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Profiling Pediatric Potentially Avoidable Transfers using Procedure and Diagnosis Codes

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Abstract

OBJECTIVES: While hospital-hospital transfers of pediatric patients are often necessary, some pediatric transfers are potentially avoidable. Pediatric potentially avoidable transfers (PAT) represent a process with high costs and safety risks but few, if any, benefits. To better understand this issue, we described pediatric inter-facility transfers with early discharges.

METHODS: We conducted a descriptive study using electronic medical record data at a single-center over a 12-month period to examine characteristics of pediatric patients with a transfer admission source and early discharge. Among patients with early discharges, we performed descriptive statistics for PAT defined as patient transfers with a discharge home within 24 hours without receiving any specialized procedures or diagnoses.

RESULTS: Of the 2,415 pediatric transfers 31.4% were discharged home within 24 hours. Among transferred patients with early discharges, 356 patients (14.7% of total patient transfers) received no specialized procedures or diagnoses. Direct admissions were categorized as PAT 1.9-fold more frequently than transfers arriving to the emergency department. Among transferred direct admissions, PAT proportions to the neonatal intensive care unit (ICU), pediatric ICU, and non-ICU were 5.1%, 17.3%, and 27.3%, respectively. Respiratory infections, asthma, and ill-defined conditions (e.g., fever, nausea with vomiting) were the most common PAT diagnoses.

CONCLUSIONS: Early discharges and PAT are relatively common among transferred pediatric patients. Further studies are needed to identify the etiologies and clinical impacts of PAT, with a focus on direct admissions given the high frequency of PAT among direct admissions to both the pediatric ICU and non-ICU.

Keywords

Child; Patient Transfer; Health Care Transitions; Hospitalization

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INTRODUCTION

Although many hospitals have insufficient resources to provide definitive care to pediatric patients,¹⁻³ approximately 1/3 of pediatric transfers are potentially avoidable.⁴⁻⁷ Among pediatric patients, up to 39% of transferred patients are discharged from the receiving hospital's emergency department (ED) or hospitalized for less than 24 hours without receiving an intervention,^{4,6,7} suggesting that many transfers are unnecessary. Based on the Nationwide Emergency Department Sample, 410,698 children were transferred in 2012. Thus, upward of ~160,000 annual pediatric transfers are estimated to be potentially avoidable.

Pediatric potentially avoidable transfers (PAT) are 2–3 times more costly than non-transfers⁴ and impose direct (e.g., transport accidents) and indirect (e.g., psychological distress, unwarranted testing) risk to patients. Transport crashes result in about 40 fatalities per year,^{8,9} with additional serious injuries from the 4,500 annual non-fatal ambulance crashes.¹⁰ Reducing PAT would conserve resources, reduce safety risks, minimize hardships to families, and decrease physician burdens.^{4,11} Since pediatric PAT represent a process with high costs and safety risks but few or no benefits,⁴ PAT are an important issue to address. In order to reduce PAT, we must first understand the problem. A more comprehensive understanding of PAT characteristics is required to identify and test targeted interventions to improve the inter-facility transfer process.

The purpose of this study was to examine characteristics of inter-facility transfers of pediatric patients who are discharged home within 24 hours. Prior studies have described pediatric transfers to emergency departments with early discharges;⁴⁻⁷ however, this present study is unique in that it includes both transfers that arrive to the emergency department and that are directly admitted to an inpatient unit. Including transfers that are directly admitted is important, since direct admissions account for 25% of pediatric unscheduled hospitalizations.¹² Prior studies also described transfers with early discharges and specialized procedures, but these prior publications did not include specialized diagnoses as a factor in their studies.⁴⁻⁷ Pediatric patients might have a specialized diagnosis that necessitates a transfer without requiring a specialized procedure to be performed. Without accounting for specialized diagnoses, these previously published PAT rates are possibly overestimated.

We were interested in characterizing the patient characteristics, utilization, pre-transfer hospital characteristics, and principal diagnoses of PAT. We defined PAT as a patient transfer with a discharge home within 24 hours without receiving any specialized procedure or diagnosis. We were specifically interested in comparing PAT proportions among transfers arriving to the post-transfer hospital's emergency department versus directly admitted to an inpatient unit. We hypothesized that direct admissions would have lower proportions of PAT in comparison to transfers to the emergency department. Rationale being that transferred patients whose necessity of transfer is questionable and who might not require hospitalization should be triaged in the emergency department to avoid unnecessary utilization of an inpatient bed.

MATERIALS AND METHODS

Study Design and Data Source:

We conducted a cross-sectional analysis of pediatric hospitalizations using electronic medical record data from a 129-bed urban university non-freestanding children's hospital in Northern California. The electronic medical record data contained inpatient and emergency department records on all discharged patients. We included patient data from October 2015 through 2016.

Study Population:

Pediatric patients aged 0 to 17 years were eligible. The population of interest was patients with a transfer admission source from an acute care facility. The pre-transfer location included referring hospitals' emergency departments or inpatient units. The patient could arrive to the post-transfer hospital's emergency department or be directly admitted to an inpatient unit. An early discharge was defined as a discharge home alive within 24 hours from either the post-transfer hospital's emergency department or inpatient unit. A PAT was defined as an early discharge that received no specialized procedures or diagnoses at the post-transfer hospital. In the conceptual framework of this study, having a specialized procedure or diagnosis implied the transfer was necessary and therefore not potentially avoidable. The inclusion of early discharges in the PAT definition was informed by prior publications.⁴⁻⁶ Although it is possible that a PAT might not be discharged within 24 hours, such events are extremely rare based on our clinical experience.

Variables:

Specialized procedures were captured using the International Classification of Diseases, 10th Revision, Procedure Coding System (ICD-10-PCS) and Epic procedure order codes. Epic order codes were queried, because these codes capture the most comprehensive list of procedures, including procedures that might not be represented in billing data. Specialized diagnoses were captured using The International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes. We identified the transferred patients with early discharges and examined their ICD-10-PCS, Epic procedure order, and ICD-10-CM codes. A Pediatric Hospitalist and a professional coding analyst categorized each ICD-10-PCS and Epic procedure order code as specialized, maybe specialized, or not specialized by applying definitions and lists from prior publications.⁴⁻⁷ ICD-10-CM diagnosis codes that would justify a transfer to be necessary, but that would not likely occur with specialized procedure codes, were also identified and categorized as specialized. The rationale being that some specialized diagnoses that necessitate a patient transfer are often managed by observation, rather than procedures, at facilities with higher levels of care and/or subspecialists.

These categorizations were modified after incorporating independent feedback from a second Pediatric Hospitalist, a Pediatric Emergency Medicine Physician, a Pediatric Critical Care Physician, and an Orthopedic Physician. The feedback included highlighting specific codes that should potentially be re-categorized and writing comments explaining why the code should be re-categorized. The modification process was performed by the primary Pediatric Hospitalist and professional coding analyst through an iterative

process that involved reviewing the feedback, discussing the categorizations, modifying the categorizations, and seeking more feedback. The modification process was complete once the physicians providing independent feedback recommended no further changes.

Appendix I provides the finalized list of specialized procedures received among the patients with a transfer admission source and an early discharge. Similarly, Appendix II provides the finalized list of specialized diagnoses among the patients with a transfer admission source and an early discharge.

The variables examined in this study are variables previously found to be associated with emergency department use, hospitalizations, and inter-facility transfers.^{13–18} Patient demographic characteristics included age,¹⁹ gender, and insurance status. Utilization variables included pre-transfer location (ED versus inpatient unit), mode of transport, post-transfer arrival type (ED versus direct admission), and post-transfer hospital location (ED, non-ICU, NICU, or PICU). Pre-transfer hospital characteristics included bed size and children's hospital (freestanding children's versus non-freestanding children's). We identified principal diagnoses using ICD-10-CM codes categorized into Clinical Classifications Software diagnostic groupings.²⁰

Analysis:

We performed descriptive statistics for each variable of interest, comparing PAT versus non-PAT. For each categorical variable, we performed a univariate logistic regression analysis to generate a p-value based on a likelihood ratio test for variation among levels. For each level, we calculated the proportion of PAT as a ratio of the number of patient transfers categorized as PAT (numerator) to the number of all patient transfers (denominator). Among the transferred patients categorized as PAT, we identified the most common ICD-10-CM Clinical Classifications Software diagnostic groupings and the top three most common diagnoses within those diagnostic groupings. Using a scatterplot, we presented the proportion of transfers that were PAT among the total number of transfers versus the total number of transfers for each hospital. Data were analyzed using STATA 13.²¹ This study was approved as exempt by the University of California Davis IRB.

RESULTS

There were 2,415 pediatric inter-facility transfers to this urban teaching hospital over the 12-month period. Transfers arrived from 79 distinct referring hospitals. Among those with a transfer admission source, 1,015 (42.0%) arrived to the emergency department and 1,382 (57.2%) were directly admitted to an inpatient unit. Among the patient transfers that were directly admitted, the number of patients directly admitted to the NICU, PICU, and non-ICU locations were 275 (19.9%), 602 (43.6%), and 505 (36.5%), respectively. Of the 2,415 total patient transfers, 759 (31.4%) were subsequently discharged home within 24 hours. Within the group of transferred patients with early discharges, 356 patients (14.7% of total patient transfers) received no specialized procedure or diagnosis (Figure 1).

Profile of Transferred Patients:

Table 1 profiles the patient- and hospital-level characteristics of transferred patients, presenting by PAT and non-PAT. The age group comprising the most number of transfers was 0–1 years (n=881, 36.5% of transfers), while the age group comprising the most number of PAT was 2–5 years (n=119, 33.4% of PAT). The age group with the highest proportion of their transfers categorized as PAT was among those age 2–5 years (22.2%). In contrast, those age 12–17 years only had 10.2% of their transfers as PAT.

Patients transferred from emergency departments were categorized as PAT 3.4-fold more frequently than patients transferred from inpatient units. Regarding post-transfer arrival type, direct admissions were categorized as PAT 1.9-fold more frequently than transfers arriving to the emergency department. Among transferred pediatric patients with direct admissions, PAT proportions to the NICU, PICU, and non-ICU were 5.1%, 17.3%, and 27.3%, respectively.

Among the hospitalizations for transferred patients with early discharges who did not receive any specialized procedures or diagnoses, the most common discharge diagnostic groupings are presented in Table 2. Table 2 shows that the respiratory infections (e.g. croup, bronchiolitis, upper respiratory infections, pneumonia), asthma, and ill-defined conditions (e.g., fever, nausea with vomiting) were the most common pediatric PAT diagnoses. Combined, respiratory infections and asthma comprised 34.6% of the PAT diagnoses.

The scatterplot of the proportion of transfers that were PAT and the total number of transfers for each hospital is presented in Figure 2. This scatterplot shows that transfer volume did not correlate well with proportion of PAT. Some hospitals with very few transfers had extreme representations of PAT (e.g., 0% or 100%) due to chance. Aside from the hospitals with total transfer volumes less than 75, the proportion of PAT generally ranged between 10–20%.

DISCUSSION

This study identified that 31% of pediatric inter-facility transfers were discharged within 24 hours. Additionally, 15% of pediatric inter-facility transfers were potentially avoidable, being discharged within 24 hours without receiving any specialized procedure or diagnosis. This study was unique in that it categorized PAT using not only specialized procedures, but also using specialized diagnoses as well. Another unique aspect of this study was that it profiled both transfers that arrived to the emergency department and also transfers that were directly admitted to an inpatient unit. This study highlighted the importance of including direct admissions in studies examining inter-facility transfers; direct admissions comprised more than half of the transfers in this study. Transfers that arrived to the post-transfer hospital as direct admissions were 1.9-fold more frequently PAT in comparison to transfers that arrived to the post-transfer hospital's emergency department, suggesting that triage decisions regarding the necessity of transfer for direct admissions has possible room for improvement.

Previous pediatric studies have described transfers with early discharges that received no specialized procedures. These studies reported frequencies ranging from 20% to 39%,^{4–7}

which are higher than our study's PAT frequency of 15%. One explanation for this difference is that our definition for PAT was more conservative. Mohr et al.⁴ derived their PAT definition from Li et al.⁵ and used separately billable procedures as the means to capture necessary transfers. Mohr et al. additionally supplemented the list with 105 additional procedure codes that the investigators felt could justify a transfer. Similarly, Gattu et al.⁶ and Peebles et al.⁷ used specialized procedures at the post-transfer hospital to categorize transfers. In our present study, however, we included specialized diagnoses in the PAT categorization. Some specialized diagnoses require transfer for observation or monitoring without requiring a specialized procedure. For example, a patient who presents with altered mental status from an ingestion likely requires a transfer to a higher level of care with specialists for monitoring, but this patient will not necessarily receive any specialized procedures. Without including specialized diagnoses in a PAT definition, the prevalence of PAT is at risk of falsely overrepresenting the problem. By including specialized diagnoses, our study categorized transfers as necessary that would have likely been categorized as potentially avoidable in prior studies.

As the body of literature on inter-facility transfers grows, it would be beneficial to have a consistent definition for PAT. Such consistency would permit comparison across studies. Importantly, a metric that captures PAT needs to be validated. Once validated, this PAT metric using electronic medical record data would provide a cost-effective, practical means to assess interventions and to compare performance across hospitals.

National data for all non-elective pediatric hospitalizations shows that 25% of pediatric hospitalizations are direct admissions.¹² Our study population only included transfers and included both emergency department discharges and hospitalizations. In our study, direct admissions represented 57% of the transfers. Our study's higher percentage of direct admissions might be explained by a unique practice at this single university hospital. However, our data likely indicates that inter-facility transfers, in comparison to non-transfers, are more commonly admitted directly to an inpatient unit. When referring hospitals transfer a patient, it is usually to access a pediatrician or pediatric specialist for definitive care.²² This definitive care is often presumed to require an inpatient admission, thus patients are directly admitted to the post-transfer hospital to expedite the process and avoid emergency department utilization.

Unfortunately, PAT in our study was more common among transferred patients arriving as direct admissions in comparison to transferred patients arriving to the emergency department. This data suggests that the triage and decision-making surrounding direct admissions for transferred patients has potential need for improvement. This concern is not unique to our study. Pediatric physicians from across the nation perceive there to be difficulties in determining admission appropriateness for direct admissions.²³ Possibly, more patients should arrive to the emergency department to be triaged in order to prevent unnecessary utilization of an inpatient bed. Further studies comparing outcomes of PAT direct admissions versus PAT emergency department arrivals are needed in order to identify optimal systems.

Among transfers arriving as direct admissions to the non-ICU, 27% of them are PAT. This relatively high proportion suggests we should target our efforts on improving non-ICU transfers. However, we also need to evaluate transfers to the PICU, since 17% of transfers directly admitted to the PICU are PAT. While this number is lower than for the non-critically ill pediatric patients, it is still relatively high. Again, this data is from a single-center post-transfer hospital, thus further studies should be performed to determine if these PAT patterns are occurring at other hospitals and in other regions.

The most common diagnoses among PAT were respiratory infections. This finding is not surprising, since respiratory infections are among the most commonly transferred diagnoses.¹⁸ Prior research has identified that pediatric hospital care has become more concentrated over the past decade, even for common conditions.²⁴ This trend of increasing reliance on referral centers for common conditions that were previously not referred is a potential explanation for the occurrence of PAT. In this setting, interventions to decrease PAT should focus on providing resources to the referring hospitals that permit them to definitively manage common conditions such as bronchiolitis and asthma. Telemedicine is one potentially useful intervention.

Telemedicine can reduce transfer rates by up to 50%.^{25–29} Telemedicine consultations for proposed inter-facility transfers provide a second opinion from a specialty physician and help to recognize patients who do not require an inter-facility transfer. In permitting virtual face-to-face communication and a means for specialty providers to remotely assess the patient, telemedicine has advantages over standard telephone communication and can result in care that is of higher quality, more family-centered, and more accessible.^{29–33} Telemedicine is also perceived by referring physicians to provide educational value and reduce their anxiety in managing acute pediatric problems.²⁶

This study has several limitations. Generalizability is limited due to the study including only one post-transfer hospital site. Hospital agreements, both formal and informal, likely influence transfer practices. Other post-transfer hospitals might have different relationships with their referring hospitals, thus their PAT data might be different. We did not have medical records from the pre-transfer hospital. Such information would provide valuable data that could be used to refine the PAT categorization. We are also unable to comment on the thought process of the treating physicians and thus the rationalization behind transferring the patient. The PAT definition used in this study has not been validated; however, we used an iterative process involving multiple physicians to develop and refine the definition. The definition was also based on prior publications and was further developed to be more comprehensive, specifically by incorporating specialized diagnoses.

In conclusion, pediatric PAT occurred in more than 1 in 7 inter-facility transfers. PAT proportions were higher among transfers arriving as direct admissions and among non-critically ill patients. Further investigations examining the outcomes of PAT are needed to improve inter-facility transfer practices.

Acknowledgments

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APPENDIX I:

Specialized procedures received among pediatric patients with a transfer admission source and an early discharge. Specialized procedures were identified from International Classification of Diseases, 10th Revision, Procedure Coding System (ICD-10-PCS) and Epic procedure order codes among the sample as part of the categorization of transfers as potentially avoidable. Presence of one or more specialized procedure categorized a transfer as not potentially avoidable.

ICD-10-PCS Procedure Code	ICD-10-PCS Procedure Name
009U3ZX	Drainage of Spinal Canal, Percutaneous Approach, Diagnostic
009U3ZZ	Drainage of Spinal Canal, Percutaneous Approach
00B20ZZ	Excision of Dura Mater, Open Approach
00U20JZ	Supplement Dura Mater with Synth Sub, Open Approach
01Q30ZZ	Repair Brachial Plexus, Open Approach
02583ZZ	Destruction of Conduction Mechanism, Percutaneous Approach
02HV33Z	Insertion of Infusion Dev into Sup Vena Cava, Perc Approach
02K83ZZ	Map Conduction Mechanism, Percutaneous Approach
03LB0ZZ	Occlusion of Right Radial Artery, Open Approach
03Q80ZZ	Repair Left Brachial Artery, Open Approach
03QC0ZZ	Repair Left Radial Artery, Open Approach
04L20ZZ	Occlusion of Gastric Artery, Open Approach
05BC0ZZ	Excision of Left Basilic Vein, Open Approach
05SC0ZZ	Reposition Left Basilic Vein, Open Approach
06H033Z	Insertion of Infusion Dev into Inf Vena Cava, Perc Approach
06L20ZZ	Occlusion of Gastric Vein, Open Approach
07BB4ZX	Excision of Mesenteric Lymphatic, Perc Endo Approach, Diagn
087X0DZ	Dilation of R Lacrml Duct with Intralum Dev, Open Approach
087Y7DZ	Dilation of L Lacrml Duct with Intralum Dev, Via Opening
08NQ0ZZ	Release Right Lower Eyelid, Open Approach
08Q1XZZ	Repair Left Eye, External Approach
08Q33ZZ	Repair Left Anterior Chamber, Percutaneous Approach
08QN0ZZ	Repair Right Upper Eyelid, Open Approach
08QNXZZ	Repair Right Upper Eyelid, External Approach
08QPXZZ	Repair Left Upper Eyelid, External Approach
08QQ0ZZ	Repair Right Lower Eyelid, Open Approach
08QQXZZ	Repair Right Lower Eyelid, External Approach

ICD-10-PCS Procedure Code	ICD-10-PCS Procedure Name
08QR0ZZ	Repair Left Lower Eyelid, Open Approach
08QRXZZ	Repair Left Lower Eyelid, External Approach
08QY0ZZ	Repair Left Lacrimal Duct, Open Approach
09BQ4ZX	Excision of Right Maxillary Sinus, Perc Endo Approach, Diagn
09BQ4ZZ	Excision of Right Maxillary Sinus, Perc Endo Approach
0BC38ZZ	Extirpation of Matter from Right Main Bronchus, Endo
0BC78ZZ	Extirpation of Matter from Left Main Bronchus, Endo
0BH18EZ	Insertion of Endotracheal Airway into Trachea, Endo
0BJ08ZZ	Inspection of Tracheobronchial Tree, Endo
0C5Q0ZZ	Destruction of Adenoids, Open Approach
0C7S8ZZ	Dilation of Larynx, Endo
0C950ZZ	Drainage of Upper Gingiva, Open Approach
0C9P0ZZ	Drainage of Tonsils, Open Approach
0CBP0ZZ	Excision of Tonsils, Open Approach
0CJS8ZZ	Inspection of Larynx, Endo
0CJY8ZZ	Inspection of Mouth and Throat, Endo
0CQ30ZZ	Repair Soft Palate, Open Approach
0D774ZZ	Dilation of Stomach, Pylorus, Perc Endo Approach
0D874ZZ	Division of Stomach, Pylorus, Perc Endo Approach
0D878ZZ	Division of Stomach, Pylorus, Endo
0D9W4ZZ	Drainage of Peritoneum, Percutaneous Endoscopic Approach
0DB58ZX	Excision of Esophagus, Endo, Diagn
0DB68ZX	Excision of Stomach, Endo, Diagn
0DB98ZX	Excision of Duodenum, Endo, Diagn
0DBH4ZX	Excision of Cecum, Percutaneous Endoscopic Approach, Diagn
0DC18ZZ	Extirpation of Matter from Upper Esophagus, Endo
0DC38ZZ	Extirpation of Matter from Lower Esophagus, Endo
0DC58ZZ	Extirpation of Matter from Esophagus, Endo
0DC68ZZ	Extirpation of Matter from Stomach, Endo
0DCK8ZZ	Extirpation of Matter from Ascending Colon, Endo
0DH63UZ	Insertion of Feeding Device into Stomach, Perc Approach
0DJ08ZZ	Inspection of Upper Intestinal Tract, Endo
0DSB7ZZ	Reposition Ileum, Via Natural or Artificial Opening
0DSL7ZZ	Reposition Transverse Colon, Via Opening
0DSPXZZ	Reposition Rectum, External Approach
0DTJ0ZZ	Resection of Appendix, Open Approach
0DTJ4ZZ	Resection of Appendix, Percutaneous Endoscopic Approach
0DTJ8ZZ	Resection of Appendix, Endo
0F798ZZ	Dilation of Common Bile Duct, Endo

ICD-10-PCS Procedure Code	ICD-10-PCS Procedure Name
0F998ZZ	Drainage of Common Bile Duct, Endo
0H89XZZ	Division of Perineum Skin, External Approach
0J9L3ZZ	Drainage of R Up Leg Subcu/Fascia, Perc Approach
0JBC0ZZ	Excision of Pelvic Subcu/Fascia, Open Approach
0JQ10ZZ	Repair Face Subcutaneous Tissue and Fascia, Open Approach
0JQG0ZZ	Repair R Low Arm Subcu/Fascia, Open Approach
0JQH0ZZ	Repair L Low Arm Subcu/Fascia, Open Approach
0JQJ3ZZ	Repair R Hand Subcu/Fascia, Perc Approach
0JWS0JZ	Revise Synth Sub in Head & Neck Subcu/Fascia, Open
0KQ10ZZ	Repair Facial Muscle, Open Approach
0KQ80ZZ	Repair Left Upper Arm Muscle, Open Approach
0LB40ZZ	Excision of Left Upper Arm Tendon, Open Approach
0LQ40ZZ	Repair Left Upper Arm Tendon, Open Approach
0MBN0ZZ	Excision of Right Knee Bursa and Ligament, Open Approach
0NHS04Z	Insertion of Int Fix into L Maxilla, Open Approach
0NHV04Z	Insertion of Int Fix into L Mandible, Open Approach
0NSM04Z	Reposition Right Zygomatic Bone with Int Fix, Open Approach
0NSP04Z	Reposition Right Orbit with Int Fix, Open Approach
0NST04Z	Reposition Right Mandible with Int Fix, Open Approach
0NSV04Z	Reposition Left Mandible with Int Fix, Open Approach
0PCH0ZZ	Extirpation of Matter from Right Radius, Open Approach
0PSC04Z	Reposition Right Humeral Head with Int Fix, Open Approach
0PSC34Z	Reposition Right Humeral Head with Int Fix, Perc Approach
0PSD04Z	Reposition Left Humeral Head with Int Fix, Open Approach
0PSD34Z	Reposition Left Humeral Head with Int Fix, Perc Approach
0PSD44Z	Reposition L Humeral Head with Int Fix, Perc Endo Approach
0PSF04Z	Reposition Right Humeral Shaft with Int Fix, Open Approach
0PSF34Z	Reposition Right Humeral Shaft with Int Fix, Perc Approach
0PSF35Z	Reposition Right Humeral Shaft with Ext Fix, Perc Approach
0PSF44Z	Reposition R Humeral Shaft with Int Fix, Perc Endo Approach
0PSG04Z	Reposition Left Humeral Shaft with Int Fix, Open Approach
0PSG06Z	Reposition L Humeral Shaft with Intramed Fix, Open Approach
0PSG34Z	Reposition Left Humeral Shaft with Int Fix, Perc Approach
0PSG35Z	Reposition Left Humeral Shaft with Ext Fix, Perc Approach
0PSH04Z	Reposition Right Radius with Int Fix, Open Approach
0PSH06Z	Reposition Right Radius with Intramed Fix, Open Approach
0PSH34Z	Reposition Right Radius with Int Fix, Perc Approach
0PSH36Z	Reposition Right Radius with Intramed Fix, Perc Approach
0PSJ04Z	Reposition Left Radius with Int Fix, Open Approach

ICD-10-PCS Procedure Code	ICD-10-PCS Procedure Name
0PSJ06Z	Reposition Left Radius with Intramed Fix, Open Approach
0PSJ34Z	Reposition Left Radius with Int Fix, Perc Approach
0PSJ3ZZ	Reposition Left Radius, Percutaneous Approach
0PSK04Z	Reposition Right Ulna with Int Fix, Open Approach
0PSK06Z	Reposition Right Ulna with Intramed Fix, Open Approach
0PSK36Z	Reposition Right Ulna with Intramed Fix, Perc Approach
0PSL06Z	Reposition Left Ulna with Intramed Fix, Open Approach
0QH634Z	Insertion of Int Fix into R Up Femur, Perc Approach
0QS734Z	Reposition Left Upper Femur with Int Fix, Perc Approach
0QS806Z	Reposition R Femur Shaft with Intramed Fix, Open Approach
0QS904Z	Reposition Left Femoral Shaft with Int Fix, Open Approach
0QS906Z	Reposition L Femur Shaft with Intramed Fix, Open Approach
0QS93ZZ	Reposition Left Femoral Shaft, Percutaneous Approach
0QSG34Z	Reposition Right Tibia with Int Fix, Perc Approach
0QSH04Z	Reposition Left Tibia with Int Fix, Open Approach
0RSL04Z	Reposition Right Elbow Joint with Int Fix, Open Approach
0RSM34Z	Reposition Left Elbow Joint with Int Fix, Perc Approach
0RSV0ZZ	Reposition Left Metacarpophalangeal Joint, Open Approach
0SSF04Z	Reposition Right Ankle Joint with Int Fix, Open Approach
0TJD8ZZ	Inspection of Urethra, Endo
0U9K7ZZ	Drainage of Hymen, Via Natural or Artificial Opening
0VJ80ZZ	Inspection of Scrotum and Tunica Vaginalis, Open Approach
0VQS0ZZ	Repair Penis, Open Approach
0VS90ZZ	Reposition Right Testis, Open Approach
0VSB0ZZ	Reposition Left Testis, Open Approach
0VSC0ZZ	Reposition Bilateral Testes, Open Approach
0VT90ZZ	Resection of Right Testis, Open Approach
0VTB0ZZ	Resection of Left Testis, Open Approach
0W3P7ZZ	Control Bleeding in Gastrointestinal Tract, Via Opening
0WJP4ZZ	Inspection of Gastrointestinal Tract, Perc Endo Approach
0WQ20ZZ	Repair Face, Open Approach
0WQF0ZZ	Repair Abdominal Wall, Open Approach
0WQF4ZZ	Repair Abdominal Wall, Percutaneous Endoscopic Approach
0WQNZZ	Repair Female Perineum, External Approach
0YJ64ZZ	Inspection of Left Inguinal Region, Perc Endo Approach
0YQ50ZZ	Repair Right Inguinal Region, Open Approach
0YQ54ZZ	Repair Right Inguinal Region, Perc Endo Approach
3E04305	Introduce Oth Antineoplastic in Central Vein, Perc
3E0R3TZ	Introduction of Destr Agent into Spinal Canal, Perc Approach

ICD-10-PCS Procedure Code	ICD-10-PCS Procedure Name
3E0S3GC	Introduce Oth Therap Subst in Epidural Space, Perc
3E1M39Z	Irrigation of Periton Cav using Dialysate, Perc Approach
4A00X4Z	Measure of Central Nervous Electr Activity, Extern Approach
4A133R1	Monitoring of Arterial Saturation, Peripheral, Perc Approach
5A09357	Assistance with Respiratory Ventilation, <24 Hrs, CPAP
5A0935Z	Assistance with Respiratory Ventilation, <24 Hrs
5A15223	Extracorporeal Membrane Oxygenation, Continuous
5A1935Z	Respiratory Ventilation, Less than 24 Consecutive Hours
5A1945Z	Respiratory Ventilation, 24–96 Consecutive Hours
6A4Z0ZZ	Hypothermia, Single
B030Y0Z	MRI of Brain using Oth Contrast, Unenh, Enhance
B030YZZ	Magnetic Resonance Imaging (MRI) of Brain using Oth Contrast
B030ZZZ	Magnetic Resonance Imaging (MRI) of Brain
B03BYZZ	MRI of Spinal Cord using Oth Contrast
B03BZZZ	Magnetic Resonance Imaging (MRI) of Spinal Cord
B246ZZZ	Ultrasonography of Right and Left Heart
B24DZZZ	Ultrasonography of Pediatric Heart
B31H1ZZ	Fluoroscopy of R Up Extrem Art using L Osm Contrast
BD11YZZ	Fluoroscopy of Esophagus using Other Contrast
BD13ZZZ	Fluoroscopy of Small Bowel
BF111ZZ	Fluoroscopy of Bili/Pancr Duct using L Osm Contrast
BP1AZZZ	Fluoroscopy of Right Humerus
BP1H1ZZ	Fluoroscopy of Left Elbow using Low Osmolar Contrast
BP39ZZZ	Magnetic Resonance Imaging (MRI) of Left Shoulder
BQ13ZZZ	Fluoroscopy of Right Femur
BQ1DZZZ	Fluoroscopy of Right Lower Leg
BQ33YZZ	MRI of R Femur using Oth Contrast
BQ3DY0Z	MRI of R Low Leg using Oth Contrast, Unenh, Enhance
BR30YZZ	MRI of Cerv Spine using Oth Contrast
BR30ZZZ	Magnetic Resonance Imaging (MRI) of Cervical Spine
BR39YZZ	MRI of Lumbar Spine using Oth Contrast
BT1D1ZZ	Fluoroscopy Kidney, Ureter, Bladder, R w L Osm Contrast
BW38ZZZ	Magnetic Resonance Imaging (MRI) of Head
CD171ZZ	Planar Nucl Med Imag of GI Tract using Technetium 99m

Epic Procedure Order Code	Epic Procedure Order Name
AMBREF0201	PEDIATRIC PULMONARY REFERRAL

Epic Procedure Order Code	Epic Procedure Order Name
APHER00001	THERAPEUTIC PLASMA EXCHANGE
BBKBB00005	ABO/RH BLOOD TYPE
BBKBB00040	BLOOD TYPE VERIFICATION
BBKBB00057	DIRECT COOMBS TEST (POLY)
BBKBB00058	DIRECT COOMBS TEST/IGG
BBKBB00086	TYPE AND SCREEN
BBKBP00002	FRESH FROZEN PLASMA
BBKBP00004	RED BLOOD CELLS
BBKBP00006	PLATELETPHERESIS
BBKBP00008	RED BLOOD CELLS PEDI/NEONATE
CARD00023	PEDIATRIC ECHOCARDIOGRAM COMPLETE
CARD00048	PEDS ELECTROPHYSIOLOGY STUDY/ABLATION
NEURO00002	ROUTINE ELECTROENCEPHALOGRAM
NEURO00003	CONTINUOUS ELECTROENCEPHALOGRAM
NEURO00010	EEG ELECTROENCEPHALOGRAM, ROUTINE
PCORES00010	EXTUBATE
PTHSP00001	SURGICAL PATHOLOGY
RADCT00905	CT PELVIS WITHOUT CONTRAST
RADCT00910	CT ANGIO LOWER EXTREMITY
RADCT00911	CT ANGIO UPPER EXTREMITY
RADCT00912	CT LOWER EXTREMITY WITHOUT CONTRAST
RADCT00913	CT UPPER EXTREMITY WITHOUT CONTRAST
RADCT00921	CT CHEST WITH CONTRAST
RADCT00923	CT ANGIO HEAD
RADCT00924	CT ANGIO NECK
RADCT00925	CT SINUS / FACIAL WITHOUT CONTRAST
RADCT00926	CT SINUS / FACIAL WITH CONTRAST
RADCT00928	CT C-SPINE WITHOUT CONTRAST
RADCT00931	CT HEAD WITHOUT CONTRAST
RADCT00932	CT HEAD WITH CONTRAST
RADCT00934	CT L-SPINE WITHOUT CONTRAST
RADCT00938	CT NECK WITH CONTRAST
RADCT00943	CT T-SPINE WITHOUT CONTRAST
RADCT00955	CT ABDOMEN + PELVIS WITH CONTRAST
RADCT00967	CT 3-D RECONSTRUCTION
RADCT00989	CT TEMPORAL BONES WITH CONTRAST
RADCT01030	CT ABDOMEN + PELVIS UROGRAM
RADCT01048	CT L-SPINE (2D RECONS L-SPINE FROM ABD/PELVIS)
RADCT01049	CT T-SPINE (2D RECONS T-SPINE FROM CHEST)

Epic Procedure Order Code	Epic Procedure Order Name
RADCT01052	2DRECON TRAUMA C-SPINE (ED/RAD ONLY)
RADDX01051	FLUOROSCOPY 60+ MINUTES WITHOUT RADIOLOGIST
RADDX01052	FLUOROSCOPY UNDER 60 MINUTES WITHOUT RADIOLOGIST
RADDX01066	BONE SURVEY, >12 MONTHS OLD, COMPLETE
RADDX01074	BARIUM ENEMA
RADDX01075	BARIUM ENEMA WITH AIR
RADDX01079	ESOPHOGRAM
RADDX01086	UPPER GI SINGLE CONTRAST
RADDX01089	DX IVP PEDIATRIC
RADDX01093	BONE SURVEY, <12 MONTHS OLD, COMPLETE
RADIR01177	IR JEJUNOSTOMY TUBE CHANGE
RADMR00901	MR ABDOMEN WITHOUT CONTRAST
RADMR00905	MR PELVIS WO CONTRAST
RADMR00909	MR ANGIO UPPER EXTREMITY, WITH OR WITHOUT CONTRAST
RADMR00934	MR BRAIN WITHOUT CONTRAST
RADMR00936	MR BRAIN WITH / WITHOUT CONTRAST
RADMR00937	MR C-SPINE WITHOUT CONTRAST
RADMR00940	MR L-SPINE WITHOUT CONTRAST
RADMR00946	MR T-SPINE WITHOUT CONTRAST
RADMR00958	MR BRAIN + MR ANGIO BRAIN + MR ANGIO NECK
RADMR00960	MR C-SPINE + MR T-SPINE + MR L-SPINE
RADMR00962	MR BRAIN + MR ANGIO BRAIN
RADMR00963	MR BRAIN WITH AND WITHOUT CONTRAST + MR ANGIO BRAIN
RADMR00981	MR SPECTROSCOPY BRAIN
RADMR01022	MR UPPER EXTREMITY JOINT, LEFT WITHOUT CONTRAST
RADMR01033	MR LOWER EXTREMITY JOINT, RIGHT WITH CONTRAST
RADMR01037	MR LOWER EXTREMITY, RIGHT WITH / WITHOUT CONTRAST
RADMR01048	MR FETAL
RADNM00935	NM BOWEL IMAGING (MECKELS)
RT00017	HIGH FLOW NASAL CANULA
SLEEP00001	SLEEP STUDY

APPENDIX II:

Specialized diagnoses among pediatric patients with a transfer admission source and an early discharge, presented by diagnostic grouping and International Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes. Specialized diagnoses were identified among the sample as part of the categorization of transfers as potentially avoidable in order to capture patient transfers with early discharges that did not have a specialized procedure. Presence of one or more specialized diagnosis categorized a transfer as not potentially avoidable.

Diagnostic grouping	ICD-10-CM Diagnosis Code	ICD-10-CM Diagnosis Name
Alcohol-related disorders	F10.129	Alcohol abuse with intoxication, unspecified
Anemia	D57.00	Hb-SS disease with crisis, unspecified
	D61.818	Other pancytopenia
Bacterial infection	A41.9	Sepsis, unspecified organism
Burns	T20.26XA	Burn of second degree of forehead and cheek, init encntr
	T21.25XA	Burn of second degree of buttock, initial encounter
	T26.41XA	Burn of right eye and adnexa, part unspecified, init encntr
	T27.1XXA	Burn involving larynx and trachea with lung, init encntr
	T31.11	Burns of 10–19% of body surface w 10–19% third degree burns
Central nervous system infection	A87.8	Other viral meningitis
Cerebrovascular disease	G45.9	Transient cerebral ischemic attack, unspecified
Coagulation and hemorrhagic disorders	D65	Disseminated intravascular coagulation
Coma; stupor; and brain damage	R40.243	Glasgow coma scale score 3–8
Complications	G97.1	Other reaction to spinal and lumbar puncture
	K94.22	Gastrostomy infection
	K94.23	Gastrostomy malfunction
	T85.09XA	Mech compl of ventricular intracranial shunt, init
	T88.3XXA	Malignant hyperthermia due to anesthesia, initial encounter
	T88.6XXA	Anaphyl reaction due to advrs eff drug/med prop admin, init
Complications mainly related to pregnancy	O14.93	Unspecified pre-eclampsia, third trimester
Crushing injury or internal injury	S27.0XXA	Traumatic pneumothorax, initial encounter
	S36.114A	Minor laceration of liver, initial encounter
	S37.042A	Minor laceration of left kidney, initial encounter
	S37.061A	Major laceration of right kidney, initial encounter
Diabetes mellitus with complications	E101.0	Type 1 diabetes mellitus with ketoacidosis without coma
	E106.49	Type 1 diabetes mellitus with hypoglycemia without coma
	E131.0	Oth diabetes mellitus with ketoacidosis without coma
Digestive congenital anomalies	Q40.0	Congenital hypertrophic pyloric stenosis
Diseases of male genital organs	N44.00	Torsion of testis, unspecified
Diseases of the heart	I46.9	Cardiac arrest, cause unspecified
	I47.2	Ventricular tachycardia
Diseases of the urinary system	N01.9	Rapidly progr nephritic syndrome w unsp morphologic changes
	N04.1	Nephrotic syndrome w focal and segmental glomerular lesions
	N12	Tubulo-interstitial nephritis, not spcf as acute or chronic

Diagnostic grouping	ICD-10-CM Diagnosis Code	ICD-10-CM Diagnosis Name
	N17.9	Acute kidney failure, unspecified
Epilepsy; convulsions	G40.501	Epileptic seiz rel to extrn causes, not ntrct, w stat epi
	G40.901	Epilepsy, unsp, not intractable, with status epilepticus
	G40.911	Epilepsy, unspecified, intractable, with status epilepticus
	R56.01	Complex febrile convulsions
Factors influencing health care	Z03.6	Encntr for obs for susp toxic eff from ingest sub ruled out
Fractures	S02.0XXA	Fracture of vault of skull, init encntr for closed fracture
	S02.119A	Unsp fracture of occiput, init encntr for closed fracture
	S02.19XA	Oth fracture of base of skull, init for clos fx
	S02.3XXA	Fracture of orbital floor, init encntr for closed fracture
	S72.332A	Displaced oblique fracture of shaft of left femur, init
	S72.342A	Displaced spiral fracture of shaft of left femur, init
Gastrointestinal hemorrhage	K92.0	Hematemesis
	K92.1	Melena
	K92.2	Gastrointestinal hemorrhage, unspecified
Intracranial injury	S06.1X9A	Traumatic cerebral edema w LOC of unsp duration, init
	S06.2X7A	Diffuse TBI w LOC w death due to brain injury bf consc, init
	S06.4X0A	Epidural hemorrhage w/o loss of consciousness, init encntr
	S06.4X9A	Epidural hemorrhage w LOC of unsp duration, init
	S06.5X0A	Traum subdr hem w/o loss of consciousness, init
	S06.5X1A	Traum subdr hem w LOC of 30 minutes or less, init
	S06.6X0A	Traum subrac hem w/o loss of consciousness, init
	S06.6X2A	Traum subrac hem w loss of consciousness of 31–59 min, init
	S06.6X9A	Traum subrac hem w LOC of unsp duration, init
Joint disorders and dislocations; trauma-related	S13.130A	Subluxation of C2/C3 cervical vertebrae, initial encounter
Lower gastrointestinal disorders	K35.2	Acute appendicitis with generalized peritonitis
	K35.3	Acute appendicitis with localized peritonitis
	K35.80	Unspecified acute appendicitis
	K37	Unspecified appendicitis
	K56.1	Intussusception
	K56.2	Volvulus
	K56.60	Unspecified intestinal obstruction
	K56.69	Other intestinal obstruction
Miscellaneous mental disorders	F44.5	Conversion disorder with seizures or convulsions
Other connective tissue disease	M60.009	Infective myositis, unspecified site
	M62.82	Rhabdomyolysis
Other endocrine disorders	E162	Hypoglycemia, unspecified

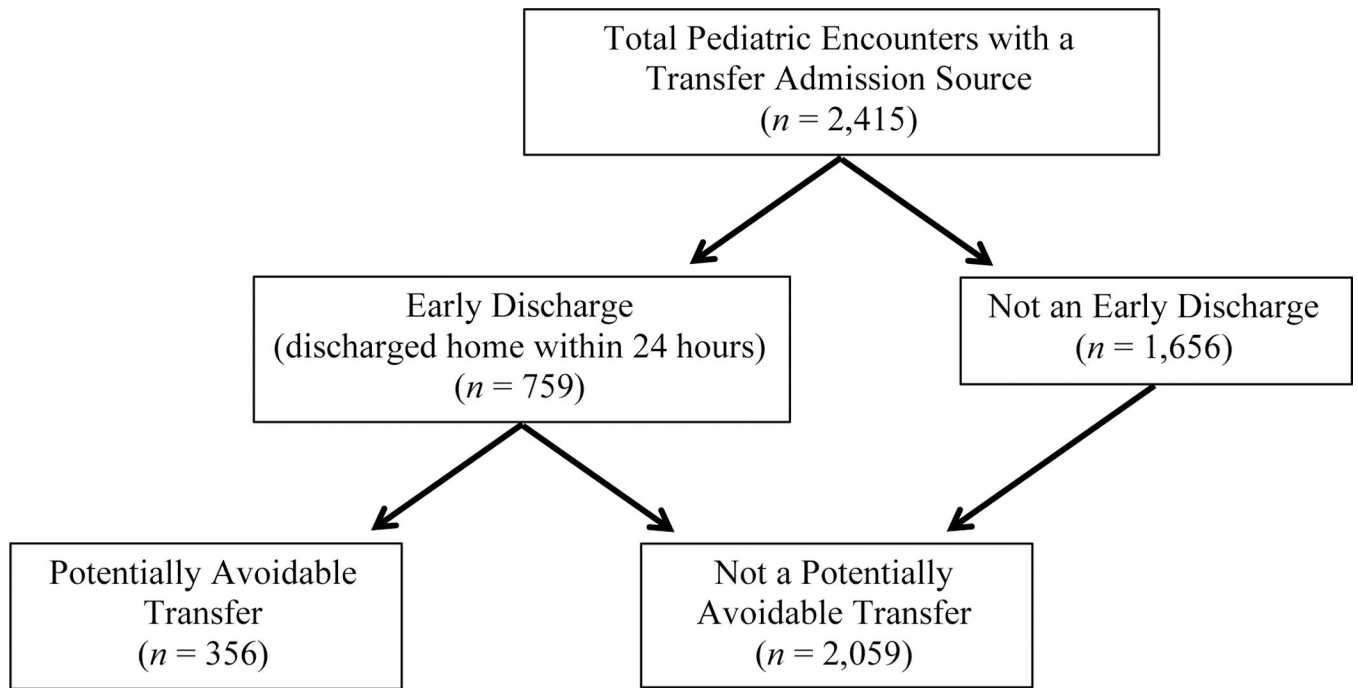
Diagnostic grouping	ICD-10-CM Diagnosis Code	ICD-10-CM Diagnosis Name
Other injuries and conditions due to external causes	T17.910A	Gastric contents in resp tract, part unsp cause asphyx, init
	T71.111A	Asphyx due to smothering under pillow, accidental, init
	T75.1XXA	Unsp effects of drowning and nonfatal submersion, init
	T75.1XXS	Unsp effects of drowning and nonfatal submersion, sequela
	T76.12XA	Child physical abuse, suspected, initial encounter
	T79.7XXA	Traumatic subcutaneous emphysema, initial encounter
Other lower respiratory disease	J81.0	Acute pulmonary edema
	R06.81	Apnea, not elsewhere classified
Other nervous system disorders	G08	Intracranial and intraspinal phlebitis and thrombophlebitis
	G93.6	Cerebral edema
Other perinatal conditions	R68.13	Apparent life threatening event in infant (ALTE)
Other upper respiratory disease	J38.5	Laryngeal spasm
Pancreatic disorders (not diabetes)	K85.9	Acute pancreatitis, unspecified
Pleurisy; pneumothorax; pulmonary collapse	J98.2	Interstitial emphysema
Poisoning	T36.6X1A	Poisoning by rifampicins, accidental (unintentional), init
	T38.3X1A	Poisoning by insulin and oral hypoglycemic drugs, acc, init
	T39.1X1A	Poisoning by 4-Aminophenol derivatives, accidental, init
	T40.2X1A	Poisoning by oth opioids, accidental (unintentional), init
	T41.291A	Poisoning by oth general anesthetics, accidental, init
	T42.4X1A	Poisoning by benzodiazepines, accidental, init
	T42.71XA	Poison by unsp antieplptc and sed-hypntc drugs, acc, init
	T42.8X1A	Poison by antiparkns drug/centr musc-tone depr, acc, init
	T43.211A	Poison by slctv seroton/norepineph reup inhibtr, acc, init
	T43.291A	Poisoning by oth antidepressants, accidental, init
	T43.591A	Poisoning by oth antipsychot/neurolept, accidental, init
	T43.621A	Poisoning by amphetamines, accidental (unintentional), init
	T45.0X1A	Poisoning by antiallerg/antiemetic, accidental, init
	T46.2X1A	Poisoning by oth antidysrhythmic drugs, accidental, init
	T46.5X1A	Poisoning by oth antihypertn drugs, accidental, init
	T48.3X1A	Poisoning by antitussives, accidental (unintentional), init
	T51.0X1A	Toxic effect of ethanol, accidental (unintentional), init
	T53.0X1A	Toxic effect of carbon tetrachloride, accidental, init
T54.91XA	Toxic effect of unsp corrosive substance, accidental, init	
T63.441A	Toxic effect of venom of bees, accidental, init	
Respiratory failure; insufficiency; arrest (adult)	J80	Acute respiratory distress syndrome
Respiratory infections	J05.10	Acute epiglottitis without obstruction

Diagnostic grouping	ICD-10-CM Diagnosis Code	ICD-10-CM Diagnosis Name
	J36	Peritonsillar abscess
Skin and subcutaneous tissue infections	L03.115	Cellulitis of right lower limb
	L03.116	Cellulitis of left lower limb
	L03.211	Cellulitis of face
	L03.311	Cellulitis of abdominal wall
	L03.317	Cellulitis of buttock
	L08.82	Omphalitis not of newborn
Spinal cord injury	S14.135A	Anterior cord syndrome at C5, init
	S14.136A	Anterior cord syndrome at C6, init
	S14.137A	Anterior cord syndrome at C7, init
Substance-related disorders	P96.2	Withdrawal symptoms from therapeutic use of drugs in newborn
	T40.7X1A	Poisoning by cannabis (derivatives), accidental, init
Suicide and intentional self-inflicted injury	T39.012A	Poisoning by aspirin, intentional self-harm, init encntr
	T39.1X2A	Poisoning by 4-Aminophenol derivatives, self-harm, init
	T39.312A	Poisoning by propionic acid derivatives, self-harm, init
	T40.2X2A	Poisoning by oth opioids, intentional self-harm, init encntr
	T42.4X2A	Poisoning by benzodiazepines, intentional self-harm, init
	T43.222A	Poison by slctv serotonin reuptake inhibtr, self-harm, init
	T43.292A	Poisoning by oth antidepressants, self-harm, init
	T43.592A	Poisoning by oth antipsychot/neurolept, self-harm, init
	T45.0X2A	Poisoning by antiallerg/antiemetic, self-harm, init
	T45.4X2A	Poisoning by iron and its compounds, self-harm, init
	T48.3X2A	Poisoning by antitussives, intentional self-harm, init
	T48.4X2A	Poisoning by expectorants, intentional self-harm, init
	T56.892A	Toxic effect of oth metals, intentional self-harm, init
Symptoms; signs; and ill-defined conditions	R57.0	Cardiogenic shock
	R57.9	Shock, unspecified
	T78.01XA	Anaphylactic reaction due to peanuts, initial encounter
	T78.05XA	Anaphylactic reaction due to tree nuts and seeds, init
	T78.1XXA	Oth adverse food reactions, not elsewhere classified, init
	T78.2XXA	Anaphylactic shock, unspecified, initial encounter
Systemic lupus erythematosus and connective tissue disorders	M30.3	Mucocutaneous lymph node syndrome [Kawasaki]
Unclassified	W65.XXXA	Accidental drowning and submersion while in bath-tub, init
	W67.XXXA	Accidental drown while in swimming-pool, init

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**FIGURE 1:**

Flow diagram of transferred patients. Potentially avoidable transfer is defined as an early discharge of a patient who did not receive any specialized procedures or diagnoses at the post-transfer hospital.

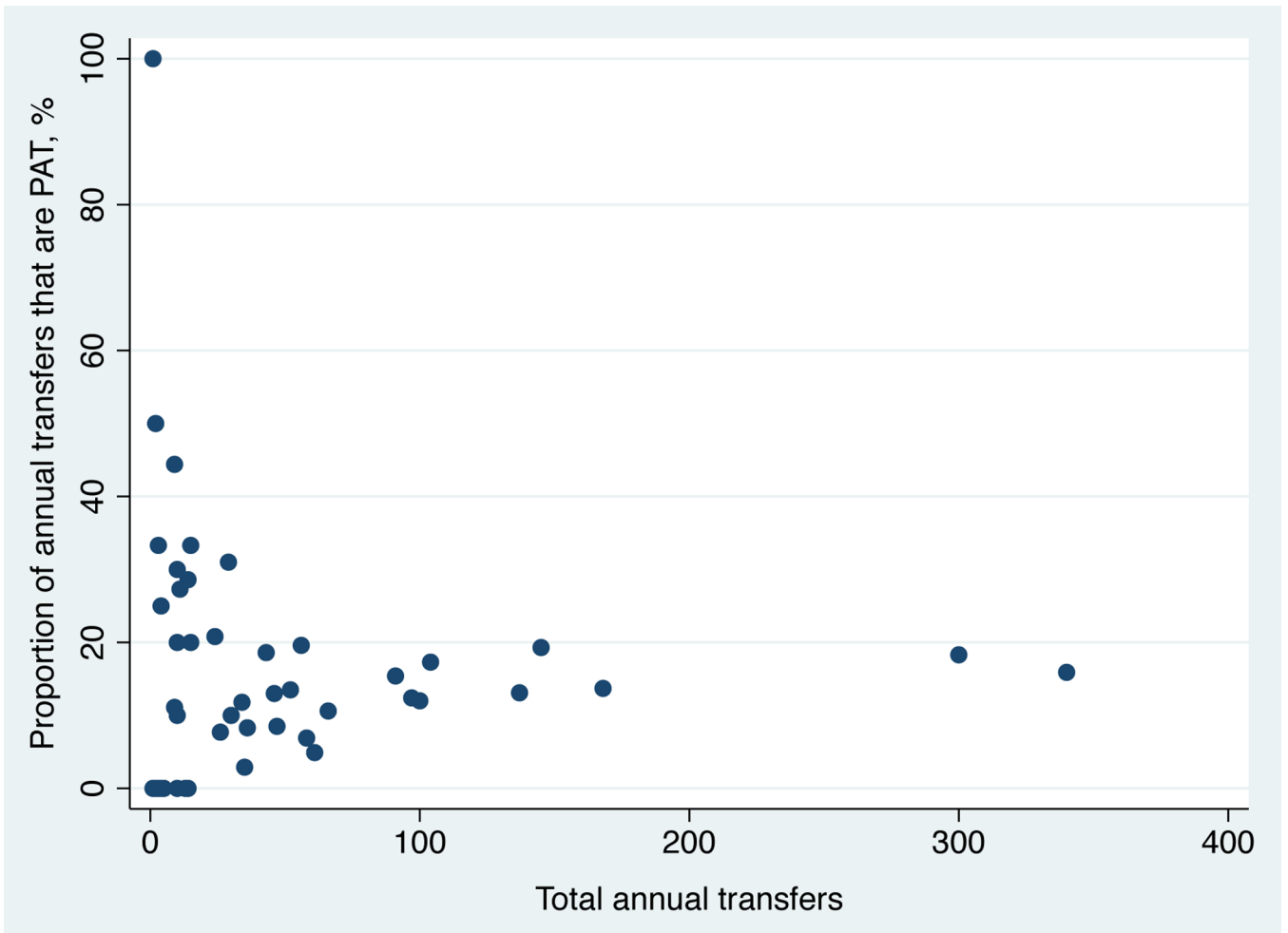


FIGURE 2: Potentially avoidable transfers (PAT) and total transfers, presented by hospital.

TABLE 1:

Profile of patient- and hospital-level characteristics of transferred patients

Patient Characteristics	Potentially Avoidable Transfer (PAT) ^a (n = 356)		Non-PAT (n = 2,059)		Proportion PAT, %	P ^b
	n	%	n	%		
Age group						<0.001
0–1 years	118	33.1	763	37.1	13.4	
2–5 years	119	33.4	417	20.2	22.2	
6–11 years	66	18.5	412	20.0	13.8	
12–17 years	53	14.9	467	22.7	10.2	
Gender						0.69
Female	155	43.5	873	42.4	15.1	
Male	201	56.5	1,186	57.6	14.5	
Insurance status						0.36
Private	103	28.9	585	28.4	15.0	
Public	250	70.2	1,468	71.3	14.6	
Self-pay or other	3	0.8	6	0.3	33.3	
Utilization						
Pre-transfer location						<0.001
Emergency department	343	96.4	1,794	87.1	16.0	
Inpatient unit	13	3.6	265	12.9	4.7	
Mode of transport						0.099
Ground	294	82.6	1,646	79.9	15.2	
Air	53	14.9	384	18.6	12.1	
Unknown	9	2.5	29	1.4	23.7	
Post-transfer arrival type						<0.001
Emergency department	97	27.2	918	44.6	9.6	
Direct admission	256	71.9	1,126	54.7	18.5	
Unknown	3	0.8	15	0.7	16.7	
Post-transfer arrival location						<0.001
Emergency department	97	27.2	918	44.6	9.6	
Non-ICU	138	38.8	367	17.8	27.3	

	Potentially Avoidable Transfer (PAT) ^a (n = 356)		Non-PAT (n = 2,059)		Proportion PAT, %	P ^b
	n	%	n	%		
Patient Characteristics						
NICU	14	3.9	261	12.7	5.1	
PICU	104	29.2	498	24.2	17.3	
Unknown	3	0.8	15	0.7	16.7	
Pre-Transfer Hospital Characteristics						
Bed size						0.004
0–150	119	33.4	609	29.6	16.3	
151–300	90	25.3	694	33.7	11.5	
301 or more	147	41.3	740	35.9	16.6	
Unknown	0	0.0	16	0.8	0.0	
Children's hospital						0.042
Freestanding children's	2	0.6	1	0.0	66.7	
Non-freestanding children's	354	99.4	2,048	99.5	14.7	
Unknown	0	0.0	10	0.5	0.0	

^aPAT defined as a patient transfer with a discharge home within 24 hours without receiving any specialized procedure or diagnosis.

^bP-values refer to comparisons between PAT and non-PAT. Determined by using univariate logistic regression analysis based on a likelihood ratio test for variation among levels.

TABLE 2:

Most common principal diagnosis ICD-10 codes for the most common diagnostic groupings among potentially avoidable transfers

Diagnostic Grouping (n)	ICD-10-CM code, description (n)
Respiratory infections (<i>n</i> = 70)	1) J05.0, Acute obstructive laryngitis [croup] (<i>n</i> = 19)
	2) J21.9, Acute bronchiolitis, unspecified (<i>n</i> = 17)
	3) J06.9, Acute upper respiratory infection, unspecified (<i>n</i> = 14)
	4) J18.9, Pneumonia, unspecified organism (<i>n</i> = 10) ^a
Asthma (<i>n</i> = 53)	1) J45.901, Unspecified asthma with (acute) exacerbation (<i>n</i> = 21)
	2) J45.902, Unspecified asthma with status asthmaticus (<i>n</i> = 14)
	3) J45.31, Mild persistent asthma with (acute) exacerbation (<i>n</i> = 6)
Symptoms; signs; and ill-defined conditions (<i>n</i> = 28)	1) R50.9, Fever, unspecified (<i>n</i> = 4)
	1) R10.31, Right lower quadrant pain (<i>n</i> = 4)
	3) I88.0, Nonspecific mesenteric lymphadenitis (<i>n</i> = 3)
	3) R10.9, Unspecified abdominal pain (<i>n</i> = 3)
	3) R11.2, Nausea with vomiting, unspecified (<i>n</i> = 3)
Epilepsy, convulsions (<i>n</i> = 24)	1) R56.01, Complex febrile convulsions (<i>n</i> = 6)
	2) G40.909, Epilepsy, unspecified, not intractable, without status epilepticus (<i>n</i> = 5)
	3) G40.901, Epilepsy, unspecified, not intractable, with status epilepticus (<i>n</i> = 4)
	3) R56.9, Unspecified convulsions (<i>n</i> = 4)
Fractures (<i>n</i> = 22)	1) S52.531A, Colles' fracture of right radius (<i>n</i> = 2)
Intracranial injury (<i>n</i> = 19)	1) S06.0X0A, Concussion without loss of consciousness (<i>n</i> = 10)
	2) S06.0X1A, Concussion with loss of consciousness of 30 minutes or less (<i>n</i> = 4)
	3) S06.0X9A, Concussion with loss of consciousness of unspecified duration (<i>n</i> = 2)
Other perinatal conditions (<i>n</i> = 18)	1) R68.13, Apparent life threatening event in infant (ALTE) (<i>n</i> = 7)
	2) P78.83, Newborn esophageal reflux (<i>n</i> = 2)
	2) P92.09, Other vomiting of newborn (<i>n</i> = 2)
Intestinal infection (<i>n</i> = 16)	1) A08.4, Viral intestinal infection, unspecified (<i>n</i> = 12)
	2) A09, Infectious gastroenteritis and colitis, unspecified (<i>n</i> = 3)
Fluid and electrolyte disorders (<i>n</i> = 12)	1) E860, Dehydration (<i>n</i> = 8)

Diagnostic Grouping (n)	ICD-10-CM code, description (n)
	2) E871, Hypo-osmolality and hyponatremia (<i>n</i> = 2)
Skin and subcutaneous infections (<i>n</i> = 9)	1) L03.115, Cellulitis of right lower limb (<i>n</i> = 2)
	1) L02.31, Cutaneous abscess of buttock (<i>n</i> = 2)

Not every diagnostic grouping lists the top three most common diagnoses within that group, because those groupings had numerous diagnoses with *n*=1 in their top three most common diagnoses. Diagnoses with *n*=1 are therefore not presented in this table.

^aThe fourth most common ICD-10-CM diagnosis was included in the respiratory infections diagnostic grouping, because pneumonia (J18.9) was among the top 10 most common individual ICD-10-CM diagnoses and thus relatively more common than other diagnoses in this table.

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