscript in High-Quality Journals

Selecting an appropriate journal is crucial for maximizing the impact of your research and should be done in consultation with your research mentor and co-authors. Ensure that the journal’s scope aligns with your research topic and that it reaches your target audience. Consider the journal’s impact factor and reputation within the field. Higher-impact journals often have more rigorous review processes and wider readership. Decide with your mentor

whether to publish in an open-access journal, which can increase visibility and accessibility, or a subscription-based journal.

Peer Review Process

Submit your manuscript through the journal's submission system. The journal editor assigns reviewers who are experts in your field. Address reviewers' comments thoughtfully and thoroughly. Revise your manuscript as needed and provide a detailed response letter explaining how you addressed each point. Be wary of journals with no peer review or very fast peer review turnaround times, peer review can often be a lengthy process.

Avoiding Predatory Publishers and Conferences

Predatory publishers and conferences are exploitative entities that prioritize profit over academic integrity, often engaging in unethical practices such as charging high fees for publication or conference participation without providing proper peer review or editorial services. For medical students new to research, it is crucial to recognize and avoid these predatory entities to ensure their work is disseminated in reputable and credible venues.

Characteristics of predatory publishers may include but are not limited to:

- Claim to offer peer review but do not conduct a rigorous or legitimate review process.
- Charge exorbitant fees without providing corresponding services.
- Use spam emails to solicit submissions, often using flattery or false claims of interest.
- Provide little or no information about their editorial board, review process, or fees.
- Use fake or misleading impact factors and other metrics to appear reputable.
- Websites are often unprofessional, with frequent errors and inconsistencies.

To help avoid submitting to predatory publishers, verify if the journal is indexed in reputable databases like PubMed, Scopus, or Web of Science. Use recognized sources to check journal impact factors and other metrics. Avoid relying on metrics provided by the journal itself without verification. Be wary of overly flattering language that emphasizes the importance of your work. A professional, well-maintained website with clear, detailed information about the journal's policies and editorial board is a good sign. Check the credibility and affiliations of the editorial board members. Legitimate journals typically list experienced and respected researchers. Look for valid contact information for the editorial board members and the journal's office. Consult your institution's library or research office for advice on selecting reputable journals. Seek recommendations from experienced faculty members or mentors in your field. The institutional library can also provide guidance on identifying predatory journals and conferences.

Characteristics of predatory conferences may include but are not limited to:

- Frequent unsolicited emails and invitations to participate or speak at conferences.
- High registration and participation fees without providing adequate services or facilities.
- Conferences often lack a proper peer review process for submitted abstracts and papers.
- Organizers and sponsors may not be reputable or well-known in the field.

- Conference details, such as schedule, speakers, and location, are often vague or subject to frequent changes.

To avoid predatory conferences, verify if the conference is sponsored or organized by reputable institutions or professional organizations. Look for information on previous editions of the conference, including locations, speakers, and participants. A good sign is a professional, well-maintained website with detailed conference agenda, speakers, and logistics information. Look at the list of confirmed speakers. A high-quality conference typically features respected researchers and professionals in the field.

Avoiding predatory publishers and conferences is crucial for maintaining the integrity of your research and ensuring it reaches a credible audience. By recognizing the characteristics of predatory entities and following the advice provided in this guide, medical students can make informed decisions about where to submit their work and which conferences to attend. Ensuring your research is published and presented in reputable venues protects your reputation and contributes to advancing medical science.

Conclusion

Effective research dissemination is essential for advancing medical knowledge and practice. Medical students can ensure that their research has a significant impact by publishing in high-quality journals, presenting at reputable conferences, and avoiding duplication. Adhering to best practices in research dissemination not only enhances the credibility and visibility of your work but also contributes to the overall advancement of the scientific community.

HOW TO PUT TOGETHER A CV

A Curriculum Vitae (CV) is a comprehensive document that outlines an individual's educational background, professional experience, skills, and accomplishments. It is typically used to apply for academic, research, and high-level professional positions, providing a detailed overview of one's qualifications and career trajectory. Creating a CV specifically for reaching out to a potential research mentor involves highlighting your academic achievements, research experience, and relevant skills. Keep in mind that the flow and content of a CV will be customized to emphasize relevant technical skills, research experience, and academic achievements relevant to the type of research project or lab you are applying to, ensuring that the most pertinent qualifications and accomplishments are prominently featured.

Contact Information

Name: Full name at the top in bold.
Phone Number: Your primary contact number.
Email: A professional email address.

Professional Summary

A professional summary is a brief section in a CV that highlights your key qualifications, experiences, and skills relevant to the job you are applying for. It serves as a snapshot of your professional profile and helps potential employers quickly understand your background and value.

Summary of Qualifications

A summary of qualifications in a CV is a concise, bullet-pointed section highlighting your most relevant skills, experiences, and accomplishments. It is designed to quickly demonstrate your suitability for the job. Here's what typically is included in a summary of qualifications:

- **Key Skills and Competencies:** Highlight the most relevant skills and competencies that align with the job you're applying for.
- **Years of Experience:** Indicate the amount of experience you have in relevant roles or industries.
- **Major Achievements:** Mention significant achievements or accomplishments in previous roles, particularly those that had a measurable impact.
- **Technical Skills:** Include specific technical skills or proficiencies with tools, software, or technologies relevant to the job.
- **Certifications and Training:** List any relevant certifications, training, or professional development courses that add to your qualifications.
- **Languages:** Mention any language proficiencies if they are relevant to the position.
- **Education Highlights:** Include notable academic achievements or relevant coursework if applicable.

Education

Medical School: Name of your medical school, location, degree pursued (e.g., MD, DO), and expected graduation date.
Undergraduate Education: Name of the undergraduate institution, location, degree received, and graduation date.
Other Relevant Education: Any other relevant education, such as additional degrees or certifications.

Research Experience

Research Projects: Title of the project, your role, the institution, dates, and a brief description of your contributions and findings.
Publications: Full citations of any published papers, abstracts, or posters.
Presentations: Any presentations at conferences or academic meetings.

Clinical Experience

Rotations and Clerkships: Details about your clinical rotations, including specialty, institution, dates, and any notable achievements or skills acquired.
Volunteer Clinical Work: Any volunteer clinical experiences, including the setting, your role, and dates.

Work Experience

Relevant Work: Any work experience relevant to medicine, including job title, employer, location, dates, and a brief description of your duties.
Other Work Experience: Any other work experience that has helped develop transferable skills (e.g., communication, teamwork).

Leadership and Extracurricular Activities

Leadership Roles: Any leadership positions held in student organizations, including title, organization, dates, and responsibilities.
Volunteer Activities: Description of any volunteer work, including the organization, your role, and dates.
Professional Memberships: Membership in medical or professional organizations.

Honors and Awards

Academic Honors: Any academic honors or awards received, including the name of the award, the awarding body, and the date.
Scholarships: Any scholarships awarded, including the name of the scholarship, the awarding body, and the date.

Skills

Clinical Skills: List specific clinical skills you have acquired.
Languages: Any languages spoken and proficiency levels.
Technical Skills: Relevant technical skills, such as proficiency with medical software or research tools.

Media Contributions

The media contribution section of a CV highlights your involvement and recognition in various media outlets. This can include articles, interviews, guest appearances, podcasts, or contributions to industry publications. It demonstrates your expertise and visibility in your field, showcasing how your insights and work have been featured or acknowledged in the media.

Certifications and Licenses

List any relevant certifications, such as BLS (Basic Life Support), ACLS (Advanced Cardiovascular Life Support), etc. Here is the section to include any medical licenses you hold. Be sure to include the issuing body and date.

References

Include the names, titles, and contact information for a few professional references (typically 3-5). Make sure to ask for their permission first.

Tips for a Strong CV

Emphasize your accomplishments and skills relevant to the position or tailor your CV to align with the research interests of the mentor you are contacting. Use bullet points and concise language to make your CV easy to read. Ensure there are no spelling or grammatical errors. Regularly review your CV to remove redundant information and ensure each section is clear and distinct. Ask colleagues or mentors to review your CV to catch any instances of double dipping and provide feedback on clarity and organization.

Avoid double dipping, in the context of academic research and presentations, double dipping on a CV refers to the practice of listing the same presentation, paper, or research project multiple times in different sections. This can make it seem like you have more accomplishments than you actually do and can be viewed negatively by potential employers or academic committees. Listing an accepted abstract and an associated publication is acceptable, but avoid listing the same iteration of a presentation multiple times. Remember, presentations at conferences should be unique presentations for that conference, it is common to present preliminary findings at a smaller, regional conference and then present updated, more comprehensive results at a larger, international conference, but you should not present the exact same abstract with no updates or changes at two conferences that have overlapping audiences and listing it on your CV.

There is an example CV template provided granted there is no definitive structure. Regardless make sure that your CV is consistently formatted, making it easy for readers to navigate and find relevant information.

Additional Tips

Accompany your CV with a personalized cover letter expressing your interest in their research and how your background aligns with their work.

Sample CV Template

John Doe
(123) 456-7890
john.doe@example.com

PROFESSIONAL SUMMARY:
Dedicated and highly motivated medical student with a strong passion for biomedical research and clinical studies. Possesses a solid foundation in medical knowledge and a keen interest in exploring innovative solutions to healthcare challenges. Demonstrates excellent analytical skills, attention to detail, and a commitment to advancing medical science through rigorous research. Seeking opportunities to contribute to cutting-edge research projects and collaborate with leading experts in the field.

SUMMARY OF QUALIFICATIONS

- Pursuing a Doctor of Medicine (MD) degree with a comprehensive understanding of medical sciences, human anatomy, physiology, pathology, and pharmacology.
- Hands-on experience in conducting laboratory experiments, data collection, and analysis. Successfully completed several research projects during medical school, focusing on areas such as oncology, cardiology, and infectious diseases.
- Proficient in various laboratory techniques, including PCR, ELISA, cell culture, and microscopy. Skilled in using statistical software (SPSS, R) for data analysis and interpretation.
- Consistently achieved high academic performance, demonstrating a strong grasp of medical concepts and research methodologies. Recipient of multiple academic awards and scholarships.

EDUCATION

- XYZ Medical School, City, State
- Doctor of Medicine (MD), Expected Graduation: May 2025
- ABC University, City, State
- Bachelor of Science in Biology, Graduated: May 2021

RELEVANT COURSEWORK
- Advanced Research Methods
- Epidemiology and Public Health
- Biostatistics

RESEARCH EXPERIENCE
Research Assistant, XYZ Medical School, City, State
June 2022 – Present
- Conducted research on the effects of drug X on Y disease.
- Published findings in the Journal of Medical Research.

PUBLICATIONS
- Doe, J., & Smith, A. (2023). Title of the research paper. Journal of Medical Research, 12(3), 123-130.
- Doe, J., & Smith, A. (2023). Title of the research paper. Journal of Medical Research, 12(3), 123-130.
- Doe, J., & Smith, A. (2023). Title of the research paper. Journal of Medical Research, 12(3), 123-130.

PRESENTATIONS & ABSTRACTS
- Doe, J. (2023). Title of the presentation. Conference on Medical Research, City, State.
- Doe, J. (2023). Title of the presentation. Conference on Medical Research, City, State.
- Doe, J. (2023). Title of the presentation. Conference on Medical Research, City, State.

CLINICAL EXPERIENCE
Internal Medicine Clerkship, XYZ Hospital, City, State
Jan 2023 – March 2023
- Assisted in patient care, conducted patient interviews, and performed physical exams.

WORK EXPERIENCE
Medical Scribe, ABC Clinic, City, State
May 2021 – May 2022
- Documented patient encounters and assisted with administrative tasks.

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES
President, Medical Students Association, XYZ Medical School
Sept 2022 – Present
- Organized events and led initiatives to support medical students.

HONORS AND AWARDS
Dean’s List, XYZ Medical School, 2022
- Awarded for academic excellence.

SKILLS

- Research: Data analysis, lab techniques, SPSS, R
- Clinical: Patient interviews, physical exams
- Languages: English (native), Spanish (proficient)

MEDIA CONTRIBUTIONS

- **Guest Speaker on "Medical Innovations" Podcast** (March 2024): Discussed the latest advancements in biomedical research and shared insights from personal research projects on cardiovascular diseases.
- **Article Contributor, MedStudent Journal** (January 2024): Wrote an article titled "The Future of Personalized Medicine: Opportunities and Challenges," exploring the impact of genomic research on patient care.
- **Panelist on Local News Segment** (October 2023): Participated in a panel discussion on the importance of clinical trials and research in developing new treatments for rare diseases.
- **Interviewed for University News** (June 2023): Featured in an article about emerging researchers, highlighting my work on innovative cancer treatment strategies.

CERTIFICATIONS AND LICENSES

- BLS (Basic Life Support), American Heart Association, 2023
- ACLS (Advanced Cardiovascular Life Support), American Heart Association, 2023

REFERENCES

Perry Cox, MD
Professor of Medicine
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Sacred Heart Teaching Hospital
Email: perry_cox@sacredhearthospital.org
Phone: (XXX) XXX-XXXX

Professor Charles Xavier
Professor of Biological Anthropology
Xavier Institute
Email: professorX@Xaviorinstitute.edu
Phone: (XXX) XXX-XXXX

Gregory House, MD
Professor of Medicine, MD
Department of Diagnostics
Princeton-Plainsboro Teaching Hospital
Greg.house@PPTH.edu
Phone: (XXX) XXX-XXXX

APPENDIX

In this section, you will find appended versions of detailed guidelines and grading rubrics (when applicable) for each aspect of the SARP course that you will be responsible for completing during SARP. Please note these guidelines can also be found with the course syllabus and on the SARP Website on the Texas Tech Health El Paso Foster School of Medicine Department of Medical Education Website. Please use these resources to help you put together your required course components.

Project Plan and Grading Rubric

Guidelines for the SARP Course Project Plan (PSAP 5401)

The Project Plan is a submission to fulfill the first credit of the three credit SARP Course requirement. The Project Plan must be developed with the help of your SARP Course project mentor and needs to describe your project in enough detail to allow a reviewer of the document a clear understanding of your research question or hypothesis, the specific aims of the project, what methods you will use to address these aims, what data, or information you will acquire and what analytic approaches you plan to use. Further, a detailed timeline of the project needs to be included.

Project Plan Points of Emphasis

- For access to the SARP Syllabus, Guidelines, and additional information, please visit the SARP Website.
- If you have any questions or concerns about your SARP Course Project Plan, don't hesitate to contact the SARP Course Faculty Co-Directors or the SARP Director.
- Your SARP Course project mentor is responsible for helping you develop your project in all its aspects. **Work proactively to develop a solid working relationship with your mentor** to maximize both the success of your project and your professional development.
- It is **essential** to engage in conversations with mentors before including them in the Project Plan.
- The Project Plan needs to be authored by you, representing original work. You must take ownership of the Project Plan and be responsible for its content.
- Group projects are allowed (with up to 5 students working with a single mentor); however, each student should clearly identify a unique research question or hypothesis that can distinguish their contribution and provide for an independent Project Plan, Final Report, and Poster presentation, in fulfillment of the SARP Course credits.
- The SARP Course is designed to provide scholarship / research to enhance your medical school experience, and credit will be given for **work done while you are enrolled at the FSOM**. Scholarship or research pursued before matriculating to the FSOM cannot be used directly in fulfillment of the SARP Course requirement; however, continuing work on earlier projects, potentially continuing work with a previous mentor, is allowed if you clearly document how your SARP Course activities are extensions of such previous work.
- Please note that **case studies or narrative reviews are not considered sufficient to meet the SARP Course Project requirement**. However, meta-analysis or systematic reviews are acceptable. For information on different types of scientific reviews, please see this helpful publication: A typology of reviews: an analysis of 14 review types and associated methodologies.

- An excellent resource to become familiar with is the ***AMA Style Manual***, which provides comprehensive guidelines for preparing uniform technical documents. A full PDF version is available: https://authorservices.wiley.com/asset/Wiley-AMA-Style-Manual.pdf
- Your Project Plan must be submitted electronically. You will receive emails reminding you of this deadline. Your SARP project mentor will receive a notification requiring acknowledgement of their mentoring responsibility.
- For those with external mentors, students must have permission to present external work at the SARP symposium.

Project Plan Contents

Your SARP Course Project Plan should contain the following elements:

- Title of Project, a concise sentence or phrase to describe the overall project.
- Mentor name and contact information

Be certain to work closely with your mentor on developing your Project Plan. Your mentor will formally sign-off on this document through the REDCap software.

Project Background and Significance

This should be a concise introduction to the topic of your project and include citations of primary literature to support the development of your ideas, providing a logical foundation for your research question or hypothesis.

Research Question or Hypothesis

This is a one sentence statement of the project's overall focus as an explicit research question or hypothesis to be addressed.

Specific Aims with Rationale

The Specific Aims should be a small set of concise one- or two-sentence summaries of what you expect to achieve in executing your SARP Course project. A short paragraph should accompany each Specific Aim to provide a rationale for how the Aim addresses the project's research question or hypothesis.

Methods

This will be a short description of the methods (employing techniques, materials, databases, surveys, etc.) you intend to use to directly accomplish your Specific Aims.

Analysis

This section describes the methods you will use to analyze your data. For basic research and community / epidemiology projects, this could include a description of the statistical methods to be employed. For a medical humanities or ethics project, this might involve narrative or reflective analysis.

Compliance

If your SARP Course project requires compliance approval for using human subjects (IRB), animals (IACUC), or biohazardous materials (IBC), it is your responsibility to work with your mentor to document these in your Project Plan and **clearly describe what compliance is in place or the schedule for obtaining compliance**. Please note **no data collection should occur without compliance documentation being approved by the institution**.

Timeline

Provide a timeline for executing your SARP Course project and when you expect to submit your Final Report. There are 3 tracks to complete your SARP Course project: choose one for creating a timeline for this Project Plan document. However, you can change your Track, if necessary, by submitting a Progress Report. For example, if you submit your Project Plan expecting to complete your SARP Course by Track 1, you can change to Track 2 by submitting a Progress Report on the due date for the Track 1 Final Report. The diagram below outlines the three available Tracks and schedules:

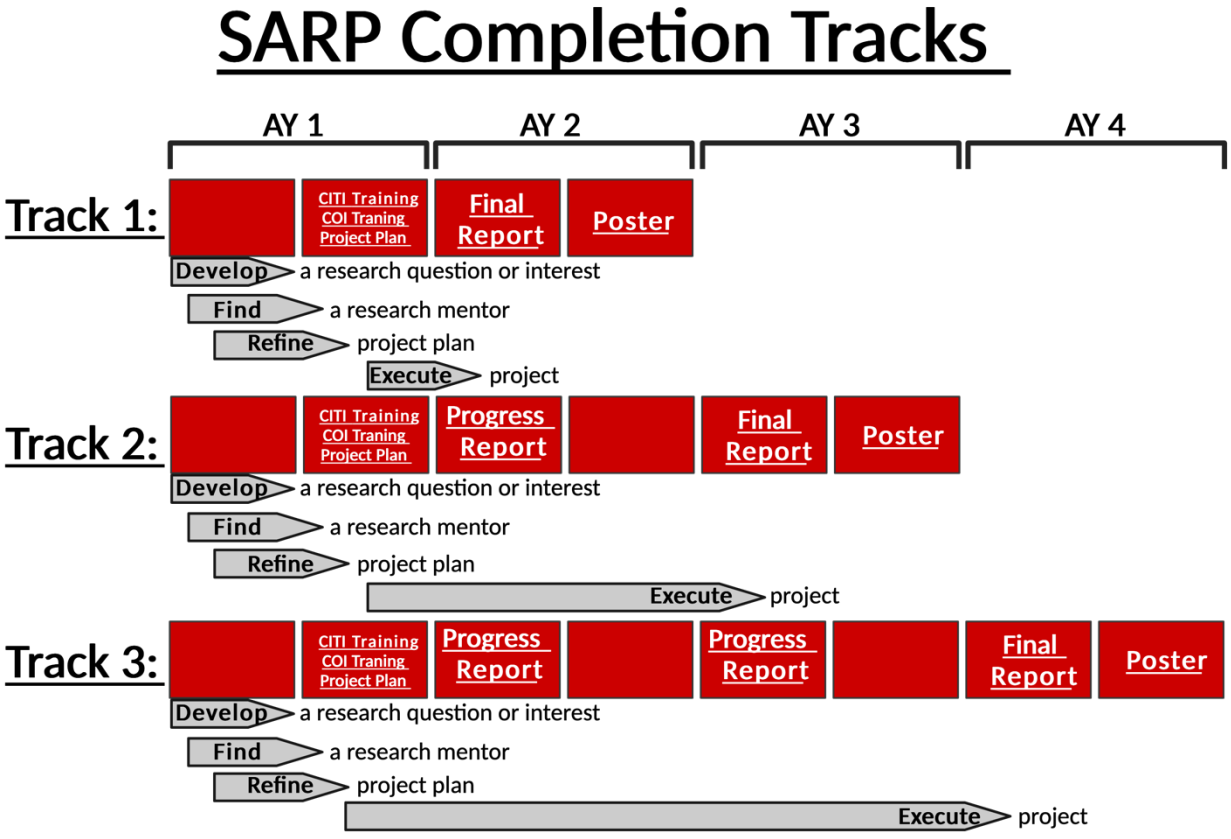


Figure 1

Additional considerations for developing your Project Plan:

- Your Project Plan will be assessed by a faculty member using a grading rubric available in the SARP Syllabus. Review this assessment rubric so you're familiar with how elements of your Project Plan will be graded.

- Be certain to **work closely with your mentor** on project planning and obtain and incorporate feedback on all drafts and the submitted Project Plan.
- Provide relevant citations and a bibliography using the format suggested in the ***AMA Style Manual***.

Be certain to read the cited references so the Project Plan has scholarly integrity.

- Edit your Project Plan carefully:
  - Proofread (suggestion: have a naïve reader look at your final draft).
  - Check spelling
  - Check grammar: punctuation, sentence structure, subject-verb agreement (plural or singular), tense consistency, etc.
  - Be certain your SARP Course project mentor is actively involved in this process.
- If you are **accepted to a summer research program** that does not provide explicit information about your mentor or project, work with the program directors so you can submit a 'placeholder' Project Plan by the deadline and propose a date you will submit a complete Project Plan.

Integrity Issues

- Students are required to demonstrate a high level of intellectual and personal integrity during all activities related to completion of the SARP Course, in alignment with their professional identity formation as physicians. This includes communicating clearly and honestly and treating all staff, students, faculty and other participants with respect and dignity.
- Write your own reports. Do not plagiarize, and if significant content derives from published materials, cite appropriately. ChatGPT or other Artificial Intelligence-derived content used in any component of your submitted assignments for the SARP Course must be clearly identified.

Submitting the SARP Course Project Plan:

In addition to the Project Plan contents described, your Project Plan requires a Cover Page that includes the following information and format:

- Heading: SARP Course Project Plan
- Student name and R-number
- Expected graduation class (e.g., C2030)
- Student email address
- Date
- Title of SARP Course project
- Mentor name and affiliation

- Mentor email address
- Expected completion date for the SARP Course (i.e., choose Track 1, 2, or 3).

The entire Project Plan document, including a Cover Page needs to be submitted electronically. Instructions for submission will be available through emails and on the SARP Website. Please use the following format for naming the submitted Project Plan PDF:

Last name_First name_C2030_Project_Plan_04.13.2027

Your Project Plan must be submitted electronically. You will receive emails reminding you of this deadline. Your SARP project mentor will receive a notification to acknowledge their mentoring responsibility and must sign off on the Project Plan for the submission to be considered complete.

Grading of the SARP Course Project Plan
Consult the syllabus for the grading criteria listed under the SARP components.

SARP Course Objectives for Project Plan:
The following SARP Course Objectives are addressed by completing the SARP Course Project Plan:

- Objective 1: Students will apply the scientific method by developing a research question or project theme, identifying a faculty mentor, and completing all requirements for the SARP Course.
- Objective 2: Students will learn how to search the literature, identifying previous knowledge and theory that provides context and relevance for their project.
- Objective 3: Students will submit a Project Plan that follows scientific method principles, including a research question or hypothesis, specific aims, rationale, methods, analysis, and timeline.
- Objective 4: Students will choose and employ adequate methods for the acquisition and statistical analysis of data and information for their project.
- Objective 6: Students will demonstrate clear and effective communication skills (oral and written) in the presentation of their project.
- Objective 7: Students will learn about protection of human and animal subjects involved in research.
- Objective 8: Students will learn and exhibit ethical principles in the design and execution of their projects.
- Objective 9: Students will exhibit attitudes and behaviors consistent with professional conduct of research and scholarship.
- Objective 10: Students will submit each assignment by the deadline and respond to all communications and feedback in a timely and professional matter.
- Objective 11: Students will collaborate generously and professionally with their mentor, faculty, students, and staff during completion of their research project.
- Objective 12: Students will learn principles of self-directed and life-long learning and apply these to the design and execution of their projects.

- Objective 13: Students will learn the principles of self-efficacy, monitoring and sharing personal progress through self-evaluation and reflection, and SARP Course evaluation.

SARP Project Plan Assessment Rubric

Reviewer Grading Rubric for SARP Course Project Plan	
Instructions for Reviewer: Please use the following category descriptors to give the student feedback on the quality of his/her project. This rubric is meant to provide the student with a feel for how well they did relative to both their peers and your expectations for a project at this stage of their career. Additionally, please provide narrative feedback regarding the strengths of the project plan as well as any areas where you see potential for improvement.	
Student Name:	
Student Mentor:	
Project Title:	
Project Background and Significance	
Needs Improvement	The project theme or significance is missing or poorly defined. Supporting evidence from the literature is missing or inadequate, failing to provide relevant background information or context.
Satisfactory	The project theme or significance is present but lacks clarity or specificity. Supporting evidence from the literature is present but may lack depth or fails to address key sources or perspectives.
Excellent	The project theme or significance is clearly defined, focused, and demonstrates originality and relevance to the field of study. Supporting evidence from the literature is comprehensive, demonstrating a thorough understanding of existing knowledge in the field and critically analyzing relevant sources.
Research Question or Hypothesis	
Needs Improvement	The research question or hypothesis is missing or poorly defined. Supporting evidence from the literature is missing or inadequate, failing to provide relevant background information or context.
Satisfactory	The research question or hypothesis is present but lacks clarity or specificity.
Excellent	The research question or hypothesis is clearly defined, focused, and demonstrates originality and relevance to the field of study.
Rationale and Specific Aims	
Needs Improvement	The rationale for the research or project aims are weak or unclear, lacking justification for significance or relevance.
Satisfactory	The rationale for the research or project aims is somewhat clear but lacks strong justification or fails to link aims to the research question or project theme.

Excellent	The rationale for the research or project aims is well-justified, logically presented, and convincingly argues for the importance and relevance of the proposed work.
Project Design and Methods	
Needs Improvement	The project design is missing or poorly described, lacking key components or not aligned with the research question or project aims.
Satisfactory	The project design is present but lacks some details.
Excellent	The project design is clear, well-structured, and demonstrates a comprehensive understanding of the research methods and procedures necessary to address the research question or project aims.
Analysis Plan	
Needs Improvement	The analysis plan is missing or insufficiently described, lacking clarity or failing to align with the research question or project aims.
Satisfactory	The analysis plan is present but lacks detail or fails to explain the appropriate statistical or analytical methods.
Excellent	The analysis plan is well-defined, appropriate for the research question or project aims, and demonstrates a sound understanding of statistical or analytical methods.
Writing	
Needs Improvement	The proposal is poorly written, containing numerous grammatical errors, lack of organization, and incoherent structure. Citations are non-existent or inconsistently formatted, or inappropriate.
Satisfactory	The proposal is generally well-written but contains some grammatical or structural issues that affect clarity or readability. Citations present and appropriate with mostly consistent formatting.
Excellent	The proposal is well-written, clear, and effectively communicates the research question or project aims, methods, rationale, and findings. Citations present and appropriate with consistent formatting.
Overall Project Plan	
Needs Improvement	There are significant concerns regarding the quality of this project plan. There are significant concerns regarding the research and academic integrity, including potential ethical issues
Satisfactory	The project plan provides sufficient information but there are minor concerns or oversights. The proposal demonstrates awareness of research and academic integrity, but there are minor concerns or oversights.

Excellent	The project plan is well-justified, logical, and convincingly presented effectively communicating all aspects of the plan. The proposal shows a strong commitment to research and academic integrity, including appropriate ethical considerations, transparent data collection and analysis, and accurate and consistent citations.
If a reviewer classifies your overall Project Plan as “needs improvement” consult with your project mentor to revise your Project Plan based on the reviewer provided feedback.	
Reviewer Comments:	

Final Report and Grading Rubric

Guidelines for the SARP Course Final Report (PSAP 6401)

The Final Report is a submission to fulfill the second credit of the SARP Course requirement. The Final Report must be developed with the help of your SARP Course project mentor and needs to describe the results of your project in enough detail to allow a reviewer of the document a clear understanding of your research question or hypothesis, the Specific Aims of the project, what methods you used to address these aims, what data, or information you acquired and what analytic approaches you used. Finally, a concise description of conclusions, limitations, and possible further work for the project needs to be included.

Final Report Points of Emphasis

- For access to the SARP Syllabus, Guidelines, and additional information, please visit the SARP Website.
- If you have any questions or concerns about your SARP Course Final Report, don't hesitate to contact the SARP Course Faculty Co-Directors or the SARP Director.
- Your SARP Course project mentor is responsible for helping you develop your Final Report. **Work proactively with your mentor** to maximize both the quality of the Final Report and your professional development.
- The Final Report must be authored by you, representing original work. You need to take ownership of the Final Report and are responsible for its content. Do not simply copy and paste a published manuscript.
- Refer to the ***AMA Style Manual***, which provides comprehensive guidelines for preparing uniform technical documents. A full PDF version is available:
- Your Final Report must be submitted electronically. You will receive emails reminding you of this deadline. Your SARP project mentor will receive a notification requiring acknowledgement of their mentoring responsibility.

Final Report Contents

Your SARP Course Final Report should contain the following elements:

- Title of Project
- Mentor name and contact information

Be sure to work closely with your mentor on developing your Project Plan. Your mentor will formally sign-off on the cover page.

Project Background and Significance

This should be a concise introduction to the topic of your project and include citations of primary literature to support the development of your ideas, providing a logical foundation for your research question or hypothesis.

Research Question or Hypothesis

This is a one sentence statement of the project's overall focus as an explicit research question or hypothesis to be addressed.

Specific Aims with Rationale

The Specific Aims should be a small set of concise one- or two-sentence summaries of what you expect to achieve in executing your SARP Course project. A short paragraph should accompany each Specific Aim to provide a rationale for how the Aim addresses the project's research question or hypothesis.

Methods

This will be a short description of the methods (employing techniques, materials, databases, surveys, etc.) you intend to use to directly accomplish your Specific Aims. This section will also describe the methods you used to analyze your data.

Results

The results section includes the relevant findings of your SARP Course Project. This section consists of your figures with appropriate captions and tables.

Discussion

The discussion portion of your Final Report explores the implications, significance, and context of the research findings. Below is a list of topics often included in a discussion:

- **Interpretation of Results**: This is the core of the Discussion section. It involves interpreting what the results mean in the context of the study's hypotheses or research question. This may include explaining how the findings support or contradict previous studies or theories.
- **Contextualization with Previous Research**: The findings should be compared with the relevant literature. For example, discussing how the results align with, extend, or challenge existing knowledge in the field.
- **Explaining Unexpected Results**: If there were any surprising or unexpected findings, these should be addressed. The discussion might explore possible reasons for these results and how they fit into the broader context of the field.
- **Limitations of the Study**: Every study has limitations, and these should be honestly and clearly stated. This may include methodological limitations, constraints on generalizability, or potential sources of bias.
- **Implications of the Findings**: Discuss the implications of the results for the field, practice, policy, or future research. This is where the broader impact of the research is explored.
- **Suggestions for Future Research**: Based on the findings and limitations, the Discussion should suggest areas for further study. This helps to set the stage for future work in the field.
- **Theoretical and Practical Relevance**: If applicable, discuss how the findings contribute to the theoretical understanding of the topic and any practical applications of the research.

Conclusions

Summarize any conclusions you were able to make. Also comment on any limitations of your study and how your work could be extended.

Compliance

Attach any compliance documents (IBC, IACUC, IRB – exempt or non-exempt) to the assignment submission portal.

Student contribution to the project

Include a brief description of your involvement in all aspects of the project and what contributions were provided by others.

Additional considerations for developing your Final Report:

- Your Final Report will be assessed by a faculty member using a grading rubric available in the SARP Syllabus. Review this assessment rubric so you're familiar with how elements of your Final Report will be graded.
- Be certain to **work closely with your mentor** on project planning and obtain and incorporate feedback on all drafts and the submitted Final Report.
- Provide relevant citations and a bibliography using the format suggested in the ***AMA Style Manual***.
- Be certain to read the cited references so the Final Report has scholarly integrity.
- Edit your Final Report carefully:
    - Proofread (suggestion: have a naïve reader look at your final draft).
    - Check spelling.
    - Check grammar: punctuation, sentence structure, subject-verb agreement (plural or singular), tense consistency, etc.
    - Be certain your SARP Course project mentor is actively involved in this process.

Integrity Issues

- Students are required to demonstrate a high level of intellectual and personal integrity during all activities related to completing the SARP Course, in alignment with forming their professional identity as physicians. This includes communicating clearly and honestly and treating all staff, students, faculty, and other participants with respect and dignity.
- Write your own reports. Do not plagiarize, and if significant content derives from published materials, cite appropriately. ChatGPT or other Artificial Intelligence-derived content used in any component of your submitted assignments for the SARP Course must be clearly identified.

Submitting the SARP Course Final Report:

In addition to the Final Report contents described, your Final Report requires a Cover Page that includes the following information and format:

- Heading: SARP Course Final Report
- Student name and R-number
- Expected graduation class (e.g., C2030)
- Student email address
- Date
- Title of SARP Course project
- Mentor name and affiliation
- Mentor email address
- Signature lines for the student and mentor

The entire Final Report document, including a Cover Page, needs to be submitted electronically. Your SARP mentor must sign off on the Final Report for the submission to be considered complete. Instructions for submission will be available through emails and on the SARP Website. Please use the following format for naming the submitted Final Report PDF:
Last name_First name_C2030_Final_Report_10.02.2026

Your Final Report must be submitted electronically. You will receive emails reminding you of this deadline. Your SARP project mentor will receive a notification requiring acknowledgement of their mentoring responsibility.

Grading of the SARP Course Final Report

Consult the syllabus for the grading criteria listed under the SARP Components.

SARP Course Objectives for the Final Report

The following SARP Course Objectives are addressed by completing the SARP Course Final Report:

- Objective 1: Students will apply the scientific method by developing a research question or project theme, identifying a faculty mentor, and completing all requirements for the SARP Course.
- Objective 2: Students will learn how to search the literature, identifying previous knowledge and theory that provides context and relevance for their project.
- Objective 4: Students will choose and employ adequate methods for the acquisition and statistical analysis of data and information for their project.
- Objective 5: Students will submit a Final Report of their project, providing a concise summary of the project execution, data acquisition and analysis, and conclusions.
- Objective 6: Students will demonstrate clear and effective communication skills (oral and written) in the presentation of their project.
- Objective 7: Students will learn about protection of human and animal subjects involved in research.
- Objective 8: Students will learn and exhibit ethical principles in the design and execution of their projects.

- Objective 9: Students will exhibit attitudes and behaviors consistent with professional conduct of research and scholarship.
- Objective 10: Students will submit each assignment by the deadline and respond to all communications and feedback in a timely and professional matter.
- Objective 11: Students will collaborate generously and professionally with their mentor, faculty, students, and staff during completion of their research project.
- Objective 12: Students will learn principles of self-directed and life-long learning and apply these to the design and execution of their projects.
- Objective 13: Students will learn the principles of self-efficacy, monitoring and sharing personal progress through self-evaluation and reflection, and SARP Course evaluation.

SARP Final Report Assessment Rubric

Reviewer Grading Rubric for SARP Course Project Final Report	
Instructions for Reviewer: Please use the following category descriptors to give the student feedback on the quality of his/her project. This rubric is meant to provide the student with a feel for how well they did relative to both their peers and your expectations for a project at this stage of their career. Additionally, please provide narrative feedback regarding the strengths of the final project report as well as any areas where you see potential for improvement.	
Student Name:	
Student Mentor:	
Project Title:	
Research Question or Project Theme	
Needs Improvement	The research question or project theme is missing or poorly defined.
Satisfactory	The research question or project theme is present but lacks clarity or specificity.
Excellent	The research question or project theme is clearly defined, focused, and demonstrates originality and relevance to the field of study.
Literature Review	
Needs Improvement	The literature review is missing or inadequate, failing to provide relevant background information or context.
Satisfactory	The literature review is present but lacks depth or fails to address key sources or perspectives
Excellent	The literature review is comprehensive, demonstrating a thorough understanding of existing knowledge in the field and critically analyzing relevant sources.
Rationale and Specific Aims	
Needs Improvement	The rationale for the research or project aims is weak or unclear, lacking justification for its significance or relevance.
Satisfactory	The rationale for the research or project aims is somewhat clear but lacks strong justification or fails to link aims to the research question or project theme.
Excellent	The rationale for the research or project aims is well-justified, logically presented, and convincingly argues for the importance and relevance of the proposed work.
Project Design	
Needs Improvement	The project design is missing or poorly described, lacking key components or not aligned with the research question or project aims.
Satisfactory	The project design is present but lacks detail or coherence, missing important information or failing to address potential limitations.

Excellent	The project design is clear, well-structured, and demonstrates a comprehensive understanding of the research methods and procedures necessary to address the research question or project aims.
Analysis	
Needs Improvement	The analysis is missing or insufficiently described, lacking clarity or failing to align with the research question or project aims.
Satisfactory	The analysis is present but lacks detail or fails to explain the appropriate statistical or analytical methods.
Excellent	The analysis is well-defined, appropriate for the research question or project aims, and demonstrates a sound understanding of statistical or analytical methods.
Writing	
Needs Improvement	The final report is poorly written, containing numerous grammatical errors, lack of organization, and incoherent structure.
Satisfactory	The final report is generally well-written but contains some grammatical or structural issues that affect clarity or readability.
Excellent	The final report is well-written, clear, and effectively communicates the research question or project aims, methods, rationale, and findings.
Research and Academic Integrity	
Needs Improvement	There are significant concerns regarding the final report research and academic integrity, including potential ethical issues, lack of transparency, or improper citation practices.
Satisfactory	The final report demonstrates awareness of research and academic integrity, but there are minor concerns or oversights.
Excellent	The final report shows a strong commitment to research and academic integrity, including appropriate ethical considerations, transparent data collection and analysis, and accurate and consistent citations.
Overall Project Final Report	
Needs Improvement	There are significant concerns regarding the quality of this final report. There are significant concerns regarding the research and academic integrity, including potential ethical issues
Satisfactory	The final report provides sufficient information but there are minor concerns or oversights. The report demonstrates awareness of research and academic integrity, but there are minor concerns or oversights.
Excellent	The final report is well-justified, logical, and convincingly presented effectively communicating all aspects of the plan. The report shows a strong commitment to research and academic integrity, including appropriate ethical considerations,

	transparent data collection and analysis, and accurate and consistent citations.
If a reviewer classifies your overall Final Report as “needs improvement” consult with your project mentor to revise your Final Report based on the reviewer provided feedback.	
Reviewer Comments:	

Poster Presentation and Grading Rubric

Guidelines for the Poster Presentation (PSAP 7401)

The Poster Presentation is the final credit of the three-credit SARP Course requirement. The Poster Presentation must be developed with the help of your SARP project mentor. The Poster Presentation is the capstone element of your SARP Course Project and should be a concise summary of your research question or hypothesis, the specific aims of the project, what methods you used to address these aims, your project's results, conclusions, and ethical statement.

Poster Presentation Points of Emphasis

- Your SARP Course project mentor is responsible for helping you develop your Poster Presentation in all its aspects. **Work proactively to develop a solid working relationship with your mentor** to maximize both the success of your project and your professional development.
- The Poster Presentation needs to be created by you, representing original work. You need to take ownership of the Poster Presentation and are responsible for its content. This needs to be a new poster created specifically for the SARP Symposium.
- Your Poster Presentation will be presented at the SARP Symposium and will be assessed by several reviewers according to the Poster Presentation rubric available on the SARP Website, in the Appendix and also on Elentra.
- Your poster will be presented at the Annual SARP Symposium. Poster templates are available from the Texas Tech Health El Paso Office of Institutional Advancement.

Poster Contents

Your SARP Course Poster should contain the following elements:

- Title of Project
- Author List and affiliations
    - Please list all authors and the respective affiliations that participated in your SARP Course Project. By convention as presenter, you should be listed as first author, and your mentor should be listed as the final author.

Background/Introduction

This should be a concise introduction to the topic of your project providing a logical foundation for your hypothesis or research question.

Hypothesis or Research Question

This is a one sentence statement of the project's overall focus stated as an explicit hypothesis, or a specific research question to be addressed.

Specific Aims with Rationale

The specific aims should be concise one- or two-sentence summaries of what you expected to achieve in executing your project.

Materials and Methods

This will be a short description of the methods (employing techniques, materials, databases, surveys, etc.) you used to directly accomplish your Specific Aims. Graphical representations of your methods or workflow may take some effort to design but it will save you space and are often more visually appealing.

Results

This section is where you will include the relevant findings of your SARP Course Project. This section should include your figures with appropriate captions and tables. Remember that figures are usually more appealing than tables and tables although often appropriate can be difficult to read at a distance.

Conclusions

This should typically be one or two sentences or bullet points. When presenting your poster, you should spend some time explaining the implications and significance of your findings to the audience as your ideas may help change practice or generate further research.

References

Include references where information is cites but it important but use citations sparingly.

Ethics statement and Funding

If your SARP Course project requires compliance approval for using human subjects (IRB), animals (IACUC), or biohazardous materials (IBC) please include a statement that this project was approved and provide a protocol number. If this project did not require institutional compliance, a statement attesting to that fact should be provided. If your project was funded by a grant, please add a statement acknowledging the funding source.

Additional considerations for your Poster Presentation:

- Your Poster Presentation will be assessed by a faculty member using a rubric available in the SARP Syllabus and on the SARP Website. Review this assessment rubric so you're familiar with how elements of your Poster Presentation will be graded.
- Be certain to **work closely with your mentor** on Poster Presentation and obtain and incorporate feedback Poster Presentation.
    - Practice your presentation with your lab, colleagues, friends, etc. Ensure you can explain all aspects of your poster, remember there is a question answer session as part of the presentation.

- Provide relevant citations using the format suggested in the ***AMA Style Manual***.
- Be certain to read the cited references so the Poster Presentation has scholarly integrity.
- Edit your Poster Presentation carefully:

  - Proofread (suggestion: have a naïve reader look at your final draft).
  - Check spelling
  - Check grammar
  - Check the accuracy of your figures (do you have titles and labeled axes)
- Be certain your SARP Course project mentor is closely involved in this process.
- Be sure to include a Texas Tech Health El Paso institutional logo as well as a logo from your mentor's institution (if your project was done outside of Texas Tech Health El Paso).
- During the group sessions, you must be present for the entire duration of the presentations. We encourage you to arrive early, and more specific details will be provided prior to the event.
- For posters presented in person, SARP will print the posters and will be available for pick up prior to presentation day. Submission of posters will be needed one week in advance of presentation day.

Integrity Issues

Students are required to demonstrate a high level of intellectual and personal integrity during all activities related to completion of the SARP Course, in alignment with their professional identity formation as physicians. This includes communicating clearly and honestly and treating all staff, students, faculty and other participants with respect and dignity.

Grading of the SARP Course Poster Presentation

Consult the syllabus for the grading criteria listed under the SARP components.

SARP Course Objectives for the Poster Presentation:

The following SARP Course Objectives are addressed by completing the SARP Course Poster Presentation:

- Objective 1: Students will apply the scientific method by developing a research question or project theme, identify a faculty mentor, and complete all requirements for the SARP Course.
- Objective 2: Students will learn how to search the literature, identifying previous knowledge and theory that provides context and relevance for their project.
- Objective 4: Students will choose and employ adequate methods for the acquisition and statistical analysis of data and information for their project.
- Objective 5: Students will submit a Poster Presentation for their project, providing a concise summary of the project execution, data acquisition and analysis, and conclusions.
- Objective 6: Students will demonstrate clear and effective communication skills (oral and written) in the presentation of their project.
- Objective 7: Students will learn about protection of human and animal subjects involved in research.
- Objective 8: Students will learn and exhibit ethical principles in the design and execution of their projects.

- Objective 9: Students will exhibit attitudes and behaviors consistent with professional conduct of research and scholarship.
- Objective 10: Students will submit each assignment by the deadline and respond to all communications and feedback in a timely and professional matter.
- Objective 11: Students will collaborate generously and professionally with their mentor, faculty, students, and staff during completion of their research project.
- Objective 12: Students will learn principles of self-directed and life-long learning and apply these to the design and execution of their projects.
- Objective 13: Students will learn the principles of self-efficacy, monitoring and sharing personal progress through self-evaluation and reflection, and SARP Course evaluation.

SARP Poster Presentation Assessment Rubric

Reviewer Grading Rubric for SARP Course Poster Presentations	
Instructions for Reviewer: Please use the following category descriptors to give the student feedback on the quality of his/her project. This rubric is meant to provide the student with a feel for how well they did relative to both their peers and your expectations for a project at this stage of their career. Additionally, please provide narrative feedback regarding the strengths of the poster and presentation as well as any areas where you see potential for improvement.	
Student Name:	
Student Mentor:	
Project Title:	
Poster Appearance	
Needs Improvement	The poster is visually unappealing, cluttered, or difficult to read. The formatting, color scheme, and layout hinder understanding and engagement.
Satisfactory	The poster is moderately visually appealing, but improvements could be made in terms of organization, clarity of visuals, and legibility of text.
Excellent	The poster is visually appealing, well-organized, and effectively utilizes appropriate visuals, fonts, colors, and layout to enhance comprehension and engagement.
Poster Content	
Needs Improvement	The content of the poster is incomplete, lacking in depth, or fails to address key aspects of the research project.
Satisfactory	The content of the poster is present but lacks coherence, contains inaccuracies, or includes irrelevant information.
Excellent	The content of the poster is comprehensive, accurate, and effectively presents the research project, including the research question, methodology, results, and conclusions.
Presentation and Communication	
Needs Improvement	The presenter fails to effectively communicate the research project, lacking organization, clarity, and engagement. The presentation lacks structure and coherence.
Satisfactory	The presenter communicates the research project but with limited clarity, relying heavily on reading from the poster, lacking engagement with the audience
Excellent	The presenter effectively communicates the research project, engaging the audience with a clear and well-structured presentation. They demonstrate strong verbal and non-verbal communication skills and provides additional insights beyond the poster content.
Response to Audience Questions	

Needs Improvement	There are significant concerns regarding the research and academic integrity, including potential ethical issues, lack of transparency, or improper citation practices.
Satisfactory	The poster demonstrates awareness of research and academic integrity, but there are minor concerns or oversights.
Excellent	The poster shows a strong commitment to research and academic integrity, including appropriate ethical considerations, transparent data collection and analysis, and accurate and consistent citations.
Overall Project Poster Presentation	
Needs Improvement	There are significant concerns regarding the quality of this poster presentation. There are significant concerns regarding the research and academic integrity, including potential ethical issues
Satisfactory	The poster presentation provides sufficient information but there are minor concerns or oversights. The poster presentation demonstrates awareness of research and academic integrity, but there are minor concerns or oversights.
Excellent	The poster presentation logical, and convincingly presented effectively communicating all aspects of the plan. The poster presentation shows a strong commitment to research and academic integrity, including appropriate ethical considerations, transparent data collection and analysis.
If a reviewer classifies your overall Poster Presentation as “needs improvement” consult with your project mentor and SARP Directors to determine a plan for remediation.	
Reviewer Comments:	

Guidelines for the Progress Report

Progress Reports are due for students completing their SARP Course by Track 2 or Track 3 (Figure 1). Progress Reports provide concise updates on the status of your SARP Course project and must be approved by your SARP Course project mentor.

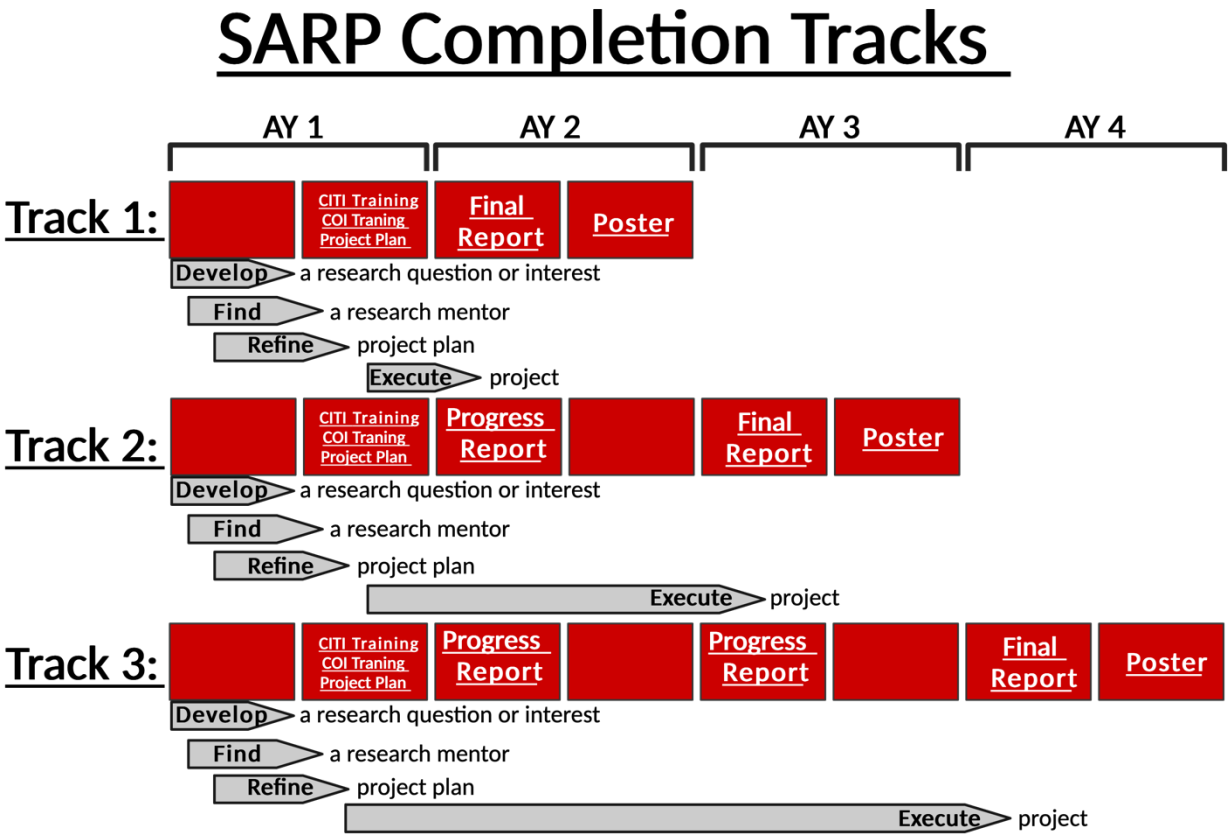


Figure 1

Progress Report Points of Emphasis

- If you have any questions or concerns about your SARP Course Project Progress Report, don't hesitate to contact the SARP Course Faculty Co-Directors or SARP Director via SARP-ELP@ttep.edu. Deadlines and additional information are available on the SARP Website.
- Your SARP Course project mentor is responsible for approving your Progress Report. **Work proactively to develop a solid working relationship with your mentor** to maximize both the success of your project and your professional development.
- Your Progress Report must be submitted electronically through the REDCap portal. You will receive an email invitation prior to the deadline. You need to submit 2 Progress reports for completing the SARP Course by Track 2, and 4 Progress reports for completing the SARP Course by Track 3 (see Figure 1).

Your SARP Course Progress Report will be submitted through REDCap and contain the following elements:

- Student name and R-number
- Expected graduation class (e.g., C2029)
- Student email address
- Date
- Title of SARP Course project
- Mentor name and affiliation
- Mentor email address
- Compliance update
- Project tasks completed to date
- Expected completion date for the SARP Course

Be certain to work closely with your mentor on completing Progress Report.

Project Information on Record

This information should correspond to the title of the project for which you previously submitted a Project Plan. If you are changing projects or working with a new mentor on the same project, you need to submit a Project Change Request (form available in the Syllabus Appendix, on the SARP Website, and on Elentra).

Compliance

If your SARP Course project requires compliance approval for using human subjects (IRB), animals (IACUC), or biohazardous materials (IBC), it is your responsibility to work with your mentor to document these in the Progress Report. **Clearly describe what compliance is in place or the schedule for obtaining compliance**. Please note **no data collection should occur without compliance documentation being approved by the institution**. The letter from the IRB, IBC and/or IACUC must be up to date and include your name on the protocol.

Project Tasks

Here is where you will check off what portions of your project are completed (Literature Review, Specific Aims, Data Collection/Review, Data Analysis, Final Report, and Poster Presentation). Briefly describe the progress for each unfished element with particular regard to the completion of each Specific Aim.

Anticipated Completion

Select an anticipated completion time for submission of the Final Report and Poster Presentation.

Additional Details

There is a free response space in REDCap where you can include any details you think the SARP team should be aware of regarding your project.

Additional considerations for developing your Progress Report:

- Your Progress Report will be assessed by the SARP team but is not graded. This Progress Report is a means to maintain accountability for progressing through the

SARP course requirement and to make the SARP team aware of any potential issues with completion of your SARP Course project and serves as formative feedback regarding progress of a SARP Project.

- Be certain your SARP Course project mentor is actively involved in this process.

Integrity Issues

- Students are required to demonstrate a high level of intellectual and personal integrity during all activities related to completion of the SARP Course, in alignment with their professional identity formation as physicians. This includes communicating clearly and honestly and treating all staff, students, faculty and other participants with respect and dignity.

SARP Course Objectives for the Progress Report:

The following SARP Course Objectives are addressed by completing the SARP Course Progress Report:

- Objective 1: Students will apply the scientific methods by developing a research question or project theme, identifying a faculty mentor, and completing all requirements for the SARP Course.
- Objective 6: Students will demonstrate clear and effective communication skills (oral and written) in the presentation of their project.
- Objective 7: Students will learn about protection of human and animal subjects involved in research.
- Objective 9: Students will exhibit attitudes and behaviors consistent with professional conduct of research and scholarship.
- Objective 10: Students will submit each assignment by the deadline and respond to all communications and feedback in a timely and professional matter.
- Objective 11: Students will collaborate generously and professionally with their mentor, faculty, students, and staff during completion of their research project.

Guidelines for Project Change Request

The Project Change Request is designed to provide notification for a change in the status of your SARP Course project. This change in status can occur due to several circumstances. Each scenario is described below, along with the corresponding information you will need to submit as a Project Change Request.

1. You are continuing to work on the same project as described in your original Project Plan, but with a new mentor.
    - In this case, you need to complete a REDCap form with the new mentor's name and contact information, briefly describe why you have a new mentor, and update your expected project completion date (choose Track, see Figure 1).
    - If project requires an IRB, IBC, or IACUC forms, you need to ensure your new mentor is listed on these documents.
2. You are continuing to work with the same mentor (as documented in your Project Plan) but want to switch to a new project.
    - In this case, you will describe why you are switching to new project.
    - This Project Change Request also requires a new Project Plan to be submitted according to the Project Plan guidelines. This new Project Plan will be reviewed and assessed by a faculty member using the grading rubric available in the SARP Syllabus.
    - You will need to update your expected project completion date (choose Track, see Figure 1).
    - If the new project requires an IRB, IBC, or IACUC forms, you need to ensure your new mentor submits these documents and adds you to the application(s).
3. You want to change to a new SARP Course project and a new mentor.
    - In this case, you need to describe why you are switching to new mentor and a new project.
    - This Project Change Request also requires submitting a new Project Plan according to the Project Plan guidelines. This new Project Plan will be reviewed and assessed by a faculty member using the grading rubric available in the SARP Syllabus.
    - Update your expected project completion date (choose Track, see Figure 1).
    - If the new project requires an IRB, IBC, or IACUC forms, you need to ensure your new mentor submits these documents and adds you to the application(s).

Project Change Request Points of Emphasis

- There is no deadline for submitting a Project Change Request; however, you should submit as soon as possible after your SARP Course project trajectory changes, ensuring to keep SARP administration current, and to obtain any useful guidance or advice and IRB, IBC, and/or IACUC documents submitted for completing your SARP Course requirement.
- Access to the Project Change Request can be requested from the SARP Email. Once received a REDCap link will be sent to you for completion.
- The SARP Syllabus, Guidelines, and additional information can be found on the SARP Website.

- If you have any questions or concerns about your SARP Course Project Progress Report, don't hesitate to contact the SARP Course Faculty Co-Directors or SARP Director via SARP-ELP@ttep.edu.

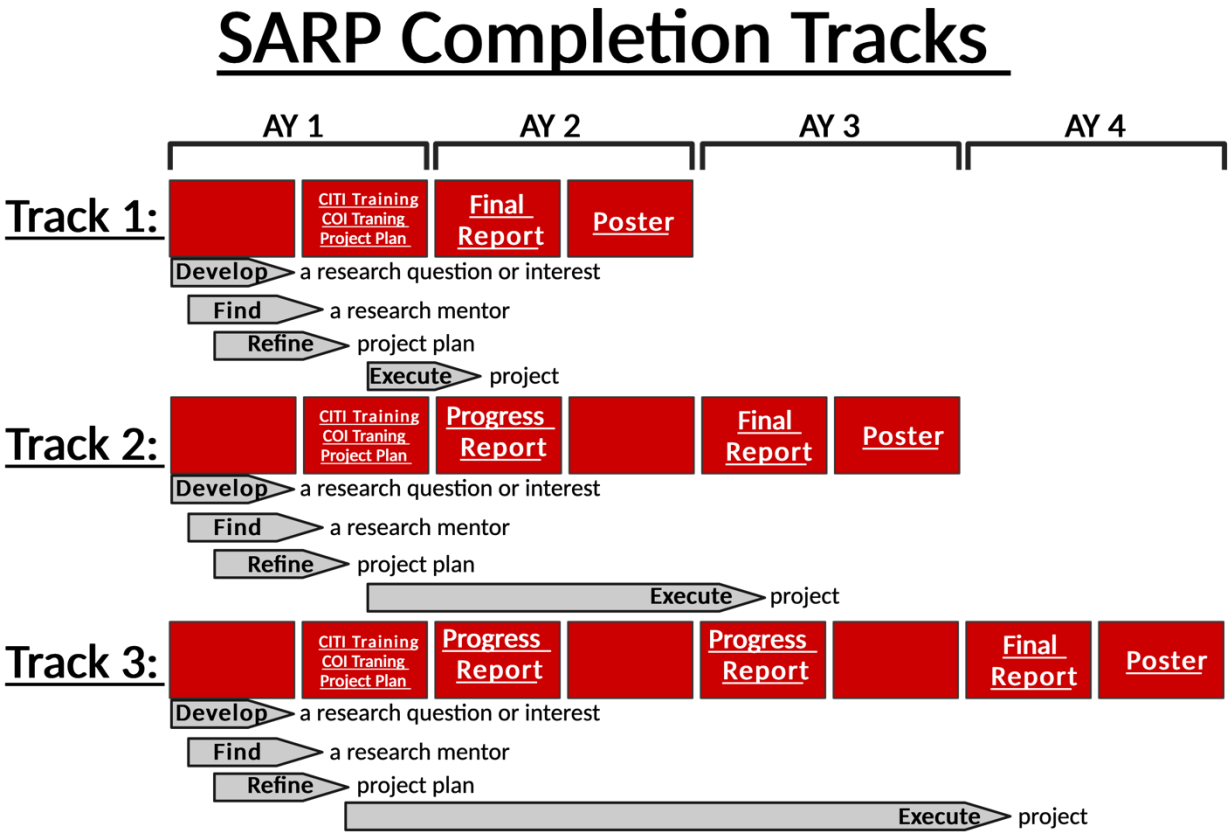


Figure 1

SARP Course Objectives for the Progress Change Request:
The following SARP Course Objectives are addressed by completing the SARP Course Project Change Request:

- Objective 6: Students will demonstrate clear and effective communication skills (oral and written) in the presentation of their project.
- Objective 9: Students will exhibit attitudes and behaviors consistent with professional conduct of research and scholarship.
- Objective 10: Students will submit each assignment by the deadline and respond to all communications and feedback in a timely and professional matter.