Section V:

Critical Opportunities for Patient Safety and Quality Improvement

Chapter 32. Professional Communication

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Background

Instructing nurses on communication is a bit like instructing birds on flying. All nurses have been taught communication skills as a basic part of a prelicensure nursing program and then retaught communication skills in postlicensure programs, continuing education programs, workshops, and meetings. Some nurses would be insulted that anyone would even raise the issue of communication since raising the issue implies that they are deficient in one of the most basic aspects of nursing care. However, the problem with good communication is that it is, ironically, easy to talk about but hard to put into practice. In the literature, there are numerous articles that provide opinion, both expert and otherwise, about communication,[1–7] but there is very little evidence about communication practices that have demonstrated an impact upon patient outcomes. The purposes of this chapter are to discuss evidence of professional communication practices or strategies that have been tested empirically and have a relationship with patient outcomes or patient safety, and to provide communication tools that might help practicing nurses maintain and improve patient outcomes and patient safety.

This chapter will focus on communication strategies in hospitals and those related to communication between nurses and physicians. Studies related to communication between physicians and patients or nurses and patients were included if they were determined to be sufficiently methodologically rigorous and had a direct relationship with patient outcomes or patient safety. There is a large body of research on communication in other health care settings and among other professionals, which was not included in this chapter.

Historical Context

The history of communication between doctors and nurses is well documented. A series of publications begun in 1967 describing the “doctor-nurse game” provides insight into the way nurses have historically made treatment recommendations to doctors without appearing to do so, the way doctors have historically asked nurses for recommendations without appearing to do so, and how both participants strive to avoid open disagreement.[8–27] Although some nurses have argued that much has changed—and improved—in the relationships between doctors and nurses since that initial 1967 article, there is little evidence, although much wishful thinking, to support that view.[28–31] Additionally, over the years, the literature has contained descriptions of verbal abuse of nurses by physicians,[32–35] disruptive physician behavior,[36, 37] and advice on how nurses can better “handle” physicians.[38–41] So, in spite of much discussion, communication between doctors and nurses often remains contentious and obscure.

Theoretical Foundations

Many professional groups study communication among humans, and a wide range of theories guides the work. For the purpose of this review, a sample of theories used to describe or study

nurse-physician communication will be presented in brief. Habermas' critical theory has been used to identify successful nurse-physician collaborative strategies, including a willingness to move beyond basic information exchange and to challenge distortions and assumptions in the relationships.[42] Theories of Foucault and other poststructuralists that have guided concept analysis of collaboration and explored the notion that the relationship between power and knowledge (knowledge and power are not fixed, meaning not stable, and the idea that there is a hidden or "real" discourse) help explain the relationships between nurses and doctors.[43, 44] Various perspectives from the field of organizational behavior, including the structural (behavior is rational) perspective, the human resource (human needs and motivation) perspective, the political (competition for resources) perspective, and the cultural (organizational culture and climate) perspective, have been used to guide activities to improve nurse-physician communication.[45]

Feminists and scientists have used oppressed-group behavior theory to explain much of nurses' work and its structure in hospitals, including nurse-physician relationships.[34, 46–54] Many scientists and writers have evoked the issue of gender as it relates to the work of nurses and the relationship between nurses and doctors. Early literature related to gender tends to emphasize nurse image, and later work focuses more on nurse job satisfaction; job retention; and differences in decisionmaking, attitudes, perceptions, and ethical or moral dilemmas.[55–73] Mark and colleagues argue for theory development related to nurse staffing and patient outcomes, maintaining that one of the important and unexplored areas is the "why" of the nurse-physician relationships and the hypothesis that "enhanced" nurse-physician communication would "result in early recognition and intervention of potentially hazardous patient situations"[74] (p. 13).

With the recent emphasis on patient safety, hospital error, and adverse events, some hospital executives have embraced human factors science and training ideas taken from the aviation industry (Crew Resource Management)[75] to try to address the issue of patient safety and the lack of collaboration or teamwork in hospital settings. One of the most intriguing recent ideas is the use of the leader-member exchange theory[76–88] to describe the interactions between nurses and doctors in hospitals. Hughes and colleagues[89, 90] used leader-member exchange theory to create a nurse-physician exchange relationship scale and discussed the relationship between nurses and doctors in terms of a supervisor-employee relationship. The physician can be thought of as being the leader or supervisor of patient care, and the nurse can be thought of as being one of the members or employees providing care. This conceptualization will undoubtedly be challenged by nurses and nurse leaders who advocate for nurse autonomy or nurse independence, but Hughes and colleagues make a compelling argument for viewing the hospital nurse-physician relationship through this theoretical lens. There exists a long and varied history between nurses and doctors, making it difficult to use only one theory to explain all the subtleties of the relationships or to hold the key to improving those relationships.

Significance—Why Do We Care About Nurse-Physician Communication?

Over the years, there have been repeated cries and admonitions for improving nurse-physician communication and questioning why it is so difficult to achieve.[1, 63, 91, 92] Some research has shown that the lack of interpersonal and communication skills of physicians and nurses is associated with errors, inefficiencies in the delivery of care, and frustration.[93] There is evidence, though conflicting, that links better collaboration with better patient outcomes,

specifically reduced medication errors,[45, 94] reduced risk of inpatient mortality,[95–98] improved patient satisfaction,[99] and some support for efficiency measures such as shorter hospital length of stay.[100–103] However, several major reviews and studies found no relationship between nurse-physician collaboration and patient outcomes such as mortality or self-reported health status.[100, 102, 103] Physician satisfaction is generally not related to perceived increased collaboration; most frequently the evidence links perceived increased collaboration with nurse satisfaction.[4, 36, 104, 105] Additionally, nurses and physicians view the level of collaboration very differently, with nurses typically perceiving less collaboration and poorer communication than physicians.[70, 106–108] So, even though the descriptive evidence for improved patient outcomes and improved hospital efficiency is conflicting, it does not clearly negate the premise that better communication and collaboration could have an impact on patient outcomes.

In the nursing literature, nurse-physician communication is discussed or studied using terms such as empowerment, autonomy, collaboration, coordination, teamwork, transitioning, organizational culture, climate, and relationships. Assessment of the descriptive studies listed in the evidence table and references from other studies provide results, information, and opinion about nurse-physician communication, but they are not interventional studies. Some of the more compelling descriptive studies are included in the evidence table but do not meet the rigor required of randomized controlled trials. The setting of much of the descriptive or interventional work is intensive care units, emergency departments, or operating rooms and is often focused on nurse change-of-shift report;[109–112] physician/resident handoff/sign-off;[113–115] nurse-physician interaction, both routine and emergent;[91, 116–118] foreign language use by physicians and nurses;[119–124] and communication with patients.[125–131]

One of the recurring themes in the literature is the difference in perceptions between nurse and physician.[36, 69, 70, 106–108, 132–134] Nurses are typically less satisfied than physicians with the communication or interaction patterns and express the need for their opinions to be heard by physicians.[133] Areas of particular difference involve those of ethical decisionmaking and the moral dilemmas confronted by nurses related to these decisions.[135–137] There is also a body of literature on the differences between patient and provider (both nurses and physicians) in perceptions of care, quality, or comfort.[138–143] Although these papers provide important descriptions and information about nurse, physician, and patient communication, they are only briefly mentioned to provide context for this chapter. The focus of the chapter is on communication between physicians and nurses and whether there is a relationship with patient safety or other patient outcomes.

Research Evidence

There is no shortage of manuscripts in the literature that advocate, based only on opinion, for one or another method of building teamwork, collaboration, or communication, including recognizing corporate culture,[144] quality improvement,[145] continuous assessment and regular communication,[146] and reducing conflict.[147] Other publications detail the experience of one institution or unit in improving communication or teamwork using strategies such as the Comprehensive Unit-Based Safety Program developed at Hopkins,[148] Surgical Morning Meetings[149] using daily goals in an intensive care unit,[150] or interdisciplinary rounds.[151] These individual experience descriptions typically report varying outcomes or lack measured outcomes.

Evidence for Interventions That Improve Positive Communication—What Works?

This review found no randomized controlled trials (RCTs) that investigated communication interventions between nurses and physicians that had a patient outcome as a measure of interest. The RCTs included in the evidence table tested whether various communication training sessions for physicians improved communication with patients.[152–157] The evidence indicates that communication training is effective in improving physician attitudes, beliefs, and communication ability. There is also evidence that an intervention called peer leader education[155] can result in fewer symptom days, lower oral steroid rates, and reduced cost for children with asthma. In general, longer training programs (2–3 days) had greater positive effects, and the effects were longer lasting. Two RCTs tested the effect of training patients about care using information or technology and found slight improvement in patient perceptions of care.[158, 159]

Four systematic literature reviews were found that evaluated aspects of communication. One review of 14 studies measured the effect of communication training on physicians, using self-rating of the training effects, but provided no evidence of a relationship between the training and patient compliance or health status, and ambiguous effects on patient psychosocial health.[160] The second review of 26 studies concluded that various interventions had no effect on patient expectations, had conflicting lung-function outcomes, improved systolic blood pressure with any interaction, and decreased pain with improved patient-practitioner interaction.[161] The third review of 89 studies found no patient outcome changes (health status, disease incidence, cure rates, mortality rates, complication rates) with implementation of interprofessional education versus single-discipline education.[162] The fourth review, covering two studies, concluded that after communication training, team development meetings, or weekly rounds, there was no difference in patient mortality rates; but staff satisfaction increased, and there were conflicting results on length of stay.[100]

The literature search provided three nonrandomized controlled trials (NRCTs) with control groups related to interventions aimed at improving effective communication.[163–165] One study described a communication training intervention, a second added personnel (nurse practitioners and hospitalists) and multidisciplinary rounds to the environment, and the third used weekly meetings to discuss role relationships. The first study improved hospital employee work satisfaction and perception of opportunities and decreased information overload.[163] The second study improved physician perception of collaboration between nurses and doctors, but produced no change in nurse perception of collaboration.[164] The third study decreased consumers' belief in shared responsibility for care versus a physician-dominated responsibility for care, and increased consumers' belief that powerful individuals influence a consumer's health status.[165]

Included in the evidence tables are seven quality improvement projects without a control or comparison group. These projects are included as examples of the numerous studies in the literature that essentially describe the experience of one or two institutions in implementing an organizational change to improve doctor-nurse collaboration or communication. Dechairo-Marino and colleagues[166] report on a teamwork training program that produced no differences in self-reported collaboration or satisfaction; McFerran and colleagues[167] describe implementation of a structured communication technique known as Situation-Background-Assessment-Recommendation (SBAR), changing policies, debriefing, and multidisciplinary reports in four Kaiser Permanente sites. No long-term measures are reported, and only the short-term expectations for the "communication initiative" were met. Leonard and colleagues[168] report on

another Kaiser study of various groups in the organization trained in SBAR, assertion checklists, and briefings. Reported outcomes associated with the intervention include reduced wrong-site surgery, decreased nurse turnover, and improved employee satisfaction; however, no specifics on the measurement of these outcomes are provided. Lassen and colleagues[169] describe development and education of a collaborative practice (primarily physician specialists) decisionmaking protocol that was associated with a decrease in rule out sepsis diagnosis, use of antibiotics, patient days, costs, and readmissions in one neonatal intensive care unit (NICU).

Dutton and colleagues[170] reported that daily discharge multidisciplinary rounds were related to decreased length of stay in the emergency department and emergency department closures in one trauma center. Copnell and colleagues[134] reported no difference in perception of doctor-nurse collaboration after introduction of a nurse practitioner in two NICUs. Boyle[4] reported an increase in perceived doctor-nurse communication skills, nurse leadership skills, and problem-solving, and a decrease in nurse stress after a six-module training session called Collaborative Communication Intervention. The designs of these quality projects were too weak to allow any sort of conclusions to be drawn.

Practice Implications

There is insufficient empirical evidence to recommend any specific communication strategy or technology device to improve doctor-nurse communication. However, there is mixed or weak evidence to support using some of the techniques described in the cited literature. It is likely that focusing an organization on any strategy and persisting in that focus will be associated with, at least temporarily, a change in doctor-nurse communication patterns (e.g., Hawthorne effect). Given the paucity of available evidence, the following suggestions are offered for possible consideration in efforts to improve professional communication:

- Carefully evaluate various strategies for doctor-nurse communication using measurable outcomes that are important to your organization; plan to use a strategy that meets the needs and culture of your organization.
- Select a strategy, focus training, and provide organizational support and sufficient resources toward improving doctor-nurse communication.
- Slowly implement the change using sufficient resources and sufficient time.
- Do not implement multiple changes simultaneously.
- Persist in that strategy for an extended period of time (years, not weeks or months).
- Critically and rigorously evaluate the strategy using patient outcomes and worker satisfaction.
- After allowing sufficient thought and time for implementation and evaluation, be willing to publicly eliminate the strategy if it does not improve the outcomes.

Hospitals have used many communication tools such as written and verbal orders, reports, rounds, and team meetings. As the United States shifted to the “business model” for hospitals, organizations have tried to change culture or climate, create transformational leaders and knowledge workers, implement continuous quality improvement or total quality management, form quality circles, and train the one-minute manager. Some hospitals have used and are currently using technology ranging from pencil and paper, medication rooms and carts, orange vests for the medication nurse so she will have fewer interruptions, Pyxis or other automatic medication dispensers, landline telephones, fax machines, beepers, e-mail, personal digital

assistants (PDAs), cellular telephones, wireless devices, direct information transfer, and Web access.

Other recent technology includes mobile communication systems such as Vocera, electronic medical records, computerized physician order entry, and bar-coding for medication administration. A number of organizations are also trying SBAR, organizational support structures such as Rapid Response Teams or techniques such as customer relationship management from business or crew resource management from aviation. Other organizations are trying systems such as Situation-Trajectory-Intent-Concern-Calibrate (STICC) using the Hands-on Automated Nursing Data System Method from the University of Illinois at Chicago and funded by AHRQ, or Gerontology Interdisciplinary Team Training from the Hartford Foundation and the American Geriatrics Society. Few, if any, of these methods or devices have been empirically tested. Without careful consideration and evaluation, efforts to improve communication problems that exist in present-day hospitals may lead to implementation of strategies that will be ineffective.

Research Implications

Based on the literature review, future research is needed to assess the following:

- What should be the communication competencies of physicians and nurses; and should these competencies be assessed periodically?
- How can health information technologies be used to ensure effective communication between physicians and nurses, across settings and among the various care delivery models?
- What is the impact of effective communication strategies on hospitalized patient outcomes and medical errors?
- What is the impact of effective communication strategies on nurse and physician job satisfaction, and how does provider satisfaction relate to patient outcomes?
- How can communication skills training for practicing physicians and nurses have a career-long impact on their communication skills?

Conclusion

Within health care, there have been and will continue to be many approaches to professional communication. Unfortunately, the body of evidence is very limited, and the research findings to support professional communication and the relationship with patient safety and quality are not available at this time. There were limited studies that tested specific interventions aimed at changing nurse-physician communication, and there is some evidence that focusing on a doctor-nurse communication may have a positive effect. Health care organizations and providers will be challenged as they seek to improve the effectiveness of professional communication, given all the subtleties of the nurse-physician relationships.

Search Strategy

Search strategies employed included the use of the electronic databases PubMed®, CINAHL®, the Cochrane Collection, and relevant AHRQ reports. Keywords included physician, nurse, relationships, communication, coordination, collaboration, autonomy, teamwork, MD,

RN, patient, outcome, safety, and adverse event. Reference lists of select publications were investigated for potential manuscripts, and literature related to relevant measurement instruments was sought.

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Evidence Table

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Randomized Controlled Trials						
Ellison 2004[159]	Patients	Design Type 2 (RCT) (Level 2) questionnaire	Patient satisfaction (Level 3)	1 hospital 85 patients	Standard care plus1 day telerounding; standard care substituting 1 day with robotic telerounding	Improvement in telerounding patients of examination thoroughness, quality of discussion, postoperative care coordination, availability of MD; in robotic telerounding improvement in availability of MD.
Fallowfield 2003[153]	MD/patient	Design Type2 (RCT)— pre/postvideotape (Level 2)	At 12 months, same as 3 months (Level 3)	Oncology MDs, UK	3 day residential communication skills training course	Same effect with use of leading questions, open-ended questions, and response to patient cues; improvement in fewer interruptions, increased summarizing; decline in expressions of empathy.
Jenkins 2002[152]	MD/pt	Design Type 2 (RCT)—P-P videotape (Level 2)	At 3 months attitudes, empathy, responses (Level 3)	Oncology MDs, UK	3 day residential communication skills training course	Improved attitudes and beliefs toward psychosocial issues compared to controls; increased expressions of empathy; open questions; appropriate responses to patient cues and psychosocial probing; self-reported changes in communication styles.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Joos 1996[157]	MD/pt	Design Type 2 (RCT)—P-P questionnaire (Level 2)	Communication skills (Level 3), and compliance and utilization (Level 2)	42 MDs and 348 patients with chronic conditions	4.5 hours of training	Increased number of times MDs elicited patient and RN concerns, increased patient perception of amount of information received, no change in patient compliance with medications or appointments; no change in patient utilization.
Levinson 1993[156]	MD/pt	Design Type2 (RCT)—P-P audiotape (Level 2)	Communication skills (Level 3)	53 community-based MDs and 473 patients	A short CME program (4.5 hours) and a long CME program (2.5 days)	Short program: no effect. Long program: more open-ended questions, asked patient opinions, gave more biomedical information, patients disclosed more information, decrease in negative affect for both, patients had fewer signs of outward distress during visit.
Lozano 2004[154]	MD/children (3–17) with asthma	Design Type2 (RCT)—cluster P-P interview and questionnaire (Level 2)	Asthma symptom days, asthma-specific functional status, frequency of oral steroid courses (Level 1)	42 primary care practices in 3 locations	Peer leader education (PLE) and peer leader + nurse-mediated organizational change (PACI)	Peer leader: fewer symptom days per year & lower oral steroid rates. Peer leader + nurse: fewer symptom days per year & greater adherence to treatment by parent report.
Sullivan 2005[155]	MD/children (3–17) with asthma	Design Type 2 (RCT)—cluster P-P interview and questionnaire (Level 2)	Symptom-free days (SFDs); asthma-related health care costs (Level 1)	42 primary care practices in 3 locations	Peer leader education (PLE) and peer leader + nurse-mediated organizational change (PACI)	SFD: 6.5 with PLE vs. usual, 13.5 with PACI vs. usual; compared with usual incremental cost effectiveness ratio was $18/SFD gained for PLE and $68/SFD gained for PACI.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Tran 2002[158]	ED patients	Design Type 2 (RCT) (Level 2) questionnaire	Patient length of stay (LOS), wait time, perception of LOS, ratings of nurse skills and MD skills (Levels 3 & 4)	1 hospital ED 619 patients	Providing patients with information q 15 minutes during stay	No difference in LOS, wait time, nurse skills. Decrease in perceived LOS and wait time and increase in perception of MD skills.
Nonrandomized Controlled Trials and Quality Improvement (QI) Projects						
Boyle 2004[4]	MDs/RNs	Design Type 6 P-P 2 units no control (Level 5)	Communication skills, increased staff satisfaction, lower stress, increased problem-solving using videotape vignettes, questionnaire	1 ICU from 2 hospitals	Collaborative Communication Intervention over 8 months: 23.5 hours for 6 modules	Increased perceived RN and MD communication skills, improved nurse leadership and problem-solving, decreased staff nurse personal stress.
Copnell 2004[134]	MDs/RNs	Design Type 6 P-P 2 units no control (Level 5)	Perception of collaboration	2 NICUs	Added NP	No difference before and after NP; MDs and RNs disagreed about collaboration with MDs scoring higher.
Dechairo-Marino 2001[166]	RNs	Design Type 6 action research—P-P 1 group-no control (Level 5)	RN reports of collaboration with MDs and RN Satisfaction with decisionmaking process- (Level 3)	1 university teaching hospital; RNs in 3 med-surg units and 2 ICUs	Activities to promote interdisciplinary teamwork between MDs/RNs, including developing principles, discussion in meetings, 1 4-hour class on decisionmaking	No differences
Dutton 2002[170]	MDs, nurses, patients discharge planners	Design Type 8-no control group (Level 5)	Patient volume, LOS, ED closure (Level 3, 4)	1 hospital trauma service	Daily discharge multidisciplinary rounds	Increase in patient volume, decrease in LOS, decrease in ED closure.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Lassen 1997[169]	Well-newborn nurses, pediatricians, neonatologists	Design Type 13-QI project with a control time (Level 5)	# of admissions with R/O sepsis, LOS, # of doses of antibiotics, costs, # of readmissions, reduction in practice variation (Levels 1, 2, 3)	1 tertiary hospital	Collaborative practice decisionmaking protocol development; education	Decrease in # of R/O sepsis diagnosis, decease in % of patients treated with antibiotics, decrease in patient days, decrease in costs, decrease in readmissions.
Leonard 2004[168]	Various groups in Kaiser Permanente	Design Type 14-QI project-no control (Level 5)	Improve communication and teamwork by standardized communication (Level 3)	different groups of MDs and RNs	Introduce standardized communication methods such as SBAR, assertion, checklists, critical event training, and briefings	Standardized briefings related to reduced wrong-site surgery, decreased nurse turnover, improved employee satisfaction, improved teamwork climate, communication, and taking responsibility for errors—but few specifics provided.
McFerran 2005[167]	Perinatal RNs, certified registered nurse anesthesists and MDs	Design Type 13 QI project-no control (Level 5)	Long-term measures: birth event data, medical-legal data, patient satisfaction data (Levels 1 & 2); short-term measures: implementation of 2-3 interventions using human factors technique during 1 year (Level 3)	4 Kaiser Permanente medical centers perinatal staff	4-hour human factors education program, SBAR communication technique, revising escalation policy, identifying safe communications, debriefs after adverse events, multidisciplinary reports, assertion, just culture statement (Level 3)	No long-term measures reported; 4 sites met short-term expectations for only communication initiatives.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Roberts 1976[163]	Hospital employees (non-MD and nonsupervisors)	Design Type 3—NRCT-P-P 2 groups with 1 being control (Level 3)	Employee perception of organizational communication, job satisfaction, and opportunities for innovative job behavior (Level 3)	1 urban hospital; ED staff members	2.5-3 hour training sessions weekly for 4 consecutive weeks	Increase satisfaction with work, pay, coworkers, job; increase perception of opportunities for innovation; increase desire for interaction with peers; and decrease in information overload.
Weiss 1985[165]	MD/RN/consumer	Design Type 3—NRCT with 3 groups, with 2 being matched control groups (Level 3)	Belief regarding value of shared versus physician-dominated responsibility for health care and beliefs that powerful individuals influence consumer health status (Level 4)	Recruited in large urban area	Discussion of role relationships, and problems for 2.5 hours 1 evening/month for 20 months	Decline in belief in shared versus physician-dominated responsibility for health care and increase in belief that powerful individuals influence the consumer's health status.
Vazirani 2005[164]	Unit organization; RN, MD, residents, hospitalist, NP	Design Type 3—NCRT 2 groups with 1 being control (Level 3)	Collaboration, communication (Level 3)	1 hospital; 1 control unit and 1 intervention unit	Added NP, hospitalist, daily multidisciplinary rounds	Perception by MDs of greater collaboration between physicians and nurses with largest effect with residents, between physicians and NPs, better communication between MDs; no difference in nurse perception of communication or collaboration between nurses and MDs, nurses perceived better communication with NPs than MDs.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Systematic Literature Reviews						
Di Blasi 1996 (Cochrane Collaboration-Centre for Reviews and Dissemination)[161]	Patients with various health problems	Design Type 11 structured review (Level 1) RCTs with and without placebo	Health outcome, symptom resolution, functional status (Level 1); health service use, medication adherence, anxiety, satisfaction (Level 3)	26 studies with 3,811 participants: poor quality studies with small sample sizes	Various treatments or disease management, including labeling, changing patient expectations, combining treatment information with emotional support	Labeling: no effect; changing patient expectations: conflicting results—improved lung function with suggestion of drug effects but improved systolic blood pressure following any interaction; combined information with support: improved outcomes, mixed result—6 studies found decrease in pain with improved patient-practitioner interaction, style of interaction can influence physical health but with small effects.
Hulsman 1999 (Cochrane Collaboration-Centre for Reviews and Dissemination)[160]	Graduate or postgraduate MDs	Design Type 11 structured review (Level 1); evaluation studies RCT and NRCT P-P video, discussion, role play, audio, written, self-rating	Receptive behaviors, information behavior, interpersonal and affective behavior, psychosocial problems and emotions (Level 3); compliance, health status, psychosocial status (Level 2)	14 studies, 408 participants, 135 controls	Training, education using lecture, modeling, discussion, role play—4-96 hours over 2 days to 6 months	10 studies report some training effect with best designed reporting fewest effects; improved self-rating of communication and recognition of psychosocial patient problems, no conclusive patient compliance effect, no effect on health status, ambiguous effect of psychosocial health. The other 4 studies report no effects.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Zwarenstein 2000 (The Cochrane Collaboration)[100]	Chiropodists/podiatrists, dentists, dietitians, MDs, hygienists, psychologists, nurses, pharmacists, occupational therapists, and others	Design Type 11 structured review (Level 1); RCT, controlled before and after, and interrupted time series	Self-reported health status, disease incidence, cure rates, mortality, complication rates (Level 1); adherence, satisfaction, continuity of care, costs (Level 3)	89 studies; none met the inclusion criteria	Interprofessional education (IPE) versus single-discipline education	No conclusive evidence of the effectiveness of IPE in relation to professional practice or health outcomes.
Zwarenstein 2000 (The Cochrane Collaboration)[100]	MDs/RNs	Design Type 11 structured review (Level 1); RCT, controlled before and after, and interrupted time series	MD/RN collaboration/joint decisionmaking (Level 3), costs(Level 4); LOS, mortality (Level 1)	2 studies with 1,102 admissions in one and 417 admissions in the other	Training, workshops, ward reorganization, team development, meetings, patient-centered care, 4 times weekly rounds, weekly case conference	1st study: shorter LOS, reduced costs, no difference in mortality rate, increased staff satisfaction. 2nd study: no difference in LOS and no difference in mortality rates.
Descriptive						
Aiken 1994[171]	MDs/RNs	Design Type 4 cross-sectional (Level 5)	Medicare mortality rates (Level 1)	39 Magnet hospitals, 139 controls	None	Magnet hospitals (higher autonomy, control, MD relationships, RN hours, skill mix) had lower Medicare mortality rates.
Aiken 1999[99]	MDs/RNs	Design Type 4 cross-sectional (Level 5)	30-day mortality, patient satisfaction, nurse-patient ratios, control by bedside nurses; specialty physicians (Levels 1, 3)	40 units in 20 hospitals; 1,205 patients and 820 nurses	None	Better nurse-patient ratios, lower mortality; higher nurse control, higher patient satisfaction.
Alt-White 1983[105]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Nurse-physician collaboration (Level 3)	46 units, 446 nurses	None	Primary nurse, critical care units, unit communication, coordination, nurse satisfaction associated with better collaboration.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Baggs 1997[107]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Nurse/physician collaboration and satisfaction with decisionmaking, nurse retention (Level 3)	3 ICUs in 3 hospital	None	Collaboration was associated with satisfaction for all but more strongly for nurses; nurse satisfaction with decisionmaking was not associated with retention.
Baggs 1999[95]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Mortality, ICU readmission (Level 1)	3 ICUs in 3 hospitals	None	In the medical ICU, there was an association between nurse perception of collaboration and lower risk of patient death or ICU readmission; MD reports of collaboration were not associated with patient outcomes.
Estabrooks 2005[98]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5	30-day mortality	49 hospitals	None	Greater nurse-physician relationships, more temporary positions, higher nurse education level, and richer skill mix associated with better 30-day mortality.
Kaissi 2003[106]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Nurse-physician interpersonal interaction/teamwork (Level 3)	2 hospitals	None	78% of nurses rated experience with MDs as very low/low or adequate.
King 1994[108]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Nurse-physician collaboration (Level 3)	90 nurses, 40 physicians, 4 hospitals, and 2 hospital ships	None	MDs & RNs disagreed with MDs perceiving higher collaboration than RNs.
Knaus 1986[97]	MDs/RNs	Design Type 4, 8 cross-sectional with no comparison group (Level 5)	Actual and predicted mortality, coordination of care (Levels 1, 3)	13 hospitals	None	Hospitals with less actual mortality than predicted had better coordination of care and communication between RNs/MDs and among MDs.

Source	Communication Targets	Design Type	Study Design, Study Outcome Measure(s)	Study Setting & Study Population	Study Intervention	Key Finding(s)
Rosenstein 2002[36]	RNs/MDs/executives	Design Type 4, 8 cross-sectional with no comparison group (Level 5)	Nurse-physician relationship (Level 3)	Network of hospitals; 1,200 responses from RNs, MDs, executives	None	MDs and RNs were significantly different; more RNs have witnessed disruptive MD behavior, more RNs say the disruptive behavior is important in nurse morale; nurses perceive less support for conflict; nurses perceive MDs as unaware of relationship.
Zimmerman 1993[103]	MDs/RNs	Design Type 4, 8 cross-sectional with no comparison group (Level 5)	Strong medical and nursing leadership, collaboration, coordination, communication, mortality, LOS (Levels 1, 3)	9 ICUs in 9 hospitals; 316 RNs and 202 MDs	None	No difference in risk-adjusted mortality or LOS between high-performing and low-performing ICUs.
Shortell 1994[101]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	LOS, nurse turnover, technical quality of care, meeting family needs (Levels 3, 4)	42 ICUs	None	Higher scores on leadership, coordination, communication, conflict management, associated with shorter LOS, higher technical quality of care, greater ability to meet family needs.
Thomas 2003[70]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	Collaboration, communication (Level 3)	8 ICUs in 2 hospitals; 90 MDs, 230 RNs	None	Most MDs rated collaboration and communication as high or very high; most RNs rated it as low or very low.
Zimmerman 1991[102]	MDs/RNs	Design Type 4, 8 cross-sectional no comparison group (Level 5)	ICU LOS, predicted hospital mortality (Levels 1, 3)	40 hospitals	None	Lower mortality associated with better technological adequacy and work environment; shorter LOS associated with better communication, culture, coordination, conflict management.

Appendix

Measurement Instruments

Source	Measurement Instrument	Concepts	Number of Items & Response Style
Shortell 1991[172]	ICU Nurse-Physician Questionnaire; 48 items selected from the Organizational Culture Inventory (OCI)	Organizational culture, leadership, communication, coordination, problem-solving	48 items; 1–5 point Likert scale
Roberts 1974[173]	Organizational Communication	Communication	35 items; 7–10 point Likert scale
Choi 2004[174]	Perceived Nursing Work Environment (PNWE)	Nursing management, nursing process, RN/MD collaboration, nursing competence, scheduling climate	42 items; 4 point Likert scale
Weiss 1985[175]	Collaborative Practice Scales	RN/MD interaction and influence on patient care	9 items RN & 10 items MD; 6 point Likert scale
Aiken 2000[176]	Nursing Work Index-Revised (NWI-R)	Autonomy, RN/MD relationships, control of practice	57 items; 4 point Likert scale
Temkin-Greener 2004[177]	PACE team performance questionnaire	Interdisciplinary team performance	59 items; 5 point Likert scale
Baggs 1994[178]	Collaboration and Satisfaction About Care Decisions (CSACD)	RN/MD collaboration	14 items; 7 point Likert scale
Dougherty 2005[179]	A review of instruments measuring RN/MD collaboration	RN/MD collaboration	Collaborative Practice Scale, Collaboration and Satisfaction About Care Decisions, ICU Nurse-Physician Questionnaire, Nurses Opinion Questionnaire, and the Jefferson Scale of Attitudes Toward Physician-Nurse Collaboration