Public Health and Risk Management

A Hybridized Approach to Military Injury Prevention

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Injuries represent the leading problem of U.S. military personnel across the spectrum of health, from deaths and disabilities to hospitalization and those requiring only outpatient treatment.[1,2] More serious injuries result from accidents than any other cause, including combat.[3–5] As a consequence of knowledge about the magnitude of the injury problem for the U.S. military and the belief that "world-class organizations do not tolerate preventable accidents," in May of 2003 the U.S. Secretary of Defense challenged the Department of Defense with aggressive accident-reduction goals.[6] The secretary also created the Defense Safety Oversight Council (DSOC) to provide governance over the department's accident-reduction initiatives. To support execution of this responsibility, the DSOC chartered nine task forces, each covering a specific mission or mission support functional area. The Military Training Task Force (MTTF) was created to study and recommend policies, programs, and investments to achieve accident reductions in military ground training.

The MTTF is composed of military training, safety, and occupational health subject matter experts from the Air Force, Navy, Marine Corps, and Army. In order to provide the leadership and training experience necessary to achieve the goals of the MTTF, the U.S. Army's Deputy Director of Training chairs the task force. In some aspects, the MTTF's task is more challenging than that of the other task forces. First, in order to accomplish the operational mission and save lives in combat, military training must closely replicate the dangerous conditions soldiers, sailors, airmen, and marines will face in combat. Additionally, unlike motor vehicle and aviation accident prevention, for which interventions (such as seat belts) have been tested and proven to reduce injuries, there are no well-established military or civilian prevention strategies for military training–related injuries.

From its inception, the MTTF utilized the Army's mishap risk management process to identify and analyze risks in military training and develop meaningful, effective risk-control measures that would reduce injuries while maintaining training readiness. Mishap risk management is the process of identifying and assessing hazards associated with a mission or with the design and operations of a system, facility, or equipment; determining their risk (the combined expression of loss severity and probability); developing, evaluating, and selecting controls; making risk acceptance decisions; and implementing and managing those decisions to improve operational effectiveness and conserve Army resources.

While the mishap risk management process proved to be a valuable tool in identifying and managing risks, the MTTF felt the need for a systematic approach to military training mishap reduction that would prioritize mishap-reduction initiatives and also provide for an evaluation of initiatives' effectiveness. This would assist leaders in determining where to focus their efforts and where to most effectively apply other resources, to include money, personnel, and time. Leveraging past affiliations between the U.S. Army Center for Health Promotion and Preventive Medicine and the CDC, the MTTF turned to the public health approach, an epidemiologic tool (Table 1). The MTTF was of the opinion that combining the Army mishap risk management process and the public health approach[7,8] would provide a framework for a systematic process to prevent injuries. Because of the close similarities of the two, it was felt that line officers and safety and preventive medicine personnel would all understand this systematic process. The systematic process would (1) identify and (2) describe the causes of military injuries; (3) conduct trials and evaluations to determine what initiatives are effective in preventing military injuries; (4) implement injury prevention policies and programs; and (5) monitor and evaluate these policies and programs to determine success or failure.

Finally, the MTTF employed an evidence-based approach to support decision making, including the application of criteria to setting priorities.[9,10] Using this hybridized approach—the mishap risk management process combined with the public health approach and an evidence-based approach—MTTF projects were selected and prioritized based on criteria such as the magnitude of the injury problem addressed, the effectiveness of prevention strategies, the feasibility of im-

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plementation, and the potential to quantify and evaluate an initiative's outcomes (success or failure).

The MTTF's experience with setting priorities suggested that initiative prioritization worked best when done by subject matter experts, who then reported results to senior leaders for decision support and resource allocation. Based on this, the MTTF requested that the Office of the Assistant Secretary of Defense for Health Affairs establish the Defense Military Injury Prevention Priorities Work Group (DMIPPWG). The DMIPPWG was chartered to employ the MTTF's systematic approach to military training mishap reduction to identify the top five causes of military injuries.[11] Results of their work are presented in this supplement.[12] This effort was not limited to military training injuries, but considered all military injuries, including those resulting from motor vehicle accidents, falls, sports, and off-duty recreation.

The MTTF continues to organize ongoing and completed projects according to the steps of the public health approach (Table 2). Topics listed in bold are reported in this supplement to the *American Journal of Preventive Medicine*.

In conclusion, military training injury prevention is a new frontier that would not have been explored had it not been for the leadership provided by the U.S. Department of Defense. Although the MTTF has been extremely active in identifying and analyzing military training mishaps and developing recommendations for mishap prevention, the MTTF's most significant accomplishment, and indeed the most significant contribution of this supplement, is the model it provides for a hybridized approach to injury risk management and prioritization. Contained in this supplement are three excellent examples of the success of this approach:

Table 1. The U.S. Army mishap risk management process and the public health approach

U.S. Army mishap risk management	Public health approach[a]
1. Identify and assess hazards	1. Surveillance to quantify and prioritize problems
2. Determine risk (loss severity and probability)	2. Research to identify modifiable risk factors and causes
3. Develop controls	3. Intervention trials or program evaluations to determine effectiveness
4. Make risk acceptance decisions	4. Implementation of programs and policies
5. Implement, supervise, and evaluate	5. Evaluation/monitoring of programs and policies to determine success or failure

[a]First described by Mercy JA et al.[7]; recently employed by the National Center for Injury Prevention and Control[8]

Table 2. Military Training Task Force projects and priorities grouped by steps of the public health approach

1. Surveillance to quantify and prioritize problems
• **Establish more robust military injury metrics with greater sensitivity to detect changes in rates**
• **Use objective evidence-based criteria to establish DSOC prevention priorities**
• **Apply five-step public health process to injury prevention**
2. Research to identify modifiable risk factors and causes
• Reduce incidence of negligent discharge injuries
• **Identify modifiable causes and risk factors for military vehicle accidents**
• Identify modifiable risk factors for post-deployment injuries
3. Intervention trials or program evaluations to determine effectiveness
• Determine what works to prevent fall-related injuries
• Determine effectiveness of ankle brace for ground operations/patrolling
• Evaluate effectiveness of smoking cessation to prevent injuries
4. Implementation of programs and policies
• **Implement new programs and policies to prevent overtraining to reduce physical training–related injuries**
• **Train leaders and service members on evidence-based physical training–related injury prevention**
• **Prevent parachute jump–related ankle injuries through use of the parachute ankle brace**
• Ensure use of seat belts in military vehicles when tactical situation permits
• **Share safety lessons learned across Services**
5. Evaluation/monitoring of programs and policies to determine success or failure
• **Systematically identify leading DoD injury problems based on size and preventability**
• Maintain near-miss accident reporting system
• Ensure cause coding of outpatient injuries
• Establish leader accountability for accidents and injuries
• Build evaluation of effectiveness into implementation of programs and policies

DoD, Department of Defense; DSOC, Defense Safety Oversight Council

- Bullock et al.[13] present the results of a systematic process to identify and rate interventions to prevent physical training–related injuries;
- Knapik et al.[14] discuss an injury prevention strategy, the parachute ankle brace, that was proven to be a cost effective means of preventing lower extremity injuries during parachuting, and cause no additional harm;
- Knapik et al.[15] provide an example of why it is important to evaluate every intervention, program, and policy. The sports medicine literature had suggested that the assignment of running shoes according to foot arch height would reduce injuries; however, this study conducted among Air Force personnel showed otherwise.

The projects described in these papers would not have been pursued had it not been for the employment of a systematic, evidence-based hybridized approach to military injury prevention. The ultimate benefit of such an approach is the production of information that can be directly translated into policy and/or programs. An added advantage is its similarity to risk management. The similarities mean that military unit commanders and worksite supervisors, who are responsible for prevention program implementation, already know the process and have "bought into" it. Given its advantages and past successes, the MTTF strongly supports the continued use of a systematic, evidence-based approach to the prevention of military training–related injuries while simultaneously preparing for operational missions.

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