

CROSSROADS

Exploring the Possibility for a Common System for Joint Aeromedical Standards

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ABSTRACT: The Physical qualification standards for aviation service used by the United States Army, Navy/Marine Corps, Air Force, and Coast Guard developed in parallel, diverging in many instances due to differences ranging from terminology to mission. Presently, standards and requirements for waiver vary widely between the services, in spite of minimal differences in aeromedical concerns for any given medical condition. Standardization or increased concordance between the services would have several advantages leading to more efficient and effective delivery of aviation medical support to the operational forces. This is particularly true in an increasingly joint operational environment. The authors have identified four major hurdles that must be overcome before the concept of joint aviation physical standards can be explored. These include: a difference in terminology including aviator classification, a difference in mission definitions and requirements, a difference in the processes of policy development, and a difference in the review and application of those policies. These hurdles are explored, and suggestions for their mitigation are presented with open discussion following.

Keywords: Aerospace Medicine, Aviation Medicine, Physical Standards, Military Medicine

INTRODUCTION

The clinical practice of Aviation Medicine in the U.S. Military revolves around an administrative landscape of aeromedical policy and physical standards which are specific to the four main branches of the U.S. Armed Forces including the U.S. Air Force, U.S. Army, U.S. Navy/Marine Corps, and the U.S. Coast Guard. In today's operational environment, military Flight Surgeons are increasingly practicing in a joint military environment in which service members from different services must collaborate in order to accomplish the mission. In this joint military environment, Flight Surgeons are expected to be equally well versed in the policies and procedures of their sister services, as they provide aeromedical care for aviators and aircrew members from all services. Despite commonalities in aeromedical concerns, each service's aeromedical policies have diverged over time, resulting in an often confusing and unnecessarily complicated joint framework for aviation physical standards. There is increasing pressure from high levels of U.S. Department of Defense administration to consolidate practices across services in many areas of support including but not limited to aviation medicine. This paper explores the hurdles encountered in developing a set of joint Aeromedical physical standards and administrative procedures and proposes potential solutions to some of these problems. While these proposals are not intended to be comprehensive in nature, they are presented to raise awareness and initiate dialog between administrators throughout the aeromedical communities, with the goal of moving toward the authors' vision of a single common system of aeromedical administration for the U.S. Military. The scope of this article is limited to the U.S. Military for the sake of brevity, but parallel analysis with our international brethren is invited, as many of the same lessons clearly apply in the international military aviation medicine community.

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BACKGROUND

The idea of a unified approach to medical service for all branches of the U.S. Armed Forces is not new. With four separate medical departments in the U.S. Navy/Marine Corps, U.S. Army, U.S. Air Force, and U.S. Coast Guard, the efficient delivery of health care to armed service members and their dependents has long been complicated by stovepiping of resources and programs. One of the most energetic attempts to consolidate US Department of Defense medical services was put forth by Major General Norman Kirk in 1947. While Kirk did not originate this idea, he materialized the concept in a detailed plan that he presented to the Senate Armed Forces Committee (13). Since that time, several more attempts have been made to propose a sweeping unification of all the armed forces medical services into one integrated service. In fact, the Civilian Health and Medical Program for the Uniformed Services (CHAMPUS) was a direct spin-off of these attempts.

Efforts to establish physical standards for selection and retention in aviation date back to World War One when Allied Forces were wrestling with integration of the airplane into normal operations. Recognizing the need for standardization in aviation medicine, Drs. Theodore Lyster and Isaac Jones developed a system of physical standards and education throughout the U.S. Army, which laid the foundation for the standardized approach to physical qualification for aviation service which we utilize today in all branches of the U.S. Armed Forces (6). Those early efforts of Doctors Lyster and Jones evolved into the modern practice of aviation medicine in the military, and as the Air Force broke off from the Army Air Corps in 1948, this framework for aviation medicine carried forward. But with five United States armed forces entering the modern era of aviation, Aeromedical policies and physical standards have necessarily diverged to meet operational demands of the specific service.

Advances in technology drive the evolution of military tactics, which in turn results in changes to organizational structures, changes in Techniques, Tactics, and Procedures (TTPs) and the application of Combat Services Support on the battlefield. Changes in our current operational climate dictate the need to reconsider the practice of aviation medicine in the military. Increasingly, Flight Surgeons and aircrew are deployed in settings where crewmembers must rely on Aeromedical support from sister service Flight Surgeons. Under current practices, Flight Surgeons are rarely trained and are even less frequently familiar with the aeromedical standards of their sister services. As a result, they will do their best to wade through the necessary bureaucracy in order to meet the mission, frequently without achieving success and often failing to meet requirements. Differences in administrative frameworks between military aviation medicine programs unnecessarily inhibit the Flight Surgeon's ability to provide needed services.

Proponents of unification of aeromedical systems across service boundaries tout an increased efficiency of care and decreased costs of administration. These advantages may be particularly true during peacetime, and in stationary military medical facilities. Opponents to unification rightly point out the differences in mission and operational environment between the services, and the requirement for medical assets organic to individual units that are able to provide optimal and timely care in these unique settings. Frequently, this requires divergence in training in order to provide an operationally relevant product.

While the authors do not necessarily advocate the unification of the medical services as a whole, the adoption of a common language and a set of common tools within the aeromedical communities of the individual services has several advantages. Issues as simple as which form to use for a flight physical, or which labs to order, or as complex as how to classify an aeromedical disposition or how to process a waiver evaluation frustrate the Flight Surgeon and often lead to duplication of work, or worse. Standardization or increased concordance between the services would lead to more efficient and effective delivery of aviation medical support to the operational forces both at the individual Flight Surgeon level as well as at the program administration level.

Clearly, each service has both shared (e.g. rotary wing) and unique (e.g. carrier landings) aviation functions, and each operational environment places unique physiological and psychological stresses on the aviator. However, equally clear should be the reality that the vast majority of medical conditions (e.g. cardiovascular disease) will have the same implications in an aviator who straps into any aircraft, regardless of type or paint color. Evidence-based practice mandates that Flight Surgeons separate their aeromedical analysis from

political service-based policy boundaries, and continue to delineate with the highest degree of fidelity which conditions, and to what degree these conditions will have a different impact on aviators operating from different platforms based on valid medical evidence. By and large, this work has lacked the broader perspective of military aviation medicine as a whole. Increasing collaboration and improved distribution of labor will lead to improved policies and improved Risk Management for the entire military aviation community.

Our vision is very simple. We are advocating and have been working in what has proven to be a very political realm towards the simple goal of having one system in which flight surgeons can experience true interoperability, providing aeromedical services across service boundaries—an operational reality and necessity which we believe can no longer be ignored.

To this end, in 2002, the authors began a series of posters, panel discussions and working groups presented at international conferences including the Aerospace Medical Association Scientific Meeting and Medicine in Challenging Environments which brought together aviation medicine representatives from all of the U.S. Armed Services in order to discuss and further delineate the possibilities for improved collaboration in the development of Aeromedical policy and practices. As a result of these and many other sidebar discussions, we are happy to report several significant movements in the direction of Aeromedical jointness. In 2009, the U.S. Navy, U.S. Army, and U.S. Coast Guard have adopted a common administrative framework

Figure 1: The Aeromedical Decision Making Process

in the Aeromedical Epidemiological Research Office (AERO) for the workflow of flight physicals, and the U.S. Coast Guard and U.S. Army have agreed to share a common system of physical standards for aviation. Other special duty communities within the Army are also evaluating these systems as a viable solution to parallel processes within those communities. While there is still significant work to do in the areas which will be explored in this article, these landmark decisions mark a significant and growing support for the vision of one common system of Aeromedical administration.

AEROMEDICAL DECISION MAKING PROCESS

Critical to the process of joint aeromedical administration, must be a common system of evidence based decision making and analysis. Doctors Sauer and Woodson described the Aeromedical Decision Making Process (1) as an analog of Operational Risk Management applied to aviation medicine clinical and policy decisions.

The goal of the Aeromedical Decision Making Process is to "prevent aviation mishaps due to physical or medical deficiencies…without unnecessarily restricting [military] aviation." It is the method that Flight Surgeons employ in order to evaluate specific conditions and crewmembers for entering or remaining on aviation service.

Within this framework, aeromedical policy and physical standards for aviation service are viewed as risk management controls to increase aviation safety. The effects of a given medical condition must be evaluated on an individual and population basis in order to assess the impact upon severity and probability of contributing to a mishap or mission failure.

When applied to policy development, this process provides an objective means by which to evaluate the common Aeromedical concerns for a given medical condition which all sister services share, while attending to the specific differences in mission requirements free from the individual bias which has long skewed aeromedical policy. It should be noted that mission differences, rather than service differences, drive this aeromedical risk assessment process based on the real and observed aviation operating environment. The commonalities between service-specific considerations for a specific mission or platform type far outweigh the differences.

The first hurdle to overcoming service boundaries in aviation medicine may very well be to adopt a common framework for the discussion and evaluation of aeromedical concerns. This model provides such a framework and may supply

an efficient means for converting available medical evidence into better risk controls and aeromedical policies which serve all aircrew and flight surgeons regardless of nationality or service membership.

HURDLES TO JOINT AEROMEDICAL STANDARDS

Each of the U.S. armed services enjoys its own unique culture and challenges. These may range from simple differences in language to more complex significant mission requirements such as accounting for the additional challenge of performing an aircraft carrier landing. An effective joint system for aeromedical administration must account for these differences. Before moving forward with any type of program implementation, we must first reach consensus on what hurdles these differences present. As this question has been analyzed, the authors have identified four primary hurdles: 1) a difference in terminology including aviator classification, 2) a difference in mission definitions and requirements, 3) a difference in the processes of policy development, and 4) a difference in the review and application of those policies.

DIFFERENCES IN TERMINOLOGY

Individual service cultures and administrative landscapes have contributed to the development of non-standard terminology in aviation medicine. While the meaning in most cases translates in the same manner, it is difficult for members of one service to understand a sister service's policy stance for no other reason than differences in language. Before moving forward with common policy or programs, we must begin to adopt standard terminology or "common language."

The wide variation in terminology used illustrates our incongruities. Even simple concepts such as the retention of a service member on active duty, the status of an individual's physical and mental condition for flight, or identification of the service member's work code specialty each have different nomenclature between the services. For example, the Army and Navy may refer to "Retention" while the Air Force may refer to "continued military service." The Air Force may refer to an aviator who does not meet designated physical standards for aviation as "Not Qualified" while the Army refers to the same aviator as "Disqualified" and the Navy as "Not Physically Qualified (NPQ)." The Army and Air Force will describe physical limitations as "profiles" (based on a system of physical profiling as outlined in the regulations) while the Navy will describe "Limited Duty." Similar terminology differences abound in the regulations across service boundaries.

Most of these language differences are not critical in nature. Certainly, a common meaning is normally inferred. The important thing to recognize is that they can be misleading and cumulatively, they do create confusion when working in a cross-cultural aviation medicine environment. More importantly, such language will have to migrate towards commonality as joint policies, procedures, and systems are developed.

More troubling than differences in language is the variance in aeromedical classification systems of the different services. Looking at the differences between the Army/Coast Guard, Navy, and Air Force aeromedical classification systems, different approaches are immediately evident (Table 1).

Aeromedical policies are designated for specific classes of aviators as outlined in Table 1.

Air Force	Navy	Army/Coast Guard
Flying Class I: Selection for Pilot Training Flying Class IA: Selection for **Navigator** Training Flying Class III: non-rated duties Categorical Flying Class II • FC IIA: Low-G aircraft (tanker, transport, bomber) • FCIIB: Non-ejection Seat • FCIIC: Specified restrictions	Class 1: Pilots (Naval Aviators) • Service Group I: unrestricted (including night carrier operations) • Service Group II: no shipboard operations (except helicopter) • Service Group III: dual-control only; with SG I/II copilot Class 2: All other aircrew (Naval Flight Officer, Flight Surgeon, etc.) Class 3: Air Traffic Controllers, UAV operators, etc.	Class 1A: Initial pilot applicant (Commissioned) Class 1W: Initial pilot applicant (Warrant) Class 2: Rated aviator Class 2F: Flight Surgeon, Aeromedical Physician Assistant Class 3: All other aircrew (crew chiefs, gunners, flight medics, aerial observers, maintenance aircrew, altitude chamber technicians, UAV operators) Class 4: Air Traffic Controllers

Table 1: Aeromedical Classification Systems

Aeromedical disposition in each service is grounded in its own aeromedical classification system, each of which have developed through an amalgam of service culture and regulatory framework entirely outside the realm of aviation medicine. It is fairly easy to recognize that these classes are defined in each service based on fundamentally different frameworks. In many cases, the difficulty in interpreting aeromedical physical standards is rooted in the differences in these classification systems.

It is difficult to see a truly joint aeromedical system that uses the current service-specific aircrew classification structure. Standardization of this system into a common inter-service aircrew classification would seem the only plausible solution to this problem and a vital step towards unification of aeromedical systems in the U.S. Military.

Several solutions may present themselves, but one potential solution could be based upon crewmember type and basic aeromedical distinction. There are only four essential types of individuals who require aeromedical clearance, each of which represents unique job-related physical requirements: 1) flight crew who control aircraft , 2) flight crew who do not control aircraft 3) crewmembers who perform ancillary duties in flight (aerial observers, weapons system operators, equipment operators, etc) unrelated to the control of the aircraft 4) individuals who perform flight-related duties, but not involving actual flight duties (ground crew, ATC, UAS operators etc). Accordingly, one potential interservice classification system might look like that seen in table 2a, which separates mission specific considerations and initial vs. retention considerations from the basic element of disposition classification. A second option could link aeromedical risk to aeromedical threat (Table 2b).

Aircrew Class	Description
Class A	Non-flight crew performing aerial duties
Class B	Non-flying, flight related personnel
Class C	Flight Crew, Pilot in Control, single-control aircraft
Class D	Flight Crew, Pilot in Control, dual-control aircraft
Class E	Flight Crew, Non-pilot

Table 2a: Proposed Interservice Aircrew Classification System, version 1

	In-Flight Crew	**Ground-based**
Flight Critical	Class A	Class C
Flight Important	Class B	Class D

Table 2b: Proposed Interservice Aircrew Classification System, version 2version 1

Any classification system will require the Flight Surgeon to make decisions based on individual crewmembers and their specific job requirements, but an effective classification system must account for differences in physiological requirements. The key point is that adoption of a common inter-service classification structure such as that presented in tables 2a or 2b would facilitate cross-service communication and allow for a common framework of aeromedical regulations, moving us much further down the road towards a unified joint aeromedical system.

FRAMEWORK FOR STANDARDS DEVELOPMENT (MISSION VS. PHYSIOLOGY)

The major services of the U.S. Armed Forces frequently distinguish themselves based upon their stated mission. On the most basic level, these missions may be categorized based upon service distinct missions (e.g. land-based vs. carrier-based in the Navy), the platform flown (e.g. fixed vs. rotary wing) or the complement of crew (e.g. single pilot vs. multi-crew aircraft). However, each type of aviation platform places its own unique set of physical demands on the aviator, while many demands are common to all aviation platforms.

Aeromedical concerns are more appropriately described in reference to the mission the aircrew member is serving than to the branch of service of which he or she is a member. There is no doubt that due diligence must be paid to the physiological demands of specific missions and equipment on the crewmember. It must be noted, however, that these demands are grouped into categories that transcend service boundaries. The present system effectively prevents aeromedical categorization of missions across the services. More importantly, it frequently does not even account for actual physical stresses on different categories of crew members within a given service. An effective framework for aeromedical standards would appropriately account for differences in physiological demands based on mission, equipment, environment and other job requirements.

One example of the failure to consider mission specific physical demands is illustrated by looking at the standards for stereopsis in Army aircrew. Current policy allows deficiencies in stereopsis for crewmembers (non-pilots) but not for pilots (9,11). This may represent a leftover policy from the primarily fixed wing days of Army aviation medicine and is probably based on reasonable rationale: pilots need advanced stereopsis on final approach and landing phases of flight which are within the

stereoptic range, and back-end helicopter crewmembers' duties would not routinely call on their stereoptic capability as they manage payload. Yet evidence supports the idea that monocular pilots (without stereopsis) do just as well as binocular pilots in landing aircraft (15,16) and mission analysis readily demonstrates that the army crewmember may require greater degrees of stereopsis than the front end crew as he controls aircraft position in fine detail during air assault, fast-rope, sling-load, and routine hot-loading operations. The basic (reasonable) premise for this inversion of standards is most likely based on a general impression that pilots require higher standards than non-pilots.

This is a seemingly simple oversight, but it highlights the difficulties encountered when we fail to consider the actual physical demands of mission and equipment on crewmembers. Compound this phenomenon by comparing the differences between high-Gz platforms, carrier-based landings, rotary wing platforms, and Unmanned Aerial Systems (UAS). Other critical differences in demands exist based on differences in operating altitude and G-Forces.

One approach to developing a functional joint system would be to examine the unique physiological aspects of broad categories of aircraft (Table 3).

When examining physical standards from this perspective, a more suitable framework for physical standards emerges; one which would serve the needs of all services, and would be based on physiological demands rather than political boundaries. A very important consideration is that each service does not necessarily operate within its own traditional boundaries; missions traditionally reserved for one service may be conducted by aircrew from another service. One commonly cited difference is the Navy requirement for carrier-based operations, an obviously demanding aviation task. Yet Army, Coast Guard, and Air Force rotary wing aviators are often called on to land on ship-based platforms. Current aeromedical administrative structure would not account for these challenges and their associated physical demands. If modified to address platform and mission based differences, a new joint aeromedical structure would allow us to speak the same aeromedical language across service boundaries and would better reflect an evidence based approach to aviation medicine.

An aeromedical evaluation of an aviator could be made in the context of platform/mission-based parameters. A pilot, flight officer or aircrew member can be effectively authorized or restricted to fly on different types of missions, based on the

Rotary Wing	**Fixed Wing – Low Gz** (tanker, transport, bomber)	**Tactical Jet – Hi Gz**	**Unmanned Aerial Systems (UAS)**

• Lower Gz
• Vibration (2-35 Hz)
  • Intervertebral disc dz 4-5 Hz)
  • Pregnancy
• ↓ Hypoxia Concern
• Visual Acuity
  • Contrast sensitivity
  • Close proximity to the ground
  • Constantly clearing for obstacles, wires
  • Ground Target acquisition
• Monocular displays/NVG
  • Binocular rivalry
  • Stereopsis eliminated (Terrain within limit)
  • Neck pain
  • ↓ Acuity (20/40)
  • ↓ Fields of view (40 deg)
  • Color vision eliminated
  • ↑ Ocular Motility demand
• Depth perception
  • NVGs
  • NOE flying
• MOPP
• Living conditions/Heat stress
	• Lower Gz
	• Long Duration Missions
	• Large Crews, often dual piloted
	• ↑ Hypoxia Concern
	• Stereopsis less critical
	• Decompression (also pressure suits)
	• Radiation (high altitude recon)
	• ↑ Circadian rhythm shifting
		• High, rapid-onset Gz
		• ↑↑ Hypoxia Concern
		• Long Duration Missions
		• Decompression
		• Visual Acuity
		  • Increased visual demand for tactical mission
		  • Close proximity to the ground
		• Air Target acquisition
		• Ejection Seats
			• Ground Based
			  • No Hypoxia Concern
			  • No pressure differentials
			• Color Vision critical
			• Stereopsis not required
			• Dual Pilot
			• Potential for in-flight crew changes
			• Increased demands on decision making and situational awareness challenge traditional views of UAS requirements
			  • Flying in Class A Airspace
			  • Weapons and targeting systems

Table 3: Aeromedical Aspects of Broad Categories of Aircraft

Aircraft
☐ Rotary ☐ Fixed-wing prop ☑ Fixed-wing jet
Environment
☑ High G (>3G) ☐ Low-G (<3G)
Base of Operations
☐ Land-based Flight Ops ☑ Sea-based Flight Ops ☑ Ground-Based Ops
Crew Complement (pilots only)
☐ Single pilot ☐ Dual pilot
Further Limitations:
none

Figure 2: Example of Proposed Up Chit (Recommendation for Flying Duty)

corresponding aeromedical stressors and that person's physical and mental capabilities. More appropriately, the categories may be organized so that the service member is fully qualified for all categories except for those indicated. One example of this classification, as it might appear on a joint aeromedical clearance chit (up slip) is seen in Figure 2.

Such a system would allow classification of pilots, flight officers and enlisted crewmembers, regardless of service, based upon physical and mental capabilities from an aeromedical perspective. With the increasing incidence of exchange tours, particularly among pilots between the services, this system would allow a common basis of categorization, further helping to eliminate the "language barriers" that exist between the aeromedical branches of the Army, Navy and Air Force.

DIFFERENCES IN THE PROCESSES OF POLICY DEVELOPMENT

Currently, each service maintains parallel analogous organizations which develop and implement aeromedical policy (Code 42, Army Aeromedical Activity (AAMA, Aeromedical Corporate Board, Aeromedical Consult Service, Aeromedical Advisory Council, etc). Each service also maintains its respective process for submission, review, and disposition of aeromedical standards as well as policy development. These organizations and processes serve a vital role in maintaining safety and quality in aviation medicine.

As we consider the convergence of aeromedical systems, each service must ensure that its administrative aeromedical system continues to serve its own interests. Migration towards a common process and waiver guide is a step-wise approach and must ensure that these interests and representation are maintained. The authors do not advocate for or suggest a radical course change, but rather a common effort towards commonality. We have already begun to work toward this end and are sharing information better than ever before. In today's aeromedical environment, waiver policies are usually modified with at least some modicum of collaboration between the services. Joint policies are in some cases being adopted, and convergence into common electronic systems is evolving. (Some of these will be discussed later in this article.)

Ideally, however, services could eventually move (when collectively ready) towards some system of formal "joint aeromedical council" or board which could manage a truly joint aeromedical waiver guide and/or disposition system. This idea may seem alarming to some, but the important thing to recognize is that there is an entire spectrum of possibilities to consider, including formal and informal processes and systems. In order to sustain a joint process we will need to establish some kind of mechanism by which Aeromedical policies are developed, considered, implemented, and modified while protecting the interests and concerns of all the services. While clearly not comprehensive, Table 4 illustrates a stepwise approach which could move us carefully in the joint direction.

DIFFERENCES IN REVIEW AND APPLICATION PROCESS

While medical conditions may be interpreted differently by each service, or in aircrew members flying different mission platforms, most Aeromedical Physical Exam requirements are (and should be) based on sound medical/public health screening principles, and should not vary by service or mission.

One of the easiest and highest yield obstacles we can overcome is that of unifying the actual requirements for initial and periodic aeromedical

evaluations across services and mission platforms. Wading through the service-specific regulations and instructions, we identify a grossly incongruent set of physical exam requirements. Differences exist in issues as simple as who is required to undergo ECG testing, or who must have a G6PD, urinalysis, or lipid panel. Chest X-rays do not share common mandates and each service has its own variation of anthropometric testing and cardiac risk profiling. Yet, we all seek the same outcome. Most of these differences probably reside not in the medical merit of the tests themselves, but in the differences in policy development as outlined previously. Yet these differences are extensive; they are the culprit in wasting numerous man-hours when an aviator from one service is forced to complete a flight physical with a sister-service flight surgeon which does not meet his service standards.

Adoption of a single, unified set of diagnostic testing requirements for initial applicants and established aircrew members should be fairly simple to achieve and would represent tremendous progress toward commonality. The net effect of this one change would be a dramatic improvement in interoperability of the flight surgeon in the joint environment.

Another hurdle which presents a fairly simple opportunity for convergence is found in the paperwork drill. In spite of Department of Defense level efforts to standardize the physical exam forms in the DD2807 and DD2808, we have not seen universal adoption of these forms in aviation medicine. Additionally, our abbreviated physical exam forms for interim flight physicals remain distinct. Forms represent a standardized method of collecting and presenting basic clinical data and are critical "glue" for the aviation medicine program. In addition to the joint up chit described previously, adoption of a common "short form" and agreement to utilize the DD2807/8 for comprehensive physicals in all services would appear an easy fix and should not encounter significant resistance within individual service cultures.

Another opportunity for convergence exists in our method of submission, review and disposition of aeromedical evaluations. Each service retains (and should retain) its own authoritative body on disposition. Traditionally, physical exams were submitted on paper to the corresponding administrative body (AAMA, Code 42, ACS, etc) for review. Modern world-wide-web technology has presented the possibility for a new model for review and disposition which may potentially bring us closer together. A common internet application shared by the service authorities would better facilitate cross-communications between aeromedical specialists and provide for a common process which would better facilitate joint aeromedical communications and research.

Initial Steps
• Individual services move toward common "best-practices" as aeromedical policies (waiver guides) come up for review; informal collaboration across services (information sharing) with goal as unified approach to a given aeromedical condition. • Basic physical exam requirements (exam, labs, forms, etc) are unified (see above). • Aviator Classification system is unified (see above). • Cross-pollination in training (joint residencies) and joint assignments at aeromedical centers, leading to better information sharing and opportunities for collaboration.
Periodic "Aeromedical Council" (e.g. quarterly, semi-annual)
• Joint forum in which representatives from all the services and aviation communities are able to share ideas and information in a unified effort to develop congruent "best practices" in waiver policies across service boundaries. • Strategic long-term plan to review all aeromedical waiver policies in systematic manner over time. • Barriers to commonality in waiver policy, administrative requirements, etc are explored and ultimately problems are solved.
Consolidated Joint Waiver Guide
• Policies are unified through an evidence-based risk management model, which accounts for all mission/service needs under a unified classification model. • Resources are pooled, yielding an improved product without unnecessary duplication of effort. • All Flight Surgeons have a single tool that allows for improved management of aviators in an increasingly joint environment.

Table 4: Policy Development and Implementation of Process

THE AEROMEDICAL ELECTRONIC RESOURCE OFFICE (AERO) AND CURRENT JOINT INITIATIVES AS AN EXAMPLE OF CONVERGENCE

Opportunities to converge towards common systems, policies, and practices abound and do not necessarily require a monumental overhaul of what is currently in place. While compromise is important, the service-specific aeromedical authorities do not need compromise on their standards or requirements in order to find common ground. One example of such endeavors can be found in recent developments in the integration of the Aeromedical Electronic Resource Office (AERO) at Fort Rucker, Alabama.

In 2002, the U.S. Army Aeromedical Activity (USAAMA) adopted AERO as an internet-based solution to aeromedical review and disposition, replacing a cumbersome paper-based submission process in the Army. This government owned and developed system was fielded, and over a short period of time, resulted in significant improvements in the disposition of Army flight physicals. In addition to improving the submission process, internal processing times at USAAMA were reduced from 150 days to 1-2 days on average, while also making provisions for immediate review when necessary. AERO provided for data checking and was easily integrated into the Flight Surgeon's office, both CONUS and OCONUS in the deployed setting. Administrative errors on submitted physicals were reduced from 40% on the paper-based system to <1% on AERO, and immediate feedback was provided to the Flight Surgeon on the disposition of aircrew physicals. Backlogs were cleared and overall efficiency was dramatically improved.

In 2008, with problems similar to those experienced using the Army's paper-based systems, steps were taken independently in the U.S. Navy and U.S. Coast Guard to implement AERO as their system for aeromedical disposition and review. While still undergoing testing and implementation in both services, it is already clear that this system has the potential to make significant improvements in the process of disposition and allows for commonality on an entirely different level than ever before.

There are several points about this AERO migration which must be emphasized. Firstly, the Army, Coast Guard, and Navy all shared a similar pathway for review and disposition within their own organizational structures (e.g. all three use a centralized review authority). Secondly, the Coast Guard and Army share a common footing in aeromedical culture as a result of the sharing of a common training base for Flight Surgeons, and a common migration of Army Flight Surgeons into the Coast Guard medical service. Thirdly, in the case of the Coast Guard, the aeromedical physical exam parameters (items required for physical exams) were already very similar. To cement these similarities, the Coast Guard agreed to adopt the same standards utilized by the Army, and Code 42 in the Navy has worked diligently to more closely align physical exam parameters with the Army and Coast guard in order to facilitate AERO integration.

The opportunity presented by Navy and Coast Guard AERO integration allowed AAMA to make some minor modifications to AERO to account for differences in requirements within the Navy's aeromedical policy. Without modification, the process of review within AERO very easily accommodated differences in the waiver process in both services. Because AERO utilizes a role-based system, the actual waiver authority could be retained in the service and allow for service-specific review while allowing all three services to utilize a common system and begin to migrate specific physical exam parameters, beginning to overcome one of the previously mentioned hurdles to commonality.

While AERO is only one system and one example, it serves the purpose of this article, as a vivid example of the capacity for convergence towards the authors' vision of a single common aeromedical system, while simultaneously raising the program standards within each individual service.

CONCLUSION

The prospect of developing a joint Aeromedical System and Waiver Guide is clearly daunting and is not without its challenges. Service culture, existing systems, policies, and service specific regulatory landscape all play important roles in keeping aeromedical systems separate. It is clear with the continuing evolution of the military operational environment that each of the services must work to migrate towards commonality while time permits, before higher authorities mandate such a move. In the meantime, the benefits of increased jointness include increased efficiency, increased interperability, and the facilitation of aeromedical epidemiological research. Despite aeromedical divergence over the course of the last 100 years since the beginning of military aviation medicine, we are beginning to see a convergence towards a common system. As we continue to explore and overcome hurdles to joint aeromedical systems, we will see that the authors' vision of a single common system of Aeromedical Administration for the U.S. Military is indeed within reach.

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