

# MEDEVAC Miscategorization

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**ABSTRACT** Objective: To assess the effectiveness of an education program designed to improve medical evacuation (MEDEVAC) categorization. Methods: To remedy the MEDEVAC miscategorization rates identified in the southern region of Afghanistan, the MEDEVAC medical director for that area created an education program to improve the situation. This education program was implemented through the region by the 14 NATO countries serving in southern Afghanistan and adopted by the Canadian Army as part of the training for Canadian medics. Results: The education program yielded statistically significant improvement in the MEDEVAC miscategorization rate. Conclusions: Education concerning the categorization of MEDEVAC patients is essential for efficient use of Army MEDEVAC. Further investigation is warranted concerning the accuracy of categorization among an Army-only population.

## INTRODUCTION

Military medical evacuation (MEDEVAC) is a sparsely researched area of the military medical system, as reflected in the relatively few academic articles written on the topic. This is illustrated by the fact that an extensive search of printed and electronic resources at the University of Texas Health Science Center at San Antonio and the Army Medical Department Center and School, Fort Sam Houston, Texas, yielded no relevant material on the topic of military MEDEVAC categorization. However, MEDEVAC is currently the top priority aviation mission within Operation Enduring Freedom in Afghanistan. The purpose of MEDEVAC is to provide "timely and efficient movement of the wounded, injured, or ill while providing en route medical care to and between medical treatment facilities."<sup>1</sup> This is best accomplished through efficient and effective use of MEDEVAC resources with the intention of saving the most coalition lives possible.

MEDEVAC is summoned to an injured soldier/patient through the use of a nine-line. As part of this nine-line, a categorization of the severity of injuries is provided. The categorization is as follows:

- Category A (Urgent): Patient needs urgent medical attention within 2 hours for the preservation of life, limb, or eyesight.
- Category B (Urgent Surgical): Patient needs urgent surgical attention within 2 hours for the preservation of life, limb, or eyesight.
- Category C (Priority): Patient needs medical or surgical intervention within 4 hours for the preservation of life, limb, or eyesight.
- Category D (Routine): Patient needs medical attention within 24 hours.
- Category E (Convenience): Patient needs medical attention at the earliest possible convenience.<sup>1</sup>

These categorizations are determined by personnel at the scene, which are not necessarily medically trained individuals

<sup>1</sup>Aviation Health Clinic, 7149 Blacksheep Run, Fort Campbell, KY 42223.

(combat medics), though most units do have a combat medic. If there is a combat medic with the unit, he/she is typically the individual that determines the categorization of the casualty, unless the combat medic is the casualty or there is a higher trained person (physician or physician assistant) present. When a casualty is encountered, there is no formula to assist ground personnel to determine the category. For instance, a gunshot to the leg may fall into multiple categories. A grazing wound would be a category of Convenience. If the course of the bullet penetrates deeply into the leg, a category of Priority may be more appropriate. However, if there is arterial involvement, Urgent may be a more suitable category. Similar variables may occur with all injuries including chest and abdominal trauma.

Within an installation, such as a forward operating base, the battalion aid station is available for access to medical providers (physicians and/or physician assistants) to aid in accurate assessment of the patient and determination of the appropriate MEDEVAC categorization. If a unit is in contact with the enemy or is geographically separated from the installation, the battalion aid station, and medical providers, will likely not be accessible in a timely manner. That is when on-ground personnel must categorize the patient.

For efficient and effective use of the system, an accurate categorization must be attained. Despite the clear guidelines for categorization delineated in the Army Field Manual 4-02.2, correct application of these guidelines is a significant problem within the Afghanistan combat theater. This difficulty is not limited to U.S. forces. The 14 countries functioning in Regional Command-South, Afghanistan, all rely on either British or United States MEDEVAC, both of which are utilizing the U.S. categorization system.

Numerous explanations for the categorization problems may exist. One of the most obvious and difficult situations to overcome is over-reaction by the combat lifesaver (CLS), medic, or doctor on the ground. In a combat theater, medics develop an emotional attachment to the service members with whom they daily risk their lives. Although it is difficult for medical personnel to see a soldier in pain, pain is not included in the MEDEVAC criteria and is not a reason to over-react

and, consequently, misuse the medical evacuation system. Medical personnel must overcome the tendency to allow their emotional involvement to influence their professional reaction. Medics must subdue their personal biases to review the emergency situation objectively so as to assess injuries accurately and to categorize the corresponding injury.

Another possible reason for miscategorization is an intentional exaggeration of the category for the sake of “helping a buddy.” Though the goal of this action is to help a fellow service member, the ramifications can be life threatening to other injured personnel. To purposely attempt to manipulate the categorization system can result in a more severely injured patient’s dying as a result of one individual’s choice to exaggerate his or her patient’s status.

A third possible reason for miscategorization is an inadequate understanding of the system. This is by far the easiest problem to remedy. The keys to understanding the MEDEVAC categorization system are taking the time to read and understand the different category criteria, as well as thinking about the objective needs of the patient requiring evacuation. Improving medical personnel’s understanding of the MEDEVAC category criteria to meet the needs of the patient accurately and effectively is the focus of this article. Though education of all ground forces would be ideal, the most practical method of improving miscategorization is to focus primarily on the combat medics who accompany the ground units.

## PROBLEM

Over a 6-week period spanning the end of December 2008 through January 2009, the MEDEVAC miscategorization within Regional Command–South, Afghanistan was 49%.

## METHOD

Once the miscategorization problem was identified, efforts were taken to correct it. To decrease this high level of miscategorization, an education program was implemented throughout the 14 NATO countries utilizing MEDEVAC within southern Afghanistan.

First, an accurate level of miscategorization was attained. Miscategorization was determined by reviewing each of the MEDEVAC “run sheets,” a log of patient assessment and care completed by the flight medic responding to the MEDEVAC request. All run sheets were reviewed by the same flight surgeon, who also served as medical director for the MEDEVAC element. In keeping with MEDEVAC and Army doctrine, the criteria used were the same criteria outlined above.

In the first 6 weeks reviewed, approximately 100 MEDEVAC missions were carried out. Of these, 49% were miscategorized, prompting the Army MEDEVAC medical director in Regional Command–South, Afghanistan, this researcher, to create an education program and implement it throughout NATO forces stationed in southern Afghanistan. This education program was implemented in the third week of February.

The education program consisted of a two-fold plan. The first component was to educate the medical providers (physicians and physician assistants) operating in southern Afghanistan. A memorandum was issued through the channels established by each of the NATO member’s forces represented at the weekly Medical Operations meeting. The medical chains of command then disseminated the information to each of the providers throughout the country. The memorandum illustrated the problem by presenting case information from 17 actual miscategorized MEDEVAC missions that had occurred within the 6 weeks that involved the 49% miscategorization rate.

The second aspect to this education program was the creation of an interactive teaching tool that providers could use to educate the field medics, frequently the ones that initiate the nine-line. This program, a PowerPoint slide show, presented the same cases outlined in the Medical Operations meeting memorandum. The difference was that the cases were presented as patients that the medics were asked to assess for medical evacuation. Specifically, the medics identified the category into which the injured patient fell, after which, the supervising provider discussed the correct categorization and reason for the particular categorization. The Army MEDEVAC medical director provided an explanation as a guide for the providers. This training occurred throughout Regional Command–South, Afghanistan at the locations most convenient for the providers and medics to assemble, presumably at each unit’s battalion aid station.

The rationale for utilizing a two-step program, instead of giving the same block of instruction to both providers and combat medics, was to build relationships within the medical section. By allowing the provider to educate his/her medics, the medics would be more receptive to change. This method also allows the providers to be viewed as an authority on the topic. Medics, therefore, may have increased confidence in the providers they work under. To undermine the confidence of the medics in their providers would only create resistance to improvements and diminish unity within each line unit’s medical section. The use of a two-step program was intended to build confidence within the medical section, act as a training tool, and ultimately decrease miscategorization.

It is important to recognize that the purpose of reviewing and improving MEDEVAC miscategorization is to allow for more accurate and efficient use of MEDEVAC during subsequent missions. Review after the fact will always be more accurate than assessment in a combat situation.

## RESULTS

In the first month, the program was implemented (February), the miscategorization rate showed a mild decline to 42%. This result was derived from the February results and reflected only 1 to 2 weeks of implementation.

March, the first full month assessed after implementation of the education program, showed a reduction to 22%, a 27% reduction in the number of miscategorized patients, equating to a 55% improvement.

**TABLE I.** Changes in Miscategorization with Implementation of Education Program

	Total Cases for Month	Number Miscategorized for Month	Percent Miscategorized for Month	Improvement From Previous Month	Percent Improvement From Previous Month	Percent Improvement From January Baseline
January	77	38	49.4	N/A	N/A	N/A
February	82	35	42.7	6.7%	6.7%	6.7%
March	49	11	22.4	20.3%	47.5%	54.7%

**STATISTICAL ANALYSIS**

In Table I, the results show the data were first analyzed to determine whether there was a difference between the values obtained for each month. This was done to assess the uncertainty in the estimated populations.

Table II suggests that if the data were reproduced, there is a 95% statistical chance that the values would fall within the range of the proportion value  $\pm$  the margin of error value. This information allows for further exploration of statistically significant results.

Because there are multiple months being examined, a  $\chi^2$  test of independence was performed to show that there was a difference between each of the months. The results are listed in Table III demonstrating that the variation of values was not simply due to chance. According to the  $\chi^2$  test of independence, there is a 99.04% chance that the variation in the months is truly reflective of a difference between the months. A  $\chi^2$  test of trend showed a downward trend between the months. These data are listed in Table IV.

These results indicate a statistical significance to the data. With a 99.27% certainty, the education program improved the MEDEVAC categorization in the population studied.

**DISCUSSION**

MEDEVAC categorization is paramount to effective and efficient utilization of the U.S. Army MEDEVAC system. This categorization system, when applied objectively, proves the best system developed to date. Every year in Afghanistan and Iraq, thousands of injured soldiers are evacuated through this system, with life-saving results. Since it is such a highly utilized system, effective use of this high-priority asset must be maximized.

Any soldier can place a nine-line (a MEDEVAC request).<sup>1</sup> This is essential since a nine-line may have to be initiated in the absence of medical personnel. As such, every U.S. soldier is educated in the correct use of the categorization system. Frequently, this education takes place during basic training with little to no emphasis placed upon continuing education. Since nonmedical personnel may have to categorize a patient, some degree of miscategorization must be accepted. However, in most situations there is a medically trained person present, because every unit has an assigned combat medic. Combat medics receive further training in the use of nine-lines as part of the military occupation specialties (MOS) specific training that they acquire during advanced individual training (AIT). According to the medics assigned to the unit respon-

**TABLE II.** Margin of Error

Proportion	95% Margin of Error
0.494	0.112
0.427	0.107
0.224	0.117

**TABLE III.** Monthly Differences with Implementation of Education Plan

$\chi^2$ Test of Independence		
Observed Values		
Correct Category	Incorrect Category	Total
39	38	77
47	35	82
38	11	49
124	84	208
Expected Values (Under Independence)		
45.9	31.1	77
48.9	33.1	82
29.2	19.8	49
124	84	208
<i>P</i> Value	d.f.	
0.0096	2	

**TABLE IV.** Downward Trend of Miscategorization

$\chi^2$ Test of Trend	
<i>R</i> <sup>2</sup>	From JMP Results
n-1	207
<i>M</i> <sup>2</sup>	7.2036
d.f.	1
<i>P</i> Value	0.0073

sible for creating this program, this nine-line education component lasts the better part of 1 week. Coalition forces receive a rapid introduction to the use of nine-lines before arriving in theater. The total education for nine-line use appears to be inadequate.

This observation is further evidenced by the rapid improvement in miscategorization after the short education program implemented in Regional Command-South, Afghanistan. This study did not differentiate between U.S. Army soldiers and other coalition forces using the MEDEVAC system; however, this study clearly indicates that education produces rapid

results, even in soldiers with little to no prior experience with the U.S. Army nine-line system.

NATO medical personnel in southern Afghanistan, shared this assessment, leading to the implementation of this education program. Additionally, after the program's results became apparent, the Canadian Army adopted the program to educate all medics preparing to enter the Afghanistan combat theater.

The success of this education program suggests that further study of U.S. Army initiated nine-lines is warranted to identify miscategorization rates throughout the system and to assess the need for enhanced AIT and/or predeployment MEDEVAC categorization education.

The program referenced in this study may be obtained via e-mail from the program creator at the following address: [jason.pizzola@us.army.mil](mailto:jason.pizzola@us.army.mil).

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## REFERENCE

1. U.S. Army: Medical evacuation. In: *FM 4-02.2: Army Medical Evacuation*. Washington, DC, Army Publishing Directorate, 2007.