Exploring the Possibility for a Common System for Joint Aeromedical Standards


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 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, Flight Surgeons are increasingly practicing in a joint military environment in which medical personnel from all services are deployed in settings where crew- members must rely on information 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 often need to access the information necessary to operate in these unique settings. Frequently, this requires training in the sister service’s systems.

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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.
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 improving and have been working in what has proven to be a very political realm towards the simple goal of improved Risk Management for the entire military aviation community.

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 medical 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 duty.

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 different languages 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 may make 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 the meaning of another service’s language 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 Coast Guard, Army, 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.

<table>
<thead>
<tr>
<th>Air Force</th>
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<th>Army/Coast Guard</th>
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<tr>
<td>Flying Class 1A: Selection for Pilot Training</td>
<td>Flight Officer, Flight Surgeon, etc.)</td>
<td>Flight Class: Air Traffic Controllers, UAV operators, etc.</td>
</tr>
<tr>
<td>Flying Class I: Selection for Navigator Training</td>
<td>Class 2: All other aircrew (Naval Flight Officer, Flight Surgeon, etc.)</td>
<td>Class 1: Pilots (Naval Aviators)</td>
</tr>
<tr>
<td>Categorical Flying Class II</td>
<td></td>
<td>Service Group I: unrestricted (including night carrier operations)</td>
</tr>
<tr>
<td>• FC IIA: Low-G aircraft (turbine, transport, bomber)</td>
<td></td>
<td>Service Group II: no shipboard operations (except helicopter)</td>
</tr>
<tr>
<td>• FCIII: Non-ejection Seat</td>
<td></td>
<td>Service Group III: dual-control only; with S1/S2 copilot</td>
</tr>
<tr>
<td>• FCHC: Specified restrictions</td>
<td></td>
<td>Class 2: All other aircrew (Naval Flight Officer, Flight Surgeon, etc.)</td>
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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.

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| Class 2: Rated aviator |
| Class 3: All other aircrew (Naval Flight Officer, Flight Surgeon, etc.) |
| Class 4: Air Traffic Controllers |
| 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 S1/S2 copilot |
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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 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 inter-service aeromedical classification system might look like that seen in Table 2a, which separates mission specific considerations and initial vs. retention consideration from the basic element of disposition classification. A second option could link aeromedical risk to aeromedical threat (Table 2b).

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 in these 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 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 aviator type and basic aeromedical classification. 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 stereotrope range, and back-end helicopter crewmembers’ duties would not routinely call on their stereoscopic capability as they manage payload. Yet evidence supports the idea that monocular pilots (without stereopsis) do just as well as binocular pilots in landing and takeoff operations. 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 in these regulations, moving us much further down the road towards a unified joint aeromedical system.

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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 aero medical clearance chit (up slip) is seen in Figure 2.

Aircraft
- Single pilot
- Dual pilot

Crew Complement (pilots only)
- None
- Single pilot
- Dual pilot

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

Another hurdle which presents a fairly significant resistance within individual service authorities would better facilitate cross-communications between aeromedical specialists and provide for a common process which would move us carefully in the joint direction.

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 disposal 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 aero medical 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 which could manage a truly joint aeromedical waiver process and further helping to eliminate the “language barriers” that exist between the aeromedical branches of the Army, Navy and Air Force.

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As we consider the convergence of aero medical 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 which could manage a truly joint aeromedical waiver process and further helping to eliminate the “language barriers” that exist between the aeromedical branches of the Army, Navy and Air Force.
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 for 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 physcials. In addition to improving the submission process, internal processing times at USAAMA were reduced from 150 days to 1-2 days on average, while making process improvements for immediate review when necessary. AERO provided data for 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 progress 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 for 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 common pathway for review and disposition within their respective military 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 interoperability, and the facilitation of aeromedical epidemiological research. Despite aeromedical divergences, 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.