Appendix 1.

Additional details about all study variables and modeling procedures are provided below.

Patient Characteristics included in all marginal and partial analyses

Age (years)

Age-Squared

Male (yes/no)

Non-white ethnicity (yes/no)

Emergency Admission (yes/no)

Transfer Admission (yes/no)

Arrhythmia History (yes/no)

Congestive Heart Failure History (yes/no)

Hypertension History (yes/no)

Stroke/Cardiovascular Accident History (yes/no)

Chronic Obstructive Pulmonary Disease History (yes/no)

Electrolyte/Fluid Abnormality History (yes/no)

Prior History of Cancer (yes/no)

Rheumatoid Arthritis History (yes/no)

Thrombocytopenia History (yes/no)

Diabetes History (yes/no)

Insulin-Dependent Diabetes Mellitus History (yes/no)

Angina History (yes/no)

Unstable Angina History (yes/no)

Renal Failure History (yes/no)

Myocardial Infarction History (yes/no)

Distant Cancer Stage (yes/no)

Length of Disease (months)

Atlas™Severity Score (0 = low risk of inpatient mortality; 4 = high risk of inpatient mortality) (Brewster et al. 1985; Iezzoni and Moskowitz 1988)

Cancer Type (categorical variable with head and neck as referent)

Hospital Characteristics measured separately in marginal analyses and included in all partial analyses

Bedsize (≤ 100 beds; 101-250 beds; ≥ 250 beds)

Teaching Status (No residents/fellows; < 1:4 residents/fellows per bed; > 1:4 residents/fellows per bed)

Advanced Procedures (Performed Open Heart or Solid Organ Transplant in 1999; yes/no)

National Cancer Institute Clinical or Comprehensive Cancer Center (yes/no)

Nursing characteristics measured separately in marginal analyses and included in all partial analyses

Nurse Staffing – Hospital average of patients cared for on last shift (≤ 4, 5, 6, 7, ≥ 8)

Nurse Practice Environment (favorable or mixed versus unfavorable)

Nurse Education (Proportion of RNs per hospital reporting a bachelor's or higher degree)

Marginal analyses predicted the likelihood of 30-day mortality, complications, or failure to rescue based on all 25 patient characteristics, plus one hospital or nursing characteristic. Thus, there were 21 marginal analyses performed; one for each hospital and nursing characteristic on all three outcomes.

Partial analyses predicted the likelihood of the outcomes based on all 25 patient characteristics, all 3 nursing characteristics, and all 4 hospital characteristics; thus three models were estimated to predicted 30-day mortality, complications, and failure to rescue using all 32 variables.

Brewster, A.C., B.G. Karlin, L.A. Hyde, C.M. Jacobs, R.C. Bradbury, and Y.M. Chae. 1985. "Medisgrps: A Clinically Based Approach to Classifying Hospital Patients at Admission." *Inquiry* 22 (4): 377-387.

Iezzoni, L. I., and M. A. Moskowitz. 1988. "A Clinical Assessment of Medisgroups." *Journal of the American Medical Association.* 260 (21): 3159-63.