HOSPITAL MEDICINE

Hospital Readmissions: Physician Awareness and Communication Practices

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BACKGROUND: Patients requiring early hospital readmission may be readmitted to different physicians, potentially without the knowledge of the prior caregivers. This lost opportunity to share information about readmitted patients may be detrimental to quality of care and resident education.

OBJECTIVE: To measure physician awareness of and communication about readmissions.

DESIGN: Cross-sectional study.

SETTING: Two academic medical centers.

PARTICIPANTS: A total of 432 patients discharged from the general medicine services and readmitted within 14 days.

MEASUREMENTS: We identified patients discharged from the general medicine services and readmitted within 14 days, excluding patients readmitted to the same physician(s) and planned readmissions. We surveyed discharging and readmitting physicians 48 h after the time of readmission.

RESULTS: Discharging physician teams were aware of 48.5% (95% CI 41.5%-55.5%) of patient readmissions. Communication between teams occurred on 43.7% (95% CI 37.1%-50.3%). Higher medical complexity was associated with an increased likelihood of physician communication (adjusted OR 1.12, 95% CI 1.06-1.19). When communication occurred, readmitting physicians received information about the discharging team's overall assessment (61.9%, 95% CI 51.9%-71.9%), psychosocial issues (52.6%, 95% CI 42.4%-62.8%), pending tests (34.0%, 95% CI 24.2%-43.8%), and discharge medications (30.9%, 95% CI 21.5%-40.3%). When communication did not occur, most physicians (60.8%, 95% CI 56.7%-64.9%) responded it would have been desirable to communicate.

CONCLUSIONS: Physicians are frequently unaware of patient readmissions and often do not communicate when readmissions occur. This communication is often desired and frequently results in the exchange of

important patient information. Further work is needed to design systems to address this potential discontinuity of care.

KEY WORDS: hospital readmission; physician awareness; communication practice; quality of care.

J Gen Intern Med 24(3):374-80

DOI: 10.1007/s11606-008-0848-x

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Hospital readmission occurs in 5-29% of medical-surgical inpatients within 30 days,¹ and the readmission rate is a potential indicator of quality of care.^{2,3} In academic medical centers, attending and resident physicians rotate teams on a frequent basis, so patients may be readmitted to different physicians or teams, potentially without the previous physician's or team's knowledge. Thus, physicians may lose the opportunity to share information about readmitted patients. Although the discharge summary is generally available to the readmitting team, it may not contain all the information necessary to optimally care for the patient, especially considering that the typical patient at high risk for readmission has advanced age, multiple comorbidities, and complex psychosocial problems.^{4,5} Discussing the patient's prior hospital course may allow the readmitting team to clarify the previous management plan, assess the certainty of the discharge diagnosis, and reconcile medications and pending tests, while allowing the discharging team to receive feedback on preventable factors or care processes that may have contributed to the patient's return.

Little is known about physician awareness or communication practices when patients are readmitted. In one retrospective study of surgeon awareness of readmissions with venous thromboembolism, only 44% of charts reviewed had evidence that the surgeon who cared for the patient during the previous admission was aware of the readmission.⁶ The authors suggested that feedback about this complication might increase the surgeon's appreciation of its frequency. We are aware of no other studies that have evaluated physician awareness of readmissions, and although several studies have documented gaps in physician communication in various settings,⁷⁻¹¹ none have specifically examined communication about readmissions. Therefore, we sought to determine physician awareness of readmissions and the frequency, predictors, and content of physician communication regarding readmissions.

Received May 20, 2008

Revised September 25, 2008

Accepted October 14, 2008

Published online November 4, 2008

METHODS

Setting

We conducted the study on the general medicine services of two tertiary care, academic medical centers in Boston, Massachusetts (Hospital A and B). The human research committees of both hospitals reviewed and approved the study design. The general medicine service at Hospital A was composed of nine teams; eight of these teams consisted of one resident and two interns; the remaining team had two to three physician assistants. Five of the teams (including the physician assistant team) were hospitalist teams supervised by an attending hospitalist; four teams were staffed by non-hospitalist general medicine or subspecialty attendings. At Hospital B, the general medicine service consisted of nine teams. Eight of these teams were part of Hospital B's teaching service and included one or two junior or senior residents and four interns. Of these eight teams, five included one or two teaching attendings who were functioning as hospitalists, and three of the teams were supervised by a varying number of private attendings and hospitalists. The ninth team had no assigned house staff and was primarily staffed by four or five attending hospitalists and one nurse practitioner. At both hospitals, inpatient physicians had access to the electronic medical record, including discharge summaries and records from prior admissions.

Study Subjects

Using hospital databases, we prospectively collected data on patients discharged from the general medicine services between February and May 2007 and readmitted to any service within Hospital A or B within 14 days. The data obtained included patient name, medical record number, dates and times of first admission and readmission, discharge diagnosis, readmission diagnosis, and the names of all inpatient providers (attending, resident, intern, nurse practitioner, and physician assistant) for both discharging and readmitting teams. We excluded patients whose readmission was planned and those who were readmitted to a team that included a provider who was on the original discharging team. We included all patients regardless of their readmitting service (medicine, surgery, etc.), but did not include patients readmitted to other hospitals or visits to the emergency department not requiring admission.

Surveys

Using e-mail, we simultaneously surveyed the discharging and readmitting team providers 48 h from the time of readmission (Appendix 1 and 2). The surveys were developed by the authors through an iterative process and were pilot tested among hospitalists for clarity. The discharging team survey included the patient's name, medical record number, discharge diagnosis, and dates of the initial admission and readmission, as well as the names of the providers on the readmitting team. The survey asked the discharging team providers if they were aware the patient was readmitted and if they had already communicated with the readmitting team. If they had already communicated with the readmitting team, they were asked about the content of this communication. If they were aware of the readmission, but had not communicated, they were asked why they did not communicate. The discharging team was also

asked to assess the medical and psychosocial complexity of the patient. If they had been unaware of the readmission, they were asked if they would have wanted to be notified and what (if any) information they would have wanted to share with the readmitting team.

We simultaneously sent the readmitting team providers a similar survey, first asking if they had already communicated with the discharging team. If they had already communicated with the discharging team, we asked about the content of this communication. If they had not communicated, we asked if they would have wanted to communicate with the discharging team and what, if any, information was needed. We also asked the readmitting team providers to assess the medical and psychosocial complexity of the patient.

Outcomes

The primary outcomes of interest were discharging team awareness of readmissions and frequency, predictors, and content of communication between the discharging and readmitting teams about readmissions. Other outcomes of interest included physician preferences regarding communication and barriers to communication.

Statistical Analysis

Physician awareness and communication frequency were examined using descriptive statistics. We used logistic regression to determine if certain patient factors (age, race, gender, medical complexity, psychosocial complexity), hospital site, or time to readmission were associated with communication between the two physician teams. In order to account for any clustering effects stemming from the personal habits of the physicians in the sample, we used the generalized estimating equations approach to the analysis (SAS GENMOD). All analyses were done using SAS Version 9.1.

RESULTS

Identification of Readmitted Patients, Flow of Surveys, and Study Subject Characteristics

During the study period, we identified 432 patients discharged from the general medicine services that were subsequently readmitted to the hospital within 14 days. Of these, 207 were excluded from the study: 123 patients because there was a common provider on both the discharging and readmitting teams, and 84 patients because the readmission was planned. For the remaining 225 readmissions, surveys were sent to 493 discharging team physicians and 475 readmitting team physicians. We received 327 completed discharging team surveys and 290 readmitting team surveys, for individual response rates of 66% and 61%, respectively. There were 200 readmissions with at least one discharging team survey completed and 192 readmissions with at least one readmission team survey, for team response rates of 89% and 85%, respectively. A total of 222 readmissions had at least one survey response from either team (overall team response rate 99%).

Table 1 shows survey response rates by hospital site, provider type, and readmitting service. Providers from Hospital A were more likely to respond than those from Hospital B, and

Table 1. Survey Response Rates by Hospital, Provider Type, and Readmitting Service

	Respondents (n=617)	p-value
Hospital		0.05
A	66.5%	
B	60.5%	
Provider type		<.0001
Attending	70.8%	
Resident	55.7%	
Intern	54.8%	
NP/PA	82.9%	
Readmitting service		0.23
Medicine	65.2%	
Medicine subspecialty	62.2%	
Surgical	57.1%	

attending staff and midlevel providers were more likely to respond than interns or residents. The readmitting service had no effect on survey response rates. Table 2 shows the characteristics of the 225 readmitted patients included in the study, including patient demographics, physician ratings of medical and psychosocial complexity, and time to readmission.

Discharging Team Awareness

Of the 200 patient readmissions with at least one survey response from the discharging team, discharging teams were aware of 97 (prevalence of awareness 48.5%, 95% CI 41.5%-55.5%) (Table 3). Of those discharging team physicians who were unaware, most (98.0%, 95% CI 96.0%-100.0%) indicated they would have desired notification of the readmission.

Table 2. Patient Characteristics

Characteristic	(n=225)
Age	
Mean (SD)*	63.1 (19.4)
Range	18-96
Median (IQR)†	67 (51-78)
Race	
White (%)	66.2
Male (%)	54.7
Primary language	
English (%)	83.1
Insurance	
Medicare (%)	60.0
Commercial (%)	28.0
Medicaid (%)	8.4
Free care (%)	2.2
Self-pay (%)	1.3
Medical complexity‡	
Mean (SD)	3.12 (1.4)
Median (IQR)	3 (2-4)
Psychosocial complexity‡	
Mean (SD)	3.09 (1.4)
Median (IQR)	3 (2-4)
Time between admissions (days)	
Mean (SD)	6.9 (4.0)
Median (IQR)	6.3 (3.3-10.2)

*Standard deviation

†Interquartile range

‡Scale of 1-5 with 5 indicating highest complexity

Table 3. Discharging Team Awareness of Readmissions*

	Aware of readmission (%; 95% CI)
Team (n=200)	48.5% (41.5%-55.5%)
Intern (n=60)	33.3% (21.1%-45.5%)
Resident (n=83)	42.9% (32.1%-53.7%)
Faculty (n=165)	39.2% (31.8%-46.6%)
PA/NP (n=12)	41.7% (11.9%-71.5%)

*Team awareness is defined as the number of patient readmissions with any discharging team provider response indicating awareness, divided by the total number of readmissions with at least one discharging team provider survey response. Provider-type awareness is defined as the number of patient readmissions with any discharging provider in this role group responding that they were aware of readmission, divided by the total number of readmissions with at least one survey response from a discharging team provider in this role group. All proportions are adjusted for clustering by physician

Discharging team physicians responded they would have desired notification in order to (1) satisfy their curiosity about the clinical outcome (75.4%, 95% CI 69.4%-81.4%), (2) improve continuity of care or communicate important clinical information (58.3%, 95% CI 51.3%-65.3%), (3) receive feedback about the quality of their care (51.3%, 95% CI 44.3%-48.3%), and (4) learn or improve their educational experience (45.2%, 95% CI 38.2%-52.2%).

Physician Communication Frequency, Predictors, and Content

Of the 222 patient readmissions with at least one survey response from either team, communication occurred in 97 (overall communication frequency 43.7%, 95% CI 37.1%-50.3%) (Table 4). Table 5 provides selected examples of patient scenarios and physician survey responses when communication did not occur, along with an analysis of how communication might have been beneficial. Only medical complexity (as rated by physician survey respondents) was predictive of physician communication (OR 1.12, 95% CI 1.06-1.19). Patient age, sex, race, hospital site, psychosocial complexity, and time to readmission were not associated with physician communication. For the 97 patients for whom communication between teams occurred, physicians responded that the content of this communication included the discharging

Table 4. Frequency of Communication About Patient Readmissions*

	Communication occurred (%; 95% CI)
Team (n=222)	43.7% (37.1%-50.3%)
Intern (n=137)	23.1% (13.5%-32.7%)
Resident (n=123)	13.6% (4.6%-22.6%)
Faculty (n=323)	28.7% (21.3%-36.1%)
PA/NP (n=34)	31.8% (11.4%-52.2%)

*Team communication frequency is defined as the number of patient readmissions with any provider from either team indicating communication had occurred, divided by the total number of patient readmissions with at least one survey response from either team. Provider-type communication frequencies are defined as the number of patient readmissions with any provider in this role group indicating communication had occurred, divided by the total number of patient readmissions with at least one survey response from a provider in this role group on either team. All proportions are adjusted for clustering by physician

Table 5. Patient Scenarios and Responses of Physicians Regarding Patient Readmissions on Which Communication Did Not Occur

Patient scenario	Responses of discharging team physicians	Responses of readmitting team physicians	Issues
Patient with diabetes mellitus, admitted initially with confusion, hyponatremia, hyperglycemia, and readmitted within 3 days with confusion and severe hypoglycemia	"Patient lives alone and we were concerned about her compliance and risk of possible medication error"	"On discharge, the patient received an overly aggressive oral hypoglycemic regimen, which resulted in hypoglycemia"	Discharging team was aware this patient was fragile, had problems with compliance, and was at risk for a medication error, which did in fact occur. This represents a missed opportunity for feedback and education and for exchange of important information about the patient's ability to adhere to treatment
Patient with traumatic brain injury, seizure disorder, admitted with chest pain, readmitted with seizures	"Patient has frequent admissions and difficult social situation"	"Several psychosocial issues appeared to be prominent and needed to be dealt with"	Discharging team was aware of complex psychosocial issues, but was not able to communicate them to the readmitting team
Patient with diabetes mellitus, hypertension, peripheral vascular disease, admitted initially with multiple strokes, readmitted 11 days later with vomiting and abdominal pain	"Complicated patient-notification would have been useful"	"A primary care physician still had not been set up for the patient by the time she was readmitted"	The readmitting team implies that the discharging team did not arrange timely primary care follow-up in this complicated patient
Patient admitted initially with weight loss and colitis, readmitted with new renal failure	None	"Patient was given an inappropriately high dose of a medication to take at home, leading to acute renal failure"	The discharging team did not receive important feedback about a medication dosing error

team's overall assessment (61.9%, 95% CI 51.9%-71.9%), psychosocial issues (52.6%, 95% CI 42.4%-62.8%), pending tests and follow-up (34.0%, 95% CI 24.2%-43.8%), and discharge medications (30.9%, 95% CI 21.5%-40.3%).

Physician Communication Preferences and Barriers

When communication did not occur, 60.8% (95%CI 56.7%-64.9%) of physicians responded it would have been desirable to communicate. Of the 125 patients for whom no communication occurred, there were 77 patients with survey responses from physicians on both the discharging and readmitting teams. For these 77 patients, discharging and readmitting team physicians agreed that communication would have been desirable in 36 and that it was unnecessary in 9. In 29 patients, the discharging team wanted to communicate, but the readmitting team thought it was unnecessary, and in 3, the readmitting team wanted to communicate, but the discharging team thought it was unnecessary.

Discharging team physicians who responded they were aware of the readmission but did not communicate with the readmitting team were asked why they did not communicate. They responded that they did not contact the readmitting team because they (1) were too busy (45%, 95% CI 32.1%-58.9%), (2) did not think it was necessary (45%, 95% CI 32.1%-58.9%), and (3) did not know who to contact (18%, 95% CI 7.8%-28.6%).

DISCUSSION

In this study of general medicine services at two major academic medical centers, we found that physician teams

were often unaware when patients they discharged within the past 14 days were readmitted and that communication between the discharging and readmitting teams occurred for less than half of all readmitted patients. Physician-rated medical complexity was associated with physician communication, but patient demographics, time to readmission, and psychosocial complexity were not. When communication did occur, potentially valuable clinical information was exchanged, such as information about the discharging teams overall impression, psychosocial issues, discharge medications, and pending tests. When communication did not occur, most physicians responded that they would have welcomed the opportunity to exchange information. Interestingly, when communication did not occur and physicians of both teams responded, there were often discordant responses regarding desire for communication, with readmitting team physicians often indicating that communication was not needed and discharging team physicians responding that it was.

Several of our findings deserve further comment. Discharging physicians who were unaware overwhelmingly desired notification of readmissions, and many were simply curious about the outcome. In academic centers, discontinuity of care is the rule rather than the exception, and so perhaps it is unsurprising that physicians in this setting desire this feedback. In fact, less than a third of the patients readmitted during our study period were assigned to a team that included a physician who was on the original discharging team. Several factors that are commonplace in academic medical centers contribute to this discontinuity, including changing admitting and rotation schedules among house staff and faculty, increased "hand-offs" of patients because of restrictions on house staff duty hours,¹² and the widespread use of hospitalists and subspecialty services for inpatient care. This discon-

tinuity occurred despite the presence in both hospitals of “bounce back” rules, common among house staff programs, which provide guidelines that facilitate repatriation of readmitted patients to their prior team. Another finding worth comment is that psychosocial complexity did not predict communication, but paradoxically, when communication did occur, psychosocial factors were often discussed. It may be that this information is left out of discharge summaries for privacy concerns, and hence only available through direct communication.

These gaps in awareness and communication may be explained by several factors. First, physicians in our study reported several barriers, including (1) having no system in place to notify discharging team physicians about readmissions, (2) not having enough time to communicate, and (3) not knowing whom to contact. Second, readmitting physicians frequently thought communication was unnecessary, which may have been true for some patients, but for others it may have been a case of physicians “not knowing what they didn’t know,” supported by frequently discordant responses among discharging and readmitting physicians regarding desire for communication. This may also explain the frequency with which psychosocial matters were discussed when communication did occur, despite the failure of psychosocial complexity to drive communication.

Similar to our study, Swan and colleagues found low surgeon awareness of 27 postoperative readmissions for venous thromboembolic disease, with only 44% of charts containing evidence that the surgeon from the prior admission was aware of the readmission.⁶ The authors hypothesized that the surgeon’s lack of awareness of this complication might lead to the mistaken belief that this complication is rarer than it is, and might lead to less aggressive prophylaxis. They concluded that better physician communication might improve patient care. Our findings suggest a lack of awareness of readmissions and a failure to communicate about them are widespread and not limited to this specific clinical scenario. If physicians do not communicate directly when a patient is readmitted, it can be assumed that most information about the prior admission is obtained from the discharge summary. However, several authors have found discharge summaries are often missing important information, including discharge diagnosis, pending tests, follow-up plans, and discharge medications.^{13–16} In our study, physicians frequently communicated to clarify similar clinical data, further supporting prior evidence that the discharge summary is frequently inadequate.

Our study has several important limitations. First, it was conducted at two tertiary academic medical centers in Boston, and so our findings may not be generalizable to other settings with different cultures and systems in place. However, the previously mentioned surgical study by Swan and colleagues found a similar prevalence of awareness of readmissions for venous thromboembolic disease in an Australian medical center. Second, our study was observational, and the primary outcome was physician communication. As such, we are unable to determine whether more physician communication about readmissions would translate into better patient care, but one might argue that physician communication is so fundamental to patient care that it is an important outcome itself. Third, it is possible that our results are biased by differences in awareness and communication practices among survey responders and non-responders, or by limitations in

the scope of our study to readmissions within the same hospital. We would expect the general direction of this bias would lead us to have underestimated the problem, since (1) it seems likely that physicians would be more reluctant to respond to the survey if they were unaware or had not communicated, (2) non-responders were more likely to be interns and residents who, because of competing demands on their time, and because attendings are more likely to be identified as having cared for the patient, are less likely to be aware or communicate, and (3) we would expect that physician awareness and communication would be even lower for patients readmitted to other hospitals, given the relative ease of e-mail communication within our own hospitals and the difficulty of communication with physicians in other institutions.

Improving physician communication about readmissions has implications for quality of care: (1) by directly improving the immediate care of the patient who was readmitted (for example, by informing the readmitting team of a discrepancy in medications, pending results, or important psychosocial factors) and (2) by educating discharging physicians about what happened to the patient, the care of those physician’s future patients may be improved (for example, informing the discharging physicians of an important drug dosing error or missed diagnosis may potentially prevent this error being committed in the future). Because clinical diagnosis is mostly an “open loop” system, where the individual physician only receives minimal, ad-hoc feedback about diagnostic errors and a patient’s lack of response to treatment (as well as about correct diagnoses and successful responses to treatment), systematic approaches to providing “upstream” feedback and follow-up may result in substantial improvements in quality of care.^{17,18} Our findings also have important implications for medical education and residency training programs. In this era of high patient turnover, shorter length of stay, and reduced resident work hours, the care of inpatients by residents is often fragmented and episodic, and as a result residents often miss the opportunity to learn what happens to patients as their course evolves. As such, residents may derive valuable and otherwise unlearned lessons from more emphasis on follow-up of patients who are readmitted.

In summary, we found gaps in physician awareness of and communication about readmissions that may be detrimental to quality of care and physician education. Future research should focus on determining the impact of interventions aimed at increasing physician awareness of and communication about readmissions. Discontinuity of care is the root of the problem, so institutions might work to minimize this by lengthening rotations and extending “bounce back” rules. Information systems may be useful to notify physicians of readmissions, while dedicating time during rounds or morning report to readmitted patients may allow residents and faculty the opportunity to discuss these patients in real time. More broadly, future work should focus on improving physician communication in general and on providing systematic feedback to physicians about patient outcomes.

Acknowledgements: This study was supported by a grant from the Harvard Risk Management Foundation and was presented at the Society of Hospital Medicine Annual Meeting on April 3, 2008.

The authors are indebted to Jason Lee for assistance with data management and Gordon Schiff, MD, for critical review of the manuscript.

Conflict of Interest: None disclosed.

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APPENDIX 1

Discharging Team Survey Questions

1. Before receiving this survey, did you know that this patient was readmitted?
2. Have you already been in contact with the readmitting team about this patient?
3. What information (beyond what is available in the discharge summary and discharge orders) did your team communicate to the readmitting team (please check all that apply)?

___ Information about your team's discharge diagnosis and overall assessment of the patient

___ Information about discharge medications

___ Information about pending tests and anticipated follow-ups

___ Information about important psychosocial issues

___ No additional information needed to be communicated

___ Other _____

4. Please rate the levels of complexity of this patient from 1 to 5 with 5 being the highest:
 - a. Medical complexity (co-morbidities, severity of illness)
 - b. Psychosocial complexity (family issues, end of life issues, substance abuse, homelessness, psychiatric illness)

5. Please use this space for additional comments about this readmission.

If the discharging provider answered no to question 1, they were asked questions 4 and 5, as well as:

- 2a. What are the reasons you would have wanted to have been notified of this readmission (please check all that apply)?

___ To receive feedback about the quality of my care

___ To improve continuity of care or communicate important clinical information

___ Curious about clinical outcome

___ To learn or improve upon my educational experience

___ I would not have wanted to be notified

___ Other _____

- 3a. What information (beyond what is available in the discharge summary and discharge orders) would you have liked to communicate to the readmitting team about this patient (please check all that apply)?

___ Information about your team's discharge diagnosis and overall assessment of the patient

___ Information about discharge medications

___ Information about pending tests and anticipated follow-ups

___ Information about important psychosocial issues

___ No information needed to be communicated

___ Other _____

If the discharging provider answered yes to question 1 but no to question 2, they were asked questions 4 and 5, as well as:

- 3b. What information (beyond what is available in the discharge summary and discharge orders) would you

have liked to communicate to the readmitting team about this patient (please check all that apply)?

___ Information about your team's discharge diagnosis and overall assessment of the patient

___ Information about discharge medications

___ Information about pending tests and anticipated follow-ups

___ Information about important psychosocial issues

___ No information needed to be communicated

___ Other _____

4b. Why have you not been in contact with the readmitting team (please check all that apply)?

___ Did not think it was necessary

___ Too busy/not enough time

___ Did not know who to contact

___ Unable to reach team

___ Other (please explain) _____

___ Information about discharge medications

___ Information about pending tests and anticipated follow-ups

___ Information about important psychosocial issues

___ No information needed to be communicated

___ Other _____

3. Please rate the levels of complexity of this patient from 1 to 5, with 5 being the highest:

a. Medical complexity (co-morbidities, severity of illness)

b. Psychosocial Complexity (family issues, end of life issues, substance abuse, homelessness, psychiatric illness)

4. Please use this space for additional comments about this readmission.

If the discharging provider answered no to question 1, they were asked questions 3 and 4, as well as:

2a. What information (beyond what was available in the discharge summary or orders) would you have wanted the prior team to communicate to you (please check all that apply)?

___ Information about their discharge diagnosis and overall assessment of the patient

___ Information about discharge medications

___ Information about pending tests and anticipated follow-ups

___ Information about important psychosocial issues

___ No information needed to be communicated

___ Other _____

APPENDIX 2

Readmitting Team Survey Questions

1. Before receiving this survey, had you been in contact with this patient's prior team regarding this readmission?

2. What information (beyond what was available in the discharge summary or orders) did the prior team communicate to you (please check all that apply)?

___ Information about their discharge diagnosis and overall assessment of the patient