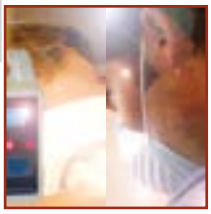

Standardizing Communication From Acute Care Providers to Primary Care Providers on Critically Ill Adults

By Kerri A. Ellis, DNP, Ann Connolly, NP, Alireza Hosseinnezhad, MD, and Craig M. Lilly, MD

Objective To increase the frequency of communication of patient information between acute and primary care providers. A secondary objective was to determine whether higher rates of communication were associated with lower rates of hospital readmission 30 days after discharge.
Methods A validated instrument was used for telephone surveys before and after an intervention designed to increase the frequency of communication among acute care and primary care providers. The communication intervention was implemented in 3 adult intensive care units from 2 campuses of an academic medical center.
Results The frequency of communication among acute care and primary care providers, the perceived usefulness of the intervention, and its association with 30-day readmission rates were assessed for 202 adult intensive care episodes before and 100 episodes after a communication intervention. The frequency of documented communication increased significantly (5/202 or 2% before to 72/100 or 72% after the intervention; $P<.001$) and the communication was considered useful by every participating primary care provider. Rates of rehospitalization at 30 days were lower for the intervention group than the preintervention group, but the difference was not statistically significant (41/202 or 23% vs 16/88 or 18% of discharged patients; $P=.45$; power 0.112 at $P=.05$).
Conclusions The frequency of communication episodes that provide value can be increased through standardized processes. The key aspects of this effective intervention were setting the expectation that communication should occur, documenting when communication has occurred, and reviewing that documentation during multiprofessional rounds. (*American Journal of Critical Care.* 2015;24:496-500)

doi: http://dx.doi.org/10.4037/ajcc2015XXX

More frequent communication among acute care providers and primary care providers (PCPs) has been associated with better outcomes for patients.[1,2] However, research thus far indicates that communication across health care settings is less frequent than expected by PCPs.[3,4] Effective transfer of information about patients when they arrive at the hospital reduces the risk of medication errors, unnecessary diagnostic testing, and rehospitalization rates and is associated with improved quality of life for patients.[1,5] Furthermore, successful communication strengthens relationships among providers and may increase patient referral rates across health care settings.[3] It is increasingly clear that the frequency of communication among providers across health care settings is lower than the optimal levels that our patients expect.[4,6]

Ineffective communication adds to the patient's disease burden and the costs of care. Cost savings from improved communication, specifically at times of care transitions, were estimated to be $25 to $45 billion for the United States in 2011.[7] Realizing these cost savings depends, in part, on identifying achievable methods for more effective communication among acute care providers and PCPs.

Our prior study[4] of the epidemiology of communication among acute care providers and PCPs suggested that communication could be improved by implementing a standardized communication protocol. That study[4] also provided qualitative data that were used to design the intervention that was used for this study and provided a validated instrument to make the required measurements. In the present study, we measured the effects of a novel communication intervention that can be implemented at little incremental cost or effort when it is integrated into daily multiprofessional rounds.

The hypothesis tested in this study was that a standardized communication protocol would increase the rate of documentation on mode of communication from acute care providers to PCPs at the time of an unscheduled admission to an adult ICU. The perceptions of PCPs about the usefulness of direct communication also were evaluated, the sustainability of the intervention was assessed, and the association of the intervention with rehospitalization rates was measured.

About the Authors

Kerri A. Ellis is an assistant clinical professor in the Graduate School of Nursing and an acute care nurse practitioner in the Department of Medicine at UMass Memorial Medical Center, Worcester, Massachusetts. **Ann Connolly** is a nurse practitioner in the Department of Medicine at UMass Memorial Medical Center. **Alireza Hosseinnezhad** is a physician in the Department of Medicine, Saint Vincent Hospital, Worcester, Massachusetts. **Craig M. Lilly** is a professor in the Departments of Medicine, Anesthesiology, and Surgery, and in the Clinical and Population Health Research Program at the Graduate School of Biomedical Sciences, University of Massachusetts Medical School, Worcester, Massachusetts.

Corresponding author: Craig M. Lilly, MD, Professor of Medicine, Anesthesiology, and Surgery, UMass Memorial Medical Center, 281 Lincoln Street, Worcester, MA 01605 (e-mail: craig.lilly@umassmed.edu).

Materials and Methods

Study Design

We designed and conducted a pre-post study to evaluate the frequency of communication among providers of acute care and PCPs. The effect of a standard communication process on the frequency of communication was measured after a 2-month washout period and a 4-week training and implementation transition period for the care providers in intensive care units (ICUs). The PCP was contacted by the ICU provider who was caring for the patient when the patient was admitted, rather than a member of the study team. Once the ICU provider completed the communication with the PCP, the ICU provider then documented the process in the patient's electronic medical record. This study was conducted on each campus of a 2-campus academic tertiary care center. The PCPs of patients admitted to any of 3 adult medical ICUs that used a closed staffing model from June 2, 2012, to July 25, 2012 were enrolled in the study. We then expanded the intervention to all 7 adult ICUs across the 2 campuses from January 1, 2013, to December 31, 2013. From January 1, 2013, to December 31, 2013, we performed weekly chart audits to assess the sustainability of this intervention.

Communication among providers across health care settings is lower than optimal levels.

Study Participants

All ICU admissions were reviewed to identify the patient's PCP from the electronic medical record. When recent visits of a patient with a PCP were confirmed, the study staff contacted the PCP and invited him or her to participate in a telephone survey. We

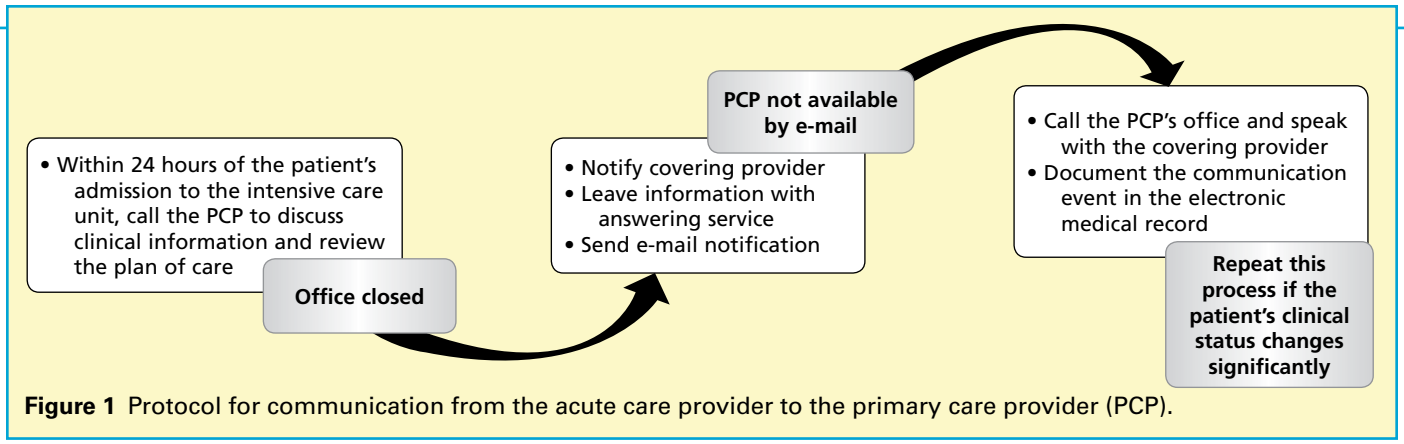

Figure 1 Protocol for communication from the acute care provider to the primary care provider (PCP).

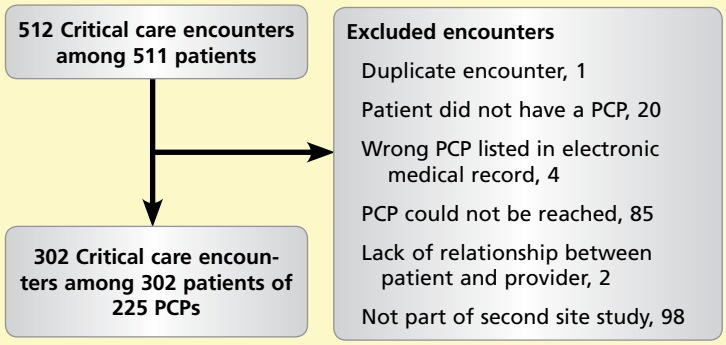

Figure 2 Enrollment of primary care providers (PCPs) in the study. Thirty-three primary care providers had more than 1 patient who required admission to a medical intensive care unit.

used a validated and published instrument to collect data during telephone surveys.[4] Study staff made up to 3 attempts to contact the patients' PCPs; if all attempts were unsuccessful, that PCP was excluded from the study. Verbal consent was obtained from each PCP before enrollment. We conducted 100 interviews to provide 80% power for detecting an increase in the frequency of communication from 5% to 20% of eligible episodes of care at a significance level of .05. In addition, we held focus groups throughout the implementation phase with the acute care providers to obtain feedback on the intervention and interactions with the PCPs.

The Intervention

The communication intervention was designed and implemented in our previous study by using the Plan-Do-Study-Act model from the Institute for Healthcare Improvement (IHI, with permission).[8] The medical record was modified to accommodate recording of how and when acute care providers communicated with the ICU patients' PCPs (Figure 1). The documentation elements included the identity of the PCP who was notified, the method and date of notification, and what information was communicated, namely, ICU admission or a decline in a patient's health status. Implementation of this standardized process of communication by an acute care provider occurred in a 1-month period. The study staff also performed an inclusive chart review from June 11, 2012, to July 25, 2012, to compare the documentation of communication in the electronic medical record with that obtained during the telephone interview.

The review of sustainability of the communication intervention was measured by weekly chart audits using the checklist method conducted from January 1 to December 31, 2013. This chart review included 7 adult ICUs (3 medical, 2 surgical, 1 cardiac, 1 neurosciences). The findings of the chart reviews of the intervention were shared with the on-service attending intensivists. This study was performed under a waiver of the requirement for written informed consent by the University of Massachusetts Human Subjects Committee (docket #14260).

Statistical Analyses

Rates of communication, documentation, and rehospitalization were compared by using the χ^2 test or the Fisher exact test to compare data from before and after the intervention by using a prespecified 2-sided significance level of .05 (SPSS version 22, IBM Corp). Qualitative data from PCPs of their perceptions were parsed by question, tabulated, coded, and summarized.

Results

We identified 302 encounters in which a patient had a PCP who we could contact among 512 ICU encounters for the entire study (Figure 2). Every PCP who was contacted on the first attempt agreed to participate in the study. The groups were well balanced with regard to demographic characteristics (Table 1). The intervention was associated with a significant increase in direct (interactive) communication events from acute care providers to PCPs (8% to 37%; $P<.001$). Concordantly, all forms of documented communication (including unidirectional electronic communications) also increased significantly (2% to 72%; $P<.001$). These improvements

in the frequency of communication were not only sustainable, but also increased for the calendar year following study completion. Acute care providers' documentation of communication with their patient's PCP increased to levels greater than 90% most of the time, which was consistently higher than the levels observed during the study.

The frequency of communication with PCPs for the intervention group increased primarily because telephonic contact increased from 16 of 202 cases (8%) to 37 of 100 cases (37%). We identified several barriers to contacting PCPs; verified e-mail transmissions from acute care providers failed to reach the PCP in 10 out of 39 cases (26%) because of inactive, incorrect, or unused e-mail accounts. Telephonic contact failed to reach the PCP in 5 of 11 cases (45%) because of inability of the answering service to transfer messages (3 cases, 27%) or delay in communication between covering providers (2 cases, 18%).

Our qualitative analyses were obtained from an open-ended question to the PCPs about how the direct communication from the acute care team was useful to them in caring for their patients. This analysis revealed that every PCP in this study perceived the communication from acute care providers to be useful. Responses were coded by the study team before analysis. Analysis suggested segregation of the responses into 4 subgroups[4]: (1) the direct communication will assist the PCP in follow-up care of the patient, (2) the PCP identified limitations for direct communication with the acute care team, (3) rehospitalization assistance was requested by the PCP, or (4) the PCP appreciates the opportunity to have direct communication with the acute care team. We were able to identify 2 primary themes regarding why the communication was valued. PCPs remarked that the information shared would help them to reengage with the patient after discharge and they appreciated the opportunity to have an active role in their patient's plan of care. Many of the PCPs who had direct communication with the acute care team commented that they also felt welcomed in the ICU environment, which matched the observations of the acute care team of having PCPs visit their ICU patients. We also collected qualitative data from acute care ICU providers regarding the ease of program implementation. They reported that input from the patient's PCPs was helpful in providing pertinent medical history that was otherwise not known that directly affected the patient's ICU plan of care and for transitioning patients to home. They reported that the intervention required a mean of 5 minutes of the ICU provider's time.

We also analyzed 30-day rehospitalization rates. The intervention was associated with an 18% rate of readmissions at 30 days, which was lower than but not significantly different ($P=.45$) from the baseline rate of 23% (Table 2).

Table 1
Demographics of patients and primary care providers[a]

Variable	Before intervention	After intervention
No. of patients admitted to intensive care unit	202	100
Age, median (SIQR), y	68 (25)	66 (25)
Sex		
Male	103 (51)	50 (50)
Female	99 (49)	50 (50)
Communication event from acute care provider to PCP documented in patient's electronic medical record	5 (2)	72 (72)
PCP aware of admission	118 (58)	72 (72)
How the PCP was notified		
Patient	7 (3)	3 (3)
Acute care staff	16 (8)	37 (37)
Electronic	79 (39)	29 (29)
Family, friend	16 (8)	3 (3)
PCP not reached	84 (42)	28 (28)

Abbreviations: PCP, primary care provider; SIQR, semi-interquartile range.
[a] Values in second and third column are number (percentage) of patients unless otherwise noted.

Table 2
Readmission to hospital before and after intervention

Variable	Before intervention	After intervention
No. of patients admitted to intensive care unit	202	100
No. of patients who died during initial hospitalization	24	12
No. (%) of patients readmitted to hospital within 30 days of hospital discharge	41 (23)	16 (18)

Discussion

The main finding of this study is that the frequency of communication among acute care providers and PCPs was significantly increased by the intervention. Moreover, when this standardized communication intervention was integrated into daily multiprofessional ICU rounds, the frequency of communication increased further and was sustained during a 1-year follow-up period. The mutual value of the information exchange was self-reinforcing. The ICU providers noted more visits by PCPs to our ICUs resulting in interactions with their patients. In addition, setting uniform expectations for documenting communication in the electronic medical record and providing feedback to each responsible clinician most likely fostered adherence. Communication with PCPs at the time of a patient's

transition into an adult ICU proved to be achievable and sustainable at little incremental cost.

Our findings that PCPs perceived that direct communication was useful, assisted them with follow-up care, and allowed them to participate in the plan of care is consistent with the results of many other studies.[1,3,6] The PCPs commented during the survey interview that they preferred communication by telephone, which has been previously reported.[3] However, some PCPs reported that e-mail was just as informative and convenient and could be bidirectional. Many e-mail responses included, "thank you for taking the time to notify me," and at other times, the PCP provided information that assisted the ICU team in plan of care, such as providing the patient's baseline creatinine level or blood pressure. Our findings are consistent with results reported by other researchers, who also note the limitations of a nonstandardized approach to communication with PCPs.[1,3,9] Our findings support a standardized and interprofessional team-integrated approach to communication with the PCPs of adult ICU patients.

A secondary aim of our study was to explore the impact of the communication intervention on 30-day hospital readmission rates. In accord with our expectations, the differences in readmission rates from this 100-encounter study were not statistically significant, and we cannot tell if these differences were due to chance or were not detected as significant because of the small sample size of the study. The study results do allow us to estimate that groups of 1200 encounters would allow an 80% probability of achieving significance at the .05 level.

The rate of nonresponse by PCPs to 3 communication attempts that were made during regular working hours was higher than we expected. We identified coverage and communication system issues specific to certain PCP's practices that prevented 17% of initial contact attempts, suggesting that improvement efforts may be of value. Further research will be helpful for understanding practice-specific factors that prevent office-delivered notifications from reaching PCPs and why some calls are not returned.

This study has important limitations that must be considered when interpreting its findings, including bias inherent to its pre-post design. First, although the study was adequately powered to detect achievable increases in communication frequency, it was not large enough to interrogate effects of the intervention on 30-day readmission rates. Moreover, the study provides limited information about the impact of the intervention in settings where the frequency of communication with PCPs is high or in settings where most patients do not have a PCP. The scope and size of the study also prevented inferences regarding outcomes that we know are important, including mortality, length of stay, and functional status over time. In addition, the study provides only limited information regarding the impact of the intervention on the relationships among acute care providers and PCPs. Furthermore, PCPs who could not be reached may have had different opinions on the importance of communicating with acute care providers, decreasing our findings of the usefulness of the intervention. Additional studies to evaluate whether this communication and documentation intervention affects morbidity and mortality, hospital costs, rehospitalization rates, and provider-to-provider relationships are needed.

This new paradigm of communication is an achievable low-cost remedy that can sustainably increase the frequency of communication among acute care providers and PCPs. Communication when a patient is being transferred into an adult ICU increases opportunities for providers to work together to bridge the gaps that can occur when patients move between health care settings.

FINANCIAL DISCLOSURES
The authors acknowledge UMass Memorial Medical Center for their generous support of this study, which was conducted without extramural support.

eLetters
Now that you've read the article, create or contribute to an online discussion on this topic. Visit **www.ajcconline.org** and click "Submit a response" in either the full-text or PDF view of the article.

REFERENCES

1. Arora VM, Prochaska ML, Farnan JM, et al. Problems after discharge and understanding of communication with their primary care physicians among hospitalized seniors: a mixed methods study. *J Hosp Med.* 2010;5(7):385-391.
2. Naylor M, Keating SA. Transitional care. *Am J Nurs.* 2008; 108(9 Suppl):58-63.
3. Etesse B, Jaber S, Mura T, et al. How the relationships between general practitioners and intensivists can be improved: the general practitioners' point of view. *Crit Care.* 2010; 14(3):R112.
4. Ellis KA, Hosseinnezhad A, Ullah A, et al. Prehospital management of evolving critical illness by the primary care provider. *Chest.* 2013;144(4):1216-1221.
5. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med.* 2009;360(14):1418-1428.
6. Bell CM, Schnipper JL, Auerbach AD, et al. Association of communication between hospital-based physicians and primary care providers with patient outcomes. *J Gen Intern Med.* 2009;24(3):381-386.
7. Burton R, Coleman E, Lipson D, Agres T, Schwartz A, Dentzer S. Health policy brief: care transitions. *Health Affairs.* September 13, 2012:1-6. http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=76. Accessed July 31, 2015.
8. How to improve. Institute for Healthcare Improvement. [cited 2011 April 2011] http://www.ihi.org/IHI/TOPICS/Improvement/ImprovementMethods/Howtoimprove/. Accessed July 31, 2015.
9. Kripalani S, LeFevre F, Phillips CO, et al. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA.* 2007;297(8):831-841.