Inpatient Cross-Cover Consensus Recommendations for Medical and Surgical Residents: A Delphi Analysis

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ABSTRACT

Background Residents regularly care for hospitalized patients for whom they are not the primary provider (cross-cover), often without guidance.

Objective We identified and defined components of safe cross-cover care.

Methods Sixty medical and surgical faculty physicians and chief residents from the Midwest were invited to participate in a Delphi study analyzing the appropriateness of cross-covering residents evaluating patients at bedside, deferring issues to the primary team, documenting a note, contacting the attending, and communicating with nurses. The first survey was free text, and responses were categorized. In the second survey, physicians rated categorized responses based on appropriateness using a 5-point Likert scale. *High consensus* was defined as $\geq$ 80% agreement, *approaching consensus* as 51% to 79% agreement, and *nonconsensus* as $\leq$ 50% agreement. Results were analyzed by specialty and cross-cover experience in the past year using Pearson χ^2 test or Fisher exact test.

Results Forty respondents (67%) completed the first survey and 30 (50%) completed the second. Responses led to 46 categories. Twenty-eight items (60%) achieved high consensus, 8 (17%) approached consensus, and 10 (22%) did not achieve consensus, with no difference based on specialty or experience. Responses with 100% consensus included: residents should evaluate a patient at bedside whenever asked by the nurse; documentation should occur for change in level of care, death, code, or rapid response team activation; and physician-nurse communication should be respectful and closed loop.

Conclusions This regional physician panel reached consensus on 28 elements important in cross-cover care, which can be used for training and future studies.

Introduction

Medical and surgical residents regularly provide care to hospitalized patients for whom they are not the primary provider. This practice, known as cross-cover,[1] is widespread among residency programs in the United States, in part due to program compliance with the Accreditation Council for Graduate Medical Education (ACGME) work hour restrictions.[2–4] In a shift-based day team and night team model, residents who are assigned to the night team provide cross-cover care for patients admitted by the primary day team.[5] Cross-cover care also occurs routinely during intrateam handoffs between residents during the day.[6] A multisite study demonstrated that the primary intern assigned to a patient is available in the hospital for only 39% of a patient's hospital stay.[7] Hence, the majority of a patient's time in the hospital is spent being cared for by a cross-covering physician. Despite this, there appear to be no recommendations regarding best practices or standards of care for resident cross-coverage.

Cross-coverage creates unique challenges; the cross-covering resident often has not met the patient or participated in generating the care plan during daily rounds. When fielding pages about these patients, cross-covering residents must make decisions regarding when a patient should be seen at the bedside, when an issue can be addressed by placing an order in the electronic health record, and when a task can be deferred to the primary team. The cross-covering resident must also have a sense of when to notify the supervising faculty member, and what additional documentation may be needed. Many graduating medical students have not received formal training in cross-cover care,[8] yet this is a skill they are expected to perform proficiently on the first day of residency.

The purpose of this study was to define key components of safe and efficient cross-cover care

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Editor's Note: The online version of this article contains a description of the Delphi method, a survey used in the study, physician consensus based on specialty and cross-cover experience, and summary of high consensus statements related to resident cross-cover.

based on input from faculty and chief residents in medical and surgical fields.

What was known and gap
Cross-cover care is common among residency programs, but best practices have not been identified.

What is new
A Delphi study that included a panel of medical and surgical faculty physicians as well as chief residents to reach consensus on elements important to cross-cover care.

Limitations
Participants were all from the Midwest, and the consensus might not be nationally representative. The survey was not tested for validity and only included physician perspectives.

Bottom line
The panel of physicians from medical and surgical specialties provided a set of general recommendations regarding cross-cover care that had high consensus.

Methods

Setting and Participants

We invited 43 medicine physicians and 17 surgeons representing 11 academic institutions in the Midwest region of the United States to participate in September 2017. This included practicing academic hospitalists (n = 24), medical and surgical subspecialists (n = 21), chief internal medicine residents (n = 9), and chief surgery residents (n = 6). All physicians invited were contacts of the authors and were selected because of their leadership roles in undergraduate or graduate medical education or because of their direct cross-cover experience. Direct cross-cover experience indicates that the physicians were responsible for performing cross-coverage themselves (ie, holding a cross-cover pager or telephone). We intentionally sought to include chief residents and hospitalists because these roles involve routine direct cross-cover experience. We invited 60 participants in order to obtain a goal of at least 20 responses, because a panel of 15 to 30 participants is recommended to effectively perform the Delphi technique.[9]

Delphi Survey

We used a modified Delphi technique[9] consisting of 2 anonymous electronic surveys created in Qualtrics (Qualtrics LLC, Provo, UT). The process is provided as online supplemental material.

Delphi Survey Round 1: In the first survey, respondents were asked the following free-text questions:

1. When should a resident evaluate a patient at bedside?
2. When is it appropriate to defer a question or concern to the primary team?
3. When should a note about cross-coverage be documented in the medical record?
4. When should an attending be contacted overnight about a cross-cover patient?
5. What aspects of communication with nurses are important for safe and efficient cross-cover care?

The authors developed these questions based on their clinical experience, and they categorized the responses based on themes. In response to the question on physician-nurse communication, 3 subsets were created: (1) physician communication with nurses, (2) nurse communication with physicians, and (3) shared features of both physician and nurse communication.

The respondents were also asked if they had direct cross-cover experience over the past year.

Delphi Survey Round 2: In the second survey, respondents were asked to review each categorized response and provide the frequency using a 5-point Likert scale (from 1, *never*, to 5, *every time*) for the following: when the patient should be evaluated at the bedside, the issue should be deferred to the primary service, additional documentation should be completed, or the supervising faculty member should be contacted.

Respondents were also asked to evaluate communication elements for their importance in cross-coverage using a 5-point Likert scale (from 1, *not at all important*, to 5, *very important*). The survey was developed by the authors without further testing.

Defining Consensus

Agreement was defined as positive or negative. Positive agreement meant that the majority of respondents chose either a 4 or 5 on the Likert scale; negative agreement meant that the majority of experts chose either a 1 or 2 on the Likert scale.[10] *High consensus* was defined as $\geq$ 80% agreement among the respondents, *approaching consensus* was defined as 51% to 78% agreement, and *nonconsensus* was defined as $\leq$ 50% agreement.[10]

The study was determined to be exempt by the University of Michigan Institutional Review Board.

Statistical Analysis

Agreement in each domain was analyzed by specialty (medicine versus surgery) and by clinical experience with direct cross-cover (none versus any in the past

TABLE 1
High Consensus Regarding Cross-Cover Care (n = 30)

Parameter	Response Category	Mean (SD)[a]	Percent Agreement[b]
When Should a Resident Evaluate a Patient at Bedside?			
Nurse requests patient evaluation at bedside	Every time–Almost every time	4.7 (0.5)	100
Code or rapid response team activated	Every time–Almost every time	4.9 (0.4)	97
Significant change in clinical status (ie, mental status change, concerns about post-op site, etc)	Every time–Almost every time	4.9 (0.4)	97
Patient fall	Every time–Almost every time	4.5 (0.7)	93
New vital sign instability	Every time–Almost every time	4.5 (0.7)	90
When Is It Appropriate to Defer a Question or Concern to the Primary Team?			
Updating patient/family regarding long-term plan of care	Every time–Almost every time	4.0 (0.7)	80
When Should a Cross-Cover Note Be Documented in the Medical Record?			
There is a change in level of care (ie, transfer to ICU)	Every time–Almost every time	5.0 (0.0)	100
A code or rapid response team is activated	Every time–Almost every time	5.0 (0.0)	100
A patient's death	Every time–Almost every time	5.0 (0.0)	100
There is a change in goals of care	Every time–Almost every time	4.8 (0.5)	97
There is a significant change in clinical status (ie, altered mental status, bleeding, etc)	Every time–Almost every time	4.6 (0.6)	97
There is a medicolegal concern (ie, conflict with patient, medical error, etc)	Every time–Almost every time	4.7 (0.6)	90
When Should an Attending Be Contacted Overnight About a Cross-Cover Patient?			
A patient's death	Every time–Almost every time	4.8 (0.5)	97
There is a change in level of care (ie, transfer to ICU)	Every time–Almost every time	4.7 (0.6)	93
A code or rapid response team is activated	Every time–Almost every time	4.4 (0.7)	90
There is an unanticipated discharge	Every time–Almost every time	4.3 (0.8)	83

Abbreviation: ICU, intensive care unit.
[a] Based on a 5-point Likert scale (from 1, *never*, to 5, *every time*).
[b] Represents percent of agreement on rating categories as *never* and *almost never* or *almost every time* and *every time*.

year). To determine differences, a Pearson χ^2 test or a Fisher exact test was completed depending on the number of response categories. A Bonferroni adjustment for multiple comparisons was completed for each domain. JMP Pro 13.1.0 (SAS Institute Inc, Cary, NC) was used for analysis.

Results

Demographics of Survey Participants

Of the 60 invited physicians, 40 (67%) agreed to participate, including 24 internal medicine physicians (60%) and 16 surgeons (40%) representing 8 academic institutions across the Midwest. This group included 10 chief residents, 14 hospitalists, 8 current or former residency program or assistant program directors, 6 current or former clerkship directors, and 10 physicians who hold inpatient leadership positions or medical school faculty roles (n = 7). A total of 22 respondents (55%) reported no direct cross-cover experience in the past year, whereas 18 (45%) had provided cross-coverage. A total of 30 invited physicians (50%) completed the second part of the Delphi survey; this was composed of 18 internal medicine physicians (60%) and 12 surgeons (40%). Of the 30 respondents, 12 (40%) had no cross-cover experience within the past year, whereas 18 (60%) had provided direct cross-cover care within the past year.

Delphi Survey Round 1

Categorization of free text responses identified 47 total categories (provided as online supplemental material). One category—medical error—was inadvertently not included in Delphi survey round 2.

Delphi Survey Round 2

Twenty-eight items achieved high consensus (TABLES 1 and 2). Several items achieved 100% consensus:

TABLE 2
Principles of Effective Cross-Cover Physician-Nurse Communication (n = 30)

Parameter	Response Category	Mean (SD)[a]	Percent Agreement[b]
Physicians Should . . .			
Value the nurses' perspective	Important–Very important	4.7 (0.5)	97
Notify the nurse about major updates in the plan	Important–Very important	4.7 (0.5)	97
Clearly inform nurses when deferring decisions to the primary team, and why	Important–Very important	4.5 (0.6)	97
Respond promptly to pages	Important–Very important	4.4 (0.7)	90
Clearly communicate new orders to nurses	Important–Very important	4.2 (0.7)	83
Nurses Should . . .			
Clearly indicate the reason and urgency when paging or calling physicians	Important–Very important	4.7 (0.5)	97
Know what situations warrant a page or call to the physician	Important–Very important	4.7 (0.6)	93
Be available to speak to the physician	Important–Very important	4.6 (0.7)	90
In nonurgent situations, review the chart before contacting the physician	Important–Very important	4.4 (0.7)	90
Understand the difference in roles between primary and covering physician	Important–Very important	4.4 (0.9)	87
Physicians and Nurses Should . . .			
Treat each other with respect	Important–Very important	4.9 (0.3)	100
Participate in closed-loop communication[c]	Important–Very important	4.7 (0.4)	100
Participate in face-to-face or verbal communication instead of pages or texts	Important–Very important	3.8 (0.9)	57

[a] Based on a 5-point Likert scale (from 1, *not at all important*, to 5, *very important*).
[b] Represents percent of agreement on rating categories as *not at all important* and *slightly important* or *important* and *very important*.
[c] Closed-loop communication: acknowledging information and repeating back to confirm accuracy.

residents should evaluate a patient at bedside whenever asked by the nurse; documentation should occur for change in level of care (ie, transfer to ICU), death, a code, or when the rapid response team is activated; and physician-nurse communication should be respectful and closed loop (acknowledging information and repeating back to confirm accuracy).

Eight approached consensus (TABLES 2 and 3). There were 10 items that did not achieve consensus (TABLE 4).

Differences Based on Specialty and Experience

There was no difference in consensus based on medical versus surgical specialty or those faculty with versus without direct cross-cover experience in the past year (provided as online supplemental material).

Discussion

This modified Delphi survey study using Midwestern medical and surgical physician faculty and chief residents demonstrated high agreement in several areas for cross-cover care in the hospital setting. There was 100% agreement seen in several categories: residents should evaluate a patient at bedside when asked by the nurse; documentation should occur for change in level of care, death, a code, or when the rapid response team is activated; and physician-nurse communication should be respectful and closed loop. High consensus was also seen in other areas: for example, attendings should be contacted for change in level of care, death, code activation, or unanticipated discharges. Of the areas that achieved consensus, there was no statistically significant difference in item ranking based on medical or surgical specialties or based on prior cross-cover experience, suggesting that these cross-cover care features are common across diverse inpatient settings.

Our results highlight clinical scenarios in which supervising faculty would like to be contacted by a resident; these are consistent with previous findings.[11] Prior work also suggests that a preexisting relationship between a supervisor and trainee is necessary for these communications to occur.[12] However, in a shift-based model of care it is possible that an attending has not met or has not had significant contact with the cross-covering resident. Hence, the use of explicit and specific recommendations may improve patient safety.[11] Trainees also must be able to identify key

TABLE 3
Approaching Consensus Regarding Cross-Cover Care (n = 30)

Parameter	Response Category	Mean (SD)[a]	Percent Agreement[b]
When Should a Resident Evaluate a Patient at Bedside?			
Change in goals of care and/or code status of a stable patient	Every time–Almost every time	4.1 (1.0)	77
Patient/family requesting to speak to the physician	Every time–Almost every time	4.3 (1.0)	73
Patient identified as "high risk" by physician giving handoff	Every time–Almost every time	3.9 (0.8)	60
When Is It Appropriate to Defer a Question or Concern to the Primary Team?			
Discussing pathology results with patient/family	Every time–Almost every time	3.9 (0.9)	70
Answering patient/family questions about prognosis	Every time–Almost every time	4.0 (0.9)	67
When Should an Attending Be Contacted Overnight About a Cross-Cover Patient?			
The resident has questions or concerns about what to do	Every time–Almost every time	4.3 (0.8)	77
There is a significant change to plan of care	Every time–Almost every time	4.0 (1.0)	70

[a] Based on 5-point Likert scale (from 1, *never*, to 5, *every time*).
[b] Represents percent of agreement on rating categories as *never* and *almost never* or *almost every time* and *every time*.

communication principles when working with nursing colleagues. Past work has demonstrated that communication with nurses in the hospital setting is inadequate,[13,14] but evaluation of communication specifically during times of cross-cover is a relatively unexplored area. One study evaluated resident, attending, and nurse perceptions of night float rotations and found that nurses perceived suboptimal physician-nurse communication and continuity of care in these cross-cover situations.[15] This is not surprising given that the cross-cover mindset can lead to a lack of ownership of a patient.[1] As front-line care providers, nurses may be the first to detect this difference in the clinical approach. Our findings reinforce the value of communication, particularly situational awareness and closed-loop communication.[16]

TABLE 4
Nonconsensus Statements Regarding Cross-Cover Care (n = 30)

Parameter	Response Category	Mean (SD)[a]	Percent Agreement[b]
When Should a Resident Evaluate a Patient at Bedside?			
Critical test results return	No agreement	3.5 (0.7)	N/A
Nurse or patient requesting a change in pain medications	No agreement	3.4 (0.8)	N/A
Nearly all patients should be evaluated at bedside	No agreement	3.2 (1.1)	N/A
When Is It Appropriate to Defer a Question or Concern to the Primary Team?			
Answering patient/family questions about an operation	No agreement	3.2 (0.9)	N/A
Answering nurses' questions regarding chronic/unchanged medical issues	No agreement	3.2 (0.9)	N/A
Changes in diet	No agreement	3.1 (1.0)	N/A
Pain medication titration in a patient at low risk for complications	No agreement	2.6 (0.9)	N/A
When Should a Cross-Cover Note Be Documented in the Medical Record?			
Whenever a patient is seen at bedside	No agreement	3.5 (1.0)	N/A
Any change in plan of care	No agreement	3.1 (1.0)	N/A
Change in pain medication regimen	No agreement	2.9 (1.1)	N/A

Abbreviation: N/A, not applicable.
[a] Based on 5-point Likert scale (from 1, *never*, to 5, *every time*).
[b] Represents percent of agreement on rating categories as *never* and *almost never* or *almost every time* and *every time*.

Our study has limitations. Training programs that participated in our study were all located within the Midwestern United States, and it is possible that the physician consensus represents a regional perspective. We sought only the viewpoints of physicians, not other members of the interprofessional care team. A significant proportion of respondents did not have cross-cover experience within the past year, and may not be fully informed about cross-cover issues. Finally, the survey was developed without testing, hence respondents may have interpreted questions differently than the authors intended.

Future steps involve seeking input from other health care professionals, specifically the nursing perspective. Currently, we are working to integrate the consensus statements into our medical school and residency curricula and to evaluate the impact. To facilitate implementation, we have created a final list of the high consensus cross-cover recommendations (provided as online supplemental material). We believe that institutional adaptation of cross-cover recommendations will help improve the transparency of expectations regarding attending supervision of significant cross-cover events and help to align the desire of faculty to be involved in cross-cover decisions with the notifications they receive from trainees in real time.

Conclusion

We have provided a set of general recommendations regarding cross-cover care that had high consensus among a panel of physicians from medical and surgical specialties. Implementation of these recommendations in the educational curricula for undergraduate and graduate medical education can offer a shared foundation for providing care in this role.

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