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International Military Medical Standardization— Status and Prospects

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SUMMARY: The purpose of this paper is to discuss medical standardization within the international military arena. I will present the driving factors, procedures, and an overview of medical standardization within NATO of importance to PFP nations.

INTRODUCTION:

Good Afternoon ladies and Gentlemen! It's a great pleasure to be with you today, to discuss a matter near and dear to my heart—that of Medical Standardization. I want to make it very clear from the outset, though, that while the general principles I want to discuss today transcend any particular organisation, the details I will be presenting are specific to NATO and to its involvement with the Partnership For Peace nations. There are other organisations involved in development of medical standards which may affect the military, such as the International Standards Organisation (ISO), the Air Standards Coordinating Committee (ASCC), and the ABCA Quadripartite Working Group, but I am not attempting to discuss their structures or procedures. Whenever possible, we in NATO attempt to make use of the standards developed by such other organisations, but generally speaking there is no direct interrelationship.

DISCUSSION:

What I want to discuss today is a series of questions: What is standardization in the NATO context? Why do we need medical standardization?; How do we do it?; and, What do we attempt to standardize?

So, what is standardization? ---“Within NATO, it is the **process** of developing concepts, doctrines, procedures and designs to achieve and maintain the most effective levels of compatibility, interoperability, interchangeability and commonality in the fields of operations, administration and materiel.”

That being said, it must be recognised that, within NATO, there is no belief that all our nations must do everything exactly the same way. While there are some areas for which total interchangeability is needed (such as ammunition), it is obvious that many other areas of concern do not need to be totally interchangeable. In fact, this is recognised, in that there are four levels of standardization which may be considered acceptable in differing circumstances:

- **COMPATIBILITY**, defined as “My System (or procedure) does not interfere with yours”.
- **INTEROPERABILITY**, defined as “My system (or equipment) can talk to yours”.
- **INTERCHANGEABILITY**, defined as “My equipment items can be exchanged for yours without modification”.
- **COMMONALITY**, defined as “We utilise the same doctrine, procedures, or equipment”.

Actually, to simplify this issue, NATO is working on a changed nomenclature which will have only three recognised levels of standardization, which are:

- **COMPATIBILITY** (“The suitability of products, processes or services for use together under specific conditions to fulfil relevant requirements without causing unacceptable interaction”.)
- **INTEROPERABILITY** (“The ability of one product, process or service to be used in place of another to fulfil the same requirements”.)
- **COMMONALITY** (“The utilisation of the same doctrine, procedures or equipment”.)

You will note that essentially this proposed new definition will amalgamate the current two categories of “Interchangeability” and “Commonality”, which are seen as having a major area of overlap at present.

It is important to understand that for a piece of equipment, or for a force structure to operate effectively, different elements may need to be at differing levels of standardization. To achieve cost effectiveness it is important, when defining a requirement, to establish the minimum level which will achieve the aim. For example doctrine, terminology and legal aspects should be on the level of **commonality**, ammunition on the level of **interchangeability**, with communication and weapon systems on the **interoperability** level.

The Guiding Principles for standardization within NATO are:

- Standardization is voluntary—no nation can be forced to agree to standardize anything. They will do so only if they agree that it is in the interests both of the Alliance and of the nation.
- It is not an end in itself—we do not attempt to standardize equipment, policy, or procedures simply to do so. It is desirable only if it increases operational effectiveness and efficiency in the use of resources.
- Some degree of standardization is essential for implementing plans.
- Other degrees of standardization may be desirable if they enhance the implementation of plans or enhance resource management.
- Interoperability is the minimum level which is desirable.
- Equipping forces is a national responsibility. NATO as an organization does not own much equipment or forces, most of which belong to the nations.
- Common terminology is essential. In fact, it is the bedrock of standardization.

Given that introduction, I think it would be useful to swiftly cover the types of issues which have successfully been standardized within NATO. These generally fall into three categories:

- Operational, including military practices, procedures, and formats (This category applies to doctrine, tactics, training, logistics, etc.);
- Materiel Specifications, including engineering or production codes, systems, components, and consumables; and
- Administrative, including terminology in all fields as well as non-military administration

In recent years there has been an increased interest on the part of the nations in medical standardization, which has resulted from changes in the geopolitical scenario.

As you are no doubt aware, during the cold war NATO's forces were lined up essentially shoulder to shoulder along the inter-German border. Each force was logistically self-sufficient, and interaction between the subordinate elements of these various corps was planned to be limited except along the corps boundaries. For the most part, logistics (including medical support) was considered to be a strictly national responsibility. Accordingly, NATO's medical structure developed along strictly national lines, with only limited interest in inter-operability. Each nation planned to provide its own medical support to the maximum extent possible, from the front lines back to the home country. Nations deploying their forces over long distances (particularly the United States and Canada) did plan to make use of some host nation medical support in the countries they deployed through, but once in combat, they too planned strictly national medical systems. Thus, though medical standardization was carried out to some degree, it generally had limited priority and applicability.

When the Berlin wall came down, and the Soviet Union disintegrated, there developed a new concept of defense within NATO, which obviously affected medical support. No longer was the primary threat

considered to be Soviet tank armies thundering through the Fulda gap. Instead, the threat was seen to be that of instability. On NATO's flanks, failed states and ethnic conflict threatened the peace, with conflicts which threatened to spill over into NATO territory.

To deal with this new threat, and in light of lessons learned from ongoing operations in the Former Republic of Yugoslavia, NATO has developed several new concepts of operations, such as the Combined Joint Task Force (CJTF). I will not discuss these today, except to note that these new concepts require new medical support structures and policies. No longer can each nation plan to "go it alone"-- sharing of resources and multinationality has become the goal in medical support as in combat power. In this new age, we foresee that medical support in an area of operations may be very complex. In addition to some strictly national structures and capabilities, we anticipate an increased use of multinational support, to include lead nation, role specialisation, and true multinationality. Increased use of host nation support may be possible, if such resources are available within the area of operations, and if they are of appropriate quality. Increased coordination with other multinational organisations (such as the UN) and with private non-governmental organisations will be a necessity.

An excellent example of the need for standardization in this new role is a potential scenario in Kosovo, where we have a multiplicity of medical assets, most of which are not multinationalally integrated. Let's look at a case in which a severely injured Kosovar patient receives first aid from NGO or UNMIK personnel, is transported in a Russian ground ambulance, receives surgical stabilisation in a Greek Role 2+ facility, and is then transferred by American Helicopter to a Role 3 hospital operated by the United Arab Emirates. Excluding strictly clinical care issues, there are innumerable areas in which this involved process can go wrong. As only a few examples: Intravenous administration sets may not be interchangeable, requiring replacement of catheters; medical documentation may not be intelligible between facilities, thus leading to loss of vital patient medical information; lack of communication protocols may lead to delays in transport or treatment; patient regulation systems may not be developed, so the patient may arrive at a facility which cannot care for his needs; litters provided by one nation may not fit retaining devices in another nation's vehicles, thus requiring numerous transfers of the patient from one litter to another; etc. Avoiding this type of problem is the purpose for which NATO produces medical standardization.

As long ago as the Crimean War, The esteemed Russian military surgeon Pirogov wrote that "It is not medicine but the organisation which plays the main role in medical aid for the wounded in war". Generally speaking, we agree with this. Accordingly, the vast majority of our effort in medical standardization has been in the administrative and materiel realms, rather than in the area of clinical care.

Unlike many other weapons systems our nations have to deal with, we medics have it easy—our major weapons system is already pretty well standardized. From the standpoint of medical care itself, most Western World Care is pretty well standardized too, and the parts that aren't tend to be pretty interchangeable. While some nations would prefer to perform early intramedullary "rodding" of a femur fracture, and others may prefer to use external fixators, both systems work well—it is only in recent years that the issue of which system is used has become of interest to other nations, as it becomes more likely that patients will eventually be cared for in hospitals other than from their own nations.

Thus, we in the NATO medical forces have concentrated for the most part on materiel and procedural standardization, rather than on direct patient care. We have very few standards on "how to do it" clinical practices, though as we work more and more with non-NATO nations in recent years we are finding that we must develop more of these—some currently being developed or improved include emergency medicine procedures, treatment of climatic injuries, improved immunisation requirements, the use of standardized external orthopedic fixators, and preventive medicine procedures.

For purposes of this presentation, I don't see any great need to go into significant details about the procedures by which NATO develops standardization policies. For most of you, this would be pretty irrelevant, and is subject to change. The basic principles, however, are crucial to your understanding of how we do business.

We have a very complex system, with many players in this field. The first is the Military Committee (MC), supported by the International Military Staff (IMS) and some high level committees like the Senior NATO Logisticians Committee (SNLC) and the Chiefs Of Military Medical Services in NATO (COMEDS), which deals predominantly with operational and procedural matters. The second major player is the NATO Command Control and Communications Agency (NC3A) for Command Control and Communications CIS systems, protocols, and formats. The third one is the Conference of NATO Armament Directors (CNAD), which is the leading agency in the area of equipment and materiel development. These committees are at the policy level and have subordinate groups or agencies working on the doctrinal level such as Military Agency for Standardization (MAS) for the MC, the NATO Army, Air and Naval Armaments Group under the CNAD and Sub-Committees under the NC3A. Operational standardization has often an impact on materiel standardization and vice versa. Coordination between those is essential and is carried out by the NATO Standardization Organization (NSO), or in the future by the NATO Standardization Agency (NSA). Note: The new NSA is planned to be operational by October 2000. The new structure will not have any changed effect on operational standardization, and will remain under the control of the Military Committee.

The process of standardization has no end; it is a continuing process. A nation or work group identifies an issue which they believe needs standardization. This proposal is then validated by the nations, and a custodian nation or group is identified to produce a draft agreement. After a series of study drafts, when a final draft document is believed to be ready to become a standard, it is forwarded to the nations for ratification. When an adequate number of nations have ratified the document (this number many vary depending upon the importance of the issue or the number of nations which have interests in this area), then it is promulgated as an official NATO document. All documents are reviewed regularly, and if needed, amendments are proposed through a repetition of the same process.

Once approved by the nations, these decisions are published as standardization documents, of which the most important are Standardization Agreements (STANAGs) and Allied Publications (APs)—Most medically-related Allied Publications are titled Allied Medical Publications or AMedPs. All ratified and promulgated STANAGs must be nationally implemented by those nations which have ratified them. The national implementing document can be a national directive, order, manual, instruction or other publication. It can also be the original or translated NATO STANAG with a national covering document. One other type of document you may hear of is the EXTAC. This category of APs is essentially comprised of extracts from non-releasable documents, which have been specially designed for use with non-NATO nations to facilitate cooperation in exercises or operations.

I'm not going to go into more details as to the internal mechanisms for approving standardization documents, except to note that there is an intricate mechanism to: identify an area in which there is a need for standardization; develop a draft document; revise it as needed to meet national and alliance needs; and finally gain ratification from the nations, after which it becomes an official NATO document.

So, what have we done in the field of medical standardization? There are currently more than 130 Medical or medically-related NATO Standardization Agreements or STANAGs either already promulgated or under development, ranging from equipment specifications to operational procedures. You certainly do not need to know about all of them at this time, but the MAS Working Groups have recently been tasked to produce a list of "Essential STANAGS" which non-NATO nations should adopt before participating in a NATO-led operation. I will not go through each of these in detail, but will simply mention some of them to give you an overview of what medical standardization is all about, and how important compliance with these documents will be in the context of a multinational medical operation.

The "Essential List of STANAGS" includes the following agreements (note that numbers with an * are not yet ratified, but are in the final stages of development and are expected to be ratified in the relatively near future—they will be available to Partner nations for consideration soon after they are promulgated.):

***STANAG 1412-- "Minimum Standards For A Litter To Transfer Patients Ship to Ship or Ship to Air"**—This agreement establishes minimum requirements for size, weight, durability and casualty protection for ship to ship or ship to air transfer litters for use by NATO Naval forces.

STANAG 2037-- “Vaccination of NATO Forces”-- The agreement considers the protection of armed forces against certain infectious diseases as an essential precaution. Participating nations agree that their armed forces are to be protected against the diseases and in line with the procedures detailed in the annex.

STANAG 2040-- “Stretchers, Bearing Brackets and Attachment Supports”-- This agreement establishes criteria to:

- Achieve interchangeability of stretchers used by NATO Forces.
- Ensure that means of suspension and fixtures used within suitable forms of transportation can receive and secure these stretchers.
- Ensure that restraining aids which safely keep the patient in the required position and prevent undue movement are available.

STANAG 2048-- “Chemical Method of Insect and Rodent Control (AMEDP-3)”-- This agreement registers national acceptance of AMEDP-3. Participating nations agree to use AMEDP-3 as the reference document on Chemical Methods of Insect and Rodent Control used within the national Armed Forces. AMEDP-3 contains the following information:

- Agents used.
- Aim of application.
- Mode of application.
- Effective compounds.
- Indications of necessary precautions.
- Addresses and names of manufacturers.
- National identification/supply-code/number.
- National laws and/or regulations restricting the use of agents or methods.

STANAG 2050-- “Statistical Classification of Diseases, Injuries and Causes of Death”-- This agreement standardizes, for the use of the NATO forces, the statistical classification of diseases, injuries and causes of death. Participating nations agree to adopt the method described for reporting and documenting such information.

STANAG 2061-- “Procedures for Disposition of Allied Patients by Medical Installations”-- This agreement establishes procedures for disposition of allied patients by medical installations in the NATO forces. Participating nations agree to use these standard procedures for disposition of allied patients or other personnel provided care.

STANAG 2068-- “Emergency War Surgery” -- As one of the few documents addressing clinical practice, the aim of this agreement is to:

- Standardize the general principles of emergency and/or first surgical treatment of war-wounded and provide standard medical measures.
- Produce a guide for the medical services of all NATO forces.

STANAG 2122-- “Medical Training In First-aid, Basic Hygiene and Emergency Care”-- This agreement identifies and requires the minimum scope for first-aid and basic hygiene training for non-medical personnel and ensures that certain procedures for the training of qualified auxiliary medical personnel are standardized and can be carried out by the armed forces personnel of each NATO nation concerned.

STANAG 2131-- “Multilingual Phrase Book for use by the NATO Medical Services (AMEDP-5)” -- This agreement registers national acceptance of AMEDP-5. Participating nations agree to use AMEDP-5 as a manual to provide, in all NATO languages, common names for injuries and diseases, words, idioms and phrases indispensable for the correct understanding between medical personnel and patients of different nationalities.

STANAG 2132-- “Documentation Relative to Medical Evacuation, Treatment and Cause of Death of Patients” -- This agreement establishes common procedures and standardized documents for the reporting of patients’ initial treatment, en route identification and care, information concerning the patients of other nations and medical cause of death. The participating nations have agreed to standardize:

- A Multinational Field Medical Card, which provides documentation of first aid, initial medical treatment, care in transit, and identification of patients (casualties)
- A procedure for reporting on allied patients to parent nations.
- A medical report of cause of death.

STANAG 2136-- “Minimum Standards of Water Potability In Emergency Situations”-- This agreement establishes minimum requirements for potability of drinking water to be used by NATO Forces during operations or under emergency conditions. Requirements and criteria are provided for both short- and long-term field water consumption.

***STANAG 2145-- “Evaluation and Control of Personnel Exposure to Radio Frequency Fields - 3 kHz to 300 GHz”**-- The aim of this agreement is to protect personnel engaged in NATO operations from exposures to Radio Frequency (RF) fields, at levels that may be hazardous to health. Participating nations agree to:

- Use the definitions included.
- Apply exposure limitations and protection principles as stated in the document to prevent harmful effects to personnel exposed to electromagnetic fields.
- Take into consideration the hazard evaluation required by the document.
- Follow standard procedures in the case of alleged or actual overexposure to RF fields.
- Use standard signs, subject to operational requirements, to identify areas where RF field levels exceed, or may exceed, the Permissible Exposure Levels (PEL).

***STANAG 2227-- “Military Medical Support in Disaster Relief”**-- This agreement registers national acceptance of AMEDP-15. Participating nations agree to use AMEDP-15 as a manual to provide the guidelines and principles for military medical assistance in humanitarian and disaster relief operations in a peacetime environment.

***STANAG 2228-- “Allied Joint Medical Support Doctrine (AJP-4.10)”** -- This agreement registers national acceptance of AJP-4.10. Participating nations agree to use AJP-4.10 as a manual for joint medical support doctrine in NATO- led operations.

STANAG 2350-- “Morphia Dosage and Casualty Marking”-- This agreement standardizes within the NATO Forces the range of initial dose of Morphia to be administered to combat casualties, and the method of recording the event. Participating nations agree that Morphia intended for administration to combat casualties will be supplied to the NATO Forces in the dose range shown herein, and that the event of Morphia administration will be recorded as described in the STANAG.

STANAG 2358-- “First-Aid and Hygiene Training In NBC Operations”-- This agreement establishes the minimum first-aid and hygiene training required for non-medical personnel during NBC operations.

STANAG 2361-- “Minimum Essential Medical Supply Items in Theatres of Operations” -- This agreement identifies minimum essential medical supply items which are required by NATO Forces in a theatre of operations.

STANAG 2409-- “NATO Glossary of Medical Terms and Definitions (AMEDP-13)”-- This agreement registers national acceptance of AMEDP-13, which includes standard definitions of medical terminology used within the NATO community.

***Study 2475—“Planning Guide for the Estimation of NBC Battle Casualties (Nuclear) - AMEDP-8, Volume I”**

***Study 2476—“Planning Guide for the Estimation of NBC Battle Casualties (Biological) - AMEDP-8, Volume II”**

***Study 2477—“Planning Guide for the Estimation of NBC Battle Casualties (Chemical) - AMEDP-8, Volume III”**

***Study 2478—“Medical Support in A Nuclear, Biological and Chemical Environment “**

STANAG 2481-- “Medical Information Collection and Reporting”-- This agreement standardizes the collection and reporting of medical information by NATO members. Participating nations agree to use the General Medical Information Report and Hospital Data Sheet for medical information gathering.

STANAG 2500-- “NATO Handbook on the Medical Aspects of NBC Defensive Operations (AMEDP-6)”-- This agreement registers national acceptance of AMEDP-6. Participating nations agree to use AMEDP-6 as a medical officer's guide on medical aspects of nuclear, biological and chemical defensive operations. **This document will soon be broken down into three volumes, which will be published separately as:**

***Study 2461—“NATO Handbook on Medical Aspects of NBC Defensive Operations (Nuclear) - AMEDP-6(C), Volume I”**

***Study 2462—“NATO Handbook on Medical Aspects of NBC Defensive Operations (Biological) - AMEDP-6(C), Volume II”**

***Study 2463—“NATO Handbook on Medical Aspects of NBC Defensive Operations (Chemical) - AMEDP-6(C), Volume III”**

STANAG 2871-- “First-Aid Material For Chemical Injuries” -- This agreement establishes a basic list of material which must be available to provide for the treatment of chemical casualties.

STANAG 2879-- “Principles Of Medical Policy In The Management of A Mass Casualty Situation”-- The aim of this agreement is to standardize the principles of the medical management of mass casualties for NATO forces.

STANAG 2931—“Orders For The Camouflage Of The Red Cross And Red Crescent On Land In Tactical Operations” -- This agreement establishes policy for determining when the protective symbols of the Geneva Conventions may be camouflaged.

STANAG 2939-- “Medical Requirements For Blood, Blood Donors and Associated Equipment” -- The aim of this agreement is to protect blood donors as well as recipients, when blood and blood products are exchanged between NATO Forces, by introducing uniform medical requirements for blood donors and regulations for transport and storage of blood. The scope of this agreement does not cover all medical conditions and tests that could be useful in selecting donors or assessing the quality of the blood. Participating nations agree:

- That blood and blood products used for transfusion in their Armed Forces should be collected, processed, transported and stored in compliance with the medical requirements described in this agreement.
- To adopt standardized blood transfusion equipment, including blood taking and blood giving equipment used for transfusions of human blood and its derivations or other infusion fluids, so that they are interchangeable and meet cross-servicing requirements.

STANAG 2954-- “Training of Medical Personnel for NBC Operations”-- This agreement lays down requirements for the additional training of medical personnel for NBC operations. Participating nations agree to use the annexes as the basis for producing training programmes for medical personnel. This agreement does not alter in any way national responsibilities in training medical personnel to the standards agreed in STANAGs 2150 and 2358.

STANAG 2982-- “Essential Field Sanitary Requirements”-- This agreement standardizes essential field sanitary requirements for NATO forces.

STANAG 3114-- “Aeromedical Training of Flight Personnel”-- This agreement identifies the minimum training required for flight personnel in order to promote flight safety and efficiency in the operation of military aircraft. Participating Nations agree that flight personnel shall receive, as a minimum, the initial and continuation aviation medicine training detailed in this STANAG.

STANAG 3204-- “Aeromedical Evacuation”-- This agreement establishes the terminology, procedures, training and equipment used in the aeromedical evacuation of sick and wounded personnel, in order to facilitate the transport of patients of one NATO nation in the aircraft of any other NATO nation. Participating nations agree that the provisions detailed in the Annexes will be applied as minimum requirements in the aeromedical evacuation of personnel.

STANAG 3318-- “Aeromedical Aspects of Aircraft Accident /Incident Investigation”-- This agreement identifies the essential points to be covered in the aeromedical investigation of accidents and/or incidents in order to facilitate the exchange of comparable information between nations.

STANAG 3474-- “Temporary Flying Restrictions Due to Exogenous Factors Affecting Aircrew Efficiency”-- This agreement stipulates the minimum temporary restrictions to be placed upon aircrew following exposure to certain physiological conditions. The use of modern aircraft requires the optimal physiological and psychological fitness of the aircrew. Apart from pathological conditions, fitness may be adversely affected by a variety of exogenous factors, the effects of which may be imperceptible and therefore negligible in everyday activities. However, these same factors may have a considerable effect on aircrew efficiency. The main factors to be considered are the administration of pharmaceutical substances to ambulant patients, immunisation procedures, blood donation, decompression chamber runs, centrifuge runs, diving, strenuous physical activities and exposure to chemical warfare agent simulants. Participating nations agree to apply, as a minimum, the restrictions contained in this agreement.

STANAG 3526-- “Interchangeability of NATO Aircrew Medical Categories”-- This agreement establishes the medical procedures for the exchange and assignment of aircrews among nations.

STANAG 3527-- “Aircrew Flying Time And Rest Periods”-- This agreement establishes guidelines for the maximum allowable flying hours and compulsory rest periods for aircrew.

STANAG 3744-- “Minimum Requirements of Medical Equipment In Search and Rescue (SAR) Aircraft”-- This agreement provides a standard list of minimum medical equipment to be carried on board NATO military SAR aircraft.

STANAG 3745-- “Medical Training For Search And Rescue (SAR) Personnel”-- This agreement establishes the scope of training of search and rescue (SAR) personnel and ensures that certain procedures for the training of qualified personnel are standardized and can be carried out by the armed forces personnel of each NATO nation concerned. The target population is SAR personnel responsible for handling and treating patients in flight.

Even realising that this list is only a small part of the overall body of medical standardization documents, you can see the wide-ranging scope of our efforts. Equally, I hope that the benefit of such a program in the context of multinational medical operations is obvious to you. I need to point out that we currently have multinational medical units actually operating in the Former Republic of Yugoslavia, and more are currently under discussion. Standardization of techniques, procedures, and equipment has certainly facilitated this effort. Without medical standardization, we could not accomplish the medical mission of providing medical care to our soldiers of a quality which they need and deserve. I strongly recommend to each of you that you investigate the degree to which your nation has ratified, and more importantly implemented, these agreements.

CONCLUSION:

In conclusion, I would simply like to note that:

- Standardization has increased operational medical compatibility within NATO;
- Our greatest success to date has been achieved in procedures, doctrine, and consumables, not in clinical guidelines;
- Most of the medical standardization documents are now available to Partner nations, and for those few which are not, EXTACs offer the PfP nations a practical vehicle for standardization with NATO.

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