Evidence Table 1. Nurse staffing

Author Year	Study Question(s)	Design	Setting	Category of Health Professional
Amaravadi 2000[46]	Is a higher nurse to patient ratio in ICUs associated with lower preventable complications?	Cross-sectional	ICUs in 35 Maryland hospitals	Nurses
Aiken 1999[42]	Is higher nurse to patient ratio associated with lower mortality among hospitalized AIDS patients?	Cross-sectional	2 inpatient nursing units in each of 20 U.S. hospitals	Nursing staff
Lichtig 1999[42]	Are RN staffing levels associated with rates of inpatient adverse events?	Cross-sectional	462 California and 229 New York acute care hospitals	RNs and total nursing staff
Anderson 1998[48]	Do nursing homes with better patient outcomes have higher levels of nurse staffing?	Cross-sectional	494 Texas nursing homes	RNs, LVNs, and nursing aides
Shortell 1994[50]	Is a higher nurse to patient ratio in ICUs associated with lower in-hospital mortality?	Cross-sectional	1-2 ICUs in each of 40 hospitals; U.S. nationwide sample	Nurses
Aiken 2002[66]	Is a higher nurse to patient ratio associated with lower 30-day mortality for patients undergoing surgical procedures?	Cross-sectional	168 Pennsylvania hospitals	Registered nurses
Kovner 2002[69]	Are staffing levels by RNs and LPNs associated with rates of adverse events for surgical patients?	Cross-sectional	570 US acute care hospitals	RNs and LPNs
Needleman 2002[52]	Are lower staffing levels associated with complications?	Cross-sectional	799 hospitals in 11 U.S. states	RNs, LPNs, and nursing aides

ICU = intensive care unit; AIDS=acquired immuno deficiency syndrome; RN=registered nurse; ICD-9=international classification of diseases; ADL=activities of daily living; LVN=licensed vocational nurse; LPN=licensed practical nurse; CMS=Centers for Medicare and Medicaid Services; HCFA=Health Care Finance Administration; ER=emergency room; UTI=urinary tract infection; DVA=Department of Veterans Affairs

Evidence Table 1. Nurse staffing (continued)

Author Year	Working Condition	Measure of Safety	Casemix Control
Amaravadi 2000[46]	Estimated ratio of nurses to patients during night shifts	Infections, cardiac arrest, re-intubation, and in-hospital death	ICD-9 codes, age, sex
Aiken 1999[42]	Nurse to patient ratio	Mortality within 30 days of admission	AIDS severity and prognostic measures and ADL
Lichtig 1999[42]	Total nursing hours and percentage of hours performed by RNs	Decubiti and in-hospital infections	ICD-9 codes, nursing intensity weights
Anderson 1998[48]	Ratio of nursing staff hours to patient days	Incidence of decubiti, UTIs, and fractures	ADLs and selected diagnoses
Shortell 1994[50]	Estimated ratio of nurses to patients	In-hospital death	APACHE III
Aiken 2002[66]	Estimated ratio of nurses to patients	30-day mortality	Demographic variables and ICD-9 codes
Kovner 2002[69]	Nursing hours per patient day	Post-operative thromboses, pulmonary complications, and UTIs	Analysis restricted to patients with defined diagnoses
Needleman 2002[52]	Nursing hours per patient day	Infections, bleeding, shock, cardiac arrest, and death	ICD-9 codes, age, sex

ICU = intensive care unit; AIDS=acquired immuno deficiency syndrome; RN=registered nurse; ICD-9=international classification of diseases; ADL=activities of daily living; LVN=licensed vocational nurse; LPN=licensed practical nurse; CMS=Centers for Medicare and Medicaid Services; HCFA=Health Care Finance Administration; ER=emergency room; UTI=urinary tract infection; DVA=Department of Veterans Affairs

Evidence Table 1. Nurse staffing (continued)

Author Year	Main Finding	Design Suitability/ Study Execution
Amaravadi 2000[46]	Units with ratios of more than 2 patients per nurse had higher rates of infections but no difference in the rates of the other complications.	Greatest FAIR
Aiken 1999[42]	Higher nurse to patient ratio was associated with lower mortality.	Greatest FAIR
Lichtig 1999[42]	In New York hospitals, higher levels of total nursing and RN hours were associated with lower rates of pressure ulcers but not nosocomial infection rates. In California hospitals, higher levels of total nursing hours were associated with lower rates of pressure ulcers and pneumonia. In California hospitals, higher levels of RN hours were associated with lower rates of all complications. Total nursing hours were not associated with complication rates. Higher percentage of RNs was associated with lower rates in California but not New York.	Greatest FAIR
Anderson 1998[48]	Higher RN and aide staffing was associated with better outcomes.	Greatest FAIR
Shortell 1994[50]	No association between staffing ratio and mortality.	Greatest FAIR
Aiken 2002[66]	Patients in hospitals with higher estimated nurse to patient ratios had slightly lower 30-day mortality (95% confidence interval of odds ratio 1.02-1.11).	Moderate GOOD
Kovner 2002[69]	Greater RN hours were significantly associated with lower rates of pneumonia but not with rates of the other adverse events. LPN hours were not associated with adverse event rates.	Moderate FAIR
Needleman 2002[52]	In-hospital complications were lower with higher staffing, but in-hospital death did not vary.	Moderate GOOD

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Evidence Table 1. Nurse staffing (continued)

Author Year	Study Question(s)	Design	Setting	Category of Health Professional
Bolton 2001[61]	Are lower ratios of licensed nurse/non-licensed caregivers associated with higher rates of pressure ulcers and falls?	Cross-sectional	Inpatient units of 38 California acute care hospitals	Nurses and non-licensed caregivers
CMS 2001[67]	Are nursing home staffing ratios and staff turnover associated with incidence of nosocomial infections, pressure ulcers, and weight loss?	Cross-sectional	5,294 nursing homes in 10 states	RNs, LPNs, and nursing aides
Dimick 2001[53]	Is a lower nurse to patient ratio in the ICU associated with higher rates of adverse outcomes after hepatectomy?	Cross-sectional	33 Maryland acute care hospitals	Nursing staff
Pronovost 2001[54]	Do hospitals with higher nurse to patient ratios in ICUs have lower complication rates after surgery for abdominal aortic aneurysm?	Cross-sectional	38 Maryland acute care hospitals	ICU nursing staff
HCFA 2000[68]	Are nursing home staffing ratios associated with incidence of pressure ulcers and nosocomial infections?	Cross-sectional	1,786 nursing homes in three states	RNs, LPNs, and nursing aides
Tarnow-Mordi 2000[55]	Is in-hospital mortality higher when more patients in an ICU have fixed nurse staffing?	Time series N=1050 patients	ICU of one hospital in Scotland	Nursing staff
Bond 1999[43]	Are staffing levels of RNs, LVNs, and pharmacists associated with in-hospital mortality rates?	Cross-sectional	3,763 U.S. hospitals	Nursing and pharmacy staff
Blegen 1998[49]	Are lower staffing levels associated with higher rates of medication errors and adverse events?	Cross-sectional	42 inpatient units of a single university hospital	Nurses and non-licensed caregivers

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Evidence Table 1. Nurse staffing (continued)

Author Year	Working Condition	Measure of Safety	Casemix Control
Bolton 2001[61]	Ratio of licensed to non-licensed caregivers	Fall rates and pressure ulcer prevalence	None
CMS 2001[67]	Ratio of each category of nursing staff to patients	UTIs, sepsis, pressure ulcers, and weight loss	ICD-9 codes, race, age, body mass index, and ADLs
Dimick 2001[53]	Nurse to patient ratio estimated by ICU director	In-hospital mortality and post-operative pulmonary and infectious complications	ICD-9 codes and demographic factors
Pronovost 2001[54]	Nurse to patient ratio estimated by ICU director	Multiple post-operative complications derived from ICD-9 codes	Age, sex, race, severity of illnes and ICD-9 codes
HCFA 2000[68]	Ratio of each category of nursing staff to patients	Respiratory infections, UTIs, sepsis, and pressure ulcers	ICD-9 codes
Tarnow-Mordi 2000[55]	Total number of patients in ICU	In-hospital mortality	APACHE II
Bond 1999[43]	Number of full-time RNs, LVNs, and pharmacists	In-hospital mortality	ICU days, ER visits and Medicaid usage
Blegen 1998[49]	Nursing hours per patient day and proportion of nursing hours delivered by RNs	Rates of medication errors, falls, decubiti, in-hospital deaths, and urinary or respiratory infections	Patient acuity measure

ICU = intensive care unit; AIDS=acquired immuno deficiency syndrome; RN=registered nurse; ICD-9=international classification of diseases; ADL=activities of daily living; LVN=licensed vocational nurse; LPN=licensed practical nurse; CMS=Centers for Medicare and Medicaid Services; HCFA=Health Care Finance Administration; ER=emergency room; UTI=urinary tract infection; DVA=Department of Veterans Affairs

Evidence Table 1. Nurse staffing (continued)

Author Year	Main Finding	Design Suitability/ Study Execution
Bolton 2001[61]	No difference in fall rates and pressure ulcer prevalence existed between hospital units with >70% RN care and units with <50% RN care.	Moderate FAIR
CMS 2001[67]	Nursing homes with the highest staffing ratios for all three categories of nursing staff had the lowest rates of all measures of adverse events. Facilities with higher turnover of nursing assistants had higher rates of UTIs and pressure ulcers.	Moderate GOOD
Dimick 2001[53]	ICU nurse staffing was not consistently associated with complication rates.	Moderate FAIR
Pronovost 2001[54]	All medical complication rates were higher in hospitals reporting lower ICU nurse to patient ratios.	Moderate FAIR
HCFA 2000[68]	Nursing homes with the lowest staff to patient ratios had the highest rates of all measures of adverse events, for all three categories of nursing staff. The relationships were stronger for nursing aides and LPNs than for RNs.	Moderate GOOD
Tarnow-Mordi 2000[55]	Mortality rates were higher when ICU census was higher.	Moderate FAIR
Bond 1999[43]	RN and pharmacist staffing were associated with lower mortality. LVN staffing was associated with higher mortality.	Moderate FAIR
Blegen 1998[49]	Non-intensive care nursing units having a higher ratio of RN care had lower rates of medication errors and decubiti. Intensive care units had higher rates of these complications and the highest ratios of RN care.	Moderate GOOD

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Evidence Table 1. Nurse staffing (continued)

Author Year	Study Question(s)	Design	Setting	Category of Health Professional
Blegen and Vaughn 1998[56]	Are lower staffing levels associated with preventable complications?	Cross-sectional	11 U.S. Hospitals	Nurses, LPNs, and nursing assistants
Kovner 1998[57]	Are RN staffing levels associated with rates of in-patient adverse events?	Cross-sectional	589 U.S. hospitals in 10 states	RNs
American Nurses Association 1997[58]	Is nurse staffing lower in hospitals having higher rates of decubiti and infections?	Cross-sectional	502 hospitals in California, Massachusetts, and New York	RNs, LVNs, LPNs, and nursing aides
Tutuarima 1993[59]	Is nursing availability lower for patients who fall than for other patients?	Case-control study of 49 hospitalized stroke patients who fell and 49 who did not	9 Dutch hospitals	Nursing staff
Hartz 1989[64]	Do hospitals with higher percentages of registered nurses have lower in-hospital mortality?	Cross-sectional	Nationwide HCFA data on 3,100 hospitals	Nursing staff
Flood 1988[51]	Are adverse events higher on a short-staffed inpatient unit?	Cross-sectional	2 inpatient nursing units in a single U.S. hospital; same number of beds & equal occupancy	RNs, LPNs, and nursing aides
JCAHO 2002[60]	Are nurse staffing problems identified in reports of sentinel events among inpatients?	Case series of 1,609 sentinel events reported to JCAHO	U.S. hospitals	Nursing staff

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Evidence Table 1. Nurse staffing (continued)

Author Year	Working Condition	Measure of Safety	Casemix Control
Blegen and Vaughn 1998[56]	Nursing hours per patient day	Medication administration errors, falls, and cardiopulmonary arrests	Type of nursing unit
Kovner 1998[57]	Number of RNs per patient day	Hospital-acquired infections and thromboses	ICD-9 codes
American Nurses Association 1997[58]	Nursing hours per patient day and RN hours per patient day	Decubiti and hospital-acquired infections	Nursing intensity weights
Tutuarima 1993[59]	Patient to nurse ratio	Inpatient fall	Gender, age, and clinical severity of stroke
Hartz 1989[64]	Percentage of nurses who are registered	In-hospital mortality	ICU days
Flood 1988[51]	Average number of nursing staff per month	Nosocomial infections, cardiac complications, and gastrointestinal disorders	Nursing acuity level
JCAHO 2002[60]	Nursing staff levels	Unanticipated events leading to death, injury, or permanent loss of function	None

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Evidence Table 1. Nurse staffing (continued)

Author Year	Main Finding	Design Suitability/ Study Execution
Blegen and Vaughn 1998[56]	Medication errors were higher with higher staffing levels. Units with the highest proportion of RN staffing had higher medication error rates. Higher RN staffing levels were associated with fewer falls.	Moderate FAIR
Kovner 1998[57]	Higher RN staffing was associated with lower rates of post-operative infections.	Moderate FAIR
American Nurses Association 1997[58]	Higher RN hours but not total nursing hours were associated with lower decubiti rates in two of the three states. Infection rates were not consistently associated with nursing hours.	Moderate FAIR
Tutuarima 1993[59]	Nursing ratio was no different between cases and controls.	Moderate POOR
Hartz 1989[64]	Hospitals with higher ratios of RNs to all nurses had lower average in-hospital mortality.	Moderate FAIR
Flood 1988[51]	The unit with lower staffing had a higher incidence of complications.	Moderate POOR
JCAHO 2002[60]	Staffing problems were identified as a factor in 24 percent of sentinel event reports.	Least FAIR

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Evidence Table 1. Nurse staffing (continued)

Author Year	Study Question(s)	Design	Setting	Category of Health Professional
Sochalski 2001[62]	Is higher nursing workload associated with higher rates of medical errors and adverse events?	Survey of registered nurses	50% sample of all licensed Pennsylvania RNs; 52% response rate	9,545 RNs
Byrne 1998[70]	Is a higher intensity of work associated with a larger number of errors on anesthetic record charts?	Time series	British hospital in Cambridge	10 trainee anesthetists
Hunt 1998[63]	Do hospitals with lower nurse to patient ratios have higher rates of adverse events?	Cross-sectional	Nationwide study of 23 hospital trusts in Scotland	Registered nurses
Fridkin 1996[65]	Is nurse staffing lower during an outbreak of inpatient catheter-associated bacteremia?	Time series study during an outbreak of infections	Single DVA hospital	Registered nurses

ICU = intensive care unit; AIDS=acquired immuno deficiency syndrome; RN=registered nurse; ICD-9=international classification of diseases; ADL=activities of daily living; LVN=licensed vocational nurse; LPN=licensed practical nurse; CMS=Centers for Medicare and Medicaid Services; HCFA=Health Care Finance Administration; ER=emergency room; UTI=urinary tract infection; DVA=Department of Veterans Affairs

Evidence Table 1. Nurse staffing (continued)

Author Year	Working Condition	Measure of Safety	Casemix Control
Sochalski 2001[62]	Subjective estimate of nursing workload	Subjective estimates of medication errors, nosocomial infections, patient falls, and incomplete nursing tasks	None
Byrne 1998[70]	Workload during simulated anesthesia cases	Recording errors on anesthetic charts of "patient's" oxygen saturation, heart rate, systolic & diastolic arterial pressures & end-tidal carbon dioxide concentrations	All subjects had the same simulated case.
Hunt 1998[63]	Nurse to patient ratio	In-hospital mortality and re-admission rates	None
Fridkin 1996[65]	Patient to nurse ratio in ICU	Bacteremia in patients with central venous catheter	APACHE-II

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Evidence Table 1. Nurse staffing (continued)

Author Year	Main Finding	Design Suitability/ Study Execution
Sochalski 2001[62]	Indirect association between workload estimates and measure of safety.	Least FAIR
Byrne 1998[70]	Chart recording errors increased with increased workload.	Least FAIR
Hunt 1998[63]	Lower ratio was associated with higher readmission rate but not with mortality.	Least FAIR
Fridkin 1996[65]	RN hours in ICU were 20.3/patient-day before outbreak of infections and 17.0 during the outbreak.	Least FAIR

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Evidence Table 2. Physician volume

Author Year	Study Question(s)	Design	Setting	Category of Health Professional	Working Condition
Nash 1999[79]	Does physician caseload affect inpatient mortality for acute MI?	Cross-sectional n=30,351 patients	1993 Pennsylvania hospital admissions for acute MI as initial episode of care	Cardiologists Internists Family Practitioners	Volume of cases per year by individual physician
Ellis 1997[81]	Does operator volume and experience influence the procedural outcome of percutaneous coronary revascularization?	Retrospective cohort n=12,985 patients Risk adjustment analysis	5 hospitals with high volume (>1,000 procedures per year) interventional cardiology programs in the US	38 physicians with ≥30 cases per year	Number of cases per year and years of experience
Margulies 2001[80]	Does case volume of trauma surgeons affect in-hospital mortality for severely injured patients?	Cross-sectional n=1754 patients	California	86 trauma surgeons in five Level I trauma centers	Case volume
Hartz 1999[44]	What is the relationship between training programs and experience and adjusted patient mortality rates?	Cross-sectional n= 83,547 patients	3 statewide databases (New York, Pennsylvania & Wisconsin)	275 cardiac surgeons	Physician experience and case volume
Czaplinski 1998[73]	Do physicians with three or more discharges per year for defined diagnoses experience lower patient mortality than lower volume physicians?	Cross-sectional n=11,316 patients	Single Connecticutt hospital	518 physicians	Total number of cases during study period

MI = myocardial infarction; ICD-9 = international classification of diseases; CCS = Canadian Cardiovascular Society; ACC/AHA = American College of Cardiology/American Heart Association

Evidence Table 2. Physician volume (continued)

Author Year	Measure of Safety	Casemix Control	Main Finding	Design Suitability/ Study Execution
Nash 1999[79]	In-hospital mortality	ICD-9 codes, severity of illness, age, gender, secondary logistic regression analysis to control for referral bias	Patients of physicians with higher caseloads for acute MI had lower mortality. Cardiologists had consistently higher caseloads than generalists.	Greatest FAIR
Ellis 1997[81]	In-hospital mortality, Q-wave infarction, emergency bypass surgery	Acute MI, age, CCS angina class, cardiogenic shock, left ventricular ejection fraction, modified ACC/AHA lesion classification score, number of diseased vessels, prior bypass surgery, prior restenosis, sex, unstable angina	High volume operators had a lower incidence of major complications. Years of experience were not associated with complication rates.	Greatest GOOD
Margulies 2001[80]	In-hospital mortality	Injury severity score, Glasgow coma scale, age, and type of injury	While institutional case volume was weakly related to survival rates, physician case volume was not.	Moderate POOR
Hartz 1999[44]	Mortality ratio	Predicted mortality rate based on patient characteristics	Physicians with highest case volumes had lowest mortality rates. Mortality rates increased with higher physician age and years of experience. Physicians trained at more prestigious programs or with current faculty appointments did not have lower mortality rates.	Moderate FAIR
Czaplinski 1998[73]	In-hospital mortality	Nursing unit on which patient was managed	There were no consistent mortality differences across the diagnostic groups between high volume and low volume physicians.	Moderate POOR

MI = myocardial infarction; ICD-9 = international classification of diseases; CCS = Canadian Cardiovascular Society; ACC/AHA = American College of Cardiology/American Heart Association

Evidence Table 3. Physician specialty

Author Year	Study Question(s)	Design
Latif 1998[84]	Do patients with malignant glioma have better outcomes if operated on by a surgical neuro-oncologist rather than a general neurosurgeon?	Cross-sectional n=236 patients
Gerbert 1996[85]	Do dermatologists have better sensitivity and specificity for recommending biopsy of skin lesions suspicious for cancer?	Cross-sectional 37 lesions on slides and computer images 25 lesions on patients
Fleischer 2001[86]	How does physician experience and specialty affect the quality of surgical excision of basal cell carcinoma?	Cross-sectional n= 1,459 specimens
Dorrance 2000[87]	Are patient outcomes after potentially curative colorectal cancer surgery different depending on the surgeon's specialty? What factors may help to explain differences in outcome among specialty groups?	Retrospective cohort n=378 for resections thought to be curative n=154 performed by colorectal surgeons n=126 performed by vascular/ transplant surgeons n=98 performed by general surgeons
Nash 1997[88]	Are outcomes for patients with acute myocardial infarction different when patients are cared for by a cardiology specialist versus a generalist?	Cross-sectional n=40,684 patients

ICD-9 = international classification of diseases

Evidence Table 3. Physician specialty (continued)

Author Year	Setting	Category of Health Professional	Working Condition	Measure of Safety
Latif 1998[84]	British university medical center	Surgical neuro-oncologist general neurosurgeons	Surgical specialty	30-day mortality, postoperative hematoma, and wound dehiscence
Gerbert 1996[85]	Dermatology clinic at a medical center in San Francisco, CA	71 primary care residents 15 dermatologists and resident dermatologists from San Francisco Bay area hospitals	Physician specialty	Correct recommendation of biopsy for skin lesions
Fleischer 2001[86]	4 US university medical centers	27 dermatologists 9 otolaryngologists 14 plastic surgeons 12 general surgeons	Physician experience and specialty	Tumor-free resection margins
Dorrance 2000[87]	A large university teaching hospital in Glasgow, UK	2 colorectal surgeons 6 vascular/ transplant surgeons 4 general surgeons	Surgeon specialty	Cancer recurrence rates
Nash 1997[88]	1993 Pennsylvania hospital admissions for acute myocardial infarction	Cardiologists, internists, family practitioners	Expertise (generalist/ specialist)	In-hospital mortality

ICD-9 = international classification of diseases

Evidence Table 3. Physician specialty (continued)

Author Year	Casemix Control	Main Finding
Latif 1998[84]	Tumor type, year of treatment and prognostic index	Post-operative complication rates were not significantly different between the group of patients operated on by the neuro-oncologist and the group operated on by general neurosurgeons.
Gerbert 1996[85]	Same cases for all participants	Dermatologists had sensitivity of .81 and specificity of .84 for recommending biopsy. Primary care residents had sensitivity of .67 and specificity of .73.
Fleischer 2001[86]	Sex, age, tumor characteristics	No significant difference was noted for physician experience. Otolaryngologists and plastic surgeons were more likely to incompletely excise tumors when compared to dermatologists. No difference was noted between dermatologists and general surgeons.
Dorrance 2000[87]	Information on demographic and operative details was collected and analyzed	Colorectal surgeons had lower local and overall cancer recurrence rates. Differences in local recurrence rates seem to be predominantly related to the extent of resection.
Nash 1997[88]	ICD-9 codes, severity of illness, age, gender	Patients cared for by cardiologists, as a group, had the lowest risk-adjusted mortality.

ICD-9 = international classification of diseases

Design Suitability/ Study Execution
Greatest FAIR
Greatest FAIR
Moderate FAIR
Moderate POOR
Moderate FAIR

Evidence Table 4. Staff experience

Author Year	Study Question(s)	Design
Blegen 2001[96]	What are the relationships between quality of patient care and the education and experience of the nurses providing that care?	Cross-sectional (Patient care units) n= 42 units in study 1 n= 39 units in study 2
Goodwin 2001[89]	What is the effect of surgical training for coronary artery bypass operations on patient mortality?	Cross-sectional n=2,740 patients
Nelson 2000[90]	What are the residents' understanding of drug dose calculations and ordering? What are the short term effects of a brief educational intervention on the skills required to properly calculate dosages and other medications?	Pre-test post-test
Hartz 1999[44]	What is the relationship between training programs and experience and adjusted patient mortality rates?	Cross-sectional n= 83,547 patients
Stevenson 1999[91]	Does adherence to training guidelines for pediatric TEE affect the outcome of patients undergoing repair of congenital cardiac defects?	Retrospective cohort n= 219 patients

TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human immunodefi
ACLS = advanced cardiac life support

Setting
Acute-care hospitals 1 large tertiary-care hospital in study 1, 11 hospitals in study 2
Regional cardiothoracic surgery unit in Cambridge, UK
Urban public hospital in New York, NY
3 statewide databases (New York, Pennsylvania & Wisconsin)
Children's hospital in Seattle, WA

iciency virus;

Evidence Table 4. Staff experience (continued)

Author Year	Category of Health Professional	Working Condition	Measure of Safety
Blegen 2001[96]	Nurses	Education and experience	Medication errors and patient fall rates
Goodwin 2001[89]	Senior and trainee surgeons	Physician composition of surgical team	30 day mortality, post-operative bleeding and wound infections
Nelson 2000[90]	30 emergency medical residents 20=intervention 10=controls	Training	Drug dosing errors in simulated cases
Hartz 1999[44]	275 cardiac surgeons	Physician experience and case volume	Mortality ratio
Stevenson 1999[91]	8 Physicians	Training qualification	Diagnoses and hospital deaths

TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human immunodeficiency virus; ACLS = advanced cardiac life support

Evidence Table 4. Staff experience (continued)

Author Year	Casemix Control	Main Finding	Design Suitability/ Study Execution
Blegen 2001[96]	Patient acuity, hours of nursing care, staff mix	Units with more experienced nurses had lower medication errors and lower patient fall rates. Units with more baccalaureate-prepared nurses were not significantly better.	Moderate FAIR
Goodwin 2001[89]	Parsonnet score	Patients operated on by teams comprised of trainees and senior surgeons had the same complication rates as patients operated on by senior surgeons.	Moderate FAIR
Nelson 2000[90]	Same questions administered to all. Repeat test had similar format.	Training in calculating and executing drug ordering is required. A brief educational intervention significantly improved short-term performance.	Moderate FAIR
Hartz 1999[44]	Predicted mortality rate based on patient characteristics	Physicians with the highest case volumes had the lowest mortality rates. Mortality rates increased with higher physician age and years of experience. Physicians who had trained at more prestigious programs or had current faculty appointments did not have lower mortality rates.	Moderate FAIR
Stevenson 1999[91]	None	Adherence to training guidelines for pediatric TEE favorably affects patient outcomes.	Moderate POOR

TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human immunodeficiency virus; ACLS = advanced cardiac life support

Evidence Table 4. Staff experience (continued)

Author Year	Study Question(s)	Design
Pollack 1997[92]	What impact do pediatric critical care training programs have on pediatric intensive care mortality?	Cross-sectional n= 2,744 admissions (fellowship program) n= 3,006 (non-fellowship program)
Eldar 1996[93]	How do residents compare to qualified surgeons in the performance of laparoscopic cholecystectomies?	Cross-sectional n=137 operations and n=76 operations
Paauw 1995[94]	What is the ability of primary care physicians to recognize physical findings associated with HIV infection?	Cross-sectional n= up to 3 cases presented
Birnbaum 1994[97]	Does ACLS training affect the process and quality of care to patients with ischemic heart disease?	Pre-test post-test n= 869 patients
Pollack 1994[95]	How do ICU size, medical school teaching status and specialist status affect pediatric ICU mortality?	Cross-sectional n= 5,415 admissions

n = number; TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human
ACLS = advanced cardiac life support

Setting
16 pediatric ICUs in the U.S. 8 with critical care fellowships
Medical center in Israel
University clinic Seattle, WA
7 rural, community hospitals in Wisconsin
16 pediatric ICUs in the U.S.

immunodeficiency virus;

Evidence Table 4. Staff experience (continued)

Author Year	Category of Health Professional	Working Condition	Measure of Safety
Pollack 1997[92]	Physicians-fellows, residents	Training	Adjusted mortality rate
Eldar 1996[93]	5 staff surgeons 3 staff/resident surgeon teams	Training	Post-operative infections and other immediate complications
Paauw 1995[94]	134 general internists and family practitioners	Subjective report of physician experience with HIV patients	Correct diagnosis
Birnbaum 1994[97]	69 Physicians 277 Nurses 115 Other critical care staff	Training	In-hospital deaths
Pollack 1994[95]	Pediatric intensivists, residents	Provider specialty training	Adjusted mortality

n = number; TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human immunodeficien
ACLS = advanced cardiac life support

Evidence Table 4. Staff experience (continued)

Author Year	Casemix Control	Main Finding	Design Suitability/ Study Execution
Pollack 1997[92]	Severity, diagnosis	Overall, adjusted mortality rates were lower in pediatric ICUs located in hospitals having critical care fellowship programs.	Moderate FAIR
Eldar 1996[93]	Demographic and clinical characteristics were compared.	Complication rates were no higher in cases performed by residents supervised by attending surgeons than in cases performed by attending surgeons.	Moderate FAIR
Paauw 1995[94]	Standardized patients	The majority of physicians did not detect the physical condition and provide correct diagnoses. Experience with HIV infection was associated with identification of oral hairy leukoplakia.	Moderate FAIR
Birnbaum 1994[97]	Disease severity score	ACLS training benefits the ACLS program and patient survival.	Moderate GOOD
Pollack 1994[95]	Physiologic status, diagnosis and other mortality risk factors	Medical school teaching status was related to higher mortality and specialist status was related to lower mortality. Residents may explain the higher mortality seen in teaching hospitals. No significant associations were noted for ICU size.	Moderate FAIR

n = number; TEE = transesophageal echocardiography; ICU = intensive care unit; HIV = human immunodeficiency virus; ACLS = advanced cardiac life support

Evidence Table 5. Temporal factors

Author Year	Study Question(s)	Design	Setting
Rosa 1993[102]	Is performance poorer on a 12-hour work shift than on an 8-hour shift for utility workers?	Time-series study of change in work schedule	Natural gas utility
Bell 2001[103]	Is in-hospital mortality higher among patients admitted on weekends?	Retrospective cohort of 3.8 million acute care patients admitted from ERs	All hospitals in Ontario, Canada
Bollschweller 2001[104]	Is length of work-shift for physicians associated with patient complications?	Cross-sectional study comparing 8-hour and 12-hour physician shifts	Six German ICUs
Booker 1995[105]	Are medication error rates related to season or photoperiod?	Time series analysis	Alaskan acute care hospital
Gold 1992[106]	Is the shift assignment of nurses associated with incidence of medication errors?	Survey of 635 nurses	US hospital
Novak 1988[107]	Is the shift assignment of factory workers associated with rates of on-the-job injuries?	Time series analysis	Chemical factory
Smith 1995[108]	Do night-shift workers perform poorer than day-shift workers?	Cross-sectional	22 shiftworkers in one nuclear power plant
Palinkas 1986[109]	Is service in an isolated cold environment associated with poorer job performance?	Case-control	Navy personnel serving in Antarctica and control personnel
Northrup 1979[110]	Is implementation of 12-hour work shifts associated with reduced work efficiency or increased workplace injuries?	Survey of managers	Chemical and petroleum plants

ER = emergency room; ICU = intensive care unit; LPN = licensed practical nurse; N/A = not applicable

Evidence Table 5. Temporal factors (continued)

Author Year	Category of Health Professional	Working Condition	Measure of Safety
Rosa 1993[102]	Non-medical	Length of work shift	Computerized battery of cognitive and motor skills
Bell 2001[103]	N/A	Day of week that patient received initial care	In-hospital mortality
Bollschweller 2001[104]	ICU physicians	8-hour vs. 12-hour work-shift	Hospital-acquired infections and adverse drug reactions
Booker 1995[105]	Nursing staff	Length of day time of year	Medication errors
Gold 1992[106]	RNs and LPNs	Shift assignment	Recalled medication errors
Novak 1988[107]	Non-medical	Rotating shifts vs. fixed shifts	Workplace injuries
Smith 1995[108]	Non-medical	Day-shift vs. night-shift	Cognitive function and alertness
Palinkas 1986[109]	Non-medical	Service in isolated extreme environment	Desertions, demotions, and absences
Northrup 1979[110]	Non-medical	8-hour vs. 12-hour shifts	Estimated productivity and workplace injuries

ER = emergency room; ICU = intensive care unit; LPN = licensed practical nurse; N/A = not applicable

Evidence Table 5. Temporal factors (continued)

Author Year	Casemix Control	Main Finding	Design Suitability/ Study Execution
Rosa 1993[102]	Some workers served as their own controls	Workers on 12-hour shifts had poorer performance especially at night.	Greatest FAIR
Bell 2001[103]	Age, sex, Charlson Comorbidity Index	Mortality rates were higher for weekend admissions for several diagnoses.	Moderate FAIR
Bollschweller 2001[104]	APACHE-II	Complication rates were not significantly different between ICU's with 8-hour shifts and ICU's with 12-hour shifts.	Moderate FAIR
Booker 1995[105]	Nursing workload	Medication errors greatest 1-2 months after darkest month, after controlling for medication error increase with increased temporary worker shifts and patient days per month, and decrease with increased overtime per month.	Moderate GOOD
Gold 1992[106]	None	Reported medication errors were slightly higher among nurses who rotated among shifts than among nurses who worked the same shift compared to day or evening shift nurses. Night shift nurses reported more near misses but similar rates of medication errors.	Moderate FAIR
Novak 1988[107]	Gender	Workers on rotating shifts had higher injury rates.	Moderate FAIR
Smith 1995[108]	None	Performance was poorer among night-shift workers.	Least FAIR
Palinkas 1986[109]	Demographic factors	No difference in rates of adverse outcomes between groups, but all rates were low.	Least FAIR
Northrup 1979[110]	None	No reported increase in accidents or decreased operational efficiency.	Least FAIR

ER = emergency room; ICU = intensive care unit; LPN = licensed practical nurse; N/A = not applicable

Evidence Table 6. Interruptions

Author Year	Study Question(s)	Design Population Setting
Flynn 1999[112]	Are workplace interruptions associated with medication dispensing errors?	Observational Task analysis of 14 pharmacists and 10 pharmacy technicians at an ambulatory care pharmacy. General medical surgical hospital Alabama
Pape 2002[134]	Is inpatient nurse use of a protocol to reduce distractions during medication dispensing effective?	Quasi-experimental Comparison of distractions during medication dispensing in 2 intervention and 1 control group. 17 licensed and registered nurses during 24 medication dispersing cycles. Medical-surgical nursing unit 520 bed hospital Southeast Texas
Peterson 1999[131]	1) Do pharmacists believe the risk of dispensing errors and number of errors are increasing? 2) What are the major factors contributing to dispensing errors? 3) What factors can minimize dispensing errors?	Observational Cross-sectional survey Mailed to 419 registered pharmacists Tasmania, Australia

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not s

Working Condition

Interruption - cessation of activity due to externally imposed reason.
Distraction - observable response to externally imposed reason (short of activity cessation).

Interruptions
Distractions

Interruptions
Workload
Noise
Packaging/
labeling

significant

Evidence Table 6. Interruptions (continued)

Author Year	Outcomes	Data Collection		Analysis
		Tools	Measures	
Flynn 1999[112]	Association between GEFT scores, interruptions/ distractions and medication dispensing errors	GEFT scores, work process videotapes	Interruptions, distractions workload; dispensing errors and types	Analysis of covariance using square root transformation of the number of errors (dependent variable) and interruptions/distractions (independent variables).
Pape 2002[134]	Distractions	Demographic data form Medication Administration Distraction Observation Sheet	Demographics Nursing education and experience Distractions (total and by type)	Descriptive frequencies One way ANOVA Multiple and bivariate linear progression.
Peterson 1999[131]	Trend in dispensing errors Factors contributing to errors Factors minimizing errors	Survey	Response to survey questions, some with visual analogue scale	Frequency of responses Comparison of pharmacy owners/non-owners. Correlation between years as pharmacist and response.

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not significant

Evidence Table 6. Interruptions (continued)

Author Year	Results	Design Suitability/ Study Execution
Flynn 1999[112]	164 dispensing errors in 5072 prescriptions (3.2% rate, CI 3.1-3.4). Wrong label error (80%) most common 2022 interruptions during 1143 prescriptions 6.65% errors in interrupted prescriptions 5.67% in uninterrupted prescriptions Errors increase with interruptions per half hour (p=.004) GEFT associated with error rate (p=0.03) Relationship between interruptions and errors NS when GEFT score used as co-variate.	Greatest GOOD
Pape 2002[134]	Significant reduction in distractions during medication administration for: focused protocol (180 distractions p=.014) Medsafe © protocol (64 distractions, p=.000) when compared to control cycles (484 distractions) Conversation, other personnel interrupting and external noise contributed most to distraction.	Moderate FAIR
Peterson 1999[131]	50% response rate 82% felt *risk* of errors increasing 47% felt *actual* errors increasing Major factors for errors rated as: a) high dispensing volume (84%) b) pharmacist overwork (80%) c) fatigue (80%) d) interruptions to dispensing (76%) e) confusing or similar drug names (75%) Owners rated interruptions as less important than non-owners-(70% as compared to 80%).	Least FAIR

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not significant

Evidence Table 6. Interruptions (continued)

Author Year	Study Question(s)	Design Population Setting
Ely 1995[133]	What are family physician's most memorable errors and their perceived causes?	Observational-Cross-sectional interviews. Random sample of 53 consenting family physicians selected from all practicing physicians. Eastern Iowa
Gladstone 1995[132]	What are the most common risk factors for nurses in the process of drug administration?	Observational-retrospective analysis. 79 drug error accident reports 102 nurses 17 nurse managers District general hospital in Southwest England.
Cooper 1984[121]	What are the types of failures, nature of the activities during failure, and associated factors in errors and equipment failures in anesthesia?	Observational-Critical incident analysis-Retrospective structured interviews and "instant" voluntary reports. ***Phase 1:*** 48 anesthesiologists 30 residents 13 nurse anesthetists 2 teaching and 2 community hospitals Boston metro area ***Phase 2:*** 18 anesthesiologists 21 residents 9 nurse anesthetists Teaching hospital Boston metro area

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not s

Working Condition

Distractions - preoccupation with other activities/obligations

Interruptions and distractions

Distraction by 1 task to the exclusion of others.
Visual restriction
Lack of sleep/fatigue
Supervisor not present enough.
Inadequate supervision
Conflicting equipment designs.

significant

Evidence Table 6. Interruptions (continued)

Author Year	Outcomes	Data Collection		Analysis
		Tools	Measures	
Ely 1995[133]	Categorize recalled errors and perceived causes	Audiotapes and transcripts of a focus group and in-depth interviews	1) Demographic characteristics of participants and non-participants 2) Classification of errors from focus group 3) Causes of error rated on 4 point scale	Descriptive statistics
Gladstone 1995[132]	Ranking of causes of drug error and factors contributing to error	Drug error accident reports. Interviews with nurses reporting errors. Questionnaires to dispensing and managing nurses.	Type of drug error, route of administration, time of day, type of follow-up intervention, ranking of causes of error, nurses' feelings and manager reaction, factors contributing to error	Descriptive frequencies
Cooper 1984[121]	Distribution of critical incidents by type and nature of failure, by nature of activity, by type of equipment involved, and associated factors cited	***Phase 1:*** Taped interviews, summary transcripts ***Phase 2:*** Taped interviews, summary transcripts, voluntary reporting forms	Data coded in content domains, fields on reporting form	Characteristics categorized by two investigator consensus, extracted and summary frequencies provided

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not significant

Evidence Table 6. Interruptions (continued)

Author Year	Results	Design Suitability/ Study Execution
Ely 1995[133]	53/70 (76%) agreed to interview: 53 errors 30 delayed or missed diagnoses 11 surgical mishaps 8 medical treatment mishaps Causes included 48 (91%) of cases - physician stressors 48 (91%) of cases - process-of- care factors 38 (72%) of cases - patient-related factors 33 (62%) of cases - physician characteristics 25 (47%) of cases - physician felt “distracted”	Least FAIR
Gladstone 1995[132]	Dose-related Highest ranked causes: 1) failure to check patient identification 2) prescription illegible 3) nurse distracted 4) miscalculation of dose 5) infusion device set up or adjustment incorrect The most frequent risk factors cited by nurses were interruptions, workload, skill mix and loss of concentration.	Least FAIR
Cooper 1984[121]	855 critical incidents 616 retrospective 239 “instant” reporting: 115 (13%) equipment failure 583 (68%) human error 111 (13%) disconnect 46 (5%) other 71 incidents reported "other distractive simultaneous anesthesia activities” as an associated factor 83 visual restriction 55 lack of sleep/fatigue 52 supervisor not present enough 34 inadequate supervisor 34 conflicting equipment designs	Least FAIR

GEFT = group embedded figures test (for distractibility); CI = confidence interval; NS = not significant

Evidence Table 7. Transitions

Author Year	Study Question(s)	Design Population Setting
Naylor 1999[141]	Does a discharge and 4-week home follow-up protocol implemented by advanced practice nurses affect longer term hospital readmissions?	RCT 363 patients age ≥ 65 (mean 75) with medical or surgical diagnoses admitted from home and at high risk for poor discharge outcomes. 2 Philadelphia hospitals
Diem 1996[143]	What is the effect of an admitting resident discharge clinic on house staff education and utilization of hospital services?	RCT 751 patients discharged to home Denver VA medical center
Siu 1996[165]	Does a nurse practitioner intervention begun during hospitalization and continued for 3 visits after discharge improve survival and reduce hospital readmissions & nursing home placement among frail elders?	RCT 354 patients age > 65 discharged Los Angeles academic medical center
Weinberger 1996[159]	Does increasing post discharge access to primary care reduce readmissions and hospital days?	RCT 1396 chronically ill patients from 9 VA medical centers. Throughout US

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 7. Transitions (continued)

Author Year	Intervention
Naylor 1999[141]	Discharge planning and 4-week home follow-up protocol implemented by advanced practice nurses
Diem 1996[143]	Discharge clinic within 10 days of discharge
Siu 1996[165]	Nurse practitioner assessment prior to discharge Geriatrics team consultation with recommendations to primary physician 3 follow-up home visits
Weinberger 1996[159]	Nurse and primary care physician assessment/counseling before discharge, nurse call 2nd day post discharge, post discharge appointment at 1 week, phone access (average nurse calls 7.5 in 6 mos.)

RCT = randomized controlled trial; VA = Veterans Administration; mo
non-significant; ER = emergency room; QWB = quality of well-being;
activities of daily living

Outcome
Hospital readmission Time to first readmission
Hospital days Hospital readmissions within 30 days ER visits Deaths
Deaths Readmissions Nursing home placement SF-36;(QWB) Satisfaction Medication adherence, number of medications
Hospital readmission Hospital days

ɔs = months; I = intervention; C = control; NS =
wks = weeks; hrs = hours; ADL =

Evidence Table 7. Transitions (continued)

Author Year	Results	Design Suitability/ Study Execution
Naylor 1999[141]	Readmission rate at 24 weeks: I: 36 (20.3%); C: 69 (37.1%) p=<.01. Time to readmission lower in I than C (p<.001 discharge to 6 weeks, p=.02 6 to 24 weeks). No difference between I & C in functional status, depression, and patient satisfaction.	Greatest GOOD
Diem 1996[143]	Readmissions in 30 days: NS Mean length of stay: NS 14 (10%) medication errors noted at discharge clinic 5 (3.5%) tests not scheduled as expected. I group had fewer ER visits than C group (65 [20.8%] vs 123 [28%]; p=.03). Deaths: NS	Greatest FAIR
Siu 1996[165]	*At 60 days:* Deaths: NS: 7 (4%) I vs. 8 (4.5%) C Readmissions: NS: 43 (24%) I vs. 37 (21%) C Nursing home placement: NS: 7 (4%) I vs. 6 (3.4%) C SF-36; QWB NS. I group less satisfied at 30 days (p=.02). Medication use NS.	Greatest GOOD
Weinberger 1996[159]	I group higher monthly readmission than C group (0.19 vs 0.14, p=0.005) and more rehospitalization days (10.2 vs 8.8, p=0.04). I group more visits to medicine clinic (3.7 vs 2.2, p<0.001). Quality of life NS at 1 & 6 mos. I group more satisfied (p<0.001).	Greatest GOOD

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 7. Transitions (continued)

Author Year	Study Question(s)	Design Population Setting
Martin 1994[161]	Does a hospital discharge team for the elderly with 6 weeks of support after discharge reduce hospital readmissions and length of hospital stay?	RCT 54 patients mean age 82 UK hospital and community
Naylor 1994[164]	Does a discharge and home follow-up protocol implemented by nurse specialists with 2 weeks follow-up affect patient and caregiver outcomes?	RCT 276 patients age 70+ with 125 caregivers Admitted to the Hospital of the University of Pennsylvania from home with medical or surgical cardiac diagnoses
Hansen 1992[163]	What is the effect of home visits on the elderly after discharge from the hospital?	RCT 344 patients ≥75 Roskilde, Denmark county hospital
Lipton 1992[162]	Does clinical pharmacist consultation to geriatric patients and their physicians before and after hospital discharge reduce clinically significant drug problems?	RCT 236 patients ≥65 discharged on 3 or more medications Community nonteaching hospital in San Francisco Bay area

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 7. Transitions (continued)

Author Year	Intervention
Martin 1994[161]	Ward team nurse manager assessment Nurse manager supervising health care assistants who visited up to 3 times a day for 6 weeks
Naylor 1994[164]	Discharge planning and home protocol implemented by nurse specialists from admission to 2 weeks past discharge
Hansen 1992[163]	Home visit by district nurse 1 day after discharge General practitioner home visit 15 days after discharge
Lipton 1992[162]	Patient books to record medication; medical record review; pharmacist consultation to patient and physician at and for 3 months post discharge

RCT = randomized controlled trial; VA = Veterans Administration; mo
non-significant; ER = emergency room; QWB = quality of well-being;
activities of daily living

Outcome
Place of residence
Hospital readmission
Number of hospital days
Mental test, morale, self-care & domestic ability
Length of stay
Time from discharge to readmission
Hospital readmission
1 year after discharge:
Hospital readmissions
Nursing home admissions
Deaths
Institutional days
Prescribing problems
Appropriateness of prescribing

ɔs = months; I = intervention; C = control; NS =
wks = weeks; hrs = hours; ADL =

Evidence Table 7. Transitions (continued)

Author Year	Results	Design Suitability/ Study Execution
Martin 1994[161]	*At six weeks:* Living at home 24 (83%) I vs. 10 (40%) C (p=<0.001). Readmissions 4 (14%) I vs. 9 (38%) C (p=<0.01). Living at home still significant 12 weeks and 1 year. Readmissions: 12 weeks NS Alive not readmitted 12 I vs. 4 C; p= <0.05 for 1 year. Inpatient days lower I vs.C at 12 weeks (p=0.05) but not one year. No difference mental test.	Greatest FAIR
Naylor 1994[164]	Time from discharge to readmission: NS Medical group: a) Readmissions at 2 wks: I: 3 (4%); C: 11 (16%) p=0.02; at 2-6 wks and for 12 wks: NS b) Days rehospitalized in I less than C at 2 wks (p=.002) & 2-6 wks (p=.01). Surgical group: NS outcome differences I vs C	Greatest GOOD
Hansen 1992[163]	Readmissions: NS Nursing home admissions: 16 (9.8%) I vs. 29 (16%) C; p=<0.05 Deaths: 32 (20%) I vs. 43 (24%) C; NS Group total institutional days: 1950 I vs. 2700 C	Greatest GOOD
Lipton 1992[162]	88% patients clinically significant drug problem; 22% patients had potentially injurious or life threatening drug problem. 103/123 (84%) I vs. 103/113 (92%) C with at least 1 prescribing problem (p=0.05); percent less than optimal medication & wrong dosage lower in I than C (p=0.01; p=0.05). Overall appropriateness of prescribing score .59 I, .76 C (p=0.01).	Greatest GOOD

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 7. Transitions (continued)

Author Year	Study Question(s)	Design Population Setting
Smith 1988[158]	Does an intention to increase post discharge ambulatory contacts reduce non-elective readmissions?	RCT 1001 patients average age 52 consecutively discharged from general medicine service with chronic disease University-affiliated hospital in Indianapolis
Townsend 1988[160]	How does use of a care attendant after hospital discharge compare with standard aftercare for effects on independence, morale and use of services?	RCT 903 patients aged >75 with chronic disease District general hospital & Harrow community, UK hospital discharged to home

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 7. Transitions (continued)

Author Year	Intervention
Smith 1988[158]	Outpatient clinic team nurse phone call to patient 1 week post discharge, contact at clinic visit, mailing post discharge to patient
Townsend 1988[160]	Care attendant visit before discharge, first day home and up to 12 hrs/wk for 2 weeks

RCT = randomized controlled trial; VA = Veterans Administration; mo
non-significant; ER = emergency room; QWB = quality of well-being;
activities of daily living

Outcome
Non-elective hospital admission
Physical independence through ADL
Morale (Philadelphia Geriatric Morale Scale)
Hospital readmissions
Deaths

ɔs = months; I = intervention; C = control; NS =
wks = weeks; hrs = hours; ADL =

Evidence Table 7. Transitions (continued)

Author Year	Results	Design Suitability/ Study Execution
Smith 1988[158]	Non-elective admissions: NS I: .104/patient/month; C: .103/patient/month p=0.4 Readmission days: NS I: 7.6% less than C (NS, p=0.5) High risk: (31.9% fewer hospital days/patient/month):NS I: 1.13 hospital days/patient/month C: 1.66 hospital days/patient/month p=0.06 Clinic contact increased in intervention: I: .53/patient/month; C: .48/patient/month p=.005	Greatest GOOD
Townsend 1988[160]	No significant change in independence or morale. No significant difference in deaths: I: 34 (7%); C: 25 (6%) Difference in total readmissions: NS at 3 months: I: 105 (23%); C: 102 (23%) Significant at 18 months for more than 2 readmissions: I: 23 (6.7%); C: 43 (13.9%) Days in hospital at 18 months: I: 18.2; C: 22.8	Greatest GOOD

RCT = randomized controlled trial; VA = Veterans Administration; mos = months; I = intervention; C = control; NS = non-significant; ER = emergency room; QWB = quality of well-being; wks = weeks; hrs = hours; ADL = activities of daily living

Evidence Table 8. Stress

Author Year	Study Question(s)	Design/ Population/ Setting
Is stress associated with errors?		
Dugan 1996[194]	Is stress associated with rates of patient incidents or staff turnover?	Cross-sectional Midwest US acute care hospital 293 of 600 nursing staff on 19 units. Response rate 49%.
Jones study 1 1988[195]	Do hospital departments with high malpractice rates have high department-average stress scores?	Cross-sectional 91 departments in five small to medium sized general care hospitals across US. Clinical and non-clinical department staff.
Jones study 2 1988[195]	Do hospitals with high reported levels of workplace and personal stress have higher rates of malpractice claims?	Cross-sectional 61 Midwestern hospitals
Does a stress management intervention reduce errors?		
Jones study 4 1988[195]	Is malpractice risk reduced in hospitals employing a hospital-wide stress management program, compared to matched control hospitals?	Pre-test/Post-test with control group
Jones study 3 1988[195]	Does a hospital wide stress management program reduce the incidence of medication errors?	Time series study of a single US hospital; 676 of 700 employees

IV = intravenous

Evidence Table 8. Stress (continued)

Author Year	Working Condition	Measure of Safety	Other respondent characteristics measured
Dugan 1996[194]	Burnout and self-rated stress symptom score; stress continuum scale	Patient incidents (medication errors, IV errors, falls)	Nurse injuries (back injuries, needle sticks)
Jones study 1 1988[195]	Job stress, organizational stress	Malpractice claim records, error and negligence identified by hospital administrative staff	Personal stress, job dissatisfaction
Jones study 2 1988[195]	Job stress, organizational stress	Malpractice claims history	Personal stress, job dissatisfaction hospital size
Jones study 4 1988[195]	Stress management program	Malpractice claims data one year before and one year after program implementation	Hospital size, location, and malpractice claims history
Jones study 3 1988[195]	Stress management program	Monthly medication error data from incident report system for 8 months prior and 7 months after intervention	

IV = intravenous

Evidence Table 8. Stress (continued)

Author Year	Main Finding	Design Suitability/ Study Execution
Dugan 1996[194]	Patient incident rates were correlated with average perceived nursing unit stress (R=0.43,p=0.05) but not with average reported stress symptoms (R-0.23, p=0.10). Nurse turnover was not correlated with perceived stress or reported stress symptoms.	Least FAIR
Jones study 1 1988[195]	Departments with higher malpractice risk had higher job stress, organizational stress, and job dissatisfaction. Personal stress not significantly different.	Least FAIR
Jones study 2 1988[195]	Job stress, organizational stress and hospital size were correlated with hospital malpractice risk; job dissatisfaction and personal stress were not.	Least FAIR
Jones study 4 1988[195]	Malpractice claims rate was significantly lower following intervention; no reduction in control hospitals.	Greatest FAIR
Jones study 3 1988[195]	Medication error rates were significantly less frequent following establishment of the stress management program.	Least FAIR

IV = intravenous

Evidence Table 9. Job satisfaction

Author Year	Study question(s)	Design/ Population/ Setting
DeVoe 2002[197]	Is career dissatisfaction associated with family physicians' ability to provide high quality patient care?	Survey of 3,166 US family physicians (~65% response rate)
Shanafelt 2002[199]	Are suboptimal patient care practices reported more frequently by physicians reporting symptoms of burnout?	Survey Multi-hospital program in NW US 115/151 internal medicine residents
Bond 2001[196]	Is the risk of pharmacist medication error related to workplace, workload, and pharmacist satisfaction?	Survey of 2,437/7,298 Texas pharmacists; response rate 33%.
Carey 2001[189]	Do relationships exist between collectivism, error orientation, and workload, control, and monotony among nurses?	Survey of 209/702 RNs in 11 US cities; response rate 30%.
Firth-Cozens 1997[198]	What factors lead to stress that impacts patient care?	Qualitative study open-ended questions included in survey of 82 British physicians who reported incidents of adverse care. 302 questionnaires sent out, 225 returned, 82 responses used.
Leppa 1996[200]	Are interpersonal relationships related to job satisfaction? Is satisfaction with relationships related to workgroup disruption? Is workgroup disruption related to quality and safety of patient care?	Survey of 908 RNs in 4 US tertiary care hospitals. Response rates in each hospital ranged from 61% to 75%.

RN = registered nurse

Evidence Table 9. Job satisfaction (continued)

Author Year	Working condition	Measure of safety	Other respondent characteristics measured
DeVoe 2002[197]	Career satisfaction	Subjective assessment of ability to provide quality patient care	Personal, professional, practice characteristics
Shanafelt 2002[199]	Stressors including sleep, shift length, leisure time; burnout (Maslach Burnout Inventory)	Suboptimal patient care practices; suboptimal patient care attitudes	Self-reported depression and substance use
Bond 2001[196]	Workload and workflow variables, worksite type, satisfaction with practice	Subjective estimate of rate of medication errors.	Demographic variables
Carey 2001[189]	Workload, Job Control, Monotony, Collectivism and Autonomy; nursing work type	Error Orientation, including subscales of error competency, risk taking, communication, learning from and covering up error	
Firth-Cozens 1997[198]	Tiredness, overwork pressure, anxiety/depression, alcohol, boredom	Irritability/anger, lowered standard of care, serious nonfatal mistakes, patient death	Coping, work attitudes, career choice, alcohol use
Leppa 1996[200]	Work group cohesion (satisfaction with relationships, workgroup disruption)	2 items on perceived quality of care	12 month data on absenteeism, agency use, personnel flux, controlled for unit size

RN = registered nurse

Evidence Table 9. Job satisfaction (continued)

Author Year	Main finding	Design suitability/ Study execution
DeVoe 2002[197]	18% were dissatisfied with career in medicine. Inability to provide quality care to patients was associated with higher dissatisfaction.	Least FAIR
Shanafelt 2002[199]	76% of residents had burnout and reported more frequent suboptimal patient care practices (errors in medication or treatment or discharge of patients to reduce team workload). Stressors were: inadequate sleep (41%) frequent shifts of over 24 hrs (42%) insufficient leisure time (42%) Coping strategies were: talking with family (72%) other residents (75%) Program features helpful for stress were: at least four days off/month (97%) ancillary help (95%) night float call system (64%)	Least FAIR
Bond 2001[196]	Higher dispensing error risk was associated with lower pharmacist satisfaction, higher workload, and lower professional involvement.	Least FAIR
Carey 2001[189]	Collectivism score was associated with error communication.	Least GOOD
Firth-Cozens 1997[198]	Causes most often cited: tiredness (57.4%) pressure from overwork (27.7%) Most common consequences cited: lowered standard of care (50%) irritability/anger (40.2%) 2 deaths and 6 serious mistakes were reported.	Least GOOD
Leppa 1996[200]	Absenteeism and agency use were associated w/ lower satisfaction; quality of nursing interaction was associated with perceived quality and safety of care; agency use was associated with lower perceived quality and safety of care.	Least FAIR

RN = registered nurse

Evidence Table 10. Physical environment

Author Year	Study Question(s)	Design/ Population/ Setting
Flynn 1996[213]	What is the association between ambient sounds and pharmacists' prescription filling errors in a pharmacy?	Case-control comparison of prescriptions with dispensing errors to prescriptions by the same pharmacist without errors. Sample of cases was selected from a prospective study of prescription dispensing errors. 13 licensed pharmacists, age 26-51, hearing test within normal range, working in 451 bed, not-for-profit medical center
Walsh-Sukys 2001[216]	Do physical modifications to reduce light and sound levels in a neonatal intensive care unit affect patient safety?	Cross-sectional comparison of one remodeled unit and one traditional unit in a single hospital 126 patient admissions
Knez 1998[217]	What are the effects of office lighting on mood and cognitive performance?	Randomized trial of two different lighting conditions for performing cognitive tasks n=80; 40 males, 40 females; age 18-55 Volunteer subjects
Stone 1998[218]	What is the impact of windows on worker performance?	Randomized trial comparing cognitive tasks in rooms with or without windows Undergraduate students, Midwestern University n=120
Kwallek 1997[219]	What is the impact of three different color schemes on worker performance?	Non-random comparison of office tasks between groups of office workers matched for office skills and demographic factors 3 different colored office spaces the same size: 8ft. 8in. wide, 11ft. 6.5in. long, 8ft. high
Kwallek 1996[220]	What is the effect of interior office colors on clerical tasks?	Randomized trial comparing clerical task performance in nine differently colored offices 675 students; 341 males, 334 females; age16-37; color-blinded students excluded

Evidence Table 10. Physical environment (continued)

Author Year	Outcomes	Results	Design Suitability/ Study Execution
Flynn 1996[213]	Uncontrolled and controlled sound; predictable and unpredictable sound; noise; loudness	31 cases of prescription errors were compared to 31 error-free cases by the same pharmacist. Ambient sound levels were not associated with error occurrence.	Greatest FAIR
Walsh-Sukys 2001[216]	Measures of patient safety included medication errors, unplanned extubations, IV infiltrations, nosocomial infections, and mortality. No casemix controls.	Lighting and sound levels were significantly lower in the remodeled unit, but there were no differences in any of the measures of patient safety.	Moderate GOOD
Knez 1998[217]	Cognitive performance: 3 memory tasks, 1 problem-solving task, 1 judgment task	No effect of lighting on cognitive performance.	Moderate FAIR
Stone 1998[218]	Performance: filing, computational, or creative task	Windows did not have an effect on performance.	Moderate FAIR
Kwallek 1997[219]	Performance: Minnesota Clerical Test: number comparison task, names comparison tasks	No difference for color schemes alone. Individual differences accounted for differences in impact of color scheme on performance.	Moderate FAIR
Kwallek 1996[220]	Human performance: Minnesota Clerical Test measures speed and accuracy of clerical tasks	There were significantly more proofreading errors in white offices vs. red or blue offices.	Moderate FAIR

Evidence Table 10. Physical environment (continued)

Author Year	Study Question	Design/ Population/ Setting
Ainsworth 1993[221]	What is the effect of office color on performance?	Randomized trial of typing performance in three office colors 45 female college students Single office space, 15 ft. by 10 ft., 11 ft. ceiling
Stone 1993[222]	What is the impact of windows on worker performance?	Randomized trial of simulated office and managerial rooms with or without windows Undergraduate students, Creighton University n=40
Buchanan 1991[223]	Does illumination level affect dispensing errors in a high-volume outpatient pharmacy?	Time-series analysis of cohort of five pharmacists working in outpatient pharmacy in which lighting levels were changed on successive days.
Rosenberg 1989[224]	What is the impact of window shape and reticle presence on performance?	Within-subjects comparison in a simulated space station 20 volunteers, screened for vision acuity
Noweir 1984[225]	What is the effect of noise exposure on industrial accidents?	Cross-sectional comparison of textile workers exposed to varying noise levels n=2,458 male workers Textile mills
Kwallek 1988[226]	What is the effect of a red vs. a blue office environment on clerical tasks?	Non-randomized comparison of typing skills between groups assigned to four different sequences of office colors 36 paid subjects, matched on age and typing ability Simulated office spaces, 8 ft. wide, 11 ft., 9 in. long, 8 ft. 9 in. high, blue or red color
Enander 1987[227]	What is the effect of moderate cold exposure on psychomotor and cognitive tasks?	Time-series comparing cognitive and motor tasks in two temperatures (5.5 degrees celcius and 21 degrees celcius) n=24; 12 males, 12 females; age 22-45 Climate chamber

Evidence Table 10. Physical environment (continued)

Author Year	Outcomes	Results	Design Suitability/ Study Execution
Ainsworth 1993[221]	Performance: words typed, errors, ratio of errors per words typed	No significant differences for words typed, errors, and their ratio for the three colors.	Moderate FAIR
Stone 1993[222]	Performance: Managerial or computational task	Windows did not have an effect on performance.	Moderate FAIR
Buchanan 1991[223]	Dispensing errors were recorded by a pharmacist observer.	Error rates were significantly lower with the highest illumination level.	Moderate GOOD
Rosenberg 1989[224]	Performance in visual alignment task	Significant difference between window shapes (less error with square window). Significant difference between reticle-present/absent (less error with reticle present condition).	Moderate GOOD
Noweir 1984[225]	Accidents: Incidence; Frequency rate; Severity rate	No significant difference in incidence, frequency rates or severity rates.	Moderate FAIR
Kwallek 1988[226]	Number of typing errors	Subjects who were in blue room, and then switched to red room, made significantly more errors.	Least FAIR
Enander 1987[227]	Performance tests: color word vigilance, simple reaction time, key tapping. Dexterity tests: screw manual, thumb tapping	The cold environment did not affect the performance tests but impaired the dexterity tests.	Least FAIR

Evidence Table 11. Organizational factors

Study Year	Study Question(s)	Design/ Population/Setting	Consideration of Culture
Shortell 2000[265]	What is the impact of TQM and organizational culture on adverse outcomes among CABG patients?	Prospective cohort study of 16 randomly selected US hospitals w/CABG volume >200 procedures annually 3,045 CABG patients 864 administrators, nurses, and physicians	Supportive culture: provider perception of their involvement in decision-making and support to make necessary for improvement.
Aiken 1999[42]	Is Magnet hospital status associated with lower 30-day mortality among AIDS patients?	Cross-sectional study of 1,205 AIDS patients admitted to 40 units in 20 hospitals 820 nurses	Culture not considered explicitly Magnet status and nurse control of practice used.
Helmreich 1998[262]	What is the effect of national, professional, and organizational culture on errors and error management in aviation and operating rooms?	Descriptive: Cross-sectional with some longitudinal data Comparative: 15,000+ pilots from 22 airlines in 36 countries	Culture as attitudes and values; considers national, organizational, and professional cultures and notes importance of subcultures.
Aiken 1994[266]	Is Magnet hospital status associated with lower in-hospital mortality?	Cross-sectional study of 39 Magnet hospitals and 195 non-magnet US hospitals with more than 100 Medicare discharges	Culture not a specified variable. Magnet hospital status includes attributes associated with culture such as nurse autonomy, and collegial relationships.

*general findings noted but measures and results not reported
QI=quality improvement; MAE=medication administration errors; CQI=continuous quality improvement; CI=culture inventory
TQM=total quality management;CABG=coronary artery bypass graft; ADE=adverse drug event; RN=registered nurse;
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Evidence Table 11. Organizational factors (continued)

Study Year	Measures	Main Findings	Design Suitability/ Study Execution
Shortell 2000[265]	TQM-baseline used as part of stratification for sample selection TQM –Baldridge Scale Culture Inventory- 20 item Cost data Patient Outcome: 1) mortality 2) other adverse outcomes 3) functional health status (Rand SF36) 4) patient satisfaction	Little association between TQM/culture and quality/outcome variables.	Greatest GOOD
Aiken 1999[42]	Magnet status designation Clinical Environment Index (7 items) 30-day mortality rate	Magnet status, nurse control of practice and organization of care in dedicated AIDS unit associated with lower mortality and higher satisfaction.	Greatest FAIR
Helmreich 1998[262]	National culture: Hofstede tool and data	Strong professional cultures both impede and enhance safety.	Greatest FAIR
	Organizational and Professional Culture: Operating Team Resource Management Survey and Flight Management Attitudes Survey	Failures/errors occur at intersection of subcultures (e.g. surgeons and anesthesiologists).	
Aiken 1994[266]	Magnet hospital status designation ICD-9 casemix measure in-hospital mortality	Magnet hospitals have lower mortality rates than matched controls.	Greatest FAIR

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Evidence Table 11. Organizational factors (continued)

Study Year	Study Question(s)	Design/ Population/Setting	Consideration of Culture
Kaminski 2001[278]	What are the relationships among organizational practices, injury rates, and productivity?	Cross-sectional 86 small manufacturing firms mostly located in Midwestern US	Teams
Maierhofer 2000[267]	Are manager and employee values related to compliance with wearing gloves among hairdressers?	Survey of 218 matched manager/employee pairs from 842 salons in an Australian state	Culture not considered explicitly. Values of preventive safety was independent variable.
Bond 1999[43]	What is the relationship of professional staffing levels and hospital occupancy and ownership with mortality rates?	Cross-sectional 3,763 general medical US hospitals	Occupancy Ownership Teaching affiliation
Schultz 1999[279]	What is the relationship of hospital characteristics and mortality due to AMI (acute myocardial infarction)?	Cross-sectional 373 purposively-sampled acute care hospitals in California	Profit status Total daily operating expenses Teaching status

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Evidence Table 11. Organizational factors (continued)

Study Year	Measures	Main Findings	Design Suitability/ Study Execution
Kaminski 2001[278]	Lost-time injury rate: days away from work/100FTE Team: use or non use of teams Hours per week: average across employees	Inverse relationship between injury rates and hours worked. Positive relationship between injury rates and teams.	Moderate GOOD
Maierhofer 2000[267]	Scale developed for study - 7 point Likert type	Positive relationship between manager's and employee's prevention values, no relationship to safe behavior. Positive relationship between manager's and employee's time urgency and negative association with safe behavior.	Moderate GOOD
Bond 1999[43]	Medicare mortality rates from HCFA and AHA Hospital characteristics from AHA	Inverse association between ownership (Private, nonprofit and for-profit) and mortality rates. No association between teaching status and mortality rates. Inverse association between medical residency program size and mortality rates.	Moderate FAIR
Schultz 1999[279]	Profit status from AHA Total daily operating expenses from Statewide Office of Health Planning and Development database Teaching status from AMA	Relationship of teaching status to mortality rates was not signficant. Profit status and total daily operating expenses significantly and positively correlated with mortality.	Moderate FAIR

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Evidence Table 11. Organizational factors (continued)

Study Year	Study Question(s)	Design/ Population/Setting	Consideration of Culture
Stetzer 1997[260]	Are employee perceptions of work climate related to workplace accidents?	Survey of 14,550 employees from 25 work divisions in large utility company	Climate and culture are similar. Shared cognitions of the work environment. Multiple different climates related to specific elements such as safety or absence.
Edmondson 1996[269]	How do group and organizational-level factors account for variance in drug error (ADE) rates across hospital units?	Cross-sectional study of 8 randomly-selected units in two urban hospitals	Not explicitly identified as variable, used 'social climate' and 'unit climate' (blame vs learning) to describe findings across several survey items and interviews.
Harter 2002[277]	What is the relationship between employee satisfaction-engagement at the business unit level and business outcomes, including accidents?	Meta Analysis 36 companies 7,939 business units 198,514 respondents 3 companies 121 business units had safety (accident) data	Employee satisfaction-engagement safety as outcome: lost workday/time incident or % of lost workdays.
Hechanova-Alampay 2001[270]	Does work team empowerment affect unsafe behaviors and accidents?	Survey of 531 employees of large chemical company in 24 workgroups across 3 US states	Culture not considered explicitly. Empowerment as independent variable.

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Evidence Table 11. Organizational factors (continued)

Study Year	Measures	Main Findings	Design Suitability/ Study Execution
Stetzer 1997[260]	Employee ratings of workers' and supervisors' commitment to quality	Overall climate and subclimates of quality and cooperation associated with lower accident rates.	Moderate GOOD
Edmondson 1996[269]	ADE identified by daily chart review and informal unit visits; confidential reporting system Survey of unit social and organizational factors based upon measure used to study cockpit crews' performance Observation: semi-structured interviews of nursing and support	Quantitative: Higher error rates with better unit performance. Qualitative: Higher error rates with higher openness ranking with one exception.	Moderate GOOD
Harter 2002[277]	Gallup Workplace Audit (GWA)	Employee satisfaction-engagement correlated with all outcomes including the safety outcome, inversely.	Least GOOD
Hechanova-Alampay 2001[270]	Empowerment assessment: 21 item, 4 point Likert type scale completed by work team members trained in assessment Unsafe behavior: anonymous 18 item self-report survey	Empowerment was negatively correlated with unsafe behaviors and accidents.	Least FAIR

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Evidence Table 11. Organizational factors (continued)

Study Year	Study Question(s)	Design/ Population/Setting	Consideration of Culture
Wakefield 2001[271]	Are measures of nurses' perceptions of organizational culture and continuous quality improvement related to medication administration error reporting?	Survey of 297 nurses in 6 Midwest hospitals	Pattern of shared values, beliefs, and expectations.
Boreham 2000[268]	What are the sources of risk (avoidable increases in probability of adverse patient outcome)?	Case series of 25 critical incidents in two emergency departments in Britain over 30 months	Case series dependent.
Jones 2000[272]	What is impact of culture on work redesign initiatives?	Case series of 3 mid-sized community hospitals in West and Midwest Respondents not identified	Explicitly measured. Corporate culture as shared values and group behavior norms. Competing Values Framework: 4 cultural orientations: 1) Clan 2) Developmental 3) Market 4) Hierarchy

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Evidence Table 11. Organizational factors (continued)

Study Year	Measures	Main Findings	Design Suitability/ Study Execution
Wakefield 2001[271]	Culture Inventory: 20 item QI Implementation Scale MAE Reporting Survey	Significant correlation of extent of CQI and culture at individual and unit level. Positive, non-significant correlation of CI, CQI, and reasons for not reporting error. Hierarchical and rational cultures negatively associated with estimated errors.	Least FAIR
Boreham 2000[268]	Critical Incidents Observations	Some latent conditions were organizational factors: power and status differential coupled with horizontal distribution of tasks resulted in breadkdowns in communication across organizational and professional boundaries.	Least GOOD
Jones 2000[272]	Culture Inventory Nurse satisfaction* Patient satisfaction*	Hospital w/balanced orientation most successful in implementing change & noted improvement in patient and nurse satisfaction scores. 2 other hospitals with increase in market and hierarchy had more difficulty and noted decrease in nurse satisfaction and latter also noted decrease in patient satisfaction.	Least POOR

*general findings noted but measures and results not reported
QI=quality improvement; MAE=medication administration errors; CQI=continuous quality improvement; CI=culture inventory
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Evidence Table 11. Organizational factors (continued)

Study Year	Study Question(s)	Design/ Population/Setting	Consideration of Culture
Orbe 2000[273]	How do RNs communicate about and what factors govern reactions to organizational wrongdoing?	Case series of 202 critical incidents from 372 returned surveys sent to 1,900 randomly selected RNs in Midwest w/active licenses	Themes emerged from analysis related to culture: 1) workplace dynamics 2) professional ideals 3) consequences of reporting
Edkins 1997[276]	What are the human and organizational factors contributing to railway accidents?	Case series Retrospective analysis of 112 railway accidents and near accidents in Australia	Railway Problem Factors (RPF) managerial/organizational origins of accidents.
Shortell 1995[274]	Do organizational culture and quality improvement process affect estimated patient outcomes?	Cross-sectional study of 61 US hospitals primarily in the Midwest and West	Values, beliefs, and norms of an organization that shape its behavior.
Buller 1988[275]	What is the effect of team building and goal setting on task performance (productivity and quality)?	Time series 20 mine stopes (excavation areas) over 15 months	Teamwork and goal setting. Goal setting alone.

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Evidence Table 11. Organizational factors (continued)

Study Year	Measures	Main Findings	Design Suitability/ Study Execution
Orbe 2000[273]	Self reports of incidents of wrongdoing	5 themes including: 1) workplace dynamics 2) tension between policy/reality w/workload 3) multiple informal ways of handling 4) not report if seen as minor 5) report if patient care or nursing standards compromised.	Least GOOD
Edkins 1997[276]	Railway Safety Checklist RPF identified through focus group of drivers and managers and refined to 13 by independent raters	15% of incidents attributable to organizational factors. 70% due to attentional factors.	Least POOR
Shortell 1995[274]	Culture Inventory–20 item QI Implementation–Baldridge Scale *Patient Impact Scale* – improved patient outcomes, reduced errors and inappropriate treatment, increased patient satisfaction, improved continuity of care *Financial Impact Scale* – reduced costs, increased profitability improved productivity/efficiency	Negative correlation between hospital bed size and culture (larger size associated with less group/developmental type culture). Significant association between group/developmental culture and QI implementation. Significant association between QI implementation and patient outcomes.	Least FAIR
Buller 1988[275]	Revenue/manshift Tons/manshift Grade of ore	Teamwork and goal setting had significant positive effect on quality. No effect of either treatment condition on production. Increase in revenue/manshift noted for both groups.	Least POOR

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