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Developing the Ready Military Medical Force: military-specific training in Graduate Medical Education

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ABSTRACT

Introduction Graduate Medical Education plays a critical role in training the next generation of military physicians, ensuring they are ready to uphold the dual professional requirements inherent to being both a military officer and a military physician. This involves executing the operational duties as a commissioned leader while also providing exceptional medical care in austere environments and in harm's way. The purpose of this study is to review prior efforts at developing and implementing military unique curricula (MUC) in residency training programs.

Methods We performed a literature search in PubMed (MEDLINE), Embase, Web of Science, and the Defense Technical Information Center through August 8, 2023, including terms "graduate medical education" and "military." We included articles if they specifically addressed military curricula in residency with terms including "residency and operational" or "readiness training", "military program", or "military curriculum".

Results We identified 1455 articles based on title and abstract initially and fully reviewed 111. We determined that 64 articles met our inclusion criteria by describing the history or context of MUC, surveys supporting MUC, or military programs or curricula incorporated into residency training or military-specific residency programs.

Conclusion We found that although there have been multiple attempts at establishing MUC across training programs, it is difficult to create a uniform curriculum that can be implemented to train residents to a single standard across services and specialties.

INTRODUCTION

Graduate Medical Education (GME) in the Department of Defense (DoD), which encompasses all specialties and services, is tasked to provide the US Armed Forces with a pool of uniformed officer physicians available to support the global and domestic missions of the US Armed Forces. Each year, 3000 physicians or 25% of the military physician workforce are enrolled in GME training and have a military service requirement upon completion.[1] Military physicians are expected to be deployable to austere environments immediately upon graduation.[2] However, throughout the latter half of the 20th century and into the 21st century, and now through multiple wars, the DoD has issued limited and vague guidance as to what defines a ready and trained military physician.[2–4] There have been persistent concerns that military skill levels among graduating residents vary considerably, given the breath of training across specialties, and the lack of a comparable military curriculum instituted among GME Programs.[2]

Although physicians graduating from GME are by and large competently trained to civilian standards within their specialty, there are no requirements for military proficiency at graduation set by military GME. Military residents attend programs approved by the Accreditation Council for Graduate Medical Education (ACGME) with the expectation that they become certified by their respective specialty boards, thereby meeting clearly defined civilian requirements. For the military side of their profession, trainees are merely expected to meet service-specific standards of military readiness, such as completing the Army's initial medical basic officer leader course.[2 5]

The question of military readiness and military training within GME has been raised periodically. In the 1980s, the Senate requested a blue-ribbon panel to address problems associated with overall military medical readiness and force size. As a result, in June of 1986, then Secretary of Defense Caspar Weinberger established a DoD GME Advisory Committee, which, led by Dr Edward Brandt, had the aim of assessing the cost-effectiveness of the military healthcare system and guiding the DoD in improving the overall military readiness mission.[4] This committee, subsequently referred to as the Brandt Commission, provided a number of recommendations, including that 'GME programs should include in the curricula all of its graduate medical education programs those aspects of the practice of a medical specialty which are unique to the military'.[4]

As a result of this commission report, Secretary William Mayer, then Assistant Secretary of Defense for Health Affairs, formally tasked the Uniformed Services University of the Health Sciences (USU) to develop a military GME curriculum that identified the military unique applications of medicine that could complement traditional curriculum of residencies and fellowships.[6] This in turn became known as the military unique curricula (MUC), which, through USU, identified nine medical areas graduating physicians were expected to be proficient in.[7–9] However, these findings served as

guidance and encouragement for integration of an MUC, not a requirement for implementation of a specific plan. As a result, MUC in GME have remained open to interpretation with no established programs across specialties or services since issuance of its guidance.[2]

For example, in the specific case of combat surgery, with the exception of the broad objectives listed in the USU MUC, which includes surgery-specific technical skills and military-specific medical knowledge, there has been little surgery-specific instruction issued since publication of the MUC.[9] Although significant attention has been paid to identifying an attending surgeon's required knowledge, skills and abilities for deployment and development of operative skill sustainment courses, there remains no clearly defined standards expected upon graduation for surgical trainees beyond ACGME requirements.[10 11]

The purpose of this review is to broadly capture previous attempts at developing or implementing an MUC in GME to improve military physician readiness and deployability upon graduation. Additionally, this review may inform the possibility of establishing a new MUC that would provide standardization of unique military requirements.

METHODS

We performed a literature search that included three bibliographic databases and one DoD database through August 8, 2023. These included PubMed (MEDLINE), Embase, Web of Science, and the Defense Technical Information Center (DTIC) using database-specific search strings with derivations of the initial terms "graduate medical education" and "military" developed with the assistance of a reference librarian from USU.

We then evaluated sources that included the following terms: residency and operational or readiness training, military program, or military curriculum. We also reviewed citations of key articles to capture additional relevant articles. The PubMed, Embase, and Web of Science results were then loaded to reference manager (Zotero), and a review was performed that first examined title and abstract. We then completed a full-text review if deemed appropriate. We reviewed 100 of the available DTIC results in the DTIC search engine. We included articles if they described or advocated for additional military training during GME, described military leadership or professional development, or discussed military-specific curricula or programs. We excluded articles that were not in English, referenced international GME programs, failed to address military readiness or training during GME, described attending level training or military–civilian partnerships for trained surgeons, or focused on military medical school education or military dental, medic, nursing, or physician assistant training. Studies were then categorized based on whether they described a need for military GME or an MUC, development of an MUC, or implementation of an MUC.

RESULTS

We reviewed a total of 1455 articles for inclusion based on title and abstract; 111 articles then had a full-text review. 64 articles were included (including articles from citation and organization review) and 51 articles were excluded as they did not meet primary or secondary inclusion criteria. An additional four articles were included based on citation search and from internal organization documents (figure 1).

Upon review of the articles, we determined that 64 articles fell into the following categories: (1) descriptions of perspectives, attitudes, recommendations or the historical context of MUC; (2) surveys within the literature identifying readiness gaps or needs assessment for an MUC; (3) military-specific programs or curricula incorporated into residency training; or (4) military-specific residency programs.

Defining a need for an MUC

In the late 1980s, the Senate-directed Brandt Committee concluded that military GME programs needed a military curriculum that could provide military and specialty-specific training to all military residents.[4 12] The USU was tasked with developing overall instructional objectives for GME, with the goal of providing the military physician with an 'awareness' of elements of their profession that was unique to the military to 'better prepare' them for both combat and deployment. The

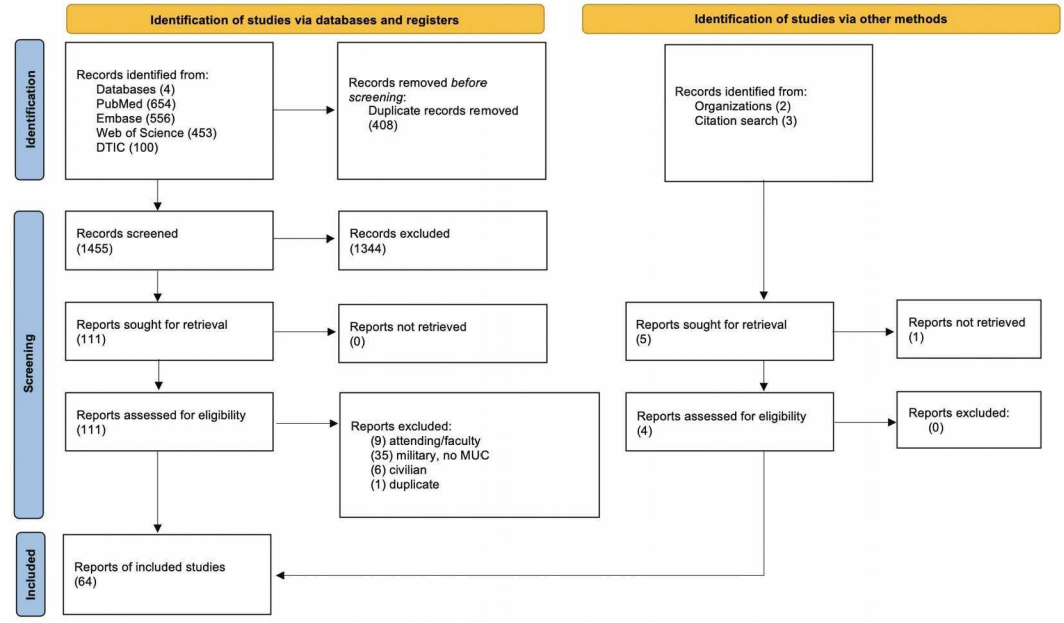

Figure 1 Depiction of articles included and excluded in literature review. MUC, military unique curricula.

Table 1 Perspectives, recommendations and attitudes on the historical need for an MUC

Citation	Year	Perspectives/recommendations/attitudes
Pierce *et al*[12]	1989	Create Department of Military Medicine so physicians are qualified as specialists and in military medicine.
Johnson[13]	1990	Military physician needs to know that skills are valued as both a physician and medical officer.
McGaha[3]	1997	No guidance or standardization on military medical readiness training across GME.
Baker[14]	2000	Uniqueness of physicians in Air Force GME programs is that they also receive specific training addressing roles during deployment and contingency operations.
Cation *et al*[15]	2002	Military internal medicine residents are expected to know more than their civilian counterparts, and military residencies should have military unique topics in curriculum.
Cloonan *et al*[21]	2003	Discussion on practice of military medicine and what military components need to be incorporated into residency.
Bowyer[16]	2004	Military physicians require additional skillsets beyond civilian counterparts.
Kelly *et al*[22]	2012	Military-specific curriculum is vital to military GME.
Meyer[23]	2013	Military professional education should have standards, duty otherwise to hold position of officer rests with residents.
Babcock[18]	2014	There are unique military requirements in a joint civilian/military residency.
Groom *et al*[17]	2015	Military GME has additional unique mission requirements.
Welton *et al*[19]	2015	In civilian/integrated programs, military residents must comply with military standards and requirements in addition to civilian.
Will and Malave[24]	2019	Military GME programs must provide additional leadership training.
Nealeigh *et al*[25]	2019	Navy surgery found a need for additional curriculum since not all procedures seen on ship covered in residency.
True *et al*[1]	2020	Military GME programs teach unique knowledge, skills and abilities required of military physicians.
Clemente Fuentes[26]	2021	Literature review of operational medicine curriculum studies.
Shahbodaghi and Farnell[20]	2021	Military GME residents benefit from additional curriculum based on unwritten, unofficial values, lessons and perspectives of their branch of service.
Tadlock *et al*[42]	2021	Describes GME surgery-specific training pipeline.
Franko *et al*[32]	2022	Surgery-specific case report review found military residency programs would benefit from military-specific training courses during residency.
Hodgson *et al*[43]	2022	Describes lessons learned from needing to maintain a medical-ready force in GME.
Degutis *et al*[44]	2023	Describes need to develop clear Tri-Service mission and vision for GME in Military Health System with essential capabilities and military specialty skills.

GME, Graduate Medical Education; MUC, military unique curriculum.

curriculum specifically differentiated what was required between surgical and non-surgical providers.[9] Within a decade after the publication of the MUC, a DoD audit of military GME programs even after the publication of the USU MUC found military readiness training to (1) be inadequate, (2) lack reasonable comparability in the types of readiness curricula taught and (3) not have an adequate system to monitor physician readiness.[2] The audit subsequently formally recommended the Assistant Secretary of Defense (Health Affairs) issue medical readiness training, guidance and standards, in addition to providing military manuals and medical textbooks specific to military medicine.[2] Additionally, they recommended trainees participate in operational opportunities including humanitarian missions and the DoD Combat Casualty Care Course.[2]

Since issuance of the initial MUC and the audit, there have been several other publications describing the role of an MUC in military GME. In this review, we found 21 articles that explored the perspectives, attitudes, and recommendations on the need for an MUC in GME (table 1).

Several publications emphasized the dual roles and responsibilities of a military physician, with military physicians expected to be both physicians and military officers. These articles highlighted the need for an MUC because military physicians are expected to have an extended skillset beyond what is required of civilian counterparts.[13–17] Articles also described integrated military/civilian programs and found that military residents had additional expectations because they had to meet unique military requirements while also fulfilling requirements set by their civilian programs, yet there were no concrete references to what those requirements actually entailed.[1 18–20]

Several of the articles examined the idea of standardizing military training within GME with a set program for military physicians. However, articles noted that although there was no guidance for issuing military medical readiness training across GME programs, they expressed a need for military education in GME with a specific military curriculum.[3 21 22] One author in a Military Medicine op-ed went so far as to suggest that in its current form, with lack of standardization, to be a professional medical officer, the 'duty to uphold the position of officer lies on the shoulders of residents.'[23] Standardization of military requirements was a gap identified in the literature by many of the articles calling for an MUC.

Additional publications that advocated for the establishment of an MUC included the idea of establishing a Department of Military Medicine to oversee military training based on the requirements of the Brandt Commission.[12] Other articles emphasized leadership training throughout GME to meet readiness requirements, or a pre-deployment curriculum for graduating residents to learn skills not covered during surgical residency.[24 25] Many of these topics were captured in a literature review of an operational medicine curriculum, although the review was not specific to the development of a military curriculum for GME (table 1).[26]

Table 2 Surveys within the literature identifying readiness gaps or needs assessment for an MUC

Author	Year	Specialty	Survey
LeClair *et al*[45]	1997	Family medicine	Survey of family medicine physicians with questions of perceptions of the adequacy of training of Army family physicians in preparation for current practice and differences in perceived adequacy of training by residency type.
Suls *et al*[7 8]	1997	Family medicine	Survey evaluating implementation and the perceived necessity of the MUC and attitudes and logistical factors relevant to military medicine instruction in military family practice residencies.
Battafarano *et al*[46]	1998	Internal medicine	Survey of current and recent internal medicine residents on confidence in practicing operational medicine, satisfaction with GME, impact of TRICARE, military-managed care plan, patients and education, and intentions on remaining in uniformed service.
Salerno *et al*[47]	1998	Internal medicine	Survey of current and recent military internal medicine residents on operational medicine, managed care, GME, and military service.
DeZee *et al*[48]	2006	Internal medicine	Survey of internal medicine residents on perceived preparedness for humanitarian missions after graduation.
Hartzell *et al*[49]	2017	All	Needs assessment of faculty and residents before development of a leadership program.
Neuman *et al*[50]	2023	Internal medicine	Needs-based assessment survey designed for internal medicine trainees and program directors to assess need for MUC.

GME, Graduate Medical Education; MUC, military unique curricula.

Existing needs-based assessments for establishing a military program or MUC

We identified seven needs-based assessments that identified readiness gaps in military residencies and supported establishing MUC. Surveys of residents addressing MUC included four pertaining to internal medicine, two for family medicine and one single-institution resident survey addressing all GME specialties (table 2). The surveys specifically addressed confidence in practicing operational medicine, adequacy of training and preparation for practice or humanitarian mission, need for an MUC, or need for development of a leadership program.

Development/implementation of MUC

In this review, we identified 27 articles that described the development or implementation of an MUC in GME residency or fellowship. Since 1989, 13 different specialties have had components of an MUC implemented within residency training, which included didactics, military leadership training, expert lectures, training exercises or operational experiences, for example. These programs included four in which all specialties were included, four that were family medicine specific, three for psychiatry, three for internal medicine, three for emergency medicine, three for general surgery, and one each for ophthalmology, obstetrics/gynecology, dermatology, anesthesia, orthopedic surgery, urology, and infectious disease fellowship.

The breadth of specialties represented in the literature indicates the significant degree to which military GME has recognized the need for a military-specific program as part of specialty training. Additionally, it shows the efforts invested to develop or implement an MUC. Specific program objectives identified during the review included 12 focused on operational medicine, 7 pertaining to military readiness, 3 focused on professional development, 2 on leadership and 2 on military ethics. There were a total of 11 programs that were joint in nature, with 6 belonging solely to the Army, 5 to the Navy, and 2 that were combined Army/Air Force or combined Army/Navy, respectively. The Air Force did not have any military unique programs or curricula that were specific to their service. Table 3 provides details of the military-specific programs, topics or curricula integrated into GME residency training.

Military occupational, environmental, preventative and aerospace medicine residencies

Perhaps the most military-focused residencies within the DoD identified in the literature are the occupational and environmental medicine (OEM), preventative and aerospace medicine residencies. OEM generally comprises a small specialty with the DoD training 20% of specialists. The DoD residency itself is the largest of OEM residencies and its mission is to 'develop physician leaders in OEM, with specific expertise in support of the health of military service members, civilian employees, and family members within the scope of DoD programs.' A significant portion of the program includes obtaining a master's degree in public health, where there is flexibility to tailor it to military requirements. The remaining clinical rotations can also be adjusted to meet the needs of the Armed Forces.[27] Gaydos *et al* describe how the original Army OEM residency that existed from 1960 to 1996 was designed to meet the military-specific needs of the Army which included occupational health for the soldier, military unique exposures, support for the military industrial base, and environmental medicine in support of military installations and deployed forces.[28 29]

Similarly, the preventative medicine residency that previously coexisted with the Walter Reed Army Institute for Research was described to have significantly more leeway and funding for identifying pathogen threats to military personal, until it was most recently restructured in 2017 due to various downsizing initiatives within military medicine. However, since then, with the downsizing, there is concern that army preventative medicine with its military-trained physicians is no longer as prepared to 'take care of its own' when it comes to emerging threats.[30]

Table 3 Military-specific programs or curriculum incorporated into residency training

Author	Year	Service	Specialty	Purpose	MUC program description
Goodell and Jones[51]	1989	Army	Family Medicine	Professional development	Integrated modular curriculum that teaches roles of medical officer and medical staff officer.
La Piana[52]	1990	Tri-Service	Ophthalmology	Military readiness	Yearly Tri-Service ocular trauma course for senior ophthalmology residents and other ophthalmologists serving utilization tours. Course is designed to instruct students in the practice of ophthalmology in the theater of operations.
Leamon *et al*[53]	1990	Army	Psychiatry	Operational medicine	Senior psychiatry residents received 10 hours of didactic training and then were integrated with infantry operational units on a regular basis during a 12-month span, with the same unit, participated in physical training, provided support, also participated in training missions.
Hoefer *et al*[54]	1992	Army	General surgery	Operational medicine	Resident physicians deployed to combat hospital during Gulf War.
Suls *et al*[7 8]	1997	Tri-Service	Family medicine	Operational medicine	Analysis of success of MUC implemented in family medicine residencies after Senate-directed blue-ribbon panel, the Brandt Committee, examined the state of military medical readiness.
Perez *et al*[55]	1999	Army	ObGyn	Professional development	MUC with three phases to prepare 'triple-threat' medical corps officer who is (1) invested with leadership skills and Army values; (2) prepared for both wartime and peacetime contingency by receiving specific training in providing combat and peacetime medical care; and (3) prepared for Department of Defense-managed care by training at TRICARE sites and learning managed care principles and practices.
Roop *et al*[35]	2001	Army	Internal medicine	Operational medicine	Operational medicine training curriculum within the Internal Medicine Residency Program.
Meffert[56]	2003	Tri-Service	Dermatology	Military readiness	Annual readiness processing (records update), common task testing (wear gas mask, perform medical operations), certification in ATLS, lectures on leadership, humanitarian missions, tropical diseases, CBRNE, environmental injury.
Murray *et al*[57]	2006	Tri-Service	Internal medicine	Operational medicine	3-day deployment course for graduating internal medicine residents, through didactic and hands-on training, gained military-relevant medical knowledge and skills necessary to function at Role I and II levels of care.
Sohn *et al*[58]	2007	Army	Family medicine	Operational medicine	Modular trauma refresher course for non-surgical physicians deploying to a combat zone
Kemp *et al*[59]	2008	Tri-Service	All	Ethics	Military biomedical ethics seminar for new Army physician trainees. Combined a didactic component and case analysis, provided tools to analyze ethical dilemmas both in the medical center environment and in the operational medicine environment.
Nagy[60]	2012	Army/Air Force	Anesthesia	Military readiness	Lecture series, using a combination of distinguished visitors, functional area experts, and colleagues recently returned from deployment as guest speakers.

Continued

Table 3 Continued

Author	Year	Service	Specialty	Purpose	MUC program description
Weston *et al*[61]	2015	Tri-Service	Psychiatry	Military readiness	MUC that prepare trainees to address various issues faced by military families. Curricula also designed to provide the psychiatrist with understanding of rigors of military service.
Jensen *et al*[62]	2015	Navy	General surgery	Operational medicine	Structured curriculum during humanitarian missions not traditionally taught in surgical resident training. Curriculum includes education in medical logistics, cultural diversity, and global healthcare.
Shirley *et al*[63]	2017	Navy	Orthopedic surgery	Professional development	Symposium dedicated directly toward the career path as a military orthopedic surgeon.
Hartzell and Gilbert[64]	2018	Tri-Service	All	Leadership	Leadership lessons from the field, reading program, designed to help provide additional leadership training.
Polk *et al*[36]	2018	Navy	Family medicine	Operational medicine	Simulation training for operational medicine providers, completed by PGY1s with 23 procedural skill competencies and 5 validated standardized patient scenarios.
Markelz *et al*[65]	2019	Army/Air Force	Infectious disease	Operational medicine	Infectious disease fellowship curriculum integrating didactics and military rotations.
True *et al*[66]	2020	Tri-Service	Internal medicine	Leadership	Pilot leadership training program for senior military internal medicine residents consisted of four 1-hour sessions of mini-lectures, self-assessments, case discussions, and small group activities.
Engelbert *et al*[37]	2020	Navy	Emergency medicine	Operational medicine	Integrated MUC with a capstone exercise, the Joint Emergency Medicine Exercise (JEMX), to provide feasible and effective educational experiences that complement traditional ACGME emergency medicine residency curricula to prepare military graduates for success in operational medicine environments.
McDonald *et al*[27]	2020	Navy	General surgery	Ethics	Describes development of ethics curriculum for US Navy surgical residents completing elective humanitarian mission on a Navy hospital ship.
Medvescek *et al*[67]	2022	Tri-Service	All	Military readiness	Quantifies annual military training requirements across all branches, computer-based training, in-person training.
Hiller *et al*[38]	2022	Tri-Service	Emergency medicine	Operational medicine	JEMX model to help augment the body of knowledge required to perform well as a provider in a Special Operations Unit.
Eker *et al*[39]	2022	Army/Navy	Emergency medicine	Operational medicine	Describes Carl R Darnell Army Medical Center's emergency medicine residency JEMX that provides high-value training in all facets of military medicine, including prolonged casualty care. Required capstone prior to graduation.
Quinn *et al*[68]	2022	Army/Navy	Psychiatry	Military readiness	Military professional education in residency training. Quarterly training incorporated into noon conferences, focusing on military disposition, military competencies. Lectures include combat operational stress control, management of a military career, specialty military behavioral health evaluations, and working with operational military units.

Continued

Table 3 Continued

Author	Year	Service	Specialty	Purpose	MUC program description
Hafer *et al*[33]	2023	Tri-Service	Urology	Operational medicine	Urologic emergency simulation curriculum for military general surgeons that demonstrated efficacy in improving the diagnostic confidence, procedural confidence, and topic knowledge for the urologic emergencies commonly encountered by military general surgeons.
Wellington *et al*[69]	2023	Army/Air Force	All	Military readiness	Military Readiness Committee at Brooke Army Medical Center, program with a lecture series on the sustainment of medical and military readiness, an interactive procedural skills training event, trainee involvement in operational pre-deployment exercises, and the development of an elective operational rotation in Honduras.

ACGME, Accreditation Council for Graduate Medical Education; ATLS, advanced trauma life support; CBRNE, Chemical, Biological, Radiological, Nuclear and Explosive; MUC, military unique curricula.

Additionally, military residencies in aerospace medicine (RAM) have been established that address the preventative medicine needs of military aviators since the profession has unique physiologic stressors and occupational hazards. RAM is ACGME approved and is comprised of a primary care internship, a Master of Public Health degree and aerospace medicine-specific clinical studies. These programs in turn are designed to provide optimal care to a 'defined community' within the military.[31] Although the RAM programs within the military remain well supported, the OEM and preventative medicine residencies, with their military-specific mission and underlying military unique program, have changed over the years due to reorganization and funding changes, making them less robust than they once were.

DISCUSSION

In this review of MUC within GME, we have sought to identify previous efforts that discussed or incorporated elements of military training into residency and fellowship. Policy leaders, administrators, and military physicians, including program directors, have recognized since the late 1980s, that because a military physician has a unique place in medicine and in the military, their training must reflect their niche role. However, this review has highlighted the difficulty in identifying and defining the role of the military physician and the training they need to execute their dynamic missions across services and specialties. Although the Brandt Commission in 1987 recommended a set MUC with certain areas of knowledge that could be implemented across GME, this review has shown the complexity of doing so.[7] Within the literature, there is a consistently demonstrated need for additional military-specific training owing to added responsibilities of the military physician. However, although over 13 specialties have incorporated elements of an MUC into their residency programs, these programs lacked broad adaptation, standardization, and continuity, and this reflects lack of consistent leadership at the highest levels.

It appears a major hindrance to creation and implementation of a blanket MUC is not only the difference in training requirements across specialties, but also the fact that military GME programs are required to comply with civilian ACGME requirements to maintain their accreditation; no elements of an MUC are required for residency accreditation, nor monitored by the ACGME or the services for compliance. Anecdotally, residency program directors do not consistently or routinely implement MUC elements into their programs because doing so may compete with ACGME requirements, and training time is limited by both recent changes to work duty hours and need to maintain civilian certifications. Because MUC elements are not mandated by any governing body, implementation is dependent on individual programs.

In contrast to the constraints in programs with limited training time and numerous civilian requirements, RAM, OEM and preventative medicine residencies were historically designed to support the military mission, and had training that could be flexed to meet the requirements of the Armed Forces and was integrated throughout the duration of the residency.[28–30] Surgical specialties in contrast, which had a limited representation in the literature, had shorter skills-based courses to augment and prepare residents for operational requirements, without advocating for additional operational training.[25 32 33] Given the limited training time, Navy surgery has developed a textbook that encompasses their MUC given the time constraints inherent in training general surgeons, although there is no standardized implementation.[34] Non-primary-based procedural specialties including psychiatry, family medicine, internal medicine and emergency medicine included more examples of operational training including field-based training, joint exercises and simulation training, likely owing the differences in overall training requirements set by civilian governing bodies.[35–39] For example, emergency medicine residencies are traditionally 3 years, but the military has 4-year programs that enable trainees to participate in asynchronous operational experiences through the program, given the flexibility with increased training time.[37] The variation in requirements across specialties shows the difficulty in creating a universal MUC, as each specialty has a different interpretation of which skills and additional training are necessary to prepare military physicians.

Given this review, it appears that there is an established and justifiable need for military-specific training during GME, although a standardized regimen remains to be seen. The primary mission of a military physician is to be prepared to go to war, in that, aptly put, 'the combat ready

soldier, threatened by injury or disease, counts on having a combat ready doctor to debride his wounds, preserve his health, and treat his ills.'[40] However, we found that in this review, that a single MUC is unlikely to be applicable to all specialties and services. It appears that an MUC tailored to a specific specialty is the best course to meet the needs of the military physician upon residency graduation, which National Defense Authorization Act of 2017 required that GME programs fully support operational medical force readiness.[41] This review has explored the significant body of work that exists describing the history, development, and implementation of MUC across services and specialties, and further studies are needed to develop an MUC that is both feasible within the constraints of civilian training requirements and realistic to providing military physicians with the knowledge and skills they need. Additionally, leadership across GME, and within each service and specialty will need to establish who would ultimately be responsible for both developing, implementing, and upholding MUC standards.

CONCLUSION

The purpose of this review was to broadly describe the history of development and implementation of MUC within GME training across all specialties and services. This review found that given the broad scope of specialties and variation in missions and readiness requirements across services, it is difficult to create a uniform curriculum that can be implemented to train residents to a single standard. However, this review demonstrates that an MUC is necessary, and that ideally, it should be tailored to specific specialties so that immediately upon residency graduation, military officer physicians are prepared to lead and provide care across the globe.

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