Quality Improvement

# Quality of ICU Discharge Summaries Produced by Pediatric Residents: The Memorial Health University Medical Center Experience

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## Abstract

### Background
Discharging intensive care unit (ICU) patients directly home is becoming more common. High-quality ICU discharge summaries are crucial in the transition of patient care. Currently, at Memorial Health University Medical Center (MHUMC), there exists no standardized ICU discharge summary template or consistency when discharge documentation is completed. Investigators evaluated the timeliness and completeness of ICU discharge summaries at MHUMC produced by pediatric residents.

### Methods
A single-center retrospective chart review of pediatric patients discharged directly from a 10-bed Pediatric ICU to home was conducted. Charts were evaluated pre- and post-intervention. The intervention included the implementation of a standardized ICU discharge template, formal resident training in writing discharge summaries, and a new policy mandating documentation completion within 48 hours of patient discharge. Timeliness was based on documentation completion within 48 hours. Completeness was evaluated on the presence of the Joint Commission on Accreditation of Healthcare Organizations' (JCAHO) recommendations of specific components that should be included in all discharge summaries. Results were reported as proportions, with differences calculated using Fisher's exact and chi-square tests. Patient descriptive characteristics were recorded.

### Results
Thirty-nine total patients, 13 pre-intervention and 26 post-intervention were included in the study. In the pre-intervention group, 38.5% (5/13) had discharge summaries completed in less than 48 hours from patient discharge compared to 88.5% (23/26) in the post-intervention group ($P$=.002). Post-intervention discharge documentation was more likely than pre-intervention to contain the discharge diagnosis (100% vs. 69.2%, $P$=.009) and to provide follow-up care instructions for the outpatient physician (100% vs. 75%, $P$=.031).

### Conclusion
Standardizing discharge summary templates and encouraging stricter institutional policies regarding the timely completion of discharge summaries can improve the ICU discharge process. Formal resident training in medical documentation is important and should be incorporated into graduate medical education curricula.

### Keywords
patient discharge; discharge planning; discharge summary; patient discharge summaries; pediatrics; pediatric intensive care units; pediatric ICU; critical care; quality improvement

## Background

Discharge summaries serve as a fundamental means of communication between the inpatient and outpatient settings. It is documentation that is crucial in the transition of patient care following hospital discharge. Providing good communication between inpatient and outpatient providers through a discharge summary, upholds patient safety and ensures continuity of care.[1,2] Given the current era of overextended resources and emphasis on cost savings, healthcare organizations strive to reduce the length of stay in the intensive care unit (ICU). The practice of direct-to-home discharge of ICU patients is thus becoming more common.[3] Nationally, as well as at Memorial Health University Medical Center (MHUMC), there has been a growing trend of home discharge directly from the pediatric intensive care unit (PICU). PICU patients can potentially have complex and prolonged hospital courses leading to a need for close follow-up and discharge documentation available for reference. The ability to produce a high-quality, timely discharge summary can, therefore, be challenging.

At MHUMC, the production of high-quality PICU discharge summaries is challenged by many factors. Discharge documentation is often completed by junior pediatric residents, who generally have limited background or formal training in writing discharge summaries. Medical staff have a deadline of fewer than 30 days to complete discharge summaries, but this policy does not strictly apply to resident physicians and is too long to provide a meaningful, timely handoff. Wide variability exists when the discharge summaries are completed, ranging from days to months after patient discharge. Additionally, at MHUMC, there is not even a standardized electronic discharge summary template used for inpatient pediatric discharges, resulting in inconsistent reporting of crucial patient information. Current literature describes other institutions experiencing similar challenges. Legault et al. studied the quality of discharge summaries prepared by first-year internal medicine residents.[4] They found that at teaching hospitals, residents were largely responsible for completing discharge summaries and that most medical school and residency program curricula contained little formal teaching about writing discharge summaries. Furthermore, investigators discovered that many residency programs do not evaluate the quality of residents' discharge summaries and identified areas for improvement in medication reconciliation and communication of follow-up plans.[4] Al-Damluji et al. studied the quality of discharge summaries of admitted heart failure adult patients and found that discharge summaries did not always include content important for care transitions, including pending studies, clinical conditions at discharge, or recommended follow-up.[5] They discovered a need for formal training in discharge summary creation.

Direct-to-home ICU discharges can make patients vulnerable due to the transfer of care from inpatient to outpatient providers. There is extensive evidence in the recent literature demonstrating the importance of high-quality discharge summaries and handoffs in delivering safe care.[6,7] Suboptimal information transfer can negatively affect patients' well-being and may lead to serious adverse events and readmissions. Indeed, current literature describes that transitions of care, especially ICU discharges, represent susceptible moments in the healthcare delivery system that are rife with potential for medical errors, adverse events, increased healthcare costs, patient dissatisfaction, and increased mortality.[8,9] Generating high-quality ICU discharge summaries provides a simple method to ensure effective communication and safe care transition between the inpatient and outpatient settings. A complete and timely discharge summary can communicate important information to outpatient providers, prevent adverse events, and reduce readmissions to the hospital.

The current literature has a paucity of data regarding the quality of ICU discharge summaries prepared by pediatric residents.

This study seeks to understand the current discharge process at a single-center PICU, develop methods of improvement for discharge summary content and completion, and conduct post-intervention analysis. Study investigators hope their experience can support a growing framework for optimizing the ICU discharge process.

## Materials and Methods

### Study Design

We conducted a retrospective chart review of ICU discharge summaries produced by pediatric residents of patients discharged from a single center, 10-bed PICU to home. Patients' electronic charts were reviewed during a pre-intervention phase (November 15, 2019-February 15, 2020) and a post-intervention phase (July 15, 2020-October 15, 2020). This facility's Institutional Review Board reviewed and exempted this quality improvement project.

The intervention developed by investigators included educational and policy changes. Researchers created and implemented a standardized discharge template to be utilized by residents when discharging patients from the PICU. Investigators conducted orientation sessions with the pediatric residents in early July 2020, where they reviewed how to write a discharge summary and introduced the new standardized electronic template. From a policy standpoint, investigators met with faculty leadership and administration to develop and enforce stricter rules regarding the timeliness of discharge summary completion. A consensus was reached to institute a new policy goal effective July 2020 that required discharge documentation to be completed within 48 hours of patient discharge.

### Patient Population

The inclusion criteria were comprised of discharge summaries written by pediatric residents of PICU patients who were discharged directly home from the ICU during the pre-and post-intervention period. Patients were excluded from the study if they were transferred to another hospital, discharged to death, if the discharge summary was completed by a resident physician from another subspecialty other than pediatrics, or if the patient's day of discharge note was a progress note instead of a discharge summary.

The quality of the PICU discharge summaries in the pre-and post-intervention groups was assessed by two primary outcomes: timeliness and completeness. Timeliness referred to the time elapsed from patient discharge to discharge summary completion. The absolute time between discharge documentation completion and patient discharge was recorded in days defined as 24-hour intervals and was ultimately reported as a binary outcome of less or greater than 48 hours from patient discharge. The completeness of the discharge summaries was evaluated by the presence or absence of specific components recommended by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) that should be in all discharge summaries, including discharge diagnosis, discharge medication list, changes to medications, a clinical course in the hospital, results of relevant investigations (eg, labs and/or imaging), and instructions for the outpatient physician regarding follow-up care. Patient demographics were also collected, including age, sex, race, and health insurance type (Medicaid vs. non-Medicaid).

Investigators hypothesized that the educational and policy interventions would improve the timeliness and completeness of the PICU discharge summaries.

### Statistical Analysis

Descriptive statistics were used to investigate differences between the pre-and post-intervention groups regarding sex, age, race, and medical insurance coverage. Categorical variables were summarized as frequencies and proportions. Continuous variables were reported as means with standard deviations (SD). Differences were calculated using Fisher's exact and chi-square tests for categorical data, and the Mann-Whitney U test for continuous data as appropriate. The presence of each of the components of the discharge summary was reported as proportions and percentages. For some of the ICU hospitalizations, certain items of the discharge summary were not applicable (eg, a discharge medication list if the patient was discharged home on no medications) and, in such circumstances, were excluded from the denominator (ie, not counted as not present). In 2 instances of missing data (a patient's race and another's medical insurance), these were removed from a subsequent analysis involving race and medical insurance. All analyses were conducted with SPSS 24.0 statistical software (IBM, Armonk, NY). In all statistical analyses, 2-tailed tests were performed, and *P*-values equal to or less than .05 were considered statistically significant.

## Results

Thirty-nine total patients were included in the study, 13 in the pre-intervention and 26 in the post-intervention group. There was no significant difference between the pre-and post-intervention groups regarding sex, age, health insurance, or race (**Table 1**). The mean age was 4.1 years (SD±4.6) in the pre-intervention group and 3.5 years (SD±4.1) in the post-intervention group. Female patients comprised 46.1% of the pre-intervention group versus 23.1% in the post-intervention group. Medicaid patients comprised 46.2% of the pre-intervention group versus 65.4% of the post-intervention group. In the pre-intervention group, 30.8% of the patients were Caucasian, 53.8% African American, 7.7% Hispanic, and 7.7% unknown. In the post-intervention group, 50.0% were Caucasian, 34.6% African American, and 15.4% Hispanic.

In the pre-intervention group, 38.5% (5/13) had discharge summaries completed in less than 48 hours from patient discharge compared to 88.5% (23/26) in the post-intervention group (*P*=.002; **Figure 1**). The mean days to completion was 15.1 (SD±25.7) in the pre-intervention group and 0.5 (SD±1.2) in the post-intervention group (*P*=.064). In the pre-intervention group, median days from patient discharge to discharge summary completion was 2 (interquartile range [IQR] 0-17.5) and 0 (IQR 0-0.25) for the post-intervention group (*P*=.001).

A summary of the presence of JCAHO components in the pre-and post-intervention groups is shown in **Table 2**. Post-intervention group discharge documentation was more likely than the pre-intervention group to contain the discharge diagnosis (100% vs. 69.2%, *P*=.009) and to provide instructions for the outpatient physician in follow-up care (100% vs. 75%, *P*=.031). The discharge medication list and the hospital clinical course were present in 100% of the discharge summaries pre-and post-intervention (13/13 and 22/22 respectively). Medication changes were reported in 50% (1/2) of the pre-intervention cases and 100% (7/7) of the post-intervention cases (*P*=.22). Results of relevant investigations were reported in 83.3% (10/12) of the pre-intervention group versus 100% (24/24) in the post-intervention group (*P*=.15).

**Table 1.** Demographics and Characteristics of ICU Patients Discharged Directly to Home (Pre-and Post-Intervention)

| Characteristics | Total n=39 | Pre-Intervention n=13 | Post-Intervention n=26 | *P*-value |
|---|---|---|---|---|
| Days between DC completion | | | | |
| Mean (±SD) | | 15.1 (25.7) | 0.5 (1.2) | .064 |
| Median (IQR) | | 2 (0-17.5) | 0 (0-.25) | **.001** |
| DC summary completed in < 48 hours, n (%) | 28 (71.8) | 5 (38.5) | 23 (88.5) | **.002** |
| Age (yr)*, mean (±SD) | 3.7 (4.2) | 4.1 (4.6) | 3.5 (4.1) | .683 |
| Sex, female, n (%) | 12 (30.8) | 6 (46.2) | 6 (23.1) | .163 |
| Race, n (%) | | | | .271 |
| Caucasian | 17 (43.6) | 4 (33.3) | 13 (50) | |
| African American | 16 (41) | 7 (58.3) | 9 (34.6) | |
| Hispanic | 5 (12.8) | 1 (8.3) | 4 (15.4) | |
| Unknown | 1 (2.6) | 1 (7.7) | 0 | |
| Insurance, n (%) | | | | .481 |
| Medicaid | 23 (59) | 6 (46.2) | 17 (65.4) | |
| Other | 15 (38.5) | 6 (46.2) | 9 (34.6) | |
| Missing | 1 (2.6) | 1 (7.7) | 0 | |

DC=discharge, SD=standard deviation, IQR=interquartile range, n=number of patients, yr=year

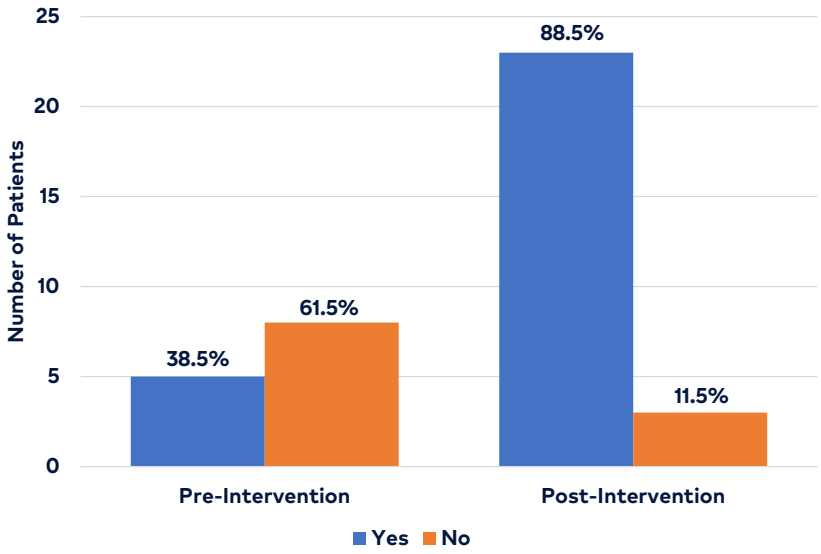


**Figure 1.** Percentage of discharge summaries completed in less than 48 hours pre- and post-intervention.

# Discussion

## Timeliness

The findings demonstrated a statistically significant increase in the percentage of discharge summaries being completed in less than 48 hours from hospital discharge post-intervention. Investigators surmised the standardized template facilitated the ease of documentation and enhanced efficiency. Moreover, the resident orientation sessions on writing a discharge summary and underscoring the importance of timely documentation may have also contributed to the results. The time goal of fewer than 48 hours between patient discharge to discharge summary completion was arbitrary. Variable opinions existed among faculty and hospital administration regarding when discharge summaries should be completed. Ultimately, a consensus was reached that the completion of the discharge summary within 48 hours from patient discharge was a reasonable initial goal. The time goal of fewer than 48 hours is consistent with other institutions' practices. O'Leary et al. sought to evaluate the effect of a newly created electronic discharge summary for adult patients discharged home from the hospitalist service at a single academic medical center.[10] The investigators sought a goal of 3 days from patient discharge to electronic discharge summary completion. In another study evaluating the timeliness of discharge summaries for adult patients admitted with heart failure exacerbations, researchers

**Table 2.** Frequency of JCAHO Components Present in Discharge Summaries

| JCAHO component | Pre-Intervention frequency n/N*(%) | Post-Intervention frequency n/N*(%) | *P*-value |
|---|---|---|---|
| Discharge diagnosis | 9/13 (69) | 26/26 (100) | **.009** |
| Discharge medication list | 10/10 (100) | 22/22 (100) | n/a |
| Medication change(s) | 1/2 (50) | 7/7 (100) | .22 |
| Clinical course in the hospital | 13/13 (100) | 26/26 (100) | n/a |
| Result of relevant investigations | 10/12 (83) | 24/24 (100) | .15 |
| Follow-up instructions for outpatient physicians | 9/12 (75) | 24/24 (100) | **.031** |

*n=cases present; N=total applicable patients. Some discharge summaries in the study were excluded in the denominator if the given variable was not applicable to the patient's ICU course (eg, "Result of Relevant Investigations" would be irrelevant for a patient who did not undergo further lab work, procedures, or imaging).

found that 67.2% of the discharge summaries were completed on the day of discharge, 11% were finished within 3 days of discharge, and 7.3% were completed within 30 days after patient discharge.[5]

Both the mean and median days elapsed from patient discharge to discharge summary completion were reported to address a potentially skewed distribution. The *P*-value of the mean days between the pre-and the post-intervention groups was not significant (*P*=.064) but significant when evaluating the median days (*P*=.001). The pre-intervention group had two extreme cases (ie, 50 and 87 days elapsed from patient discharge to discharge summary completion) that may have led to unequal variances, resulting in the difference of *P*-value significance between the mean and median. Nevertheless, the study's main outcome, comparing discharge summary completion in less than 48 hours from patient discharge between the pre- and post-intervention groups, demonstrated statistical significance.

### Completeness

The results also demonstrated an improvement in the completeness of the residents' PICU discharge summaries. A statistically significant increase was seen among the post-intervention group regarding the presence of discharge diagnosis and follow-up instructions to outpatient physicians. With a standardized template adopted, all of the required JCAHO components either auto-populated or manifested as a hard stop for the writer to complete. Thus, it was highly likely that the post-intervention group would see all the applicable JCAHO documentation component variables. Prior to this study, residents used various custom-made discharge summary templates that inconsistently contained JCAHO's recommended components of a discharge summary. Our experience underscored the benefit of adopting standardized electronic templates to guarantee consistent documentation of essential clinical information. Patient characteristics comments: There were no statistically significant differences noted in the pre-and post-intervention groups regarding sex, age, race, or type of medical insurance. There were significantly more patients in the post-intervention group than in the pre-intervention group, 26 versus 13. The authors believe that this difference in numbers was specious and not necessarily reflective of more patients being discharged from the PICU post-intervention.

Existing hospital policy and culture resulted in many excluded patients, especially in the pre-intervention group. Hospital policy currently states that patients (including those admitted to the ICU) who are admitted for less than 48 hours do not require a discharge summary. Consequently, in the pre-intervention group, 10 PICU patients were discharged home from the ICU but were excluded from the study because there was no discharge summary on record; the final documentation was a day-of-discharge progress note. Similarly, the post-intervention group had 2 patients discharged home from the PICU that were excluded because a daily progress note was the final documentation. Investigators did not evaluate the day of discharge progress note as a discharge summary given these are inherently different forms of documentation with different requisite components.

Future phases of this study may include utilizing the electronic medical record for mandatory routing of discharge summary copies to outpatient providers and advocating for the maintenance of more frequent updated hospital courses before patient discharge to aid in the timeliness of discharge summary completion.

### How Does This Project Add to the Existing Literature?

Our institution's challenges with timely and complete discharge documentation reflect a pervasive trend. Sorita et al. assessed physicians' perspectives about discharge summaries and found that they do not reach outpatient physicians in a timely manner, and when available, frequently lacked important information such as diagnostic test results and discharge medications.[11] In another study, Bench et al. described the barriers associated with ICU to primary care information transfers and discovered that hospital discharge summaries contain insufficient information and are often delayed, which is consistent with our institution's experience.[12] This study's findings also underscore the critical role discharge summaries have in upholding patient safety by ensuring the timely transfer of relevant information

among providers. Li et al. found that up to 18% of adverse events experienced by ICU patients were attributed to the discharge process and that medication errors were common during ICU discharge.[13]

Additionally, the results of this study uphold previous studies' findings that found the use of a standardized discharge summary template improves the patient's discharge process. Among adult hospitalists and family medicine physicians, there was a general consensus that discharge summaries should have a standardized format.[11] In a systematic literature review reporting ICU discharges, Stelfox et al. found that the availability of accurate and complete discharge information at the time of discharge and standardization of the discharge process can improve the quality of discharge.[8] Prior studies also suggest that using standardized discharge templates improves post-hospitalization, follow-up appointment adherence, and completion of the recommended outpatient evaluation.[10,14] Variability and inconsistency within discharge summaries can compromise patient care, safety, and follow-up. Regular optimization of electronic templates along with user training and education can enhance effectiveness and reliability.[15]

Furthermore, this study supports previous studies' assertions of the need to incorporate formal medical documentation training in graduate medical education (GME) curricula. The lack of a standardized resident curriculum regarding discharge summary preparation has been identified. A comprehensive discharge summary curriculum can feasibly be implemented within the context of a residency program by using individual and team-based feedback as well as, periodic auditing to extend program reach.[16,17] Indeed, our experience demonstrates that through educational initiatives and formal training, residents can achieve timely and more thorough discharge documentation. This study's investigators strongly advocate for formal training in discharge documentation for resident trainees.

### Limitations

This study had several limitations. This study took place at a single center. The results of this study could be unique to our institution. Additionally, the patients in the pre-and post-intervention groups consisted of different individuals. Demographics were collected to compare the groups in terms of sex, age, race, and type of insurance to ensure no significant confounders existed.

Potential enrollment bias may have been present. There was a significant increase in the number of home ICU discharges during the post-intervention versus the pre-intervention group (26 versus 13 patients). It is unclear if this increase in patients being discharged from the PICU post-intervention was an outcome of the improved ease of discharge with a standard template and the implementation of set expectations of documentation completion, the result of attending bias, seasonal variations in patient volume, or a combination of these factors.

Furthermore, the assessment of the completeness of the residents' discharge summaries was limited. Completeness was defined by the presence of the essential domains in the discharge summary outlined by JACHO. The accuracy and thoroughness of these items were not assessed. For example, if the discharge summary contained a clinical course, its mere presence was sufficient. No further evaluation was conducted on whether the information was correct or contained relevant clinical information for the follow-up physician. Study investigators felt that determining accurate and clinically relevant information within discharge summaries would be challenging and prone to variation preferences among outpatient providers.

## Conclusion

Efforts to improve the discharge process for ICU patients may aim toward standardizing discharge summary templates and encouraging stricter institutional policies regarding the time frame for completion. Standardized templates can ensure that certain key elements of the discharge summary are present. This study also highlights an essential area of resident physician educational development. Formal medical documentation training is necessary and should be universally incorporated into GME curricula. Attending physicians' enforcement of the new policies and expectations will be an important aspect of the long-term impact of this study. Future study directions may include analyzing

what type of patients are being discharged home from the ICU and how discharge summaries are transmitted to outpatient providers.

### Conflicts of Interest

The authors declare that they have no conflicts of interest.

Drs. Lee, Lytle, Shearman, and Stack are employees of Memorial Health University Medical Center, a hospital affiliated with the journal's publisher.

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

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