# IMPROVING THE DISCHARGE SUMMARY

by

Farrant Hiroshi Sakaguchi

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## STATEMENT OF THESIS APPROVAL

The thesis of **Farrant Hiroshi Sakaguchi**

has been approved by the following supervisory committee members:

| | | |
|---|---|---|
| **Leslie Lenert** | , Chair | **October 15, 2014**<br>Date Approved |
| **Kensaku Kawamoto** | , Member | **October 24, 2014**<br>Date Approved |
| **Michael Strong** | , Member | **October 28, 2014**<br>Date Approved |
| **Charlene Weir** | , Member | **October 28, 2014**<br>Date Approved |

and by **Wendy Chapman** , Chair/Dean of

the Department/College/School of **Biomedical Informatics**

and by David B. Kieda, Dean of The Graduate School.

ABSTRACT

There is a high risk for communication failures at the hospital discharge. Discharge summaries (DCS) can mitigate these risks by describing not only the hospital course but also follow-up plans. Improvement in the DCS may play a crucial role to improve communication at this transition of care. This research identifies gaps between the local standard of practice and best practices reported in the literature. It also identifies specific components of the DCS that could be improved through enhanced use of health information technology.

A manual chart review of 188 DCS was performed. The medication reconciliations were analyzed for completeness and for medical reasoning. The pending results reported in the DCS were compared to those identified in the enterprise data warehouse (EDW). Documentation of follow-up arrangements was analyzed. Report of patient preferences, patient goals, lessons learned, and the overall handover tone were also noted.

Patients were discharged on an average of 9.8 medications. Only 3% of the medication reconciliations were complete regarding which medications were continued, changed, new, and discontinued; 94% were incomplete and medical reasoning was frequently absent. There were 358 pending results in 188 hospital discharges. 14% of those results were in the DCS while 86% were only found in the EDW. Less than 50%

of patients had clear documentation of scheduled follow-up. Patient preferences, patient goals, and lessons learned were rarely (6%, 1%, and 3% respectively) included. There was a handover tone in only 17% of the DCS.

The quality gaps in the DCS are consistent with the literature. Medication reconciliations were frequently incomplete, pending results were rarely available, and documentation of follow-up care occurred less than half of the time. Evaluating the DCS primarily as a clinical handover is novel. Information necessary for safe handovers and to promote continuity of care is frequently missing. Future improvements should reshape the DCS to improve continuity of care.

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CHAPTER 1

INTRODUCTION: THE NEED TO IMPROVE THE

DISCHARGE SUMMARY

The hospital discharge is at high risk for communication failures because a patient's hospital and outpatient physicians are unlikely to speak to one another. Though these physicians are unlikely to consider themselves a "team," both treat the same patient and should have aligned plans of care. "Failure of Communication" was identified as a medical error by the Institute of Medicine (IOM)'s report, To Err is Human [1]. The follow-up IOM report, Crossing the Quality Chasm, recommended improving communication between clinicians and developing supportive information technology [2]. As the discharge summary (DCS) is the main instrument to describe the hospital course and follow-up plans, it can play a crucial role to improve communication at this transition of care.

There are several recommendations and guidelines for what belongs in a discharge summary, though there is no clear definition [3], [4]. The Joint Commission has required the following six items: 1) The reason for hospitalization, 2) The procedures performed, 3) The care, treatment, and services provided, 4) The patient's condition and disposition at discharge, 5) Information provided to the patient and family, and 6) Provisions for follow-up care. Other versions of DCS requirements have also included

significant findings, instructions to the patient and family, and the attending physicians' signature [5], [6].  The Society for Hospital Medicine provided a more extensive list: 1) Problem that led to hospitalization, 2) Key findings and test results, 3) Final diagnoses (primary and secondary), 4) Brief hospital course, 5) Condition at discharge, 6) Discharge destination, 7) Medications at discharge, 8) Follow-up appointments and proposed management plan, 9) Anticipated problems and suggested interventions, 10) Pending laboratory work and tests, 11) Recommendations of subspecialty consultants, 12) Documentation of patient education, 13) Name and 24-hour phone number for hospital physician records [7].  The Standards & Interoperability Transitions of Care working group that develops and proposes standards to the Office of the National Coordinator for Health IT (ONC) has proposed requiring: 1) Allergies, 2) Hospital Course, 3) Hospital Discharge Diagnosis, 4) Hospital Discharge Medications, and 5) Plan or Care or Assessment and Plan [8].  However, the same implementation guide includes 17 other optional Consolidated CDA Sections that would fit well within a discharge summary.  Professional coders in billing departments are also interested in the DCS to abstract a hospital course to justify the highest appropriate reimbursement.

The Medicare and Medicaid EHR Incentive Program, commonly known as Meaningful Use (MU), does not explicitly define the contents of the DCS, but rather addresses the electronic availability of DCS [9], [10].  For Stage 2, the DCS is to be available within 36 hours of discharge, substantially sooner than a potentially analogous Joint Commission requirement that the DCS be signed within 30 days of discharge. While the MU requirements increase the availability of the data as a structured document, they do not address the effectiveness of the communication.

van Walraven and Rokosh's 1999 paper is a common starting point to describe what physicians desire in a discharge summary [3]. They defined DCS quality as efficiently communicating information for ongoing care and found that physicians felt the DCS quality improved with inclusion of the admitting diagnosis, history of presenting illness, and physical exam findings pertinent to the presenting problem (both normal and abnormal), while transmission delays beyond four weeks or length exceeding two pages decreased the quality.

O'Leary et al. reported that only 19% of surveyed physicians were satisfied or very satisfied with the timeliness of receiving DCS and only 32% were satisfied or very satisfied with the quality of the DCS (as rated on a 5-point Likert scale) [11]. While they did not define quality, they also found that 41% of the participants believed that at least one of their patients had been hospitalized in the previous six months due to a preventable adverse event that was related to poor transfer of information at discharge. O'Leary later reported on the success of using an electronic health record (EHR)-generated DCS that improved the quality, timeliness, and completeness of the DCS [12]. van Walraven et al. had similar results finding that the quality of database-generated DCS was similar to those dictated in terms of quality, completeness, organization, and timeliness [13].

Horwitz et al. developed a similar but updated metric to describe the comprehensive quality of DCS based on timeliness, transmission, and content [14]. They found that while the DCS was completed relatively promptly, it was frequently not sent to the proper recipient. They found that the hospital course content was generally complete, but that information important for follow-up was less reliable. In their sample,

no single DCS met all criteria.

Rao et al. recognized that most evaluations of DCS have focused only on listing information for inclusion [15].  In response, they developed a scoring metric for DCS based on inclusion of specific elements, clarity of the document, exclusion of irrelevant material, and consistency of the documentation. They did not score the presence of administrative data specifically because they expected it to be generated automatically for the dictating physician.  With the use of templates, they found the quality to improve and the length to decrease.  However, they did not find a relationship between the intensity of hospitalization and the DCS length.

Stetson et al. reduced the 22-question physician documentation quality instrument (PDQI) down to a nine-item score plus a single general impression score to create a generalizable tool to evaluate the quality of documentation [16].  Overall it worked best to discriminate good from bad admission and progress notes, but despite reporting acceptable reliability and validity scores, they still felt unable to describe an ideal discharge summary.

Quantifying the value or impact of a DCS with effective communication can be difficult.  One measure may be relating readmission rates to the availability of discharge summaries.  van Walraven et al. identified a trend towards fewer readmissions when a discharge summary was available at the follow-up visit [17].  More recently, Li et al. found statistically significant 79% and 37% increases in readmission rates if a DCS was not finalized by 7 and 28 days, respectively [18].

Increased readmission rates are concerning both for patients as well as for payors. As a result, policy makers are targeting readmissions; the Patient Protection and

Affordable Care Act calls for a readmissions reduction program. The Centers for Medicare and Medicaid Services (CMS) have had penalties in place since October 2012 for excessive readmissions for patients whose initial hospitalization was for an acute myocardial infarction, congestive heart failure, or pneumonia [19]–[21]. It is expected that penalties will increase over the next several years, that other diagnoses will be added to the applicable conditions, and that private insurers will eventually institute similar penalties [21], [22].

There are numerous initiatives to decrease hospital readmissions; Dr. Eric Coleman's Care Transition Intervention, ProjectRED, ProjectBOOST, and Dr. Jeffrey Brenner's Care Management Program in Camden, New Jersey are all efforts to decrease readmissions that have promising initial results [23]–[26]. Common goals of these programs are patient education and empowerment and facilitating the continuity of information between the hospital, the follow-up providers, and the patients. However, these programs focus on facilitating the availability of the DCS, but do not address improving it directly. In order to ensure continuity of care, these transition programs emphasize the availability of the DCS itself, but then also suggest creating additional documentation that contains the care plan more explicitly. The Care Transition Intervention creates a paper-based, personalized document for the patient to keep called the Personal Health Record [23]. ProjectRED's version is very similar and is called the After Hospital Care Plan [24]. The Camden Coalition of Healthcare Providers is simply called the Care Plan [26]. ProjectBOOST emphasizes the need for written patient instructions [27]. While these documents are not considered replacements for the DCS, they all emphasize clear communication regarding the next steps for the patient.

Though not focused on hospital readmissions themselves, Forster et al. have drawn similar conclusions regarding adverse events (AEs). In one study, Forster et al. found AEs to occur in 19% of patients following hospitalization with a third of those being preventable and a third being ameliorable through improved communication [28]. In a similar study at another hospital, Forster et al. found similar results (23% AEs) and again concluded that better communication could have prevented a quarter of the AEs or lessened a quarter of the AEs [29].

The failure to clearly communicate the plan of care is a common theme in the literature. Moore et al. reviewed inpatient records for the discharge medications, tests pending at the time of discharge, and scheduled or recommended follow-up tests or procedures and then reviewed the outpatient medical records for the same information [30]. They defined medication continuity errors, test follow-up errors, and work-up errors and found one or more of these continuity errors in 49% of patients. In a later study investigating the cause for failure to complete recommended work-ups, Moore et al. completed a similar review but also looked at the DCS [31]. While the DCS was available to the PCP in 95% of cases, the recommended work-up that was clearly documented in the inpatient record was missing in 56% of cases. Moore et al. clearly show that clinical handovers are frequently missing from the DCS.

Kripalani et al. published two frequently cited reviews in 2007 on deficits in information transfer and recommendations to improve transitions of care [32], [33]. Hesselink et al. recently published a systematic review on improving inpatient to outpatient handovers [34]. Based on the literature, both recommended improving communication and coordination of care through structured, accurate, and timely

discharge information.

The need to improve communication between the inpatient and outpatient physicians has been clearly identified in the literature. The DCS has also been recognized as the de facto standard for communicating plans of care. However, Stetson et al. specifically found medical reasoning and plans of care were frequently missing [16]. Additionally, no studies have focused exclusively on the effectiveness of communication within the DCS and none have reported measures of the effectiveness of the handover. These ideas are not reported as results but rather are most commonly found within the discussion section. This is the gap in the literature: a means to measure and to improve the effectiveness of the DCS as a handover.

In order to fill this gap, this research aims to first characterize the effectiveness of the DCSs as a handover at the University of Utah Hospital and then to explore using a new format for the DCS to emphasize the handover at discharge.

Chapter 2 describes an analysis of 188 DCS from the University of Utah Hospital, characterizes common handover failures, and identifies informatics opportunities to improve the continuity of care. This chapter is in the process of being prepared for submission for publication.

Chapter 3 proposes a handover paradigm for DCS using the SBAR format to structure the DCS. It emphasizes that effective handovers between clinicians are needed as patients transition from the hospital to the outpatient setting. To support this perspective, the SBAR format was proposed. The SBAR format can structure and emphasize the information that is most useful from the perspective of the follow-up clinician. This chapter has been published in *Academic Medicine* [35].

Chapter 4 describes preliminary and future work. It briefly mentions the development, implementation, and evaluation efforts of the SBAR-DCS so far. The development of a SBAR-DCS template is described along with the feasibility of using a paper-based SBAR-DCS template. These pilot data have demonstrated the need for a new metric to evaluate handover communications. The Contextual Control Model (COCOM) has been proposed as an evaluation framework for handover communications and is in the process of being validated as a novel metric. Further opportunities to implement the SBAR-DCS within the EHR are being explored.

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CHAPTER 2

DISCONTINUITY OF CARE: INFORMATICS OPPORTUNITIES

TO IMPROVE THE TRANSFER OF INFORMATION

AND STRATEGY IN THE DISCHARGE

SUMMARY

Abstract

Objective

Discharge summaries (DCS) frequently fail to live up to their potential to improve the continuity of care. This study was conducted to identify 1) gaps between the local standard of practice and best practices reported in the literature, and 2) specific components of the DCS that could be improved through enhanced use of health information technology.

Methods

A manual chart review of 188 DCS was performed. The medication reconciliations were analyzed for completeness and for medical reasoning. The pending results reported in the DCS were compared to those identified in the enterprise data

warehouse (EDW).  Documentation of follow-up appointments and a follow-up provider were analyzed.  Report of patient preferences, patient goals, lessons learned, and the overall handover tone were also noted.

## Results

Patients were discharged on an average of 9.8 medications.  Only 3% of the medication reconciliations were complete regarding which medications were continued, changed, new, and discontinued; 94% were incomplete.  Medical reasoning for medications was frequently absent. There were 358 pending results in 188 hospital discharges.  14% of those results were in the DCS while 86% were only found in the EDW.  47% of patients had scheduled appointments within two weeks of hospital discharge and 45% of the DCS identified a specific follow-up provider.  Patient preferences, patient goals, and lessons learned were rarely included. There was a handover tone in only 17% of the DCS.

## Conclusions

The quality gaps in the DCS are consistent with the literature.  Medication reconciliations were frequently incomplete, pending results were rarely available, and documentation of follow-up care occurred less than half of the time.  Evaluating the DCS primarily as a clinical handover is novel.  Information necessary for safe handovers and to promote continuity of care is frequently missing.  Future improvements should reshape the DCS to improve continuity of care.

Background and Significance

Discharge summaries (DCS) frequently fail to reach their potential to improve

the continuity of care.  van Walraven et al. found a trend for decreased readmissions

when a DCS was available at follow-up after hospital discharge (relative risk 0.74) [1].

Li et al. found a statistically significant 79% increase in the readmission rate within 7 days

if a DCS was unavailable [2].  Forster et al. have reported on the incidence and severity of

adverse events (AEs) after hospital discharge and emphasize that many of the AEs could

be prevented or at least ameliorated with better communication from the hospital to

community providers [3], [4].

A reported problem with DCSs relates to medications. Walker et al. found

discharge medication discrepancies to be common, even when a pharmacist helped with

the discharge medication reconciliation [5].  Discrepancies were found in 34% of patients

with a pharmacist who performed the discharge medication reconciliation, but in 60% of

patients without a pharmacist.  This averaged to 0.86 and 1.28 medication discrepancies

per patient in the intervention and control groups, respectively.  Legault et al. found

inaccuracies in discharge medication lists, medication changes, and reason for medication

changes in 36%, 30%, and 38% of DCSs [6].  Physicians consistently rate the inclusion of

a complete list of medications and the discharge diagnoses to be the most important

components of the DCS [7]–[11].

Another common weakness of DCSs is not reporting tests pending at the time of

discharge.  Were et al. found that only 16% of pending results were reported [12].  As a

given patient may have multiple pending tests, Were et al. focused on each DCS, finding

13% and 25% reported all and some pending tests, respectively.  Walz et al. found that

32% of discharged patients had pending lab tests, most of which were microbiology tests
[13]. However, the pending tests were only documented in 11% of the DCSs. Roy et al.
found results returning after discharge for 41% of patients, 43% of which were abnormal,
two-thirds of which were potentially actionable [14].

Moore et al. looked at tests pending at the time of discharge from the perspective
of providing continuity of care [15]. They found for patients with pending tests at the
time of discharge, the diagnostic and follow-up plans in the inpatient medical record
were not completed by the outpatient physicians 41% of the time. However, in a
subsequent study that found 36% of workups recommended by inpatient physicians were
not completed by outpatient providers, Moore et al. also looked at the discharge
summary and found that the workups were documented in only 46% of cases.

van Walraven et al. also found that DCSs were not reaching follow-up physicians
[16]. In that study, they found the DCS was unavailable at 85% of the follow-up visits.
Two thirds of those cases were because the DCS was simply never sent to the outpatient
physician. Were et al. recognized that not only is the content of the DCS important,
such as tests pending at discharge, but also being able to send the DCS and results to the
appropriate follow-up provider [12]. Naming a follow-up provider is useful, but knowing
the clinic name, address, and phone number are important data in order to ensure
delivery of the DCS and results. They found that only 59% of DCSs had sufficient
information to send follow-up results. Now the Medicare and Medicaid EHR Incentive
Program, Meaningful Use (MU), Stage 2, requires the DCS to be available within 36
hours of discharge [17], [18]. Though there is no clear standard in the literature, the

timeliness of the delivery of the DCS is frequently related to its quality [7], [8], [19]–[21].

Lack of timely postdischarge follow-up has been associated with hospital readmissions and emergency department and urgent care visits [22]. While the DCS is unable to ensure that timely follow-up occurs, the Society for Hospital Medicine has endorsed the scheduling of follow-up appointments and including the details in the DCS [11].

Multiple metrics have been developed to measure the quality of the DCS. van Walraven and Rokosh surveyed physicians 100 physicians to determine what was perceived to be necessary in a high quality DCS [7]. Horwitz et al. developed a metric that also scores the timeliness of completion separately from the transmission of the DCS [21]. While completion of the DCS tended to be prompt, it was frequently not sent. They found that the hospital course content was generally complete, but that information important for follow-up was less reliable. In their sample, no single DCS met all criteria. The Rao et al. quality metric recognized that most evaluations of DCSs have focused only on lists of information to be included, but not on the quality of the communication [20]. In response, their quality metric also considered the clarity of the DCS, exclusion of irrelevant material, and consistency of the documentation. They found the use of a template to improve the quality and decrease the length of the DCS. Interestingly, the length tended to be independent of the intensity of the hospitalization. Stetson et al. developed the nine-question physician documentation quality instrument (PDQI), but still felt unable to describe an ideal DCS [23].

What has remained absent in the literature is a comprehensive framework that emphasizes clearly communicating all that is necessary in a DCS to ensure continuity of care. This includes simple data such as accurate medication lists and tests pending at discharge. But it also should include an appropriate amount of medical reasoning about the selection or duration of the treatment regimen and recommended next steps for the workup. It should also provide some context about the patient that may be easily missed or obscured by data alone. In a 2007 review, Kripalani et al. specifically concludes that communication deficits between inpatient and outpatient physicians are common and potentially may adversely affect care [9]. In a related review of key issues for hospitalists, the first area of focus of Kripalani et al. is "Inpatient-Outpatient Physician Discontinuity [10]." Prior metrics have been useful to recognize specific information components, but without putting them in the context of a handover where both the responsibility and the information need to be passed from the inpatient provider to the outpatient provider. Patient handovers involve 1) the sharing of information, 2) exchanging responsibility for a patient, and 3) transferring an understanding of the medical decision-making [24]–[42]. As Moore et al. found, the outpatient provider will be unable to complete recommended workups if they are not communicated [43].

As EHRs have become more common, it is worthwhile to consider how health information technology can be best leveraged to ensure efficient communication between clinicians. For example, Rao et al. did not evaluate the presence of administrative data in the DCS such as the name of the dictating physician because this was automatically inserted by their dictation system [20]. Data such as tests pending at the time of

discharge should be relatively trivial to track by an EHR, but can be difficult for a physician to recall when dictating from memory or when flipping through chart notes.

The aim of this study is to characterize the data in DCS through a retrospective chart review for its availability and its effectiveness of facilitating continuity of care. We focused on the medication list in the DCS, pending results, coordination of follow-up, and evidence of a clinical handover.

## Methods

### Study Setting

Data for this study come from an urban tertiary academic referral center in the intermountain west. Most patients are English-speakers. Patients admitted to the general medicine services were treated by four teaching or one attending hospitalist services. Each of the four teaching teams consisted of an attending, a senior resident, two interns, and two medical students. The attending service consisted of an attending and a senior resident. The housestaff generally dictated the DCS though typing was allowed.

### Participants and Data Sources

Retrospective data for chart review were collected from the enterprise data warehouse (EDW). The query specifically selected discharge summaries, computerized-provider-order-entry (CPOE) orders, lab results along with date-timestamps of the order and the availability of the result, patient demographic information, length of hospital stay, and diagnostic codes used for the billing record. An adapted Charlson Comorbidity

Index (CCI) was calculated from diagnoses and comorbidities in the billing record for the date of discharge [44], [45].

Three convenience samples were defined to stratify the experience level of the housestaff; the first group was 122 consecutive patient discharges from the general medicine teaching service starting August 1, 2010. The second group was 33 consecutive discharges starting May 1, 2011 from the same service, and the third group was 33 consecutive discharges starting May 1, 2011 from the attending service; i.e. the DCSs were created by by new interns, experienced interns, and senior residents, respectively.

## Chart Abstraction and Data Analysis

The data from each DCS were abstracted into four main categories: the medication list, labs pending at the time of discharge, posthospitalization follow-up, and the clinical handover for continuity of care.  The data abstraction was performed by one author (FS), a biomedical informatics postdoctoral fellow and practicing family physician. A screenshot of the Microsoft Access abstraction form is shown as Figure 2.1.

Medication Reconciliation

One of the goals of this study was to evaluate the availability of the data and the effectiveness of it being presented to facilitate continuity of care.  Thus the medication list was evaluated for its completeness, and each medication was evaluated for its status and for the presence of any relevant medical reasoning.  A "Complete" medication list should indicate the status of each medication being "Continued," "New," "Changed," or "Discontinued [9], [10], [46], [47]."  If the status of a given medication was "Unclear," it

was categorized as such and the medication reconciliation was considered "Incomplete." The presence of any medical reasoning regarding the indication, selection, or duration for each medication was noted. The number of medications per DCS is summarized and the proportion of "Complete" medication lists is reported. The proportions of the status and the presence of medical reasoning for each of the medications are also reported.

Pending Results

      To measure the communication of tests pending at the time of discharge, the DCS and the EDW report of record of CPOE orders were treated as separate sources. From the DCS, every instance of a pending result (e.g. a pending blood culture) and recommended follow-up test (e.g. follow-up INR or scheduled sleep study) was recorded. From the EDW report, every laboratory order with pending results at the time of discharge was identified. The two lists were compared for each patient, item by item. For each pending result, there was one possible condition: reported in both the DCS and the EDW, reported in the DCS but not the EDW, or reported in the EDW but not the DCS. These proportions are reported in a cross-table.

Hospital Follow-up

      Identifying a specific follow-up provider also suggests an awareness of a post-hospitalization plan of care for the patient. A follow-up provider must be identified with sufficient contact information to facilitate delivery of the DCSs. For example, "Dr. Smith" was considered "General" whereas "Dr. George Smith in Clinic 2" was considered "Specific" so that a completed DCS could be appropriately delivered. Follow-up

appointments were categorized as within 14 days, beyond 14 days, not scheduled but recommended within a specific timeframe, not mentioned, or deferred due to patient transfer. The proportions of identifying follow-up providers and follow-up appointment are reported.

Clinical Handover for Continuity of Care

In addition to the presence of concrete concepts, we looked for the presence of Patient Values, Patient Preferences, Patient Goals, and "Lessons Learned" in the discharge summaries. We defined these as when the DCS indicated a direct patient value (e.g. patient values independence more than safety), preference (e.g. patient preferred nursing home A due to proximity to family) (something that would affect decision-making though there is no specific target), a direct patient goal (e.g. the patient's goal is to return to her own home before the holidays)(something clinicans could help the patient work towards), or some other comment in a conversational style (e.g. the key lesson from this hospitalization is…), respectively. We defined a "Handover Tone" when there were three of the following: a cohesive story, predictions and guidance for the patient's clinical trajectory, an explicit plan moving forward, key parameters to monitor, clear medical reasoning, or a holistic perspective about the patient. The frequencies of Patient Values, Patient Preferences, Patient Goals, "Lessons Learned," and a "Handover Tone" in the DCSs are reported.

Statistical Analysis

Statistical analysis was performed to evaluate for differences between the cohorts. The probability was estimated to be a 75% chance that a given categorical measure, such as whether the primary care provider was identified, would be present in the DCS. The minimal sample size to detect a difference between categorical variables is calculated with the equation $N = 4z^2p(1-p)/D^2$. For $z_{0.05} = 1.96$, probability = 0.75, and precision = 0.2, the necessary sample size to detect a difference between would be 51.

The chi-squared test was used to evaluate whether there was a difference for categorical variables (gender distribution, whether the primary care provider was identified, and whether the patient was discharged to home, the length of the DCS, and the time from discharge to dictation of the DCS) of the three cohorts. An ANOVA was used to evaluate for gross differences between the cohorts regarding patient age, length of stay, and the Charlson Comorbidity Index.

Summary of Data

We used a fishbone diagram to illustrate quality gaps as well as informatics opportunities to improve the DCS. Each "bone" of the diagram represents a component of the DCS, that when missing or incomplete, contributes to creating discontinuity of care; the modes of failure do not occur in a simple linear process.

Review of the project and approval by the local Institutional Review Board were completed October 11, 2011.

Results

Characterization of Patients and Discharge Summaries

Using ANOVA (for continuous variables) and chi-squared tests (for categorical variables), we found no statistical differences for the age, length of stay, comorbidity index, DCS length in words, time from discharge order to dictation, gender-ratio, identification of PCP, or discharge to home between the three cohorts, as summarized in Table 2.1.

Grouping all discharges together, 95 or 51% of the patients were female, with an average age of 58 (18) years, length of stay of 4 (5.2) days, and a modified Charlson Comorbidity Index of 3.2 (2.5) [44], [45]. The mean length and time until dictation of all the discharge summaries were 762 (336) words and 2 (3.9) day, respectively.

Data Analysis

Medication Reconciliation

Table 2.2 summarizes the number of medications, their status, and the availability of the related medical reasoning. 188 patients were discharged on an average of 9.8 (5.7) medications. Only five out of 188 discharge summaries were "Complete," explicitly reporting the status of every medication. In the 61 discharge summaries when it was explicit, an average of 2.1 medications were discontinued. Seven discharge summaries failed to name any specific medications by either omitting the medication list or indicating "all medications were continued." An analysis of the differences between the discharge summary and the pharmacist-performed medication reconciliation at discharge is reported elsewhere and is currently under review.

Pending Results:  Inpatient Orders Such as Last Cultures

or Last Set of Labs or Serologies

In the 188 discharges, 358 lab results (an average of two results per patient), were pending at the time of discharge from the hospital.  31 (9%) of the pending results were identified in both the discharge summary and by the EDW, 17 (5%) were identified by the discharge summary but not by the EDW, and the remainder, 310 (86%), were identified in the EDW but not in the DCS.

Not only are pending lab results commonly omitted from the DCS, those reported correlate poorly to those identified in the EDW, shown in Table 2.3.  Of the 188 patients, only two (1%) cases had an exact match between the dictated discharge summary and the electronic record.  In one of those cases, there were pending results and in the other case, the summary stated correctly there were no pending results.

Another 61 (32%) of cases implicitly matched where no pending results were mentioned in the DCS and none were found in the EDW.  In the remaining 125 (66%) of cases, there was some discrepancy between the pending results noted by the discharge summary and reported by the EDW.

Pending Results:  Outpatient Orders Such as INR vs Anticoagulation

at Hospital Discharge

31 (16%) patients were discharged on warfarin.  In only one third of those discharge summaries (10 patients) was there mention of a follow-up INR or how anticoagulation was to be managed as an outpatient.

Hospital Follow-Up

A primary care provider (PCP) was identified specifically, generally, or not at all in 34%, 27%, and 39% of DCS, respectively. Since some DCS mention a PCP and specialist, 45% of all DCS identified at least one specific follow-up provider.

The DCS contained scheduled follow-up appointments for 88 (47%) and 11 (6%) of patients within 14 days and beyond 14 days, respectively. For 48 (26%) patients, some follow-up was recommended while no follow-up was mentioned for 29 (15%).

Clinical Handover for Continuity of Care

There were references in zero (0% of discharges), 11 (6% of discharges), 2 (1% of cases), and 5 (3% of cases) to patient values, patient preferences, patient goals, and lessons learned, respectively. An example statements of patient preferences was, "It was a good talk with Palliative Care; and the patient is to remain DNR/DNI, but would still like interventions other than that to help keep her healthy." An example of a patient goal was, "He was transferred to [skilled nursing] for ongoing PT and OT therapy in hopes to regain his strength and eventually return home." An example of a lesson learned was, "It also should be noted that the patient was only taking three medications at home once daily and it was unclear which medications he was taking and therefore we restarted the above medications and set the patient up with home health for assistance with medication administration."

Handover tone was also uncommon. While a cohesive story and clear medical reasoning of the hospitalization was available in 151 and 156 cases, respectively, predictions and guidance for the patient's clinical trajectory, an explicit plan with key

parameters to monitor or a clear process to follow, or a holistic perspective of the patient was present in only nine, 22, and 20 of the cases, respectively.  A handover tone was achieved in only 32 (17%) cases.

Figure 2.2 summarizes the modes of failure to provide continuity of care in discharge summaries in the topic areas of Medications, Follow-up, Pending Results, and Clinical Handover.  These points were chosen as based on the data available in our study as well as the potential to improve these areas through health information technology.  It helps to illustrate that improving discharge summaries will require a socio-technical solution [26].

Strengths and Limitations

The key strength of these findings is framing the analysis of the DCS primarily as a handover.  Also, the mixed analysis method of performing a chart review and comparing relevant findings to results from an EDW query is relatively unique.

One of the greatest limitations to these findings is the use of a single data abstractor.  It was felt that a physician or possibly a nurse was necessary in order to be familiar with the clinical context.  Unfortunately, other clinical resources were unavailable for the data abstraction.

Another potential limitation was the attempt to stratify the experience levels of the physicians.  Some might argue that a random sampling may be more representative.  However, we found no differences between the three cohorts in terms of patient demographics, case complexity, or general analysis of the DCSs themselves.

Some might express concern about the generalizability of the results from a single academic institution or the use of a specific EHR. However, the hospital uses a common, widely implemented EHR and has CPOE fully implemented.  Future work may reproduce this analysis at other sites.

<u>Discussion</u>

We found several quality gaps in the DCS at our institution, consistent with the literature. The context for these opportunities to improve are the DCSs created at an institution recognized by the U.S. News & World Report's Best Hospitals and the University Health System Consortium as among the best in quality.  It is also noteworthy that the institution's readmission rate is below the national average.

Based on the DCS, we conclude that continuity of care was not a consideration at discharge; a specific follow-up provider was identified only 45% of the time, lower than the 67% observed by Were et al. [12].  Without identifying a specific follow-up provider, it becomes impractical and a legal liability to forward important information regarding the hospitalization contained in the discharge summary.  These conclusions are inline with the low continuity scores observed by Van Walraven et al. [48].

Were et al. found 16% of pending tests reported in the discharge summary and Roy et al. found that 41% of patients discharged had pending labs where we found 67% [12], [14].  We found that discharge summaries reported only 48 (14%) of all pending results but that 17 (5%) were not identified by the EHR.  Our conclusions were consistent with those of Walz et al.; the majority of pending test results were microbiology tests with the majority of those specifically being pending cultures.

Despite consensus that anticoagulation at transitions of care should be carefully coordinated, there was little evidence of this in our data with 68% of warfarin patients lacking mention of a follow-up INR [49], [50].

Several prior efforts to improve discharge summaries have focused on the content of the discharge summaries such as through the use of checklists [7], [8], [10], [11]. A related approach that has shown improvement in the rated quality of discharge summaries is through formal teaching interventions [51], [52]. O'Leary was successful in creating a draft electronic discharge summary template that would automatically insert specific data elements and found an overall improvement in the quality and timeliness of discharge summaries [19].

A focus on conveying medical reasoning in the discharge summary has been essentially missing altogether from the literature. Several studies seem to recognize this problem, but fail to identify the need to explicitly communicate medical decision-making. The paucity of medical reasoning became evident in our chart review. Even the Moore et al. documentation of failure to communicate loose ends and intended diagnostic plans did not address the concepts of "lessons learned" or the clinical trajectory of a patient, patient preferences, or patient goals [15], [43]. The absence of this global perspective for the patient once he or she left the hospital was evident in our study.

The discharge summary may be the only clinician-to-clinician communication when the patient leaves the hospital and thus appears to be the most practical form for a handover. Our findings suggest that not only are DCSs imperfect as information containers, they are poorly suited as clinical handovers. While the data could be more complete by leveraging the EHR alone, handover tone will likely require a paradigm

shift. The real failing of the discharge summary is not the mere absence of data, but rather the failure to recognizing the need for a handover [39]. In a separate paper, we discuss that potential of using the DCS as a handover instrument [53].

A new paradigm for discharge summaries may be needed. This new paradigm for discharge summaries would include not only data, but would focus on clear communication. We envision the EHR being able to generate a dynamic, prepopulated discharge summary that includes data already stored within the EHR. The discharge summary would then be completed by clinicians adding brief narratives that clarify the medical decision making of the case and that provide guidance and a useful handover to the next provider. We are investigating automatic generation of portions of the DCS and teaching the DCS as a handover in our institution. Further research may be necessary to clarify the most valuable elements of medical reasoning, how to record patient preferences, and how to most efficiently gather and present this knowledge.

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Table 2.1: Demographics and description of discharge summaries*

| Group | Fall - Teaching | | Spring – | | Spring - | | Groups | |
|---|---|---|---|---|---|---|---|---|
| *Patient* | | | | | | | | |
| Dates of Discharge | August 1, 2010 – | | May 1, 2011 – | | May 1, 2011 – | | | |
| N | N = 122 | | N = 33 | | N = 33 | | N = 188 | |
| Female *n, (%)* | 63 (52%) | | 15 (45%) | | 17 (52%) | | 95 (51%) | |
| | Mean | S | Mean | S | Mean | S | Mean | S |
| Age *(years)* | 59 | 19 | 58 | 18 | 52 | 15 | 58 | 18 |
| Length of Stay | 5.4 | 7. | 5.2 | 3. | 4.5 | 4 | 5.2 | 6. |
| Charlson | 3.1 | 2. | 3.8 | 2. | 2.8 | 2. | 3.2 | 2. |
| PCP Identified | 41 | 34 | 12 | 36 | 11 | 33 | 64 | 34 |
| Discharged to | 57 | 47 | 15 | 45 | 11 | 33 | 83 | 44 |
| *Discharge Summary* | | | | | | | | |
| Length (words) | 735 | 30 | 818 | 34 | 808 | 44 | 762 | 33 |
| Days to Dictation | 1.9 | 3 | 1.5 | 2. | 3 | 6. | 2 | 3. |

*There were no statistically significant differences between the three groups using the chi-squared test for dichotomous variables and an ANOVA for continuous variables.

Table 2.2:  Average number of medications and occurrences of medical reasoning (about medications) per discharge summary.

| Medication Status | # of Medications | # of Occurrences of Medical Reasoning |
|---|---|---|
| Continued | 7.9 | 2.9 |
| Changed | 1.2 | 0.8 |
| New | 2.3 | 1.8 |
| Discontinued | 2.1 | 1.6 |
| Unknown | 7.3 | 3.5 |

Table 2.3: Correlation of reporting pending results between DCS and EDW (2x2 table for source of reported pending results).*

| | | DCS | |
| --- | --- | --- | --- |
| | | Present | Absent |
| EDW | Present | 1 (0.5%) Match | 106 (56%) Discrepancy |
| | Absent | 6 (3%) Discrepancy | 1 (0.5%) Explicit Match<br>61 (32%) Implicit Match |

*In 13 (7%) of Discharge Summaries, there were mixed discrepancies so that some pending results were missing from the EDW while other pending results were missing from the DCS.  The DCS with an explicit match stated, "there are no pending results," which matched the EDW query.  The DCSs with an implicit match did not mention the presence or absence of pending results, though none were found in the EDW.
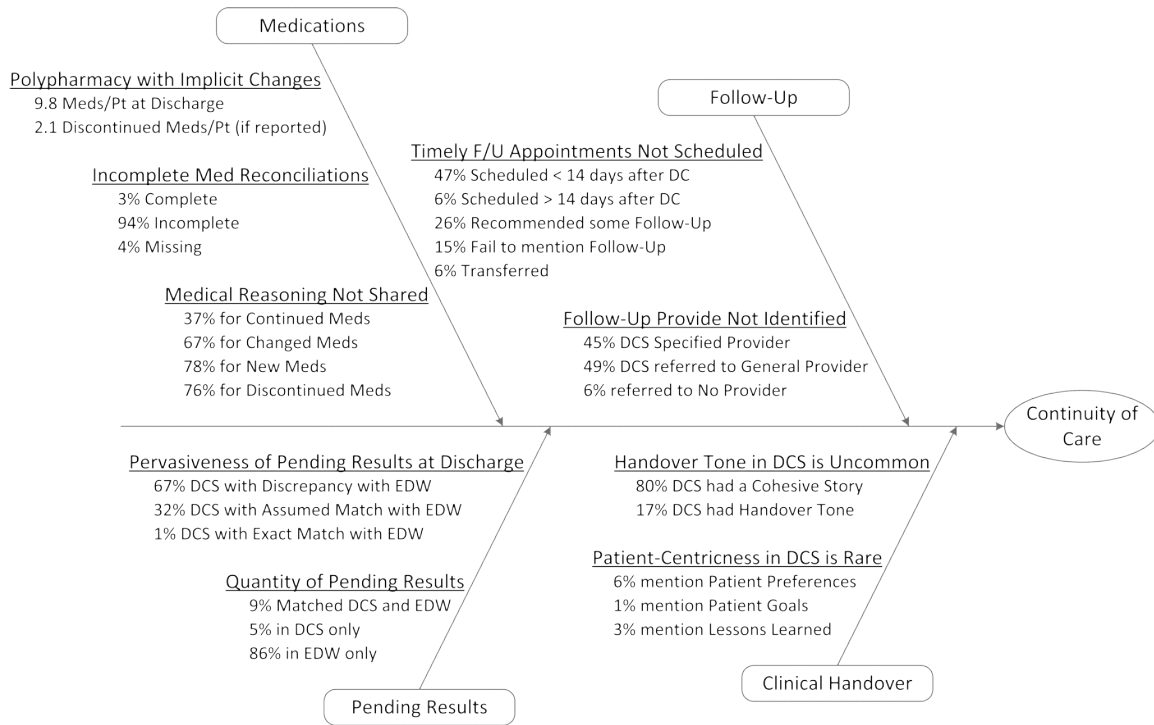
Figure 2.1: Form for manual data collection.

Figure 2.2: Failure modes for providing continuity of care in discharge summaries

CHAPTER 3


RETHINKING THE DISCHARGE SUMMARY:

A FOCUS ON HANDOFF COMMUNICATION

# Rethinking the Discharge Summary: A Focus on Handoff Communication

Leslie A. Lenert, MD, MS, Farrant H. Sakaguchi, MD, MS, and Charlene R. Weir, RN, PhD

## Abstract

The discharge summary is one of the most critical documents in medical care settings, but it is prone to systematic lapses that compromise the continuity of care. Discontinuity is fostered not only by incomplete inclusion of data (such as pending labs or medication reconciliations) but also by failure to document clinical reasoning and unfinished diagnostic workups. To correct these problems, the authors propose the Situation–Background–Assessment–Recommendations (SBAR) format for discharge summaries. SBAR is already used for handoffs the way Subjective–Objective–Assessment–Plan is for progress notes. The SBAR format supports the concise presentation of relevant information along with guidance for action. It shifts the paradigm and purpose of the discharge summary away from being a "Captain's Log" (a historical record of the events, actions taken, and their consequences during hospitalization) and towards being a handoff document (a tool for communication between health professionals aimed at ensuring continuity of care). To test SBAR as a template for discharge summaries, the authors have initiated a study to document the impact of the SBAR model on the quality of trainees' thinking in discharge summaries.

In an academic setting, the purpose of medical note writing goes beyond documentation, payment facilitation, and communication. Note writing teaches residents and medical students how to think and also makes their thought process transparent, which helps in assessing their performance and tailoring education.[1] Effective communication specifically requires addressing the higher levels of cognitive processing and synthesis. One widely used aid to help clinicians organize their thoughts while writing notes is the SOAP (Subjective Objective Assessment and Plan) template.[2] However, this template is not well suited to discharge summaries because it has a focus on differential diagnosis rather than on continuity of care and on deliberation rather than communication. How can we help residents and students "think better" at the end of an episode of care for a patient, the way the SOAP templates help them think better at the beginning and middle?

In this perspective, we argue for the "Situation–Background–Assessment–Recommendations" (SBAR) model as an effective framework for discharge summaries. We begin with a discussion of the current inadequacies of the "usual" method for creating discharge summaries. We then consider how handoff communication can be applied to thinking about the discharge summary, and we describe the SBAR model as a template for discharge summaries. We conclude with our plan for next steps in evaluating and validating the efficacy of the SBAR template.

### Inadequacies of the Traditional Discharge Summary

The *discharge summary* is one of the most critical documents in medical care settings. The effects of its absence perhaps best define its importance: Delayed discharge summaries are associated with a substantially increased risk of hospital readmission by 50% or more.[3,4] Inadequate communications and deficiencies in information transfer at discharge—problems that might be addressed by a high-quality discharge summary—are a frequent cause of errors and near misses.[5–8] O'Leary and colleagues[9] found that 41% of outpatient general internists thought that at least one of their patients in the past six months had experienced a preventable adverse event due to poor transfer of information at discharge.

Many problems associated with inadequate discharge summaries can be viewed as a failure to organize the information at the level of abstraction required for good communication and narrative.[10] For example, one of the most common problems with discharge summaries is the failure to include information on diagnostic tests that are still pending at discharge. Identifying pending tests requires awareness that others in the future will need this information. Were and colleagues[11] found that only 16% of tests pending at discharge were reported in discharge summaries, and only 67% of the discharge summaries adequately identified an outpatient provider to whom lab results could be sent. Walz and colleagues[12] found that whereas a third of patients were discharged to subacute care with pending microbiology results, only a third of those pending results were documented in the discharge summaries. Roy and colleagues[13] prospectively

**Dr. Lenert** is professor, Departments of Biomedical Informatics and Internal Medicine, and associate chair for quality and innovation, Department of Internal Medicine, University of Utah School of Medicine, Salt Lake City, Utah.

**Dr. Sakaguchi** is a postdoctoral fellow, Department of Biomedical Informatics, University of Utah, Salt Lake City, Utah.

**Dr. Weir** is associate professor, Department of Biomedical Informatics, University of Utah School of Medicine, and associate director, Veterans Affairs Health System Geriatric Research, Education, and Clinical Center and Salt Lake City Informatics, Decision Enhancement and Surveillance, Salt Lake City, Utah.

Correspondence should be addressed to Dr. Lenert, Department of Biomedical Informatics, University of Utah, 26 S. 2000 E., Suite 5700, Salt Lake City, UT 84112-5750; telephone: (801) 581-4080; e-mail: leslie.lenert@hsc.utah.edu.

collected data on test results pending at the time of discharge from inpatient care and surveyed primary care physicians about the importance of these results. Lab results were pending for 41% of the patients, yet 61.6% of the time the primary care providers were unaware of those outstanding results, 9.4% of which were ultimately considered potentially actionable.

Discharge summaries also often fail to include critical recommendations from hospitalization for future actions. Moore and colleagues[14] noted that 54.1% of all discharge summaries failed to describe the recommended outpatient workups that were clearly documented in the inpatient charts. In a review of discharge summaries at our own institution, we found that whereas changes in medication between outpatient and inpatient environments were documented—so-called medication reconciliation—the rationale for changes was almost never completely explained. Further, discharge summaries rarely discussed insights into patients' preferences or the lessons learned for future care.[15]

Why is it so common to omit critical information from discharge summaries, particularly information on higher-level thinking for patient management? Among the possible reasons such as time pressure, cognitive overload, and a lack of training is a problem we call the "Captain's Log" phenomenon. In the Captain's Log phenomenon, physicians may be much more focused on producing a *narrative story* of what they believe are the salient features of a hospitalization, rather than producing a document for another clinician taking over the care of the patient. According to this hypothesis, physicians create summaries for themselves, under the constraint of organizational requirements for content (e.g., hospital bylaws and the regulations of accreditation bodies), as a process of sense making through story telling.[16] The discharge summary was developed in an era when it was traditional for primary care physicians to follow their patients into the hospital for care. At the time, it may have been appropriate to simply summarize care rendered during the stay because there was no handoff—while the setting of care changed (hospital to clinic), the care provider did not. However, the value of the contemporary

discharge summary as a historical document is questionable. In fact, Moore and colleagues[17] found "information errors" between inpatient notes, the discharge summary, and the outpatient record in half of cases reviewed.

The Captain's Log phenomenon occurs when communicators fail to adequately consider the perspective of the "other." Psychological studies demonstrate that speakers are unaware of how poorly they communicate information.[18] Accordingly, physicians fail to write the discharge summary at the level of clarity or synthesis required for effective communication. In one study of handoffs among pediatric interns, the most important information was missing 60% of the time, despite their belief that they were communicating well.[19]

The complexity of the information may also thwart effective summarization and communication of data and priorities; the underlying problem is information overload. Discharge summaries include so many individual items, tests, and changes in therapy that the complexity of information may make it difficult for a person to remember all the significant items, let alone create a cohesive narrative. The author of the discharge summary strives to convey information for the handoff, but the task may be too complex for most humans to complete without a checklist or a software tool that supports their cognition.

The hectic clinical environment in which discharge summaries are written also contributes to cognitive overload as there is usually significant time pressure and concurrent demands. In addition to causing slips or errors of omission, information overload diminishes the capacity to imagine the perspective of the reader or the "other," thus exacerbating the Captains Log phenomenon. Taking an alternative point of view in document creation requires considerable cognitive effort that only significant training would make automatic or natural.[20]

Most prior work to solve the poor quality of discharge summaries has assumed that omission of critical information is due to information overload. Common strategies to mitigate overload have included checklists and electronic forms to prevent omissions from discharge summaries.[21–25] Investigators have

demonstrated that such software can improve both the completeness and timeliness of discharge summaries.[7,25,26] However, this approach does not fix problems with omission of higher-level types of information, such as workup plans, clinical goals, and lessons learned. This type of information is difficult for computers to extract from electronic health record (EHR) systems. Moreover, in educational settings, if a computer generates the summary for a patient, the resident or the medical student who used an EHR function may not have the opportunity to learn by actively deciding what information to include. A human role may be critical in training environments to teach the skills required for summarization; effective communication in a discharge summary requires a balance among completeness, clarity, and brevity.[24,27]

## The Discharge Summary as a Handoff Communication

How can residents and students overcome the Captain's Log mentality? We believe they need to recognize the discharge summary as a handoff, a specialized form of communication. Handoffs can be defined as the passing and accepting of information and responsibility for a patient from one provider to another. Herbert Clark,[28] the communication theorist, would call it a "joint action." Most clinicians are familiar with handoffs that occur during shift changes or when sharing call.[22,29–31]

The Institute of Medicine has identified failed communication as the most common cause of error in clinical settings.[32] Many studies have found that communication errors were involved in most—anywhere from 50% to 91%—adverse events or "mishaps."[33,34] According to theorists, shared knowledge regarding the goals, sense of the situation, and roles of the other are central to effective communication.[28] Medical school curricula have incorporated communication skills training for addressing physician–patient interaction but have not yet expanded that teaching to writing progress notes and discharge summaries. However, recent qualitative work addressing perceptions of the impact of computerized documentation has found that clinicians may be starting to view electronic documents as a *shared space*, more in line with the view that clinical documentation is a form of communication.[35]

SBAR—"Situation–Background–Assessment–Recommendations" —is the most commonly cited mnemonic for medical handoffs.[36] We are studying its use as a cognitive tool to help physicians view the discharge summary as a handoff. Similar to the SOAP, SBAR provides a framework for the processes of communication, nudging the speaker to convey the overall "story" of the patient, to include goals and expectations, providing pertinent details as well as the big picture. Advocates of this model have argued that SBAR reporting promotes collaboration through communication of critical thought processes.[37]

Historically, SBAR was used in the U.S. Navy to facilitate handoffs in nuclear submarines and improve communication from junior to senior officers.[38,39] Since then, many groups, institutions, and programs have adopted the SBAR model; these include the Agency for Healthcare Research and Quality's Team Strategies and Tools to Enhance Performance and Patient Safety program and their Patient Safety Network, the U.S. Department of Defense's Patient Safety Program, the Institute for Healthcare Improvement, Kaiser Permanente, the National Health Service in the United Kingdom, and

the Interventions to Reduce Acute Care Transfers collaborative.[24,40–44] Experience with using SBAR templates for handoffs suggests that it is a useful communications framework with positive effects on both individuals and organizations. Several observational studies have shown that adoption of SBAR templates for handoffs improved communications among interdisciplinary teams and enhanced perceptions of an organizational culture of safety.[23,44–48] Additionally, Vardaman and colleagues[39] observed that use of the SBAR format in handoffs enhanced rapid sharing of clinical contexts, clarified roles and expectations, and increased trust among interdisciplinary team members. The SBAR model also has been shown to facilitate critical thinking and analysis in case discussions in morbidity and mortality conferences.[49,50]

## The SBAR Model for Discharge Summaries

How can the SBAR model be adapted to discharge summaries? In Figure 1, we mapped the common discharge summary components and applied them to a framework, which contains five sections: Header, Situation, Background, Assessment, and Recommendation.

The "Header" section identifies the individuals and dates for the episode of care involved in the handover as the parameters for the transition of care. The patient, discharging, and follow-up physicians are explicitly identified because they are the key participants in the transition. The "Situation" section briefly describes the patient and his or her location within the current episode of care to help the reader understand the clinical and social context of the handoff. In addition to pending results and follow-up tests and appointments, concerns for readmission and interim care should be described in this section. "Background" provides a context for follow-up care such as relevant pieces of the hospital course. Procedures, vital signs, and other objective data in this section should not only provide a baseline but also describe the trajectory of the patient. In the "Assessment" section, primary discharge diagnoses, chronic diagnoses, and the patient's condition should be systematically listed as necessary to meet institutional requirements for documentation. The "Recommendations" section emphasizes medical reasoning for future medical care, addressing the bulk of the standard discharge summary's inadequacies.
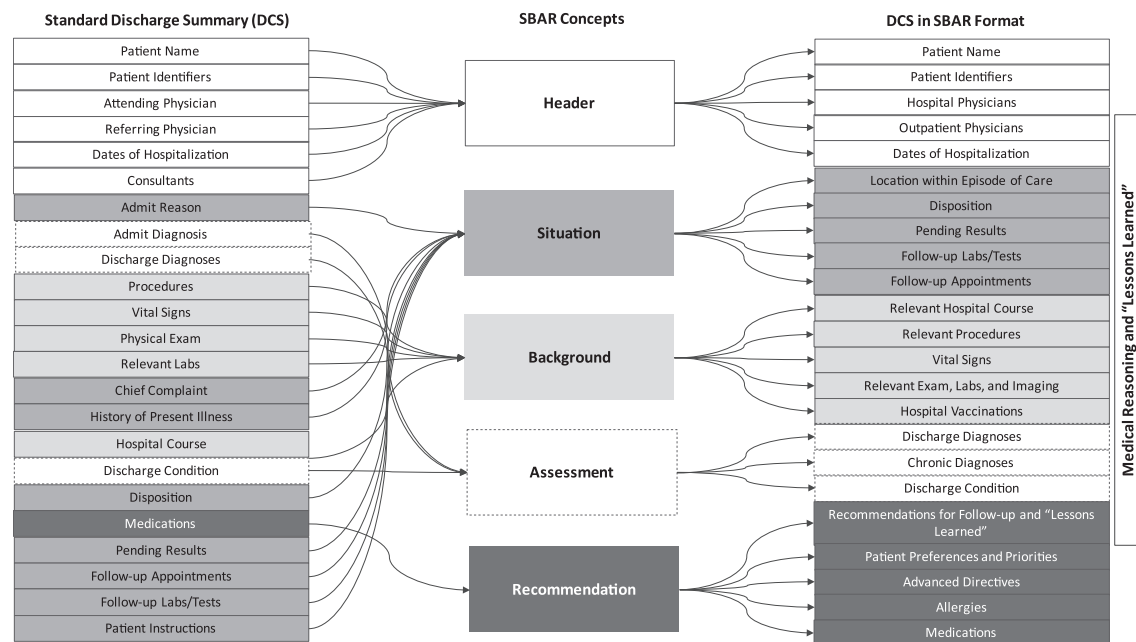


**Figure 1** Mapping of a standard discharge summary's components onto the format of the Situation–Background–Assessment–Recommendations (SBAR) discharge summary model, which contains five sections: Header, Situation, Background, Assessment, and Recommendation.

Patients' preferences, such as code status and advanced directives, which should appear in this section, ensure that those preferences guide future care. Additionally, unresolved issues or uncertain diagnoses should be discussed. Finally, the "Recommendations" section should explicitly indicate which medications have been discontinued, changed, or added during hospitalization (e.g., medication reconciliation) along with a rationale for the changes.

Restructured into the SBAR format, discharge summaries can still meet all the Joint Commission's requirements for discharge summaries.[51] For examples of SBAR-formatted discharge summaries, see Supplemental Digital Appendix 1, http://links.lww.com/ACADMED/A180.

Changing the discharge summary's format from summarization to a handoff model would shift its focus to collaborative care and the next provider. Too often, discharge summaries give great detail regarding the hospital stay, yet provide minimal useful information to outpatient providers who see the patient for follow-up. Instead of a historical summary, discharge summaries should contain a strategic plan for future care. Lessons learned and unresolved issues from the hospitalization would be discussed. In addition, discharge summaries would include a projection (i.e., a prediction) of how the author believes patients' clinical condition will evolve over time. For example, if a patient is discharged on oxygen therapy: "We believe that oxygen therapy will be able to be weaned within one to two weeks." With the SBAR framework, the author of a discharge summary would need to think about continuity of care, communicate medical reasoning, and identify the factors necessary to convey situation awareness of the medical status of the patient, including relevant preferences and contextual information.

## Evaluating SBAR's Impact and Next Steps

Proving that SBAR templates will improve residents' ability to create effective discharge summaries is a difficult task. We cannot directly compare the quality of the thinking in discharge summaries that were created using an SBAR template versus the

## Table 1

**Approach to Analyzing the Quality of Thinking in Discharge Summaries, Adapted From Hollnagel's Contextual Control Model\***

| Level | Description |
|---|---|
| Strategic | Clear, patient-centered narrative that includes goals, priorities, relationships, choice of actions, reasoning, and predicted outcomes. |
| Tactical | Adequate narrative that may include goals, priorities, and relationships, but tends to demonstrate a reliance on guidelines or scripts. Supportive reasoning may not be present. |
| Opportunistic | Disconnected narrative that identifies a few goals, but minimal identification of priorities or patient perspective. Lacks reasoning and integration of predicted outcomes. |
| Scrambled | Incoherent narrative with no identifiable priorities for goals or patient perspective. Lacks reasoning and predicted outcomes. |

\*See Hollnagel 2005.[52]

standard format because the summary's SBAR structure would unblind raters, creating potential biases. To overcome this problem, we plan to interview residents after they have completed their discharge summaries, to capture their thought processes about the patient. Each resident will provide an oral handoff summary of the case. A blinded independent rater will rate the degree of organization of the resident's thinking, and we will compare the degrees of organization observed between use of the SBAR model and the standard template.

We hypothesize that the SBAR template will elevate residents' thinking to a higher level of reasoning or synthesis based on Hollnagel's Contextual Control model. We define the thinking pattern, ranging from "scrambled" to "strategic" levels, by the degree to which discharge summaries contain actual plans for the care of patients in the community and the extent to which those plans take into account the nonmedical contexts surrounding the patient's care (see Table 1).[52–54]

## Integrating SBAR and Informatics

As we study the impact of the SBAR format for discharge summaries, we are not proposing to abandon work on informatics systems that address information overload by including data already in the EHR. Instead, a well-implemented system will refocus the clinician's cognitive energy on communicating reasoning, goals and recommendations, and future priorities for care. Rather than simply producing

lists of diagnoses, procedures, labs, and medications, or recounting a historical narrative of the events of hospitalization, an advanced SBAR discharge summary application will facilitate the creation and telling of a different type of narrative from the hospitalization—stories that facilitate the return of the patient to management in an ambulatory environment. This task is inherently different from the summarization of successes and failures in a Captain's Log. The emphasis, particularly for clinicians in training, will be on identifying and sharing the lessons learned in the acute hospital setting, to provide a strategic background for the future longitudinal care of the patient.

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CHAPTER 4


PRELIMINARY AND FUTURE WORK


The overall purpose of my research has been to improve the continuity of care for patients, focusing on discharge summaries. The foundation for these efforts and the baseline data were gathered through a gap analysis, reported in Chapter 2.  Chapter 3 primarily proposes a new paradigm and format for discharge summaries to improve clinical handovers at hospital discharge.  This chapter describes the natural next steps for this research.  Based on the premise that improved clinical handovers will facilitate safer and more efficient transitions of care, the goal will be increasing the salience of the handover in clinical communication.  It is proposed to operationalize the concept by implementing the SBAR discharge summary.  To gauge its effectiveness, a new metric is needed to evaluate the degree or nature of handover-ness in communication surrounding transitions of care.

Initial feedback to the SBAR Discharge Summary and discharge handover has been positive, with many clinicians immediately appreciating the need to shift the emphasis of clinical documentation to conveying useful, high priority information, rather than long catalogs of data that support billing without supporting communication. Evaluation will require addressing socio-technical challenges.

One way to approach this social challenge is to disseminate the perspective of the discharge summary as a handover through medical education venues where formal instruction might occur in small group or one-on-one interactions. Using the natural teaching infrastructure of a residency program will be one of the avenues for teaching and receiving feedback about handovers at transitions of care. The director of the internal medicine residency at the University of Utah has acknowledged the value of such teaching and has agreed to facilitate future research while working with trainees.

To address both the social and the technical challenges, the SBAR discharge summary will need to be operationalized within an EHR. This would allow incorporation of previously stored data from that system into the document template and would be deployable system-wide. Depending on clinical workflows, such an implementation would allow the SBAR discharge summary to be started early during an admission so that useful handover information might be recorded as it arises, rather than waiting until the very end of the hospital stay. Initial efforts were made to develop a PowerNote template within the University Hospital's EHR, (PowerChart by Cerner). Several technical challenges arose, particularly regarding the user-interface of the PowerNote template. This was significant because the current standard of care is the dictation of discharge summaries due to its speed and convenience. An awkward electronic template using mouse and keyboard would impose a significant change to current workflows. Hospital-wide plans to change EHRs only further undermined the feasibility of an electronic implementation at this time.

Another approach was to operationalize the SBAR discharge summary through a paper template with the advantage that it could be easily distributed, shared, discussed,

and taught. The paper template is system agnostic and could be used for typed or dictated discharge summaries. Also, by virtue of being a paper template, a clinician retains greater flexibility in its use. A paper-based SBAR discharge summary template was created that can fit in a lab-coat pocket of a clinician. This template was developed through an iterative design process. The first iteration started with a typical discharge summary and then was modified based on the principles described in Chapter 3. A panel of practicing physicians reviewed each version and their feedback was incorporated.

To test the feasibility of the SBAR discharge summary format, the template was printed in color, laminated, and was distributed to interested residents, with both sides shown in Figure 4.1. Five interns and residents created a total of 17 discharge summaries for actual patients using the SBAR discharge summary template. Overall, they found the template relatively easy to use (2 out of 5) even though the template took 20 minutes to use instead of the usual 10. However, in all discharges (17/17), they agreed that the template helped focus on the handoff. The template frequently reminded them of things likely otherwise forgotten (16/17 discharges), emphasized the importance of lessons-learned for the follow-up provider (15/17 discharges). Through a verbal report, we learned that an emergency medicine resident decided against readmitting a patient based on an SBAR discharge summary. The discharge summary made clear that the patient's chronic condition could likely be managed as an outpatient. Also, a couple of senior outpatient internists felt that several of the SBAR discharge summaries they received were more useful than those they typically review.

Evaluating the effect of the SBAR discharge summary template could occur through either evaluation of the resulting discharge summary itself or through an

evaluation of a handover conversation based on that discharge summary. These efforts might be focused on either the creator of the discharge summary, or on the recipient of the discharge summary. A template that helps the discharging provider consider the handover more thoroughly has value, but it may be the improved situation awareness of the recipient that should be the gold standard.

While evaluating the effectiveness of the ability to communicate discharge information to the recipient is the ideal, there are limited tools to objectively quantify the effectiveness of the handover perspective within a discharge summary. Existing tools are useful to measure processes (e.g. time for task completion, or the number of mouse clicks) or to measure the presence of data or information. Other metrics have focused on data completeness, but fail to evaluate the cognitive processes; there is a paucity of models that assess the quality or effectiveness of communication.

One promising approach is to utilize the theory of joint cognitive systems (JCS), proposed by cognitive psychologists Erik Hollnagel and David Woods, which describes systems with complex interactions [1], [2]. This theory focuses on how functions are accomplished, (e.g. how order is introduced to move the system towards a goal). The JCS implicitly recognizes that smaller systems can be aggregated into higher order systems, which can then be aggregated into a yet higher order system. The simplest composition of a JCS involves two systems working together, such as two individuals or a single individual working with a tool. One of the key points is acknowledging the importance of both the aggregation and disaggregation of different systems. System boundaries are important to define a system. Such definitions need not be absolute, but they are markers of where to look for inputs and outputs.

To describe goal-oriented behaviors within these joint systems, Hollnagel and Woods describe a contextual control model (COCOM), which combines the concepts of Competence (individual expertise), Control (patterns of thinking), and Constructs (system constraints). The concept of Control describes the cognitive approach towards actions. Control can be described by four characteristic modes: Scrambled, Opportunistic, Tactical, and Strategic, which can describe the organization of documentation, communication, and processes. In other words, Control may characterize clinical interactions, and has been used to study EHR usage patterns [3]. It is proposed to use the four Control modes to characterize handover communication.

The implicit purpose of discharge summaries is for the discharging physician to convey understanding of the patient to the next care provider. Applying COCOM to evaluate discharge summaries, the Control mode may characterize the nature or effectiveness of communication. To efficiently increase situation awareness of the patient being discharged, communication should be organized to provide a strategic, or at least tactical perspective.

Initial work has been done to adapt the COCOM to evaluate the degree of strategy communicated in discharge summaries. It was developed through an iterative process based on feedback from Dr. Lenert and Dr. Weir. It was validated on a set of 11 discharge summaries with Dr. Weir and myself with a Cronbach's alpha of 0.74. The proposed COCOM for Transitions of Care matrix was presented as a poster at the annual American Medical Informatics Association conference in November 2013 and is shown in Table 4.1. While retaining the four levels of control or patterns of thinking described by Hollnagel and Woods, we cover the concepts A) the number of goals

addressed, B) the time horizon, C) the evaluation of outcomes, D) the reasoning behind actions, and E) the scope of the perspective. However, further work is needed to validate this model with a larger data set and with a greater number of raters.

The COCOM for Transitions of Care will be useful to evaluate the impact of the SBAR discharge summary template and to create more strategic discharge summaries. Because cognition cannot be directly measured, it is proposed to use handover conversations as a surrogate. A brief handover conversation with the creator or recipient of an SBAR discharge summary will be recorded, transcribed, and characterized using the COCOM for Transitions of Care. Moving beyond a checklist of required elements, the COCOM for Transitions of Care might also be used as a teaching tool to frame successful handover communication.

The initial gap analysis was intended to improve discharge summaries in a single institution with a single EHR. However, the resulting steps are beginning to outline methods and tools to improve transitions of care more broadly by focusing on handovers.

<div align="center">References</div>

[1] E. Hollnagel, *Joint cognitive systems: foundations of cognitive systems engineering*. Boca Raton, FL: Taylor & Francis, 2005.

[2] E. Hollnagel, "Cognition as control: a pragmatic approach to the modeling of joint cognitive systems," *IEEE Trans. Syst. Man Cybern. Syst. Humans – "Model-Based Cogn. Eng. Complex Syst.*, vol. Unpublished special edition. Invited contribution to a Special Issue of IEEE Transactions on Systems, Man, and Cybernetics A: Systems and Humans – "Model-Based Cognitive Engineering in Complex Systems". For reasons unknown, the Special Issue was never completed and published.

[3] C. Weir, F. A. Drews, M. K. Leecaster, R. J. Barrus, J. L. Hellewell, and J. R. Nebeker, "The Orderly and Effective Visit: Impact of the Electronic Health Record on Modes of Cognitive Control," in *AMIA Annual Symposium Proceedings*, 2012, vol. 2012, p. 979.

Table 4.1:  COCOM for Transitions of Care matrix

| CONTROL MODE | # OF GOALS ADDRESSED | TIME HORIZON | EVALUATION of OUTCOME (new) | SELECTION of ACTION | SCOPE of PERSPECTIVE |
|---|---|---|---|---|---|
| **Strategic**<br><br>Prioritized, Synthesized, Projection | Multiple goals/problems. Clear priorities **AND** relationships between them. | **Projection** and **prediction** into future.<br>Includes **Past, Present,** and **Future.**<br>If/then statements. | Follow-up items/issues with **Parameters AND Process.**<br>Include Contingencies. | **Reasoning of actions** or Explanation of Context. Patient centeredness and Individualization. | **Patient, Social (Family, Community), and Healthcare System.** |
| **Tactical**<br><br>Lacks Priority or Projection | Multiple goals/problems. **Lacks** priorities but **with** relationships. | **Past** and **Present** only.<br>Only historical view, no forward projection. | Follow-up items/issues but with **Parameters** only.<br>No Contingencies. | **Minimal reasoning** with sense of "script" based on guidelines/rules. | **Patient** and **Healthcare System** only. |
| **Opportunistic**<br><br>No synthesis. | Goals/problems **lack** <u>priorities</u> or relationships. | **Present** time only. | Items/issues for follow-up **without Parameters.** | **Medically reasonable** plans but no individualization. | **Healthcare System** only, **no patient** context. |
| **Scrambled**<br><br>No discussion | Lacking organization or discussion. | Multiple timeframes **without** causal links. | **Lacking specification** for follow-up items/issues. | **Plans have Conflicting goals** or actions. | **No Context.** |

**SBAR Discharge Summary v4.1 – a Handover at Discharge**

| Patient | Name | DOB | | MRN |
|---|---|---|---|---|
| InPt Providers | Name | Pager/Phone | | Service |
| OutPt Providers | Name | Phone | | Address/Clinic |

**S** | SITUATION: *This is a 30-second sign-out, a coherent story.*

- Pt's Present State and Cinical Trajectory
- Interim Care
- Failure Points / Risks for Readmission

*e.g. PICC to remain in until IV Abx completed...*
*e.g. No home-health or transportation is available.*

- Disposition
- **M** Pending Results
- Follow-up Labs
- Follow-up Appointments
- Discharge Medications
  1. Continued
  2. Changed
  3. New
  4. Discontinued

*e.g. name of facility*
*e.g. Send-outs, pending Cx*
*e.g. INR, sleep-study, etc.*
*Try to schedule within 7 days.*
*Be explicit about any changes – include duration or reason for changes as appropriate.*

**B** | BACKGROUND: *This is the context that facilitates continuity of care.*
*Include only the most PERTINENT items, e.g. completeness of workup.*

- Discharge Diagnoses
- Chronic Dx / Relevant Past Med Hx
- Relevant Hospital Course
- Major Procedures and Outcomes
- **M** Vitals, Pertinent Physical Exam
- RELEVANT data
  - **M** Labs and **M** Imaging
  - Echocardiogram
- Hospital Vaccinations
- Functional Status

*e.g. Reasons for hospitalization*
*e.g. comorbidities that affect Tx plan*

*e.g. physical finding to follow*

*e.g. the most useful trends*
*e.g. EF, key findings*
*e.g. pneumovax, influenza*
*e.g. relevant limitations*

**A** | ASSESSMENT:

- Condition
- Overall Readmission Risk

*A Joint Commission requirement*
*e.g. Low, average, or high*

**R** | RECOMMENDATIONS: *The medical decision making, esp. explanations for unusual instructions and personalized care. Help the outpatient doctors understand why they should follow your treatment plans.*

- Unresolved problems/uncertain diagnoses
- Reasoning for medication changes *(e.g. duration or anticipated changes)*
- Lessons learned for future care
- Patient Preferences, Priorities, or Goals: ( **M** advance directives)

Questions? Contact Farrant Sakaguchi, MD – Farrant.sakaguchi@hsc.utah.edu, 801-879-9461 (cell) or 801-410-0514 (for voicemails) or Les Lenert, MD – Leslie.Lenert@hsc.utah.edu, 801-581-7906 (office)

**Purpose:**
The SBAR Discharge Summary is intended to change the discharge summary from mere summarization into a handover communication. The SBAR Discharge Summary balances the big picture with the details necessary for efficient follow-up.

**Remember, you are "talking" to another doctor about caring for your shared patient. This should be your handover. Put yourself in the shoes of the receiving physician – what information do you value the most?**

**How to Use:**
In PowerChart, open the Inpatient M-page. The **M** icon reminds of information for the discharge summary that is summarized in the M-page.

The **Header** identifies the patient and "clinical stake holders." Their contact information facilitates delivery of the discharge summary and efforts to communicate with one another. At University Hospital, the Date of Admission and Discharge are automatically inserted in the dictation.

The **Situation** is the *30-second sign-out* that is the essential story of the discharge summary. It describes the patient's present state, clinical trajectory, and follow-up needs. The 1st paragraph is a coherent narrative that emphasizes a safe patient handover and avoiding failures and readmissions. The 2nd paragraph contains the "objective" details to ensure appropriate follow-up. These details are necessary for an effective handover of responsibility.

The **Background** provides context for follow-up. Since the discharging equivalent of the Chief Complaint and HPI are in the Situation, they do not need to be mentioned here (or at least minimized). Rather this section should provide *further* context and details to ensure continuity of care, i.e. a reference or a baseline.

The **Assessment** is the patient's discharge condition and a global assessment of the risk for readmission.

The **Recommendations** *emphasizes the medical decision making* that is the basis for your treatment moving forward. This is where you justify any unusual instructions so that the outpatient doctors understand why they should follow your treatment plan. Identify unresolved problems, uncertain diagnoses, reasoning for medication changes, lessons learned for future care, patient preferences, priorities and/or goals.

**For Dictation:**
To dictate using this guide, please select the discharge summary option, then say, **"Please use SBAR Discharge Summary Template."** Please name the following sections: **"Header," "Situation," "Background," "Assessment,"** and **"Recommendations"** so that your dictation will be formatted correctly.

Figure 4.1: SBAR-Discharge Summary template