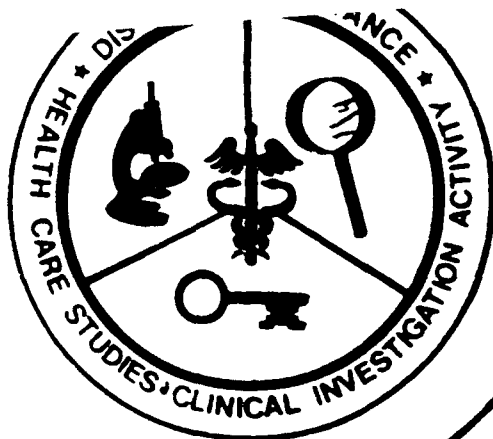AD-A234 584

# UNITED STATES ARMY
# HEALTH CARE STUDIES AND
# CLINICAL INVESTIGATION ACTIVITY

EVALUATION OF AMBULATORY CARE CLASSIFICATION SYSTEMS
FOR THE MILITARY HEALTH CARE SYSTEM

LTC JAMES M. GEORGOULAKIS, Ph.D., MS
LTC ATANACIO C. GUILLEN, M.A., MS
LTC CHERRY L. GAFFNEY, M.D., MC
GS-11 SUE E. AKINS, M.S.W., DAC
GS-12 DAVID R. BOLLING, M.S., DAC
GS-13 VELDA R. AUSTIN, M.S., DAC

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This report discusses the evaluation of ambulatory patient classification systems for military use. At the time of the study, the two systems which appeared to have the greatest potential for this purpose were the Products of Ambulatory Care (PACs) which was developed by the New York State Health Department (Tenan et al, 1988) and the Ambulatory Visit Groups (AVGs) which was formulated by a group at Yale University (Fetter, 1980).

The data base used for all evaluations consists of a sample derived from the Army's Ambulatory Care Data Base (ACDB) Study (Georgoulakis et al, 1988). The sample used in the evaluation contained 516,006 clinic visits.

Because the military does not have a per visit cost accounting system, four costing methodologies were applied to the PACs and AVGs to allow analyses on the effectiveness of these groupers as resource allocation devices.

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19. ABSTRACT (Continuation)  An important finding was that the effectiveness of a classification system is directly related to the methodology used to attach a "cost" to each visit.  The results of the study also provided a greater understanding of ambulatory classification systems when using a large data set which covered the spectrum of military-based hospital out-patient services.  Even with the large data set, all the AVGs were not used (140 empty groups).  Conversely, given the large number of visits and the diversity of these visits in each of the PACs, it seems appropriate to expand the PAC grouping beyond the present configuration.

In summary, at the present time (in their current form) none of the ambulatory classification systems reviewed in this  report meets the needs of the military for the allocation of resources.

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SUMMARY

In order to evaluate ambulatory classification systems for military use, a thorough literature review was performed. As a result of this search, a number of systems were eliminated because they were either unsuitable for resource allocation or system software was not available.

The final selection for Phase I of the study focused on two ambulatory classification systems. One was the Products of Ambulatory Care (PACs) which was developed by the New York State Health Department (Tenan et al, 1988) and the other was the Ambulatory Visit Groups (AVGs) which was formulated by a group at Yale University (Fetter, 1980). As other systems become available, they will be added to the list of those examined for possible evaluation.

Subsequent phases will focus on PACs with an ambulatory surgery component included called Products of Ambulatory Surgery (PAS), Ambulatory Patient Groups (APGs) which are based on AVGs, Emergency Department Groups (EDGs) (Cameron, Baraff, and Sekhon, 1990), and Ambulatory Care Groups (ACGs) (Weiner, Starfield, Steinwachs, and Mumford (1990). Each of these systems will be evaluated separately and in relation to previously evaluated systems.

The data base used for all evaluations consists of a sample derived from the Army's Ambulatory Care Data Base (ACDB) Study (Georgoulakis et al, 1988). The ACDB study was conducted over a 21-month period (January 1986 to September 1987) during which over 3.1 million patient encounters were recorded from six study hospitals. These encounters represented more than 4,000 health care providers in some 70 clinical specialties.

The six facilities selected for the study, having diverse missions and populations, constituted a representative sample of Army Medical Department health care. The six sites were Brooke Army Medical Center, Fort Sam Houston, Texas; Fort Jackson, South Carolina; Fort Bragg, North Carolina; Fort

Campbell, Kentucky; Fort Polk, Louisiana; and Redstone Arsenal, Alabama.

The sample used in this evaluation study contained 516,006 clinic visits. These visits were randomly selected from a cleaned data set of over a million visits. The total uncleaned data base consisted of 3.1 million patient visits.

Preparation for the evaluation of the two systems including recoding and mapping some of the diagnosis and procedure codes into the International Clasification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) and Physicians' Current Procedural Terminology, Fourth Edition (CPT-4) codes, respectively. Details of other data transformations performed are included in HR90-002, Part B.

Because the military does not have a per visit cost accounting system, it was necessary to develop several different costing methodologies for testing the two classification systems. The four costing methodologies were applied to the PACs and AVGs to allow analyses on the effectiveness of these groupers as resource allocation devices. Analyses of variance (ANOVAs) were run on each grouper using the four different cost formulas.

The results of the ANOVAS using the PAC grouper with the four cost formulas showed the grouper to be most effective (accounts for the greatest variance) when using the cost formula based on the currently used military system which is based on reimbursable military supply cost and least effective when using the formula based on labor cost only.

The results of the analysis of variance (ANOVA) on the AVG Grouper showed the AVG grouper to be most effective when using the cost formula based on CHAMPUS procedure cost. It was about equally ineffective with the other three formulas.

While this initial report covers only two classification systems, albeit the two most widely written and discussed, there have been some interesting

and critical findings obtained from the results.

First, it cannot be over emphasized that if the purpose of an ambulatory classification system for the military is the allocation of resources, the effectiveness of a classification system is directly related to the methodology used to attach a "cost" to each visit.

Secondly, some classification systems work much better in terms of explaining more cost variance with a particular cost methodology than others. This is of particular importance to the military, since at the present time the military (unlike the civilian community) is not fully capable of producing a "bill" or itemized list of "cost" for services provided during a visit. Until the military is able to produce such a "bill", efforts toward direct comparisons of cost with the civilian community for specific medical services will be severely hampered.

In general, all ambulatory classifications systems use various combinations of procedures, diagnoses, and selected patient demographic information (i.e. age and gender) to divide visits into categories. It would therefore seem reasonable that for a classification system to be optimally effective as a "resource allocator" or "cost containment tool," it should be developed by using a combination of clinical and cost variables simultaneously. This would best be accomplished using an iterative process with inputs and outputs reviewed by both clinicians and comptrollers/resource allocators.

Third, the results of the study clearly provided a greater understanding of ambulatory classification systems, especially when using a large data set which covered the spectrum of military-based hospital outpatient services. As a result of employing a large data set across diverse outpatient services, a number of interesting observations were drawn. For example, if a data set

containing more than 500,000 visits did not use all the AVGs, the question
arises of the necessity of having the groups structured the way they are in
the AVGs. That is, 570 groups may be an appropriate number, but the algorithm
needs to be restructured so that all groups are used. With 140 empty groups,
it would appear that the AVG algorithm has created groups which the military
data did not fill. However, the possibility that the military outpatient
departments did not maximize the number of outpatient procedures that can be
performed must also be considered. Additional possibilities to explain the
empty AVGs may be attributed to a lack of widespread occurrence of the
diagnoses or procedures which make up the empty AVGs.

Conversely, given the large number of visits and the diversity of these
visits in each of the PACs, it seems appropriate to expand the PAC grouping
beyond the present configuration. Thus, an ambulatory system which would
contain more groups than the PACs and perhaps fewer than the AVGs would
be a more practical system. For example, the largest PAC contained such a
diversity of procedures and diagnoses that it lost clinical meaningfulness.
In short, some PACs appeared to form too coarse a grouping of visits while
distinctions between AVGs groupings were perhaps too fine. Nevertheless, in
any ambulatory classification system, the number of subgroups must be of a
significant number to allow for meaningful clinical and cost differences to be
evident. Too few groups create large groups without clinical meaningfulness.
More specifically, this results in too many varied combinations of procedures
and diagnoses being grouped together. On the other hand, AVGs appear to be
creating unnecessary divisions among clinically related disorders and
producing overlapping groups with respect to cost.

A fourth area that merits discussion concerns the inclusion of
nonphysician health care providers in an ambulatory classification algorithm.
At the present time, none of the systems reviewed in this study, nor the

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systems under development, incorporate nonphysician providers into their classification systems. Further, it does not appear that they plan to do so in the future. This is a serious concern to the military where an extensive network of nonphysician providers has been developed. Thus, any classification system intended for military use should have provisions for nonphysician health care providers. This provision could be made through the use of expanded CPT-4 codes, modification and utilization of the expanded HCFA Common Procedure Coding System (HCPCS) or the development of a system of military procedure codes which could be rolled up into either of the aforementioned coding conventions.

In summary, at the present time (in their current form) none of the ambulatory classification systems reviewed in this report meets the needs of the military for the allocation of resources. This should not come as a surprise to anyone since these systems were not designed to operate in a environment where comprehensive, cradle-to-grave medical care is provided without cost considerations or concerns for precise cost accounting procedures or billing.

The results of the study provided a greater understanding of ambulatory classification systems as they apply to the military -- especially when using a large data set across the spectrum of military based hospital outpatient services. At this juncture it appears that if the military is to comply with the National Defense Authorization Act for FY 87 (S.2638), 14 November 1986, Section 1101, which directed the Secretary of Defense to establish by regulation the use of outpatient DRGs as the primary criteria for allocation of resources for DOD Medical Treatment Facilities (MTFs) on 1 October 1991, much work needs to be undertaken. More specifically, the following must be accomplished:

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1. A financially sound cost methodology must be developed. This provisory methodology must account for as many of the factors related to the providing of care as possible.

2. An extensive evaluation of the recently developed ambulatory classification systems such as the Products of Ambulatory Surgery (PAS) the Emergency Department Groupings (EDGs) and as of yet released Ambulatory Patient Groups (APGs).

3. The military must realize that it may not be possible to "take off the shelf" an ambulatory classification system and without major modifications implement it throughout the medical system.

4. Since at the present time all ambulatory classification systems focus on physician services, it would be prudent for the military to initiate as soon as possible the development of an ambulatory classification system which would incorporate non-physician health care providers.

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