Chapter 35

ROLE OF THE PHYSICIAN ASSISTANT IN RESEARCH

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Introduction

Army physician assistants (PAs) have research positions at the US Army Research Institute of Environmental Medicine and may also participate in research in a variety of environments that may include, but are not limited to, academics, research institutes, and clinical settings. Whatever the setting, the Army PA should attempt to align research interests with the lines of effort designated by the Army Medical Specialist Corps (AMSC) with the intent of better serving Army soldiers. Current lines of research include the following:

- illness and injury prevention,
- disease and nonbattle injury management and rehabilitation,
- combat trauma management and rehabilitation, and
- health and performance optimization and reintegration.

A complete list of lines of research and their subcomponents can be obtained from the AMSC Research Committee.

Conducting Research

Conducting research and publishing are important for many reasons. Clinicians may engage in case series and/or case reports as a way to define injury or disease patterns. These studies are essential for the early identification of problematic exposures and formation of hypotheses, but...
are not analytic in nature. They have no explicit comparison group or reference population. However, case series and case reports are important to PAs because of unique military medical encounters and experiences that are not often seen by civilian PAs. The contributions of military medicine in these cases, especially for PAs, can also become catalysts for further research and hypothesis generation. It is also important to share lessons learned on the individual level with other clinicians.

Once a hypothesis is developed, an analytic study is the appropriate next step. (Note that all investigators must receive institutional review board approval prior to initiating any type of research study.) The following section will briefly describe the types of analytic studies that may be conducted. The study types vary in strength based on the scientific rigor of their respective designs, as follows (from strongest to weakest):

1. randomized clinical controlled trial
2. cohort study
3. case-control study
4. cross-sectional study
5. ecologic study

**Randomized Clinical Controlled Trials**

- In clinical trials, the exposure is determined by the investigator.
- Randomized means that differential confounding is removed by assigning the exposure randomly.
- Strengths: provide strongest evidence for causality because of clear temporality, cause and effect, and control for unknown confounding factors.
- Weaknesses: expensive, time consuming, possibility of selection bias, and potential lack of generalizability to the population of interest.

**Cohort Studies**

- Cohort studies are prospective studies in which individuals with an exposure are identified and compared to individuals without the exposure with respect to future outcomes of interest. They are longitudinal studies conducted over time in which outcome incidence is compared between exposed and unexposed groups.
- Yields: cumulative incidence relative risk ratios and incidence density relative risk ratios.
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- Strengths: clearly defined temporality because the exposure occurred before the outcome.
- Weaknesses: time consuming, costly, loss to follow-up is common.

**Case-Control Studies**

- Case-control studies are retrospective studies in which individuals with a condition (cases) are identified and compared to individuals without the condition (controls) with respect to prior exposures.
- Yields: odds ratios and prevalence ratios.
- Strengths: efficient use of time, less costly, can study rare diseases, statistically efficient.
- Weakness: temporal ambiguity, recall bias, selection bias.

**Cross-Sectional Studies**

- Cross-sectional studies can be seen as “snap-shots” in which individuals are selected without regard to outcome or exposure status. Data is collected at one point in time at the individual level. Often these are the first analytic study to be conducted, because if a causal relationship is not identified, no further studies are needed.
- Yields: odds ratios and prevalence ratios.
- Strengths: relatively inexpensive and efficient.
- Weakness: temporality; because data on exposure and outcome is captured at one point in time, the exposure could have occurred after the outcome of interest.

**Ecologic Studies**

- In ecologic studies, the units of measurement are captured at the population level (as opposed to the individual level). These studies use group data to describe correlations between conditions and exposures in various populations.
- Yields: correlation ratios.
- Strengths: quick, efficient, yields multinational and multiorganizational comparisons.
- Weaknesses: no direct linkage between exposures and outcomes at the individual level; risk of ecologic fallacy (the correlation identified at the population level does not necessarily represent a relationship at the individual level).
Collaboration

Modern scientific research is expected to include complexity and in-depth analysis. It follows that a substantial range of resources must be marshaled to conduct a research project, particularly in terms of individual talents. Collaboration has therefore been seen as integral to modern research, ensuring that each project is a productive endeavor.\(^1\) Research collaboration represents more than the simple involvement of many people, however. Collaboration is a complex process that is not easily defined or assessed,\(^2\) although the presence of differing talents and perspectives is a key component. Collaborations can be established among individuals, departments, or institutions. As providers accustomed to practicing on collaborative teams, PAs are well-suited to engage in the process. In this era of evidence-based medicine, their comfort with clinical science ensures the critical perspective needed for productive medical research.

The recognized benefits of collaboration in research\(^3\) each apply to PAs. Collaboration promotes the effective use of individual talents, providing PAs an opportunity to employ clinical experience in addition to research-related training. Research allows the transference of knowledge. PAs may therefore find that collaboration provides a new mechanism to impart wisdom, both to partner researchers and to readers of publications. Their involvement in collaborative research allows critical experiences and lessons learned to be incorporated into evidence-based practice standards. Collaboration is also a source of intellectual stimulation and companionship as well as professional networking. PAs may find these benefits refreshing after prior clinical experience involving relatively limited interaction with other professionals.

Balancing Research With Clinical Duties

Research is detail oriented and may require a significant investment of time. Often, the work is completed outside of clinical duties. It is important to establish a schedule and remain disciplined throughout the research process, which will allow for effective management of multiple requirements. In the beginning of the research process, it is important to identify the primary and associate investigators. Assigned roles and responsibilities should be determined at the initiation of the project so
all parties can appropriately balance their clinical responsibilities with the research requirements.

It is also important for the primary investigator to devise a project timeline and routinely schedule team meetings. Whether meetings are conducted virtually or face-to-face, they will provide accountability of the project. A realistic schedule must be developed to minimize conflict with clinical duties. The key is beginning with the end goal in mind and conducting backward planning. Incremental goals should be established and divided among the research team. Setbacks are inevitable, making it imperative for team members to remain flexible. Time management is a cornerstone to successful research, particularly for those who have clinical duties, required professional development, or travel.

**Doctorate Programs Requiring Research**

Currently, the US Army/Baylor University Doctor of Science (DSc) in emergency medicine and orthopedic residency programs require Army PAs to complete a research project. The research may include primary data collection and analysis, secondary data analysis, or metaanalysis. These residencies are 18-month programs. Not only must residents manage both their clinical and didactic responsibilities, they also need to dedicate adequate time to completing their research project, which they will be required to defend at the end of the program to Baylor and DSc staff. PA residents should choose a topic that interests them and solicit feedback from staff along the way. PA residents are also required to choose a staff advisor for their topic and meet with the advisor routinely regarding the progress of their project. It is also important to get explicit guidance from the program director on all research requirements unique to the Baylor program.

When an Army PA is selected for funding to pursue a PhD at a civilian school of choice, he or she must meet the research requirements of the selected program. Earning a PhD requires completing a dissertation project, which usually includes primary data collection and analysis.

**Mentoring in Research**

There are many opportunities for mentorship within the research community. Not only is supervisor-subordinate mentoring required, but frequently peer-to-peer mentoring is required and welcomed.
Academic Settings

Army PAs pursuing an advanced graduate degree benefit from the mentorship not only of their academic advisors, but also of fellow Army PAs who have previously earned an advanced degree. Particularly when studying in a civilian school, guidance on how to maneuver through the program in a timely fashion as an active duty PA is imperative. Earning a PhD requires planning and execution of very specific steps, including didactic studies, comprehensive exams, research proposals, and dissertation defense. Similar key events may be present in master’s-level programs as well. Failing to complete or meet the standards at every step can result in significant delays or failure to complete the program. Army PA mentors can help provide the guidance necessary to stay on track throughout these programs.

Research Institutes

Army PAs may serve in a research institute where the focus of their duties is to plan, execute, and analyze research (Figure 35-1). These positions may or may not require an advanced degree. Peer-to-peer mentorship while working in these settings can be very useful. Learning the steps to getting a research protocol approved by an institutional review board, evaluating the scientific rigor of a proposal, efficiently using available resources, and reviewing manuscripts are all topics that can be discussed among peers. Finding a mentor with significant experience in these processes will always contribute to successful research.

References


Figure 35-1. Major Bradley Warr, research physician assistant and chief of the Military Performance Branch of the US Army Research Institute of Environmental Medicine in Natick, Massachusetts, prepares a soldier for measurement of oxygen consumption while carrying 25-mm ammunition cans at Fort Hood, Texas, as part of the Training and Doctrine Command Physical Demands Study in December 2013. Photograph courtesy of Major Bradley Warr.

Attachment 1. Research Examples

Case-Control Study


Case Report


Case Series


Cross-Sectional Study


Cohort Study


Ecologic Study


Randomized Clinical Controlled Trial


Attachment 2. Helpful Websites

Research Tools

- Purdue University Online Writing Lab (APA Manual Quick Resource): http://owl.english.purdue.edu/owl/resource/560/01/
- Delicious bookmarking service: http://www.delicious.com
- Dropbox free file sharing service: http://www.dropbox.com
- Endnote reference management software: http://www.endnote.com (ask local librarian or Information Management Division for download on government computers)
- Mendeley reference manager and academic social network: http://www.mendeley.com
- Poster presentation templates: http://www.posterpresentations.com
- Power analysis tool: http://www.gpower.hhu.de/en.html
- ARMDEC SAFE (Safe Access File Exchange) large file transfer: https://safe.amrdec.army.mil/SAFE/
- AKO storage cloud: https://www.us.army.mil/suite/page/AKOCloud
- Survey Monkey survey site: http://www.surveymonkey.com
- Zotero free online referencing: http://www.zotero.com

Research Links

- AMEDD Virtual Library: http://medlinet.amedd.army.mil/
- Congressionally Directed Medical Research Programs (CDMRP): http://cdmrp.army.mil/
- Geneva Foundation: http://www.genevausa.org/
- Henry Jackson Foundation: http://www.hjf.org/
- Medical Research and Material Command and subordinate commands: https://mrmc.amedd.army.mil/index.cfm?pageid=subordinate_commands.overview
• Telemedicine and Advanced Technology Research Center (TATRC): http://www.tatrc.org/
• University of Nebraska Medical Center Student Research Portal: http://www.unmc.edu/students/studentresearch.htm
• University of Nebraska Medical Center Library: http://www.unmc.edu/library/
• US Army Institute of Surgical Research: https://www.usaisr.amedd.army.mil
• US Army Medical Research Institute of Infectious Disease (USAMRIID): http://www.usamriid.army.mil/

Publications

• Harvard Health Publications: http://www.health.harvard.edu/
• Internet Journal of Academic PAs: http://ispub.com/IJAPA
• Military Medicine manuscript submission: http://publications.amsus.org/page/milmed/submit-a-manuscript
• Postgraduate Medicine: http://www.postgradmed.org/