# Bibliography of VA *Data Quality*

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## Introduction

This bibliography contains references to articles that report the quality of Veterans Affairs data and databases. To construct this bibliography, a PubMed search was conducted on 10/7/03 using the following search criteria in all text fields.

[(veteran OR veterans)

AND (sensitivity OR specificity OR "predictive value" OR PPV OR NPV OR reliability OR validity OR "data quality")

AND (database OR databases OR OPC OR PTF)]

The search yielded forty-one articles. The abstract of each article was read to determine whether VA data were utilized. Thirty-seven articles were found to be relevant and are included in this bibliography. The references are listed alphabetically by year.

### Bibliography of VA *Data Quality*

#### *Year 2003*

**Kim HM, Lowery JC, Hamill JB, Wilkins EG.**
Accuracy of a web-based system for monitoring chronic wounds.
*Telemed J E Health* 2003; 9(2):129-140.

Abstract: This study evaluated the accuracy of a store-and-forward telemedicine system for assessing the status of chronic wounds, including those surgically repaired. Digital photos and other patient and wound data were collected by a nurse using a laptop and transmitted via the Internet to a database, which organized and posted the data onto a web page for access by the telemedicine physician. Two Veterans' Affairs (VA) medical centers and two specialties (plastic surgery, physical medicine and rehabilitation) participated in the study. Study patients included inpatients and outpatients with pressure ulcers of stage II, III, or IV, plus outpatients with diabetic foot ulcers or venous stasis ulcers. All patients were assessed both in-person (the "gold standard") and with the telemedicine system using yes/no responses and a 5-point scale, respectively, on four diagnostic questions concerning wound healing and infection, based on AHCPR guidelines. A total of 70 patients were enrolled, with data collected on 430 visits: up to 6 visits per wound. Percentage agreement for all visits ranged from 67.1 for "not healing" to 88.8 for "cellulitis present." Sensitivity ranged from 0.32 for cellulitis to 0.63 for necrosis; and specificity ranged from 0.80 for necrosis to 0.91 for cellulitis. Although agreement of the telemedicine system was not high, it was not significantly less than interphysician agreement on in-person assessments. A relatively inexpensive store-and-forward telemedicine system for monitoring the status of

chronic wounds has the potential to improve access to specialty care for patients who are not currently receiving routine monitoring by specialized nurses or physicians
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12855036

**Margenthaler JA, Longo WE, Virgo KS, Johnson FE, Oprian CA, Henderson WG et al.**
Risk factors for adverse outcomes after the surgical treatment of appendicitis in adults.
*Ann Surg* 2003; 238(1):59-66.

Abstract: OBJECTIVE: To define risk factors that predict adverse outcomes after the surgical treatment of appendicitis in Department of Veterans Affairs Medical Centers. SUMMARY BACKGROUND DATA: Risk factors for adverse outcomes after the surgical treatment of appendicitis in adults are poorly defined. Accurate presurgical assessment of the risk of perioperative complications and death is important in planning surgical therapy. METHODS: The VA National Surgical Quality Improvement Program contains prospectively collected and extensively validated data on approximately 1,000,000 major surgical operations. All patients undergoing surgical intervention for appendicitis from 1991 to 1999 registered in this database were selected for study. Independent variables examined included 68 putative preoperative risk factors and 12 intraoperative process measures. Dependent variables were 21 specific adverse outcomes, including death. Stepwise logistic regression analysis was used to construct models predicting 30-day morbidity rate and the 30-day postoperative mortality rate. RESULTS: There were 4163 patients identified. The mean age was 50 years; 96% were male. Sixteen percent of patients had 1 or more complications after surgical intervention. Prolonged ileus, failure to wean from the ventilator, pneumonia, and both superficial and deep wound infection were the most frequently reported complications, accounting for the majority of the morbidity. The 30-day mortality rate was 1.8% (74 deaths). For >50% of the complications reported, the 30-day mortality rates were significantly higher ($P < 0.01$) for patients with complications than for those without. Thirty-day mortality rates for several complications exceeded 30%, including cardiac arrest, coma >24 hours, myocardial infarction, acute renal failure, bleeding requiring >4 units of red cells, and systemic sepsis. Four preoperative factors predicted a high risk of 30-day mortality in the logistic regression analysis: "completely dependent" functional status, bleeding disorder, steroid usage, and current pneumonia. "Threat to life" or "moribund" American Society of Anesthesiologists classification and more than a 10% weight loss in the 6 months before surgery were associated with a high risk of complications. CONCLUSIONS: Morbidity and mortality rates after the surgical treatment of appendicitis in VA hospitals are comparable with those reported in other large series. Most postsurgical complications are associated with an increased 30-day mortality rate. The models presented here are the most robust available in predicting 30-day morbidity and mortality for VA patients with appendicitis. Furthermore, they provide a starting point for the design of similar models to evaluate non-VA patients with appendicitis using the data the National Surgical Quality Improvement Program is currently gathering from private hospitals
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12832966

**Metlay JP, Hardy C, Strom BL.**
Agreement between patient self-report and a Veterans Affairs national pharmacy database for identifying recent exposures to antibiotics.
*Pharmacoepidemiol Drug Saf* 2003; 12(1):9-15.

Abstract: PURPOSE: The dramatic rise in antibiotic drug resistance among community pathogens has stimulated interest in the epidemiological relationship between antibiotic exposure and drug resistance. In assessing the strength of this relationship, studies are hampered by the lack of data on the accuracy of subject self-report of antibiotic exposure. The authors compared self-report with pharmacy dispensing data to determine the accuracy of self-reported antibiotic exposure. METHODS: The study design was a cross-sectional survey of veterans seen at the Philadelphia Veterans Affairs (VA) Medical Center in 1999 and 2000. Subjects reported exposures to antibiotics, antihypertensive drugs and nonsteroidal anti-inflammatory drugs through a structured telephone interview. The instrument included open-ended questions, condition-specific prompts and drug-specific prompts. Subject responses were linked to a national VA pharmacy database that served as the reference standard for evaluating self-reported exposures. RESULTS: The authors found that the sensitivity of self-report of antibiotic exposure increased with increasing use of prompts. A comprehensive assessment of antibiotic exposure identified 73% of antibiotic exposures, compared to 73% of antihypertensive drug exposures and 92% of nonsteroidal anti-inflammatory drug exposures. CONCLUSIONS:

Assessment of antibiotic exposure appears to be comparable to assessment of other chronic and episodic drugs. Multistep assessment of exposure improves the sensitivity of assessment
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12622056

**Sloan KL, Sales AE, Liu CF, Fishman P, Nichol P, Suzuki NT et al.**
Construction and characteristics of the RxRisk-V: a VA-adapted pharmacy-based case-mix instrument.
*Med Care* 2003; 41(6):761-774.

Abstract: BACKGROUND: Assessment of disease burden is the key to many aspects of health care management. Patient diagnoses are commonly used for case-mix assessment. However, issues pertaining to diagnostic data availability and reliability make pharmacy-based strategies attractive. Our goal was to provide a reliable and valid pharmacy-based case-mix classification system for chronic diseases found in the Veterans Health Administration (VHA) population. OBJECTIVE: To detail the development and category definitions of a VA-adapted version of the RxRisk (formerly the Chronic Disease Score); to describe category prevalence and reliability; to check category criterion validity against ICD-9 diagnoses; and to assess category-specific regression coefficients in concurrent and prospective cost models. RESEARCH DESIGN: Clinical and pharmacological review followed by cohort analysis of diagnostic, pharmacy, and utilization databases. SUBJECTS: 126,075 veteran users of VHA services in Washington, Oregon, Idaho, and Alaska. METHODS: We used Kappa statistics to evaluate RxRisk category reliability and criterion validity, and multivariate regression to estimate concurrent and prospective cost models. RESULTS: The RxRisk-V classified 70.5% of the VHA Northwest Network 1998 users into an average of 2.61 categories. Of the 45 classes, 33 classes had good-excellent 1-year reliability and 25 classes had good-excellent criterion validity against ICD-9 diagnoses. The RxRisk-V accounts for a distinct proportion of the variance in concurrent (R2 = 0.18) and prospective cost (R2 = 0.10) models. CONCLUSIONS: The RxRisk-V provides a reliable and valid method for administrators to describe and understand better chronic disease burden of their treated populations. Tailoring to the VHA permits assessment of disease burden specific to this population
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12773842

**Wang Q, Bernardini J, Piraino B, Fried L.**
Albumin at the start of peritoneal dialysis predicts the development of peritonitis.
*Am J Kidney Dis* 2003; 41(3):664-669.

Abstract: BACKGROUND: Both peritonitis and serum albumin level are associated with morbidity and mortality in peritoneal dialysis (PD) patients. Severe cases of peritonitis result in hypoalbuminemia. However, it is not clear whether hypoalbuminemia predicts the development of peritonitis. METHODS: We performed a retrospective analysis of a prospectively collected database from six centers in western Pennsylvania and West Virginia. Incident PD patients with a Charlson Comorbidity Index (CCI) score at the start of PD therapy and serum albumin level measured within 30 days of initiation were selected. Poisson regression was used to analyze predictors of peritonitis. RESULTS: Three hundred ninety-three patients had a CCI score and serum albumin level measured at the start of PD therapy. Overall peritonitis rate was 0.65 episodes/dialysis-year. Significant univariate predictors were albumin level (rate ratio [RR], 0.79 per 1-g/dL [10-g/L] increase; 95% confidence interval [CI], 0.65 to 0.95; P = 0.015), male sex (P = 0.003), and being dialyzed in the Veterans Administration (RR, 1.97; 95% CI, 1.48 to 2.62; P < 0.001) or other center (RR, 1.68; 95% CI, 1.92 to 5.62; P < 0.001). Although CCI score correlated inversely with albumin level (r = -0.305; P < 0.001), CCI score was only marginally predictive of peritonitis (P = 0.068). In multivariate analysis, predictors were albumin level (RR, 0.74; 95% CI, 0.31 to 1.75; P = 0.002) and race (RR, 1.36; P = 0.024). Patients with an initial serum albumin level less than 2.9 g/dL (29 g/L) had a peritonitis rate of 1.5 episodes/dialysis-year compared with 0.6 episodes/dialysis-year for patients with an initial serum albumin level of 2.9 g/dL or greater (P < 0.001). CONCLUSION: Hypoalbuminemia at the start of PD therapy is an independent predictor of subsequent peritonitis. Intervention studies to decrease peritonitis risk in this high-risk subset of patients are needed
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12612991

## *Year 2002*

**Ahmed A.**
Quality and outcomes of heart failure care in older adults: role of multidisciplinary disease-management programs. *J Am Geriatr Soc* 2002; 50(9):1590-1593.

Abstract: PURPOSE: To determine whether the management of heart failure by specialized multidisciplinary heart failure disease-management programs was associated with improved outcomes. BACKGROUND: The advent of angiotensin-converting enzyme inhibitors, beta-blockers, and spironolactone has revolutionized the management of heart failure. Randomized double-blind studies have demonstrated survival benefits of these drugs in heart failure patients. Nevertheless, in spite of these advances, heart failure continues to be a syndrome of poor outcomes.1-4 There is also evidence that a significant portion of heart failure patients does not receive this evidence-based therapy that reduces morbidity and mortality.5-7 Various disease-management programs have been proposed and tested to improve the quality of heart failure care. Most of these programs are specialized multidisciplinary heart failure clinics lead by cardiologists or heart failure specialists and conducted by nurses or nurse practitioners. Similar to the Department of Veterans Affairs (VA) multidisciplinary geriatric assessment clinics, these clinics also use many other services, including pharmacists, dietitians, physical therapists, and social workers. Some of these programs also have an affiliated home health service. Several observation studies, using mostly pre- and postcomparison designs, have demonstrated the effectiveness of these programs in the process of care, resource use, healthcare costs, and clinical outcomes in patients with heart failure.8 Risk of hospitalization was reduced by 50% to 85% in six of the studies.8 Subsequently, several randomized trials were conducted to determine the effectiveness of these programs. The purpose of this systematic review was to determine the effectiveness of these programs on mortality and hospitalization rates of heart failure patients. METHODS: Published articles on human randomized trials involving specialized heart failure disease-management programs in all languages were searched using Medline from 1966 to 1999 and other online databases using the following terms and Medical Subject Headings: case management (exp); comprehensive health care (exp); disease management (exp); health services research (exp); home care services (exp); clinical protocols (exp); patient care planning (exp); quality of health care (exp); nurse led clinics; special clinics; and heart failure, congestive (exp). In addition, a manual search of the bibliographies of searched articles was performed to identify articles otherwise missed in the above search. Personal communications were made with three authors to obtain further data on their studies. Using a data abstraction tool, two of the investigators separately abstracted data from the selected articles. Data from the selected studies were combined using the DerSimonian and Laird random effects model and the Mantel-Haenszel-Peto fixed effects model. Meta-Analyst 0.998 software (J. Lau, New England Medical Center, Boston, MA) was used to determine risk ratios (RRs) with 95% confidence intervals (CIs) of mortality and hospitalization for patients receiving care through these specialized programs compared with those receiving usual care. The Cochran Q test was used to test heterogeneity among the studies, and sensitivity analyses were performed to examine the effect of various covariates, such as duration of intervention, and other characteristics of the disease-management programs. RESULTS: The original search resulted in 416 published articles, of which 35 met preliminary selection criteria. Of these, 11 were randomized trials and were selected for the meta-analysis. Studies that were not randomized trials, did not involve heart failure patients or disease-management programs, or had missing outcomes were excluded. Of the 11 studies selected, nine involved specialized follow-up using multidisciplinary teams and the remaining two involved follow-up by primary care physicians and telephone. These studies involved 1,937 heart failure patients with a mean age of 74. The follow-up period ranged from no follow-up (one study) to 1 year (one study). Patients receiving care from specialized heart failure disease-management programs had a 13% lower risk of hospitalization than those receiving usual care (summary RR = 0.87; 95% CI = 0.79 -0.96), but the Cochran Q test demonstrated significant heterogeneity among the studies (P =.003). Subgroup analysis of the nine studies using specialized follow-up by a multidisciplinary team showed similar results (summary RR = 0.77, 95% CI = 0.68-0.86; test of heterogeneity, P>.50). Seven of the nine studies did not show any significant association between intervention and reduced hospitalization, but the two studies that used follow up by primary care physicians and telephone failed to show any significant reduction in hospitalization (summary RR = 0.94, 95% CI = 0.75-1.19). In fact, one of the studies demonstrated a higher risk of hospitalization for patients receiving intervention (RR = 1.26, 95% CI = 1.04-1.52). Of the 11 studies, only six reported mortality as an outcome. None of these studies found any association between intervention and mortality (summary RR = 1.15, 95% CI = 0.96-1.37; test of heterogeneity, P>.15). Five of the studies used quality of life or functional status as outcomes, and, of them, only one demonstrated significant positive association. The results of the sensitivity analyses were negative for any significant association with duration of intervention or follow-up or year of study. Eight studies performed cost analyses and seven demonstrated cost-

effectiveness of the intervention. CONCLUSIONS: The authors concluded that specialized disease-management programs were cost-effective, and heart failure patients cared for by these programs were more likely to undergo fewer hospitalizations, but the study did not provide any conclusive association between these programs and quality of care or mortality. The authors recommend that disease-management programs involve patient education and specialized follow-up by a multidisciplinary team including home health care
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12383160

**Best WR, Khuri SF, Phelan M, Hur K, Henderson WG, Demakis JG et al.**
Identifying patient preoperative risk factors and postoperative adverse events in administrative databases: results from the Department of Veterans Affairs National Surgical Quality Improvement Program.
*J Am Coll Surg* 2002; 194(3):257-266.

Abstract: BACKGROUND: The Department of Veterans Affairs (DVA) National Surgical Quality Improvement Program (NSQIP) employs trained nurse data collectors to prospectively gather preoperative patient characteristics and 30-day postoperative outcomes for most major operations in 123 DVA hospitals to provide risk-adjusted outcomes to centers as quality indicators. It has been suggested that routine hospital discharge abstracts contain the same information and would provide accurate and complete data at much lower cost. STUDY DESIGN: With preoperative risks and 30-day outcomes recorded by trained data collectors as criteria standards, ICD-9-CM hospital discharge diagnosis codes in the Patient Treatment File (PTF) were tested for sensitivity and positive predictive value. ICD-9-CM codes for 61 preoperative patient characteristics and 21 postoperative adverse events were identified. RESULTS: Moderately good ICD-9-CM matches of descriptions were found for 37 NSQIP preoperative patient characteristics (61%); good data were available from other automated sources for another 15 (25%). ICD-9-CM coding was available for only 13 (45%) of the top 29 predictor variables. In only three (23%) was sensitivity and in only four (31%) was positive predictive value greater than 0.500. There were ICD-9-CM matches for all 21 NSQIP postoperative adverse events; multiple matches were appropriate for most. Postoperative occurrence was implied in only 41%; same breadth of clinical description in only 23%. In only four (7%) was sensitivity and only two (4%) was positive predictive value greater than 0.500. CONCLUSION: Sensitivity and positive predictive value of administrative data in comparison to NSQIP data were poor. We cannot recommend substitution of administrative data for NSQIP data methods
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11893128

**Cowper DC, Kubal JD, Maynard C, Hynes DM.**
A primer and comparative review of major US mortality databases.
*Ann Epidemiol* 2002; 12(7):462-468.

Abstract: PURPOSE: Mortality data are important tools for research requiring vital status information. We reviewed the major mortality databases and mortality ascertainment services available in the United States, including the National Death Index (NDI), the Social Security Administration (SSA) files, and the Department of Veterans Affairs databases. METHODS: The content, reliability, and accuracy of mortality sources are described and compared. We also describe how investigators can gain access to these resources and provide further contact information. RESULTS: We reviewed the accuracy of major mortality sources. The sensitivity (i.e., the proportion of the true number of deaths) of the NDI ranged from 87.0% to 97.9%, whereas the sensitivity for the VA Beneficiary Identification and Records Locator System (BIRLS) ranged between 80.0% and 94.5%. The sensitivity of SSA files ranged between 83.0% and 83.6%. Sensitivity for the VA Patient Treatment File (PTF) was 33%. CONCLUSIONS: While several national mortality ascertainment services are available for vital status (i.e., death) analyses, the NDI information demonstrated the highest sensitivity and, currently, it is the only source at the national level with a cause of death field useful for research purposes. Researchers must consider methods used to ascertain vital status as well as the quality of the information in mortality databases
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12377423

**Johnston JA, Wagner DP, Timmons S, Welsh D, Tsevat J, Render ML.**
Impact of different measures of comorbid disease on predicted mortality of intensive care unit patients.
*Med Care* 2002; 40(10):929-940.

Abstract: BACKGROUND: Valid comparison of patient survival across ICUs requires adjustment for burden of chronic illness. The optimal measure of comorbidity in this setting remains uncertain. OBJECTIVES: To examine the impact of different measures of comorbid disease on predicted mortality for ICU patients. DESIGN: Retrospective cohort study. SUBJECTS: Seventeen thousand eight hundred ninety-three veterans from 17 geographically diverse VA Medical Centers and 43 ICUs were studied, admitted between February 1, 1996 and July 31, 1997. MEASURES: ICD-9-CM codes reflecting comorbid disease from hospital stays before and including the index hospitalization from local VA computer databases were extracted, and three measures of comorbid disease were then compared: (1) an APACHE-weighted comorbidity score using comorbid diseases used in APACHE, (2) a count of conditions described by Elixhauser, and (3) Elixhauser comorbid diseases weighted independently. Univariate analyses and multivariate logistic regression models were used to determine the contribution of each measure to in-hospital mortality predictions. RESULTS: Models using independently weighted Elixhauser comorbidities discriminated better than models using an APACHE-weighted score or a count of Elixhauser comorbidities. Twenty-three and 14 of the Elixhauser conditions were significant univariate and multivariable predictors of in-hospital mortality, respectively. In a multivariable model including all available predictors, comorbidity accounted for less (8.4%) of the model's uniquely attributable chi statistic than laboratory values (67.7%) and diagnosis (17.7%), but more than age (4.0%) and admission source (2.1%). Excluding codes from prior hospitalizations did not adversely affect model performance. CONCLUSIONS: Independently weighted comorbid conditions identified through computerized discharge abstracts can contribute significantly to ICU risk adjustment models
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12395026

**Krein SL, Hofer TP, Kerr EA, Hayward RA.**
Whom should we profile? Examining diabetes care practice variation among primary care providers, provider groups, and health care facilities.
*Health Serv Res* 2002; 37(5):1159-1180.

Abstract: OBJECTIVE: To evaluate the amount of variation in diabetes practice patterns at the primary care provider (PCP), provider group, and facility level, and to examine the reliability of diabetes care profiles constructed using electronic databases. DATA SOURCES/STUDY SETTING: Clinical and administrative data obtained from the electronic information systems at all facilities in a Department of Veterans Affairs' (VA) integrated service network for a study period of October 1997 through September 1998. STUDY DESIGN: This is a cohort study. The key variables of interest are different types of diabetes quality indicators, including measures of technical process, intermediate outcomes, and resource use. DATA COLLECTION/EXTRACTION METHODS: A coordinated registry of patients with diabetes was constructed by integrating laboratory, pharmacy, utilization, and primary care provider data extracted from the local clinical information system used at all VA medical centers. The study sample consisted of 12,110 patients with diabetes, 258 PCPs, 42 provider groups, and 13 facilities. PRINCIPAL FINDINGS: There were large differences in the amount of practice variation across levels of care and for different types of diabetes care indicators. The greatest amount of variance tended to be attributable to the facility level. For process measures, such as whether a hemoglobin A1c was measured, the facility and PCP effects were generally comparable. However, for three resource use measures the facility effect was at least six times the size of the PCP effect, and for inter-mediate outcome indicators, such as hyperlipidemia, facility effects ranged from two to sixty times the size of the PCP level effect. A somewhat larger PCP effect was found (5 percent of the variation) when we examined a "linked" process-outcome measure linking hyperlipidemia and treatment with statins). When the PCP effect is small (i.e., 2 percent), a panel of two hundred diabetes patients is needed to construct profiles with 80 percent reliability. CONCLUSIONS: little of the variation in many currently measured diabetes care practices is attributable to PCPs and, unless panel sizes are large, PCP profiling will be inaccurate. If profiling is to improve quality, it may be best to focus on examining facility-level performance variations and on developing indicators that promote specific, high-priority clinical actions
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12479491

**Prakash M, Raxwal V, Froelicher VF, Kalisetti D, Vieira A, O'Mara G et al.**
Electrocardiographic findings in patients with chronic spinal cord injury.
*Am J Phys Med Rehabil* 2002; 81(8):601-608.

Abstract: OBJECTIVE: To demonstrate the prevalence and prognostic value of electrocardiographic abnormalities in patients with chronic spinal cord injury. METHODS: All electrocardiographs obtained in the Palo Alto Veterans Affairs Medical Center since 1987 have been digitally recorded and stored in a computerized database. For this study, only the first electrocardiograph was considered for analysis. The subjects were divided according to age and level of spinal cord injury. The Social Security Death Index was used to ascertain vital status as of December 1999. RESULTS: Annual mortality was similar in those with chronic spinal cord injury and the able-bodied. However, individuals with a higher level of injury had a significantly higher death rate than those with a lower level of injury. The prognostic characteristics of electrocardiographic abnormalities were similar in both the able-bodied and those with spinal cord injury. CONCLUSION: In general, electrocardiographic abnormalities had the same prevalence in the spinal cord injury subjects as in the able-bodied ones. The prognostic value of electrocardiographic abnormalities in subjects with spinal cord injury is similar to that observed in able-bodied subjects
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12172070

**Szeto HC, Coleman RK, Gholami P, Hoffman BB, Goldstein MK.**
Accuracy of computerized outpatient diagnoses in a Veterans Affairs general medicine clinic.
*Am J Manag Care* 2002; 8(1):37-43.

Abstract: BACKGROUND: Electronically available data, both administrative, such as outpatient encounter diagnostic data, and clinical, such as problem lists, are being used increasingly for outcome and quality assessment, risk adjustment, and clinical reminder systems. OBJECTIVE: To determine the accuracy of outpatient primary care diagnostic information recorded in administrative and clinical files in a Veterans Affairs VISTA (Veterans Health Information Systems and Technology Architecture) database compared with medical chart notes. STUDY DESIGN: Cross-sectional medical chart review of 148 patients attending a general medicine clinic at a university-affiliated Veterans Affairs hospital for 9 diagnoses relevant to the choice of drug therapy for hypertension. PATIENTS AND METHODS: An administrative file of encounter diagnoses, for a 2-year period, and a clinical file of the problem list maintained by the clinician were the sources of electronic diagnoses. We compared these sources with diagnoses abstracted by medical chart review. We estimated the sensitivity and specificity of each electronic data source for detecting medical chart note diagnoses. RESULTS: The sensitivity for 8 of the 9 study diagnoses was greater than 80% in the administrative file and 49% in the clinical problem list. The specificity was good for the administrative file (91% to 100%) and even better for the clinical file (98% to 100%). CONCLUSIONS: Outpatient encounter diagnoses relevant to hypertension recorded as electronic data had high specificity, and some codes had high sensitivity when collected over multiple visits. The administrative file was more sensitive but less specific than the clinical file. Administrative vs clinical files can be selected to minimize either the false-negative or the false-positive designations, respectively, as dictated by the needs of the quality assessment review
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11814171

**Vallarta-Ast N, Krueger D, Binkley N.**
Densitometric diagnosis of osteoporosis in men: effect of measurement site and normative database.
*J Clin Densitom* 2002; 5(4):383-389.

Abstract: Controversy exists regarding which sites to measure, and the appropriate reference database to use, for densitometric diagnosis of osteoporosis in men. While hip and spine bone mineral density (BMD) measurement is routine, spinal osteoarthritis often elevates measured BMD in older men. Additionally, the use of male reference data is standard practice; however, recent reports suggest that a female database may be more appropriate. This study evaluated the effect of sites measured, and normative database utilized, on the densitometric diagnosis of osteoporosis in men. Spine, femur, and ultradistal radial BMD T-scores were determined in 595 male veterans using the GE Lunar male normative database. Subsequently, World Health Organization diagnostic criteria were applied, identifying 282 men with osteoporosis (T-score </= 2.5). The combination of femoral (lowest of neck or total) with the ultradistal radius site was more sensitive ($p < 0.0001$) for diagnosing osteoporosis than femur plus lumbar spine. When scans from 129 subjects with documented fractures were analyzed using female normative data, fewer ($p < 0.0001$) met an arbitrary threshold for receiving pharmacologic osteoporosis therapy. In conclusion, BMD measurement at only the spine and hip leads to underdiagnosis of osteoporosis in men. This situation will be exacerbated by utilization of a

female normative database; more men with prior fracture may be categorized as not meeting a pharmaceutical intervention threshold
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=12665639

## *Year 2001*

**Cook JW, Pierson LM, Herbert WG, Norton HJ, Fedor JM, Kiebzak GM et al.**
The influence of patient strength, aerobic capacity and body composition upon outcomes after coronary artery bypass grafting.
*Thorac Cardiovasc Surg* 2001; 49(2):89-93.

Abstract: BACKGROUND: Physical activity, physical fitness and body habitus of patients may be important predictors of outcomes after cardiac surgery. This study sought to quantify physical fitness and determine whether components of fitness enhance the prediction of outcomes in a group of patients undergoing coronary artery bypass grafting. METHODS: A group of 200 patients were evaluated prior to coronary artery bypass surgery. A Veterans Specific Activity Questionnaire (VSAQ) measured aerobic capacity. A grip dynamometer assessed strength. Skin-fold thickness was used to calculate percent body fat and lean body mass index. Patients were divided into low risk (0-2.5%) and high risk (>2.5%) groups based on the STS National Cardiac Surgery Database prediction of operative mortality. RESULTS: Patients with both a high percent body fat and a low VSAQ were at higher risk for at least one serious complication ($p<0.05$) and a longer postoperative length of stay ($p<0.05$). CONCLUSION: This study suggests: 1) An index of physical fitness can be obtained preoperatively in cardiac surgical patients; 2) This information aids in the prediction of operative risk
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11339458

**Grover FL, Shroyer AL, Hammermeister K, Edwards FH, Ferguson TB, Jr., Dziuban SW, Jr. et al.**
A decade's experience with quality improvement in cardiac surgery using the Veterans Affairs and Society of Thoracic Surgeons national databases.
*Ann Surg* 2001; 234(4):464-472.

Abstract: OBJECTIVE: To review the Department of Veteran Affairs (VA) and the Society of Thoracic Surgeons (STS) national databases over the past 10 years to evaluate their relative similarities and differences, to appraise their use as quality improvement tools, and to assess their potential to facilitate improvements in quality of cardiac surgical care. SUMMARY BACKGROUND DATA: The VA developed a mandatory risk-adjusted database in 1987 to monitor outcomes of cardiac surgery at all VA medical centers. In 1989 the STS developed a voluntary risk-adjusted database to help members assess quality and outcomes in their individual programs and to facilitate improvements in quality of care. METHODS: A short data form on every veteran operated on at each VA medical center is completed and transmitted electronically for analysis of unadjusted and risk-adjusted death and complications, as well as length of stay. Masked, confidential semiannual reports are then distributed to each program's clinical team and the associated administrator. These reports are also reviewed by a national quality oversight committee. Thus, VA data are used both locally for quality improvement and at the national level with quality surveillance. The STS dataset (217 core fields and 255 extended fields) is transmitted for each patient semiannually to the Duke Clinical Research Institute (DCRI) for warehousing, analysis, and distribution. Site-specific reports are produced with regional and national aggregate comparisons for unadjusted and adjusted surgical deaths and complications, as well as length of stay for coronary artery bypass grafting (CABG), valvular procedures, and valvular/CABG procedures. Both databases use the logistic regression modeling approach. Data for key processes of care are also captured in both databases. Research projects are frequently carried out using each database. RESULTS: More than 74,000 and 1.6 million cardiac surgical patients have been entered into the VA and STS databases, respectively. Risk factors that predict surgical death for CABG are very similar in the two databases, as are the odds ratios for most of the risk factors. One major difference is that the VA is 99% male, the STS 71% male. Both databases have shown a significant reduction in the risk-adjusted surgical death rate during the past decade despite the fact that patients have presented with an increased risk factor profile. The ratio of observed to expected deaths decreased from 1.05 to 0.9 for the VA and from 1.5 to 0.9 for the STS. CONCLUSION: It appears that the routine feedback of risk-adjusted data on local performance provided by these programs heightens

awareness and leads to self-examination and self-assessment, which in turn improves quality and outcomes. This general quality improvement template should be considered for application in other settings beyond cardiac surgery
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11573040

**Horner RD, Cohen HJ, Blazer DG.**
Accuracy of self-reported stroke among elderly veterans.
*Aging Ment Health* 2001; 5(3):275-281.

Abstract: The objective was to use secondary analysis of prevalence data from a prospective cohort study to ascertain the accuracy of self-reported stroke among veterans. The study comprised a community-dwelling population of 88 elderly veterans (from five counties in the Northern Piedmont of North Carolina, USA) who received health care at the local Veterans Health Administration (VHA) medical center and were respondents at the North Carolina site of the NIH-funded Established Populations for Epidemiologic Studies of the Elderly (EPESE) project. Self-report of stroke from the baseline interview of the EPESE project; and occurrence of stroke as verified by the national VHA hospital discharge database and the patients' medical records was measured. Results showed that self-report of stroke had a sensitivity of 86% and a specificity of 100%; the predictive value of a positive report was 100%. Veterans' self-reports of stroke are sufficiently accurate to use in preliminary epidemiological studies and health services research of cerebrovascular disease
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11575067

**Khuri SF, Najjar SF, Daley J, Krasnicka B, Hossain M, Henderson WG et al.**
Comparison of surgical outcomes between teaching and nonteaching hospitals in the Department of Veterans Affairs.
*Ann Surg* 2001; 234(3):370-382.

Abstract: OBJECTIVE: To determine whether the investment in postgraduate education and training places patients at risk for worse outcomes and higher costs than if medical and surgical care was delivered in nonteaching settings. SUMMARY BACKGROUND DATA: The Veterans Health Administration (VA) plays a major role in the training of medical students, residents, and fellows. METHODS: The database of the VA National Surgical Quality Improvement Program was analyzed for all major noncardiac operations performed during fiscal years 1997, 1998, and 1999. Teaching status of a hospital was determined on the basis of a background and structure questionnaire that was independently verified by a research fellow. Stepwise logistic regression was used to construct separate models predictive of 30-day mortality and morbidity for each of seven surgical specialties and eight operations. Based on these models, a severity index for each patient was calculated. Hierarchical logistic regression models were then created to examine the relationship between teaching versus nonteaching hospitals and 30-day postoperative mortality and morbidity, after adjusting for patient severity. RESULTS: Teaching hospitals performed 81% of the total surgical workload and 90% of the major surgery workload. In most specialties in teaching hospitals, the residents were the primary surgeons in more than 90% of the operations. Compared with nonteaching hospitals, the patient populations in teaching hospitals had a higher prevalence of risk factors, underwent more complex operations, and had longer operation times. Risk-adjusted mortality rates were not different between the teaching and nonteaching hospitals in the specialties and operations studied. The unadjusted complication rate was higher in teaching hospitals in six of seven specialties and four of eight operations. Risk adjustment did not eliminate completely these differences, probably reflecting the relatively poor predictive validity of some of the risk adjustment models for morbidity. Length of stay after major operations was not consistently different between teaching and nonteaching hospitals. CONCLUSION: Compared with nonteaching hospitals, teaching hospitals in the VA perform the majority of complex and high-risk major procedures, with comparable risk-adjusted 30-day mortality rates. Risk-adjusted 30-day morbidity rates in teaching hospitals are higher in some specialties and operations than in nonteaching hospitals. Although this may reflect the weak predictive validity of some of the risk adjustment models for morbidity, it may also represent suboptimal processes and structures of care that are unique to teaching hospitals. Despite good quality of care in teaching hospitals, as evidenced by the 30-day mortality data, efforts should be made to examine further the structures and processes of surgical care prevailing in these hospitals
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11524590

**Kortas DY, Haas LS, Simpson WG, Nickl NJ, III, Gates LK, Jr.**
Mallory-Weiss tear: predisposing factors and predictors of a complicated course.
*Am J Gastroenterol* 2001; 96(10):2863-2865.

Abstract: OBJECTIVES: Little has been published regarding predictors of a complicated course after Mallory-Weiss tear (MWT). The aims of this study were to identify risk factors for a Mallory-Weiss tear and factors predictive of a complicated course. METHODS: At our university hospital, we searched a computerized endoscopy database. At our Veterans Affairs hospital we manually searched printed endoscopy reports. Proposed risk factors for MWT were: history of alcohol use, recent alcohol binge, nonbloody initial emesis, anticoagulation, other coagulopathy, nonsteroidal anti-inflammatory use, and hiatal hernia. Proposed predictors of a complicated course were: age, hematemesis, melena, hematochezia, visible vessel, adherent clot, active bleeding, multiple tears, other pathology at endoscopy, admission Hct, hypotension or orthostatic changes, and coagulopathy. A complicated course was defined on the basis of >6 U of blood transfused, rebleeding, angiography, surgery, or death. Predictors of a complicated course were evaluated using the Mann-Whitney U test or Fisher exact test. RESULTS: A total of 73 cases were reviewed. The most common risk factor was alcohol use, which was found in 44% of cases. In all, 23% of patients had no risk factors. Of the patients, 17 (23%) had a complicated course. Patients with a complicated course had a lower admission Hct ($p = 0.009$) and active bleeding at initial endoscopy ($p = 0.013$). CONCLUSION: The predictive value of active bleeding supports early endoscopy for stratification and intervention
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11693318

**Prakash M, Myers J, Froelicher VF, Marcus R, Do D, Kalisetti D et al.**
Clinical and exercise test predictors of all-cause mortality: results from > 6,000 consecutive referred male patients.
*Chest* 2001; 120(3):1003-1013.

Abstract: OBJECTIVE: To report the prevalence of abnormal treadmill test responses and their association with mortality in a large consecutive series of patients referred for standard exercise tests, with testing performed and reported in a standardized fashion. BACKGROUND: Exercise testing is widely performed, but few databases exist of large numbers of consecutive tests performed on patients referred for routine clinical purposes using standardized methods. Even fewer of the available databases have information regarding all-cause mortality as an outcome. METHODS: All patients referred for evaluation at two university-affiliated Veterans Affairs medical centers who underwent exercise treadmill testing for clinical indications between 1987 and 2000 were determined to be dead or alive using the Social Security death index after a mean 6.2 years (median, 7 years) of follow-up. Clinical and exercise test variables were collected prospectively according to standard definitions; testing and data management were performed in a standardized fashion using a computer-assisted protocol. All-cause mortality was utilized as the end point for follow-up. Standard survival analysis was performed, including Kaplan-Meier curves and a Cox hazard model. RESULTS: There were 6,213 male patients (mean +/- SD age, 59 +/- 11 years) who underwent standard exercise ECG treadmill testing over the study period with a mean follow-up duration of 6.2 +/- 3.7 years. There were no complications of testing in this clinically referred population, 78% of whom were referred for chest pain, or risk factors or signs or symptoms of ischemic heart disease. Overlapping thirds had typical angina or history of myocardial infarction (MI). Five hundred seventy-nine patients had prior coronary artery bypass surgery, and 522 patients had a history of congestive heart failure (CHF). Indications for testing were in accordance with published guidelines. Twenty percent died over the follow-up period, for an average annual mortality rate of 2.6%. Cox hazard function chose the following variables in rank order as independently and significantly associated with time to death: exercise capacity (metabolic equivalents < 5, age > 65 years, history of CHF, and history of MI. A score based on these variables (summing up the four variables [if yes = 1 point]) classified patients into low-risk, medium-risk, and high-risk groups. The high-risk group (score > or = 3) has a hazard ratio of 5.0 (95% confidence interval, 4.7 to 5.3) and a 5-year mortality rate of 31%. CONCLUSION: This comprehensive analysis provides rates of various abnormal responses that can be expected in patients referred for exercise testing at a typical medical center. Four simple variables combined as a score powerfully stratified patients according to prognosis
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11555539

**Samsa GP, Hoenig H, Branch LG.**
Relationship between self-reported disability and caregiver hours.

*Am J Phys Med Rehabil* 2001; 80(9):674-684.

Abstract: OBJECTIVE: In a large, population-based cohort of patients with spinal cord dysfunction, we assessed the relationship between self-reported physical function and hours of care received. DESIGN: Data were obtained by a cross-sectional, self-administered survey used to help establish a national registry of veterans with spinal cord dysfunction. Participants were originally identified from Department of Veterans Affairs databases as having a high probability of spinal cord dysfunction. All 13,542 respondents reporting spinal cord dysfunction and also having complete data on physical function and caregiver hours (CGHs) were included. Physical function was measured using the Self-Reported Functional Measure, and CGHs were obtained from a self-report of hours of caregiving received during the last 2 wk. RESULTS: The relationship between self-reported disability and CGHs was strong (Spearman correlation = -0.70). Subjects with moderate levels of disability had the most variability in CGHs. After stratifying by total Self-Reported Functional Measure score, the strongest predictors of CGHs were instrumental activities of daily living and individual Self-Reported Functional Measure items, explaining a moderate amount of variation in CGHs. CONCLUSION: These data support the construct validity of the Self-Reported Functional Measure and suggest that self-reported disability measures can be of use in describing the clinical epidemiology of patients with spinal cord dysfunction
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11523970

## *Year 2000*

**Gordon HS, Aron DC, Fuehrer SM, Rosenthal GE.**
Using severity-adjusted mortality to compare performance in a Veterans Affairs hospital and in private-sector hospitals.
*Am J Med Qual* 2000; 15(5):207-211.

Abstract: The objective of this study was to compare hospital mortality in Veterans Affairs (VA) and private-sector patients. The study included 5016 patients admitted to 1 VA hospital. Admission severity of illness was measured using a commercial methodology that was developed in a nationwide database of 850,000 patients from 111 private-sector hospitals. The method uses data abstracted from patients' medical records to predict the risk of death in individual patients, based on the normative database. Analyses compared actual and predicted mortality rates in VA patients. VA patients had higher ($P < .05$) severity of illness than private-sector patients. The observed mortality rate in VA patients was 4.0% and was similar ($P = .09$) to the predicted risk of death (4.4%; 95% confidence interval 4.0-4.9%). In subgroup analyses, actual and predicted mortality rates were similar in medical and surgical patients and in groups stratified according to severity of illness, except in the highest severity stratum, in which actual mortality was lower than predicted mortality (57% vs 73%; $P < .001$). We found that in-hospital mortality in 1 VA hospital and a nationwide sample of private-sector hospitals were similar, after adjusting for severity of illness. Although not directly generalizable to other VA hospitals, our findings nonetheless suggest that the quality of VA and private-sector care may be similar with respect to one important and widely used measure
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11022367

**Hoenig H, Sloane R, Horner RD, Zolkewitz M, Duncan PW, Hamilton BB.**
A taxonomy for classification of stroke rehabilitation services.
*Arch Phys Med Rehabil* 2000; 81(7):853-862.

Abstract: OBJECTIVE: To develop a taxonomy for use in measuring stroke rehabilitation services. DESIGN: A cross-sectional study using facility-level survey data and extant data files. SETTING: Veterans Administration medical centers (VAMCs). VARIABLES: (1) A list of rehabilitation characteristics, including personnel, physical facilities, coordination of care, and hospital characteristics; and (2) a classification or typology of VAMCs according to the type of postacute stroke care on-site. MAIN OUTCOME MEASURES: Data sources included extant Veterans Administration (VA) computerized databases, VA central office administrative files, and 2 mailed surveys to VA rehabilitation medicine services and stroke acute care services. The rehabilitation taxonomy was derived using 2 methods that assess face and construct validity, respectively: (1) an expert panel rating, using a modified Delphi process, of the clinical importance of each of the rehabilitation characteristics; and (2) a comparison of rehabilitation

characteristics across the different types of VAMCs. Variables were included in the final taxonomy if the expert panel reached consensus that the variable was clinically important, or if there were statistically significant differences in these characteristics across the different types of medical centers. RESULTS: Of 67 possible rehabilitation characteristics, a multidisciplinary expert panel reached consensus about the likely clinical importance of 21 rehabilitation characteristics, 11 of which showed statistically significant differences across different types of VAMCs. An additional 9 variables that lacked expert panel consensus differed significantly among the different medical centers. These 30 variables represent a preliminary taxonomy of key rehabilitation characteristics. Among the 20 variables that varied significantly across the different types of medical centers, 18 showed a pattern with the greatest amount of resources and organizational sophistication being found in VAMCs with rehabilitation units, followed by medical centers with geriatric units, and the least amount of resources and organizational sophistication was seen in medical centers whose postacute care services were limited to nursing home or intermediate care. CONCLUSION: Thirty rehabilitation characteristics had face validity and/or construct validity, and can be considered to represent a preliminary taxonomy for measuring stroke rehabilitation services. This study also shows that there are significant differences among hospitals in resources and organization of care deemed to be important for stroke patients
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10895995

**Render ML, Welsh DE, Kollef M, Lott JH, III, Hui S, Weinberger M et al.**
Automated computerized intensive care unit severity of illness measure in the Department of Veterans Affairs: preliminary results. SISVistA Investigators. Scrutiny of ICU Severity Veterans Health Sysyems Technology Architecture.
*Crit Care Med* 2000; 28(10):3540-3546.

Abstract: OBJECTIVE: To evaluate the feasibility of an automated intensive care unit (ICU) risk adjustment tool (acronym: SISVistA) developed by selecting a subset of predictor variables from the Acute Physiology and Chronic Health Evaluation (APACHE) III available in the existing computerized database of the Department of Veterans Affairs (VA) healthcare system and modifying the APACHE diagnostic and comorbidity approach. DESIGN: Retrospective cohort study. SETTING: Six ICUs in three Ohio Veterans Affairs hospitals. PATIENT SELECTION: The first ICU admission of all patients from February 1996 through July 1997. OUTCOME MEASURE: Mortality at hospital discharge. METHODS: The predictor variables, including age, comorbidity, diagnosis, admission source (direct or transfer), and laboratory results (from the +/- 24-hr period surrounding admission), were extracted from computerized VA databases, and APACHE III weights were applied using customized software. The weights of all laboratory variables were added and treated as a single variable in the model. A logistic regression model was fitted to predict the outcome and the model was validated using a boot-strapping technique (1,000 repetitions). MAIN RESULTS: The analysis included all 4,651 eligible cases (442 deaths). The cohort was predominantly male (97.5%) and elderly (63.6 +/- 12.0 yrs). In multivariate analysis, significant predictors of hospital mortality included age (odds ratio [OR], 1.06; 95% confidence interval [CI], 1.04-1.09), comorbidity (OR, 1.11; 95% CI, 1.08-1.15), total laboratory score (OR, 1.07; 95% CI, 1.06-1.08), direct ICU admission (OR, 0.39; 95% CI, 0.31-0.49), and several broad ICU diagnostic categories. The SISVistA model had excellent discrimination and calibration (C statistic = 0.86, goodness-of-fit statistics; $p > .20$). The area under the receiver operating characteristic curve of the validated model was 0.86. CONCLUSIONS: Using common data elements often found in hospital computer systems, SISVistA predicts hospital mortality among patients in Ohio VA ICUs. This preliminary study supports the development of an automated ICU risk prediction system on a more diverse population
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=11057814

**Rosen A, Wu J, Chang BH, Berlowitz D, Ash A, Moskowitz M.**
Does diagnostic information contribute to predicting functional decline in long-term care?
*Med Care* 2000; 38(6):647-659.

Abstract: BACKGROUND: Compared with the acute-care setting, use of risk-adjusted outcomes in long-term care is relatively new. With the recent development of administrative databases in long-term care, such uses are likely to increase. OBJECTIVES: The objective of this study was to determine the contribution of ICD-9-CM diagnosis codes from administrative data in predicting functional decline in long-term care. RESEARCH DESIGN: We used a retrospective sample of 15,693 long-term care residents in VA facilities in 1996. METHODS: We defined functional

decline as an increase of > or =2 in the activities of daily living (ADL) summary score from baseline to semiannual assessment. A base regression model was compared to a full model enhanced with ICD-9-CM codes. We calculated validated measures of model performance in an independent cohort. RESULTS: The full model fit the data significantly better than the base model as indicated by the likelihood ratio test (chi2 = 179, df = 11, P <0.001). The full model predicted decline more accurately than the base model (R2 = 0.06 and 0.05, respectively) and discriminated better (c statistics were 0.70 and 0.68). Observed and predicted risks of decline were similar within deciles between the 2 models, suggesting good calibration. Validated R2 statistics were 0.05 and 0.04 for the full and base models; validated c statistics were 0.68 and 0.66. CONCLUSIONS: Adding specific diagnostic variables to administrative data modestly improves the prediction of functional decline in long-term care residents. Diagnostic information from administrative databases may present a cost-effective alternative to chart abstraction in providing the data necessary for accurate risk adjustment
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10843312

## *Year 1999*

**Malone DC, Billups SJ, Valuck RJ, Carter BL.**
Development of a chronic disease indicator score using a Veterans Affairs Medical Center medication database. IMPROVE Investigators.
*J Clin Epidemiol* 1999; 52(6):551-557.

Abstract: OBJECTIVE: Develop a chronic disease index that approximates the number of chronic diseases a patient has using a medication database. METHODS: An expert panel determined whether specific medication classes could be indicative of a chronic disease. Those classes identified were incorporated into a computer program and then used to screen the medication records of 246 randomly selected patients to estimate the number of chronic diseases present in each patient. This number was designated as the chronic disease index (CDI). The CDI was then validated against chart review. The CDI and a measure of disease severity, the chronic disease score (CDS) also were compared. The sensitivity and specificity of the computer program was analyzed for seven common chronic diseases. RESULTS: The expert panel designated 54 drug classes containing medications used to treat chronic diseases. The CDI correlated moderately with the number of chronic diseases found via chart review (r = 0.65; P = 0.001) and highly with the CDS (r = 0.81; P = 0.001). The index predicted the presence of three common diseases with a sensitivity of > or = 75%, and of six common diseases with a specificity of > or = 75%. CONCLUSIONS: The CDI correlates moderately well with the actual number of chronic disease states present. This tool may be useful for researchers when trying to identify patients with specific diseases and also for risk adjustment
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10408995

**Osato MS, Reddy R, Graham DY.**
Metronidazole and clarithromycin resistance amongst Helicobacter pylori isolates from a large metropolitan hospital in the United States.
*Int J Antimicrob Agents* 1999; 12(4):341-347.

Abstract: BACKGROUND: Metronidazole and clarithromycin-based therapies are among the most efficacious treatment regimens for H. pylori infection. Resistance to metronidazole or clarithromycin is associated with impaired therapy with these agents. We conducted a retrospective review of susceptibility data to determine the frequency of primary metronidazole and clarithromycin resistance among H. pylori isolates from a single metropolitan hospital in the United States. The database comprised 933 patients who presented at the Digestive Diseases Clinic at the Veterans Affairs Medical Center in Houston between September 1988 and January 1997 with complaints of dyspepsia, abdominal pain and peptic ulcer disease. One hundred and seventy-nine of these patients had both pharmaceutical records available for evaluation and culture and antimicrobial susceptibility data for analysis. The MICs were determined by both E-test and broth microdilution tests. The frequency of primary metronidazole resistance was 37.4% (67/179). The level of primary clarithromycin resistance was 6.1%. Dual metronidazole and clarithromycin resistance was present in approx. 3%. The high level of primary metronidazole and clarithromycin resistance in H. pylori isolates from this metropolitan hospital is such that antimicrobial susceptibility data should be available so that informed choice can be made for specific eradication therapies, especially in patients who fail treatment

http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10493611

**Petersen LA, Wright S, Normand SL, Daley J.**
Positive predictive value of the diagnosis of acute myocardial infarction in an administrative database.
*J Gen Intern Med* 1999; 14(9):555-558.

Abstract: OBJECTIVE: To determine the positive predictive value of ICD-9-CM coding of acute myocardial infarction and cardiac procedures. METHODS: Using chart-abstracted data as the standard, we examined administrative data from the Veterans Health Administration for a national random sample of 5,151 discharges. MAIN RESULTS: The positive predictive value of acute myocardial infarction coding in the primary position was 96.9%. The sensitivity and specificity of coding were, respectively, 96% and 99% for catheterization, 95.7% and 100% for coronary artery bypass graft surgery, and 90.3% and 99. 7% for percutaneous transluminal coronary angioplasty. CONCLUSIONS: The positive predictive value of acute myocardial infarction and related procedure coding is comparable to or better than previously reported observations of administrative databases
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10491245

**Swindle R, Lukas CV, Meyer DA, Barnett PG, Hendricks AM.**
Cost analysis in the Department of Veterans Affairs: consensus and future directions.
*Med Care* 1999; 37(4 Suppl Va):AS3-AS8.

Abstract: OBJECTIVES: In 1997, the Management Decision and Research Center of the Department of Veterans Affairs convened cost experts and health economists in a working meeting. Its goal was to provide consensus guidelines for conducting cost analyses in managed care systems, such as VA, that do not have encounter-level cost data or that do not prepare itemized patient bills. The impetus for the meeting was that too often computer-based cost data were proposed or used in studies that were inappropriate for the question being addressed. There was also a sense that often great effort was being expended by VA health economists "reinventing the wheel" in developing new cost components for each study. METHODS: A group of 45 VA and non-VA health economists, health researchers, and policy-makers attended a 2 day working meeting organized around a series of case vignettes to identify areas of consensus, controversy, and gaps in knowledge. RESULTS: Consensus emerged in the following four areas: (1) Cost Methods. A "hybrid model" was identified as the current standard of cost analysis in VA and entails mixing "micro-costing" primary data collection and "gross-cost" computer-based methods to reflect resource-use variations that are essential to the research question. (2) Cost Infrastructure. VA is developing a new, but unevaluated, costing system that could allow for computer-based cost analyses at much finer levels of detail than is currently possible. (3) Data Quality. Ongoing data validation of existing and developing cost databases is needed, especially concerning interfacility variation. (4) Dissemination. A new cost data center was recommended to provide training, information dissemination, and coordination. CONCLUSIONS: Consensus was reached about the hybrid model as the current paradigm for cost analysis in systems like VA
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=10217379

## *Year 1998*

**Kashner TM.**
Agreement between administrative files and written medical records: a case of the Department of Veterans Affairs.
*Med Care* 1998; 36(9):1324-1336.

Abstract: OBJECTIVES: This study examined the reliability of Department of Veterans Affairs' health information databases concerning patient demographics, use of care, and diagnoses. METHODS: The Department of Veterans Affairs' Patient Treatment files for Main, Bed-section (PTF) and Outpatient Care (OCF) were compared with medical charts and administrative records (MR) for a random national sample of 1,356 outpatient visits and 414 inpatient discharges to Department of Veterans Affairs' facilities between July 1 and September 30, 1995. Records were uniformly abstracted by a focus group of utilization review nurses and medical record coders blinded to administrative file entries. RESULTS: Reliability was adequate for demographics (kappa approximately 0.92), length of stay

(agreement=98%), and selected diagnoses (kappa ranged 0.39 to 1.0). Reliability was generally inadequate to identify the treating bedsection or clinic (kappa approximately 0.5). Compared with medical charts, Patient Treatment Files/Outpatient Care Files reported an additional diagnosis per discharge and 0.8 clinic stops per outpatient visit, resulting in higher estimates of disease prevalence (+39% heart disease, +19% diabetes) and outpatient costs (+36% per unique outpatient per quarter). CONCLUSIONS: In the absence of pilot work validating key data elements, investigators are advised to construct health and utilization data from multiple sources. Further validation studies of administrative files should focus on the relation between process of data capture and data validity
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9749656

## *Year 1997*

**Berlowitz DR, Brandeis GH, Anderson J, Brand HK.**
Predictors of pressure ulcer healing among long-term care residents.
*J Am Geriatr Soc* 1997; 45(1):30-34.

Abstract: OBJECTIVES: To identify predictors of pressure ulcer healing among long-term care residents. DESIGN: A retrospective cohort study. SETTING: Department of Veterans Affairs (VA) long-term care facilities. PARTICIPANTS: All long-term care residents with a pressure ulcer on April 1, 1993, who remained institutionalized as of October 1, 1993. Patients and pressure ulcer status were identified from the Patient Assessment File, a VA administrative database. MEASUREMENTS: Pressure ulcers were considered healed if patients were without an ulcer on October 1, 1993. Predictors of pressure ulcer healing were selected from among patient characteristics in the Patient Assessment File. RESULTS: Pressure ulcers were present in 7.7% of the long-term care residents institutionalized as of April 1, 1993. Among the 819 pressure ulcer patients remaining institutionalized as of October 1, 1993, ulcers had healed in 442 (54.0%). Seventy-two percent of patients with Stage 2 ulcers were ulcer-free at 6 months, compared with 45.2% of patients with Stage 3 ulcers and 30.6% of those with Stage 4 ulcers ($P < .001$). Significant ($P < .05$) independent predictors of healing included pressure ulcer size (Odds ratio (OR) = 5.2 for Stage 2 ulcers, OR = 1.5 for Stage 3 ulcers), older age (OR = 1.5), and receiving rehabilitation services (OR = 1.3 for each additional type of therapy). Both immobility (OR = .3) and incontinence (OR = .7) were associated with ulcers not healing. CONCLUSIONS: Most Stage 2 pressure ulcers, and many larger ulcers encountered in long-term care settings will heal. Baseline patient characteristics are important predictors of healing. Interventions may then be targeted at patients whose ulcers are unlikely to heal, and observed facility performance may be compared with expected outcomes
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8994484

**Poses RM, Smith WR, McClish DK, Huber EC, Clemo FL, Schmitt BP et al.**
Physicians' survival predictions for patients with acute congestive heart failure.
*Arch Intern Med* 1997; 157(9):1001-1007.

Abstract: BACKGROUND: Current guidelines suggest that patients with low likelihoods of survival may be excluded from intensive care. Patients with new or exacerbated congestive heart failure are frequently but not inevitably admitted to critical care units. OBJECTIVE: To assess how well physicians could predict the probability of survival for acutely ill patients with congestive heart failure, and in particular how well they could identify patients with small chances of survival. METHODS: This was a prospective cohort study done in the emergency departments of a university hospital, a Veterans Affairs medical center, and a community hospital. The study population was consecutive adults for whom new or exacerbated congestive heart failure, diagnosed clinically, was a major reason for the emergency department visit. Physicians caring for the study patients in the emergency departments recorded their judgments of the numeric probability that each patient would survive for 90 days and for 1 year. The patients vital status at 90 days and 1 year was ascertained by multiple means, including interview, chart review, and review of hospital and state databases. RESULTS: By calibration curve analysis, the physicians underestimated survival probability at both 90 days and 1 year, particularly for patients they judged to have the lowest probabilities of survival. Their predictions had modest discriminating ability (receiver operating characteristic curve areas, 0.66 [SE = 0.020] for 90 days; 0.63 [SE = 0.017] for 1 year). The physicians identified only 15 patients they judged to have a 90-day survival probability of 10% or less, whose survival rate was actually 33.3%. CONCLUSIONS: Physicians have great difficulty predicting survival for patients with acute congestive heart failure and cannot identify patients with poor chances of

survival. Current triage guidelines that suggest patients with poor chances of survival may be excluded from critical care may be impractical or harmful
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9140271

## *Year 1996*

**Clark RE.**
The development of The Society of Thoracic Surgeons voluntary national database system: genesis, issues, growth, and status.
*Best Pract Benchmarking Healthc* 1996; 1(2):62-69.

Abstract: BACKGROUND: The purpose of this communication is to demonstrate the feasibility of a voluntary national cardiac surgical database. METHODS: The genesis of the Society of Thoracic Surgeons (STS) National Cardiac and General Thoracic Surgery Databases in the interval of 1986 to 1990 is described. The issues facing the Committee in the initial decision making processes are discussed choosing a society-based, in-house activity versus using an outside vendor, private practice needs versus academic ones; open versus closed membership and vendors, risk stratification; data quality; audit; and access to data. RESULTS: In the 6 years of operation the STS cardiac surgical database has grown from 41,000 to 706,000 patients. The number of practice groups, hospitals, and surgeons has increased from 26 to 624, 32 to 750, and 120 to 1850, respectively. All but one state is represented, as are more than 400 teaching hospitals, including 28 Veterans Administration hospitals and 60 university centers. CONCLUSIONS: The STS database system has become firmly established and is a model for other societies and associations. The data placed yearly in the public domain have become a national standard
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=9192577

**Roehrborn CG, Pickens GJ, Sanders JS.**
Diagnostic yield of repeated transrectal ultrasound-guided biopsies stratified by specific histopathologic diagnoses and prostate specific antigen levels.
*Urology* 1996; 47(3):347-352.

Abstract: OBJECTIVES: To determine the diagnostic yield of secondary and tertiary transrectal ultrasound (TRUS)-guided biopsies of the prostate in men suspected of having carcinoma of the prostate because of an elevated serum prostate-specific antigen (PSA) level or an abnormal digital rectal examination (DRE). METHODS: The pathology database at the Dallas Veterans Affairs Medical Center was retrospectively searched for patients who had undergone at least two TRUS-guided biopsies of the prostate within a 6-month time span. Pertinent demographic data, serum PSA, outcomes of the two (or more) biopsies stratified in six distinct histopathologic diagnoses, and Gleason grade if carcinoma of the prostate was identified, were entered into a database and analyzed. RESULTS: A total of 123 men had at least two TRUS-guided biopsies, of which 22 had three biopsies. Mean age of this group was 68.5 +/- 0.51 (SE), and mean PSA was 11.5 +/- 1.07 (SE). Of 123 patients, 28 had a positive second biopsy following a negative first biopsy, for a positive biopsy rate of 23%. Only 2 of 22 patients who underwent a third biopsy were found to have carcinoma of the prostate, for a positive biopsy rate of 9%. The positive biopsy rate for the second biopsy was 19% (3 of 16) if the PSA was 4.0 ng/mL or less, 15% (10 of 66) if the PSA was between 4 and 10.0 ng/mL independent of the DRE findings, and 37% (15 of 41) if the PSA was 10.0 ng/mL or higher. Benign prostatic hyperplasia (59 of 123 [48%]) and atypia (38 of 123 [31%]) were the most common histopathologic diagnoses on the first biopsy, and the positive re-biopsy rates were similar for these two groups (25% versus 21 %). CONCLUSIONS: An overall positive biopsy rate of 23% in our retrospective series of 123 men with a mean PSA of 11.5 ng/mL warrants the performance of a second biopsy independent of the histopathologic diagnosis made on the first (negative) biopsy, if the outcome of such biopsy would have therapeutic consequences for the patient. This policy should not be restricted to men with a PSA above the cutoff level of 4.0 ng/mL alone. Patients with atypia should be pursued aggressively, as even on a third biopsy the positive biopsy rate was 29%
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8633400

## *Year 1993*

**Zingmond D, Lenert LA.**
Monitoring free-text data using medical language processing.
*Comput Biomed Res* 1993; 26(5):467-481.

Abstract: In this paper, we describe a software system for automated monitoring of free-text data in a medical information system that we call RadTRAC (Radiology Text Report Analyzer and Classifier). RadTRAC uses a medical language processing tool and rules derived from statistical analysis of a database to process free-text chest X-ray (CXR) reports and identify reports that describe new or expanding neoplasms for the purpose of monitoring the follow-up of these patients. To evaluate the RadTRAC system, we examined a set of 470 consecutive radiology reports at the Veterans Administration Medical Center, Palo Alto, CA. We compared RadTRAC classification of CXR reports with retrospective expert classification of the reports and with clinical classification from CXR films as recorded in a logbook while the films were being read. The RadTRAC system had a sensitivity of 90% and a specificity of 82% using the logbook as the gold standard. This was similar to the performance of expert radiologists (sensitivity, 92%; specificity, 90%). We then reviewed the charts, appointment schedule, and subsequent X-ray reports of cases either in the logbook or that were identified by RadTRAC as needing follow-up. Two cases in the logbook could have potentially benefited from an automatic monitoring system to ensure follow-up. RadTRAC identified six confirmed new tumors or new metastatic lesions that were not in the logbook. Six other cases were identified by the RadTRAC system with suspicious X-ray findings that had either no follow-up or no further mention of the X-ray lesion in medical records. This suggests that a reminder system based on the RadTRAC technology would be potentially useful
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=8243070

## *Year 1992*

**Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ.**
Studying outcomes and hospital utilization in the elderly. The advantages of a merged data base for Medicare and Veterans Affairs hospitals.
*Med Care* 1992; 30(5):377-391.

Abstract: That veterans aged 65 years and older are eligible to receive care either in the Veteran Affairs (VA) health care system or in the private sector under Medicare confounds the analysis of veterans' health services utilization and outcomes in two ways. First, changes in eligibility or financial barriers to access with regard to either system influence veterans' decisions about where to seek needed care. Second, analyses of VA care for elderly veterans that rely solely on VA data sources underestimate both overall utilization and treatment complications. Similarly, failure to consider the contribution of health care delivery in the VA system may confound analyses of health care utilization by the Medicare-eligible population. To study the magnitude of such confounding influences, we linked the Medicare and VA health care administrative databases for residents of New England and New York. Results indicated that, for ten surgical procedures commonly performed in the elderly, as well as for hospitalizations resulting from acute myocardial infarction and hip fracture, VA patients receive from 17.6% to 37.4% of hospital care outside the VA system. Private hospitalizations account for 5.5% to 19.5% of the care received by veterans within 6 months after an initial episode of care in a VA hospital. It was also found that initial hospitalizations for study conditions in the VA accounted for 3.6% of all such hospitalizations among elderly Medicare-eligible men. Although overall hospital utilization appears to be underestimated in VA data sources, it was found that ascertaining mortality from sources available within the VA produced excellent results when compared with deaths recorded in the Medicare enrollment files. A national, merged VA-Medicare data base is feasible and would enhance the validity of analyses of health care delivery both for elderly veterans and for the Medicare population
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=1583916

**Williams BC, Demitrack LB, Fries BE.**
The accuracy of the National Death Index when personal identifiers other than Social Security number are used.
*Am J Public Health* 1992; 82(8):1145-1147.

Abstract: This study analyzed the accuracy of the National Death Index when personal identifiers were used that included or excluded Social Security number. Computerized records of the Department of Veterans Affairs were used for comparison. Different combinations of identifiers other than Social Security number correctly identified from 83 to 92 percent of dead and 92 to 99 percent of living persons. These results should prove useful in ascertaining the mortality status of patient populations without information on Social Security numbers
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=1636839

## *Year 1991*

**Namboodiri KK, Harris RE.**
Hematopoietic and lymphoproliferative cancer among male veterans using the Veterans Administration Medical System.
*Cancer* 1991; 68(5):1123-1130.

Abstract: Hematopoietic and lymphoproliferative cancer risk among the 3.7 million United States male veterans who use the Veterans Administration (VA) medical system annually was assessed using age-specific incidence curves and cumulative incidence rates. Relative risk comparing the VA with general population risk estimates from the Surveillance, Epidemiology, and End Results (SEER) data were increased significantly for all malignancies examined. The VA sample showed risk increases of 93% for Hodgkin's disease, 20% for non-Hodgkin's lymphomas, 51% for multiple myelomas, and 40% for all leukemias. Among the leukemia subtypes, the observed risk increases were 54%, 23%, 80%, and 46% for lymphocytic, granulocytic, monocytic, and other forms of leukemia, respectively. The large size of the sample and the consistency of risk estimates with two different methods confer validity and strength to these findings. The possible relevance of the high prevalence of tobacco and alcohol use in this population sample to the current findings is discussed and the need for further analytic investigations to explain the increases in risk is emphasized
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