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The Impact of Military Pediatrics: Assessing Clinical, Leadership, Academic, and  
Operational Experience among Pediatric-Trained Graduates from the Uniformed Services  
University of the Health Sciences (USU)

by

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Thesis submitted to the Faculty of the  
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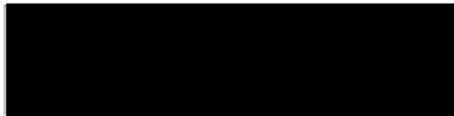
**APPROVAL SHEET**

Title of Thesis: The Impact of Military Pediatrics: Assessing Clinical, Leadership, Deployment, and Humanitarian Experience among Pediatric-trained Graduates from the Uniformed Services University of the Health Sciences (USU)

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## DEDICATION

I would like to dedicate this thesis to the family and friends who have helped me the most along the way. My parents – Teresa and Robert Judd - have always provided unending support, and have patiently listened to more “discussions” about my stress and workload than they ever should have had to endure. I love you both, and am looking forward to talking about new things in the future!

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## ABSTRACT

The Impact of Military Pediatrics: Assessing Clinical, Leadership, Academic, and Operational Experience among Pediatric-Trained Graduates from the Uniformed Services University of the Health Sciences (USU)

Courtney Judd, Master of Health Professions Education, 2020

Thesis directed by: Steven Durning, MD, PhD, Director, Graduate Programs in Health Professions Education (HPE) and Holly Meyer, PhD, Associate Director of Student Affairs, Graduate Programs in HPE

**Problem:** Our main objective was to describe the outcomes of USU graduates who pursued training in pediatrics, and therefore to begin to quantify the contributions that military pediatricians make to the military medical mission and the broader Department of Defense (DoD) mission.

**Methods:** We utilized Long-Term Career Outcome Study (LTCOS) data to perform a retrospective, descriptive analysis of USU alumni survey responses, specifically inquiring into the career outcomes and operational experiences among those graduates who pursued training in pediatrics. We grounded our research in the before, during, and after conceptual framework, focusing mainly on the “after” time period for the purposes of this thesis.

**Results:** We describe the contributions of USU-trained pediatricians to the clinical, leadership, academic, and operational realms, as they are reported by USU alumni. In doing so, we find that pediatric-trained USU graduates fill significant clinical responsibilities, serve across the full breadth of possible military medical leadership positions, and achieve notable academic milestones, as evidenced by academic promotions and publications. Additionally, 40% of surveyed USU-trained pediatricians have completed at least one deployment, and 35% have taken part in at least one humanitarian mission.

**Conclusions:** USU-trained pediatricians make important contributions to the military. We discuss the importance of our findings related to the career outcomes and operational experiences among USU pediatric-trained graduates. Finally, we propose future areas of inquiry that will further allow us to discover the full breadth of contributions that are made by uniformed pediatricians.

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# CHAPTER 1: INTRODUCTION

## BACKGROUND

Within the past few years, the idea of pediatrics as a necessary uniformed specialty has come under significant scrutiny. Much of the impetus behind this recent scrutiny began in 2017 when then Secretary of Defense James Mattis declared his renewed vision for the Department of Defense (DoD), prioritizing the need to “restore military readiness as we build a more lethal force” (1). In his 2018 National Defense Strategy, Secretary Mattis expanded on this vision, and issued a call to streamline our military services while re-focusing on and improving the lethality of our warfighting forces (2). Military leaders across the 3 major services (Army, Navy, and Air Force) began to operationalize this vision, and senior military medical consultants were tasked with the idea of reshaping our communities to more directly and efficiently support the warfighter mission. Specifically, this meant shunting personnel, resources, and training toward the most operationally relevant medical specialties, such as general surgery, orthopedic surgery, anesthesiology, emergency medicine, and flight medicine. In order to allow for these increases, senior leaders began to gather data about the feasibility and impact of decreasing the number of uniformed physicians in specialties that are less explicitly geared toward direct support of military readiness, such as pediatrics, obstetrics and gynecology, and radiology. Because of this potential downsizing, it has become important to accurately tell the story of military pediatrics by defining the need for uniformed pediatricians, describing their impact – both direct and indirect – on the overall mission of the armed forces, and assessing the implications of such a significant downsizing in military pediatrics.

Around this time, the leadership within the USU Department of Pediatrics was turning over. With this change in regime came a fresh perspective and a prioritization of clinical, theoretical, and educational research as a means to highlight the role and impact of military pediatricians, as well as to extend their influence.

Those who work in military pediatrics know the various ways in which they and their colleagues contribute to both the military and civilian medical mission – through clinical expertise, deployments, leadership, participating in and leading educational programs, developing innovative medical therapies, etc. This new era became about quantifying these accomplishments and sharing these findings with the broader military community, to include senior leadership at and above the level of the Surgeon Generals. This focus on renewed research efforts led ultimately to extensive networking within the USU community, and the creation of a pediatric theme within the well-established Long-Term Career Outcome Study (LTCOS) research group. LTCOS collects learner data before, during, and after medical school to help answer questions for medical school accreditation, scholarship, and innovation.

As the need for information about the role of military pediatricians became a high priority, the authors considered the best processes by which to gather and relay this data quickly. The USU alumni survey data represented a unique opportunity to begin this line of inquiry. The main objective of this thesis was to describe the outcomes of USU graduates who pursued training in pediatrics, and therefore to begin to quantify the contributions that military pediatricians make to the military medical mission and the broader DoD mission.

## **CONCEPTUAL FRAMEWORK**

The conceptual underpinnings of this project are grounded in the quality assurance field. In particular, the before, during, and after framework forms the conceptual foundation of this current line of inquiry, as a means to explore programmatic evaluation questions (3, 4). The LTCOS group collects and analyzes USU alumni survey data to help improve USU's curriculum and outcomes, as well as to answer various targeted research questions (3). Operationally within LTCOS, the before, during, and after framework refers to the application and admissions process for medical school (before), curriculum and clinical experiences that students have (during), and the multifaceted outcomes that are manifested by USU graduates (after) (3, 4). We are able to more specifically apply the before, during, and after framework to pediatric-trained graduates if we begin to ask questions such as: What common attributes may exist among applicants to USU who ultimately choose to pursue training in pediatrics? How do students who train in pediatrics tend to perform during the preclerkship, clerkship, and postclerkship coursework? What accomplishments do pediatric-trained USU graduates achieve?

Consistent with this conceptual framework and the quality assurance approach, the results of this thesis are retrospective, descriptive, and exploratory. The questions we asked are broad and open-ended, intended to ascertain patterns of service among military pediatricians that can be used to inform prospective projects in the future. The authors hypothesized that the contributions of pediatric-trained graduates would be substantial in terms of clinical care, leadership, academic accomplishments, and operational impact.

## **RESEARCH QUESTIONS**

Considering the background and the conceptual framework described above, the authors set out to use the available LTCOS data to elicit the impact of military pediatricians through a descriptive analysis of self-reported clinical accomplishments, academic achievements, and operational experiences among pediatric-trained USU graduates. The LTCOS alumni survey was developed using established principles of survey design, to include reviewing the literature, discussions with stakeholders and subject matter experts, pilot testing items and revising items (5). More specifically, we sought to answer the following questions:

1. What clinical and leadership roles have USU-trained pediatricians filled within the military health system (MHS)?
2. What career accomplishments have been achieved by USU-trained pediatricians?
3. How many USU-trained pediatricians have been deployed to areas of conflict and/or have contributed to humanitarian missions?

## **CHAPTER 2: THE IMPACT OF MILITARY PEDIATRICS: ASSESSING CLINICAL, LEADERSHIP, ACADEMIC, AND OPERATIONAL EXPERIENCE AMONG PEDIATRIC-TRAINED GRADUATES FROM THE UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCE (USU)**

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### **ABSTRACT**

**Background:** This thesis uses alumni survey data from the Uniformed Services University of the Health Sciences (USU) F. Edward Hébert School of Medicine to assess the professional impact of pediatric-trained USU graduates over the course of their careers. We specifically report on the clinical and leadership roles held, academic accomplishments, and operational experiences among military pediatricians.

**Methods:** This study analyzed survey data that were collected from alumni of USU. We used descriptive statistics to report the career achievements and operational experiences among USU graduates who completed training in pediatrics. This study was deemed exempt by the USU Institutional Review Board.

**Results:** Out of 1,189 alumni respondents, 110 (9.3%) trained in pediatrics. Among the pediatric-trained USU graduates, 98.2% spent some time as a full-time clinician, 73.6% served as Chief of a clinical service, 42.7% held the role of Department Chair/Chief or the equivalent, and 26.3% filled leadership positions in deployed settings.

Forty percent of USU-trained military pediatricians deployed to combat areas at least once, and 35.5% participated in at least one peacetime humanitarian mission.

**Conclusions:** Our findings contribute to the unique story of military pediatricians who graduated from USU. These uniformed pediatricians participate actively in all realms of military medicine. Their contributions include the provision of clinical care for both of military children and active duty service members, leadership positions, health professions education, and participation in both deployments and humanitarian operations. Future studies could aim to more fully address the varied contributions of military pediatricians to the overall mission by including more specific data about career experiences from all uniformed pediatricians.

## **BACKGROUND**

A quizzical expression is a common reaction from people who hear that there are pediatricians serving in the military. But, pediatricians and other pediatric-trained specialists comprise a sizable portion of the active duty medical services. The Uniformed Services University of the Health Sciences (USU) is the nation's only Department of Defense-funded undergraduate medical school, earning the moniker of "America's Medical School." Each year, USU graduates around 175 new military physicians, of whom 8-12% pursue training in pediatrics.<sup>1</sup>

All graduates of USU use their unique training to contribute to various facets of the military mission. Military medicine is traditionally considered to focus on the promotion of operational readiness and the provision of combat medical care, and the implication is that this care is provided by adult primary care and surgical specialists. While it may seem surprising, pediatricians support these same lines of effort, in addition to providing pediatric medical care in peacetime and across the spectrum of conflict, from humanitarian assistance missions to large-scale combat operations. There are at least five key ways that pediatricians contribute to military medicine: providing direct clinical care, filling vital leadership roles, contributing to health professions education, engaging in operational readiness and deployment medicine, and participating in humanitarian mission support. However, no studies to date have fully delineated the impact of military pediatricians in all of these realms.

Gilliland et al. have previously highlighted the career accomplishments and professional outcomes among all USU-trained physicians.<sup>2</sup> Given the above considerations and other contributions of military pediatricians, the Long Term Career Outcome Study (LTCOS) research team expressed interest in querying the existing data

for outcomes of pediatric-trained USU graduates, specifically. Although pediatrics is not typically recognized as a specialty that contributes directly to wartime efforts, we sought to elucidate the contributions of military pediatricians to the operational mission. Thus, the goal of this thesis is to begin to understand the impact of military pediatricians through a descriptive analysis of self-reported career achievements and operational involvement among pediatric-trained USU graduates. More specifically, we sought to answer the following questions:

1. What clinical and leadership roles have USU-trained pediatricians filled within the military health system (MHS)?
2. What career accomplishments have been achieved by USU-trained pediatricians?
3. How many USU-trained pediatricians have been deployed to areas of conflict and/or have contributed to humanitarian missions?

## **METHODS**

The Long-Term Career Outcome Study (LTCOS) research group analyzes USU alumni survey results to track the progress of the school's graduates. The results assess performance measures over time, following the arc of progress as USU medical students transition to independent medical practitioners and beyond.

Survey questions gather data about career milestones and other professional developmental characteristics that graduates may have achieved over time.<sup>3</sup> The original survey was developed by a team of USU educational leaders.<sup>3</sup> After pilot testing with educational leaders, the survey was revised and then tested by another group of academic

leaders before final revisions were made.<sup>3</sup> The survey items used in this project addressed career landmarks, clinical roles, leadership positions, educational involvement, and experience with humanitarian missions and deployments.

The most recently completed alumni survey that was sent to all USU graduates from 1980-2001 was accomplished in December 2013, and was delivered to USU School of Medicine (SOM) alumni via e-mail using PHP Surveyor.<sup>2</sup> The survey was sent to all alumni with known e-mail addresses. Out of 2,825 total alumni eligible to receive the survey at the time of its release, approximately 2,400 had known email addresses to which the survey could be sent. We used descriptive statistics to answer our research questions. This study was deemed exempt by USU's Institutional Review Board.

## **RESULTS**

There were a total of 1,189 respondents to the USU alumni survey out of the 2,400 alumni whose e-mail addresses were known and active, yielding a response rate of nearly 50%. Of the final respondents, 83.5% were male (909) and 16.5% were female (196), closely reflecting the historic composition of the classes in those years.

Out of the 1,189 total respondents, 110 (9.3%) were trained in pediatrics. Only family medicine (19.8%) and internal medicine (11.2%) were more common than pediatrics as specialties of choice among those who completed the questionnaire.<sup>2</sup> Every class year represented in the survey had at least 1 respondent who trained in pediatrics, and two class years (1996 and 1999) tied for the highest number of pediatric-trained respondents, with 10 in each class. Among those alumni who completed a pediatric residency, 63 (57.3%) reported completing a fellowship or a second residency. Nearly all

subspecialties within pediatrics are represented in the military pediatric community.

Table 1 shows the type and number of fellowships and second residencies completed by USU-trained pediatricians.

Of the survey respondents, 50 (45.5%) were no longer serving in the military; 27 (54%) of those who were no longer serving reached full retirement (at least 20 years of combined service). Five respondents (10%) who were no longer on Active Duty continued to serve in an Active Reserve or Guard unit.

Almost all (108, or 98.2%) of the pediatric alumni reported working as a full-time clinician for some time after graduating from USU. Around 74% (81) held the position of Chief of a service; 42.7% (47) served as a Department Chair/Chief/Head or the equivalent; 18.2% (20) worked as a clerkship director or other medical school course director; 17.3% (19) were Service Chiefs or Directors; and 12.7% (14) and 6.4% (7) worked as either a fellowship or residency program director, respectively. A number of pediatricians filled leadership positions in deployed settings, such as brigade surgeons (14, or 12.7%) and senior medical officers (15, or 13.6%). Table 2 shows the breakdown of pediatricians who held these and various other positions and leadership roles throughout their careers.

Among pediatric respondents, 2 (1.82%) achieved the rank of Flag Officer, and 8 (7.27%) reported working in a staff position within their service's Office of the Surgeon General. Ninety-five total pediatric-trained respondents (88.18%) reported achieving the rank of O-5 or higher, a rank that is typically commensurate with at least 12 years of active duty service after medical school graduation. Eleven pediatric-trained graduates (10%) indicated that they were selected for early promotion to the rank of O-4, O-5, or

both. Pediatric alumni of USU earned varied military medals during their service time. In particular, 15 pediatricians (13.6%) were honored with Bronze Stars, and 1 respondent (0.9%) reported earning the Silver Star. The Bronze Star Medal is awarded based on heroic or meritorious service or achievement during military conflicts.<sup>4</sup> The Silver Star is the third-highest award that can be given to a United States Armed Forces member, and is bestowed on those select individuals who demonstrate bravery and courage of action in the setting of armed conflicts.<sup>5</sup>

Almost two-thirds (71, or 64.6%) of USU pediatric alumni reported that they published at least one article in a peer-reviewed journal, and around half (53, or 48.2%) presented a paper at a national or international professional group meeting. Among pediatric graduates of USU, 5 (4.6%) achieved the academic rank of Professor, 28 (25.5%) achieved Associate Professor, and 31 (28.2%) achieved Assistant Professor by the time of the survey completion.

Forty-four USU-trained pediatricians (40%) deployed at least once for a duration of over 30 days, with 4 of them deploying at least 3 times. A total of 39 pediatric-trained respondents (35.5%) took part in at least one short-term humanitarian mission of at least 7 days' duration. Eight of these participants participated in 3 or more humanitarian efforts. See Figure 1 for detailed data pertaining to deployment and humanitarian experiences among USU-trained pediatricians.

## **DISCUSSION**

The purpose of this paper was to describe the unique story of military pediatricians by answering several specific questions about the career outcomes among

USU graduates. Through analysis of alumni survey results, we sought to describe the clinical impact, leadership experience, health professions education experience, deployment activity, and humanitarian mission involvement among pediatric-trained graduates of USU. Our findings suggest that USU-trained pediatricians are versatile, filling various leadership, educational, and mission-oriented roles throughout the various services. The delineation of their career accomplishments and operational experiences show that pediatric graduates of USU play a vital function in the peacetime and wartime missions of the military.

The mission of USU is a unique one, as previously discussed by Gilliland et al.<sup>2</sup> USU trains physicians to work within the relatively closed Military Health System (MHS), and to be both medical professionals and military officers. Within this already unique educational environment, pediatric-trained graduates contribute their breadth and depth of experience to all aspects of the MHS. Through their involvement in clinical medicine, leadership roles, operational duties, and humanitarian efforts, uniformed pediatricians support the challenge to ensure a medically ready military force and a combat-ready medical force.<sup>6</sup>

Nearly all military pediatric graduates from USU have spent time as a full-time clinician, reinforcing the obvious impact they have on providing direct healthcare to the military beneficiary population. Within the realm of clinical medicine, military pediatricians are expected to provide the full spectrum of medical care – from primary care through tertiary care needs – for MHS beneficiaries, who are typically the children of active duty and retired service members. In addition, military pediatricians evaluate and treat active duty service members (ADSMs), providing this care in garrison, at

locations outside the continental United States (OCONUS), and in deployed and humanitarian settings. Forty percent of ADSM's are 25 years old or younger, and they frequently receive care from adolescent medicine specialists and other associated pediatric specialists.<sup>7</sup> Additionally, ADSMs who develop conditions such as malignancies are often cared for by pediatric specialists who are skilled in the provision of care to adolescent and young adult (AYA) populations.

The survey results do not provide granular data about how much time is spent in direct clinical care of ADSMs, which may be an important portion of the uniformed pediatrician's clinical role. For example, many deployments for pediatricians involve serving as a general medical officer (GMO), providing medical care for ADSMs and allied forces and thereby impacting the readiness of our forces. Another important corollary involves transitions in care. In an era in which transitions in care are being recognized as a crucial part of optimal health care, pediatricians are in a position to ensure that these transitions are thoughtful, timely, and organized. The military pediatrician is uniquely equipped to facilitate this process for both ADSMs and their families.

Pediatric-trained USU graduates also fill various leadership roles across the MHS. Many pediatricians act as the Chief of the Medical Staff at military treatment facilities (MTFs), leading interdisciplinary teams of varying sizes. They also serve as division and department heads, fulfill commanding officer roles within their services, and direct clerkship, residency, and fellowship training programs. As one notable example of leadership, three USU-trained pediatricians who have attained Flag Officer military rank either recently served or continue to serve important roles in the highest echelon within

the Offices of the Surgeon Generals. While their involvement in these diverse leadership positions is clear, the data available to us from the LTCOS survey responses cannot answer why or how pediatricians come into these roles.

Operational experiences and taskings differ across the major uniformed services, but this aggregate data shows that USU-trained pediatricians have participated actively in both deployments and humanitarian missions. We suspect that the available data on deployments among pediatricians may underestimate the deployment rate of more recent graduates, since many of these alumni survey respondents would have separated from the military prior to the dramatic increase in operational activity following September 11, 2001. From estimates early in the most recent war efforts, more than 350 military pediatricians from all 3 major branches of the uniformed services deployed in various roles in support of Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF).<sup>8</sup> The presence of pediatricians in combat zones is critical, since studies estimate that between 4-15% of all hospital admissions during OIF and OEF were pediatric-aged patients.<sup>9-11</sup> Pediatric admissions accounted for 11% of all bed days in combat support hospitals.<sup>9</sup> In these ways, uniformed pediatricians contribute directly to our military medical system's ability to operate as a ready medical force around the globe, while also providing valuable humanitarian care for the children within the local national populations.

The humanitarian impact of military pediatricians can further be seen in their presence and participation in mission planning and completion. One tangible example is the involvement of military pediatricians in the development of the Military Medical Humanitarian Assistance Course (MMHAC), which they have been instrumental in

sustaining as a training platform over the past 21 years, since its inception in 1998.<sup>12</sup> The MMHAC curriculum includes lessons in clinical medicine and public health topics such as infectious diseases, malnutrition, dehydration, and preventive medicine, and also covers ethical, leadership, and legal issues that apply within military operations other than war. MMHAC training is an important force multiplier, augmenting the interdisciplinary response and optimizing the military medical capabilities that are employed in the aftermath of natural disasters (such as Hurricane Katrina and the 2010 earthquake in Haiti) and during routine peacetime humanitarian missions.

This study has several limitations. It is a survey that relies on honest and accurate self-reporting from the respondents. It is anonymous, so there is no opportunity for clarification of answers or responses. Another limitation of this study is that it relies on accurate e-mail contact information in order to reach each USU graduate. There may be response bias in the respondents who choose to fill out the survey. Finally, there are a finite number of response options and minimal opportunities to provide explanatory data within this survey, thereby limiting the quantity and quality of the data that we were able to collect.

In our continued efforts to learn about the contributions of uniformed pediatricians to the overarching military mission, we recognize several areas for future inquiry. We would like to query military pediatricians from all backgrounds, including those who trained in civilian medical schools and residencies, in order to obtain a more complete assessment of military pediatrics. Surveying pediatricians who return from deployment would allow us to better understand the specific roles and responsibilities they have in operational assignments, as well as the impact they make in these roles. We

also plan to investigate the proportion of clinical time that is spent by pediatricians in direct support of ADSMs. Another future area for research would be a study designed to understand what makes USU-trained pediatricians particularly well-suited for leadership positions, operational assignments, and coordination of humanitarian missions. Through these and other subsequent pursuits, we hope to affirm the importance of pediatricians within the MHS, and on both the local and global level.

TABLE 1. Prevalence of Military Pediatric Subspecialty Training among USU Graduates

Subspecialty Training	N (N=57)	% (out of 110)
Adolescent	3	2.73
Allergy/Immunology	7	6.36
Child Neurology	3	2.73
Clinical Genetics	1	0.91
Developmental & Behavioral Pediatrics	6	5.45
Endocrinology	5	4.55
Neonatology (NICU)	11	10.00
Cardiology	3	2.73
Pediatric Intensive Care (PICU)	2	1.82
Gastroenterology	3	2.73
Hematology/Oncology	5	4.55
Infectious Disease	3	2.73
Pulmonology	3	2.73
Rheumatology	1	0.91
Nephrology	1	0.91
Aerospace Medicine*	1	0.91
Anatomic and Clinical Pathology*	1	0.91
Preventive Medicine*	3	2.73
Nuclear Medicine*	1	0.91

\*Denotes second residency training

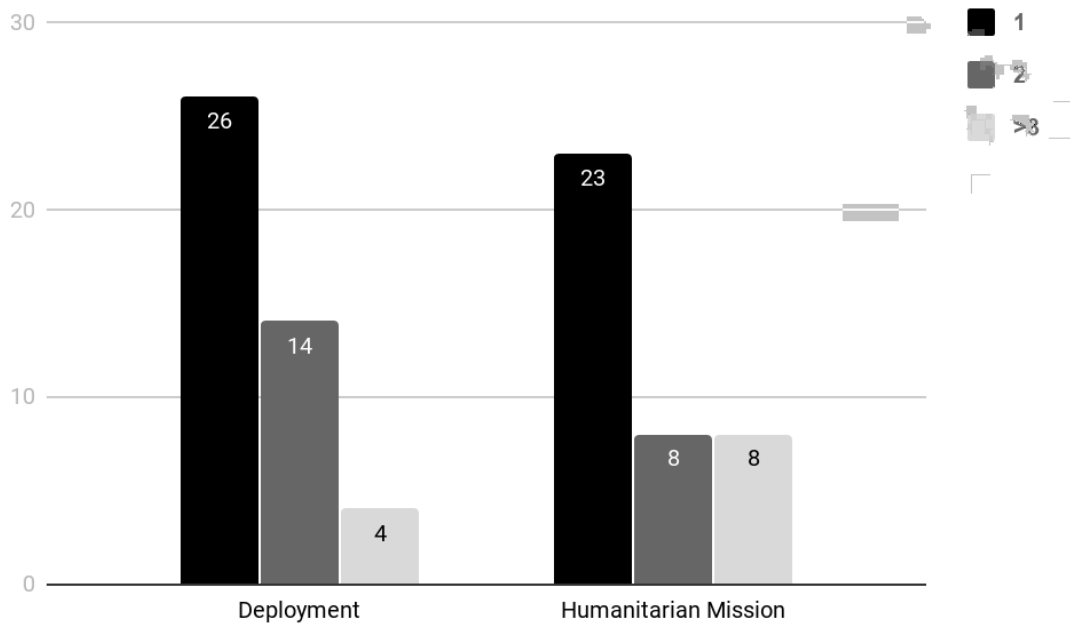
Number of pediatric-trained USU graduates (N=110) who pursued either fellowship training or additional training in a second residency program.

TABLE 2. Positions Held by Pediatric Graduates of USU over Entire Career

Titles/Positions	N (N=110)	% (out of 110)
Full-time clinician	108	98.18
Chief of service	81	73.64
Chief/Director of a clinic	30	27.27
Residency program director	7	6.36
Clinical clerkship or medical school course director	20	18.18
Department chair/Chief/Head at a medical center or community hospital without a residency program in your department	35	31.82
Department chair/Chief/Head at a medical center or community hospital with a residency program in your department	12	10.91
Service chief/Director/Head of multidisciplinary service at a medical center or community hospital	19	17.27
Military treatment facility chief of the medical staff	16	14.55
Deputy Military Treatment Facility	4	3.64
Fellowship director	4	3.64
Brigade surgeon	14	12.73
Division surgeon	2	1.82
Squadron commander	1	0.91
Senior medical officer	15	13.64
Research director	3	2.73
Other	14	12.73
Commanding officer		
Free-standing clinic commanding officer	2	1.82
Bedded community-sized hospital commanding officer	1	0.91
Medical center commanding center	2	1.82
Squadron or similar service-specific organizational commanding officer	1	0.91
Deployed/deployable medical unit commanding officer	3	2.73

Clinical, administrative, educational, and other leadership roles held by pediatric-trained USU graduates.

FIGURE 1. Frequency of Operational Experiences among Pediatric-Trained USU Graduates



Number of times that pediatric-trained USU graduates (N=110) have been on deployment to a theater of combat operations or have participated in a peacetime humanitarian mission. Each deployment is defined as a period of greater than or equal to 30 consecutive days; each humanitarian mission is defined as a period of 7 or more consecutive days. The total number of deployments or humanitarian missions per respondent is reported as 1, 2, or >3.

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## **CHAPTER 3: DISCUSSION**

### **DISCUSSION**

This thesis provides a rich initial account of some of the major career outcomes among pediatric-trained graduates from USU, including their clinical roles, leadership positions held, academic accomplishments (such as academic rank achieved and number of publications), and deployment as well as humanitarian experiences. Using the before, during, and after framework, we can better expand on the implications of these findings for program innovation and future research projects.

It is useful to note that this thesis was intentionally exploratory in nature. While drawing on available outcomes data from a sample of military pediatricians (those who graduated from USU), we hope to eventually design future research projects that will give a more robust answer to our questions. This can be done by expanding our data to include all uniformed pediatricians: USU graduates as well as graduates from civilian medical schools and civilian residency programs. We will now use the before, during, after framework to describe our findings and suggest next steps.

### **Before**

Our study mainly focused on outcomes that occurred after graduation from medical school, so we did not address the “before” phase within this project. In the future, we could consider tying the career trajectory of pediatric-trained USU graduates to preliminary data about applicants to medical school. This admissions-based data could include things such as demographic information, standardized test scores, planned

specialty choice at the time of medical school application, prior military experience, or prior experience with pediatrics.

### **During**

In order to use this data for study and improvement, it would be helpful to learn more about how prepared military pediatricians feel for the various roles and responsibilities that they ultimately fill within the clinical, leadership, academic, and operational realms. If we consider the requisite, optimal preparation for service in military pediatrics (beyond routine UME training), we might inquire into what type of leadership, deployment, and humanitarian training all current military pediatricians have had, and what additional experiences or training they believe would help them to be more successful in their given and chosen roles and responsibilities throughout their professional lives. While much of this may need to be learned after medical school or residency, some of it might be used to inform curricular changes for USU, and potentially even for military trainees in civilian institutions.

Many non-pediatric trained military physicians will be tasked with caring for children throughout their careers, whether at remote OCONUS bases or during deployments and humanitarian missions. It would be helpful to know how we can use the limited time we have within the UME curriculum to best prepare physicians in all specialties for these unique patient encounters. One recent update to the USU curriculum was the addition of pediatric-specific trauma and resuscitation lectures, and pediatric simulation cases within Operation Bushmaster. These curricular additions can be evaluated over time to gauge improvement in pediatric trauma care and, perhaps more

importantly, provider comfort and confidence when confronted with pediatric patients in field conditions. Our study findings support such curricular innovation at USU.

### **After**

This study provides a foundation for exploring various lines of inquiry related to pediatrics and, potentially, to other medical specialties within the military. As mentioned previously, future analyses could include military pediatricians from all training backgrounds. This would encompass direct accessions to the military (who typically enter active duty after completing a civilian residency) and recipients of the Health Professions Scholarship Program (who graduate from a civilian medical school and typically complete military residencies). Additionally, including survey results from more recent graduates of USU will be useful in determining how the range of deployment and humanitarian experiences has changed since 9/11 and some of the high-impact natural disasters that have necessitated the response of our emergency response teams, on which many military pediatricians serve. We could also survey this broader military pediatric population to get a better sense of what our collective force of pediatricians have accomplished and contributed, and also to compare career achievements and operational involvement between pediatricians from these various types of training backgrounds.

Since deployment and humanitarian experiences are a particular interest, we could consider interviewing military pediatricians on their return from these types of operational experiences. This would help us to learn more details about their roles and responsibilities, as well as their involvement in both combat and peacetime operations. A timely subject that we could investigate is the role that inter-professional teams play in

both deployment and humanitarian settings. Another under-represented topic in the literature that lends itself to future inquiry is a determination of the clinical care that military pediatricians provide directly to active duty service members (ADSM's), in terms of quantity, scope, and quality.

One additional specific line of inquiry for future research studies could be a qualitative investigation of military pediatricians' leadership traits, with the goal to uncover how or where these attributes were acquired. A prior LTCOS study of USU graduates who attained the rank of flag officer showed that these officers consistently demonstrated traits of transformational leadership, which would make that style of leadership a particularly good theoretical foundation in study design (6).

## **MILITARY RELEVANCE**

This research project sought to explore the continued training and presence of uniformed pediatricians in our military services, and thus is military relevant by design. Ultimately, those of us who practice pediatrics in the military do so for the good of our military families, believing in the unique ability of fellow service members to best understand and address the medical, psychological, and social needs of our own population.

The USU School of Medicine curriculum includes significant hours of leadership training spanning all 4 years, and the school is often considered to be a leadership academy, in addition to being a medical school. Due to the high demands placed on military officers to succeed as leaders, it makes sense that a training program for military

physicians would also need to help foster their development as leaders. The varied roles and responsibilities that pediatric-trained USU graduates fill, as evidenced by our results, show that pediatricians take up the mantle of leadership throughout their time on active duty. They seem particularly well suited for positions of authority. Studying how and why military pediatricians do succeed in leadership may illuminate further improvements to overall military performance, morale, efficiency, and – as former Secretary Mattis would appreciate – the lethality of our armed forces.

## **LIMITATIONS**

Consistent with quality assurance research, one of the major limitations to this study is the reliance on available, previously collected data. While this allowed us to answer our research questions and report our findings, such a retrospective approach limits the scope of the questions that we could ask. The data was also anonymous, limiting the connection of this data with other LTCOS variables of interest (before and during measures), which would have allowed us to draw deeper inferences from our findings. Also, the alumni survey data did not include more recent graduates' outcomes.

Another limitation in this study is that, despite the large number of years included, we had a relatively small sample size. Since there were only 110 pediatric-trained graduates who responded to the survey, the statistical analysis was limited to descriptive statistics. We had initially hoped to compare the outcomes for pediatric-trained graduates with the outcomes among overall USU alumni, but the low respondent numbers in pediatrics limited the value of using inferential statistical analysis.

## **CONCLUSIONS**

As desired, this manuscript begins to tell the unique and complex story of military pediatrics. While the results are somewhat limited in scope, they show that USU-trained pediatricians contribute to the clinical, leadership, academic, and operational aspects of military medicine. This investigation allowed for the development of a useful foundation of knowledge, and generated myriad questions and lines of inquiry that can be further pursued in subsequent research projects.

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