# Special Report

## Classifying severity of illness by using clinical findings

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The medical illness severity grouping system
(MEDISGRPS) is a hospital quality and cost control
system that classifies patients at admission into
severity of illness groups based on objective clinical
findings (Brewster et al., to be published). This
system can be used to describe physician and hospital-
specific performance in terms of patient outcomes
(effectiveness) and resource use (efficiency).

Effectiveness analyses focus on patients not
achieving the expected results as indicated by
mortality and morbidity measures, and are the basis
for attempts to set effectiveness or quality standards.
To accomplish this, MEDISGRPS starts with the
severity classification at admission and then measures
changes in severity of illness during the hospital stay.

Efficiency analyses examine the resource use of
patients within the same admission severity group,
after excluding patients with subsequent morbidity,
and in order to keep effectiveness issues separate from
efficiency issues.

The MEDISGRPS key clinical findings (KCF's) are
objective evidence of an abnormal situation based on
clinical laboratory, radiology, pathology, and physical
examination findings. Each finding is assigned to a
severity group based on the indicated potential for
organ failure. Group 0 is for patients with no key
clinical findings. Group 1 indicates minimal findings
where there is low potential for organ failure. Group
2 indicates either acute findings with unclear potential
for organ failure, or severe findings with high
potential for organ failure but when such failure is
probably not imminent. Group 3 patients have both
severe and acute findings. Group 4 is for critical
findings, indicating the presence of organ failure.

To illustrate MEDISGRPS results, the following
example is taken from a study at Saint Vincent
Hospital, Inc., a 578-bed teaching hospital in
Worcester, Massachusetts, that includes 16,428
consecutive medical or surgical admissions between
October 1982 and June 1983. In this study, admission
severity grouping (review 1) was done after the third
hospital day, because it usually takes that long for the
clinical data to get into the medical record. A second
severity classification (review 2) was done after the
ninth day to determine if there were any key clinical

findings present subsequent to review 1. Morbidity
was thus defined as one or more subsequent key
clinical findings in Severity Group 2, 3, or 4 that
occurred from the fourth to the ninth hospital day.
Patients discharged before review 2 were classified as
nonmorbid.

For the most common reasons for admissions, this
study's results demonstrate a statistically significant
direct relationship between admission severity and in-
hospital mortality and morbidity (Chi-square: p <
.01). The strength of this relationship between admis-
sion severity and health outcomes indicates the
validity of the MEDISGRPS.

Our results also show a statistically significant
direct relationship between admission severity group
and total charges, ancillary charges, and length of
stay (analysis of variance F statistic: p < .01).
Although this is an important finding, other factors
(for example, physician practice pattern variations)
influence resource use in addition to admission
severity, and thus the relationship between admission
severity and resource use is not as meaningful as a test
of validity as the relationship of admission severity to
health outcomes.

Table 1 shows study results for patients whose chief
reason for admission was shortness of breath. The
mortality and morbidity rates, as well as mean total
charges, ancillary charges, and length of stay, increase
monotonically with higher admission severity. Also,
within each severity group, mean total charges for
patients with subsequent morbidity are two to three
times higher than for nonmorbid patients. The statis-
tical results (t-tests) indicate that the difference in
mean total charges of adjacent severity groups are
significantly different (p < .01) except for Groups 0
and 1. The charge differences between morbid and
nonmorbid patients within each severity group are
also statistically significant.

This study's analysis of diagnosis-related groups
(DRG's) demonstrates significant charge and length-
of-stay differences among severity groups and between
morbid and nonmorbid patients within the same
DRG.

## Reference

Brewster, A. C., Karlin, B. C., Hyde, L. A.,
et al.: "Medical Illness Severity Grouping System
(MEDISGRPS): A Clinically-Based Approach to Classi-
fying Hospital Patients at Admission." MediQual Systems,
Inc., Westboro, Massachusetts. To be published.

## Table 1

### Effectiveness and efficiency measures by MEDISGRPS[1] severity groups—shortness of breath chief reason for admission: Saint Vincent Hospital: October 1982-June 1983

| Admission severity group | Number of patients | Mean total charges | Mean ancillary charges | Mean length of stay | In hospital, percent mortality rate | Review 2, percent morbidity rate | Morbidity status | Mean total charges |
|---|---|---|---|---|---|---|---|---|
| All groups | 1,060 | [2]$3,856 | [2]$1,904 | [2]9.6 | [3]9.4 | [3]22.8 | | |
| 0 | 14 | 734 | 296 | 2.1 | 0 | 0 | Morbid | — |
| | | | | | | | Nonmorbid | $ 734 |
| 1 | 299 | [4]2,154 | 930 | 6.3 | 1.0 | 8.1 | Morbid | [4]5,751 |
| | | | | | | | Nonmorbid | [4]1,840 |
| 2 | 363 | [4]3,529 | 1,725 | 9.3 | 8.6 | 19.2 | Morbid | [4]7,161 |
| | | | | | | | Nonmorbid | [4]2,660 |
| 3 | 362 | [4]5,374 | 2,756 | 12.3 | 11.5 | 37.5 | Morbid | [4]8,192 |
| | | | | | | | Nonmorbid | [4]3,697 |
| 4 | 22 | [4]9,430 | 5,100 | 18.9 | 54.2 | 54.5 | Morbid | [4]13,287 |
| | | | | | | | Nonmorbid | [4]4,801 |

[1]Medical illness severity grouping system.
[2]Analysis of variance: F statistic, $p < .01$.
[3]Chi Square: $p < .01$.
[4]t test, $p < .01$.