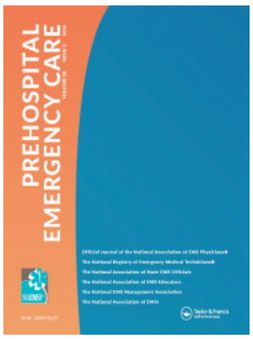

Prehospital Emergency Care

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/ipec20

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To cite this article: Tara Funk Corcoran, Remle Crowe, Christian Martin-Gill & Sriram Ramgopal (11 Jul 2024): Mapping Prehospital Clinician Impression to Hospital-Based Diagnoses in Children Transported to the Hospital by Emergency Medical Services, Prehospital Emergency Care, DOI: 10.1080/10903127.2024.2370511

To link to this article: https://doi.org/10.1080/10903127.2024.2370511

PREHOSPITAL EMERGENCY CARE
https://doi.org/10.1080/10903127.2024.2370511

Mapping Prehospital Clinician Impression to Hospital-Based Diagnoses in Children Transported to the Hospital by Emergency Medical Services

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ABSTRACT

Objectives: Emergency medical services (EMS) serves a critical role in the delivery of services to children with out-of-hospital emergencies. The EMS clinicians' initial field diagnoses, termed "impressions," facilitate focused patient assessments, guide the application of prehospital treatment protocols, and help determine transport destination. We sought to evaluate the concordance of the EMS clinician impression to a child's hospital-based diagnosis.

Methods: We retrospectively studied de-identified pediatric (<18 years old) scene runs transported to the hospital and with available linked hospital data from the 2021 ESO Data Collaborative, a multi-agency prehospital electronic health record dataset. EMS impressions and primary emergency department or admission-based diagnoses were categorized into one of twenty-one major groups in the Diagnosis Grouping System. We identified the most common hospital-based discharge diagnoses and evaluated for the agreement between EMS impression and hospital-based diagnosis using Cohen's Kappa statistic.

Results: We included 35,833 pediatric transports from the scene with linked prehospital and in-hospital data (median age 11 years, interquartile range, 3-15 years; 50.9% male). The most common categories for both EMS impressions and hospital-based diagnoses were as follows respectively: trauma (26.1%; 24.6%), neurologic diseases (18.9%; 16.4%), psychiatric and behavioral diseases and substance use disorder (11.8%; 11.6%), and respiratory diseases (11.1% and 9.5%). A total of 23,224 out of 35,833 patients, or 64.8%, had concordant EMS impressions and hospital-based diagnoses. There was high agreement between common EMS impression and in-hospital diagnoses (trauma 77.3%; neurologic diseases 70.3%; respiratory diseases 64.5%; and psychiatric, behavioral disease and substance use disorder 73.9%). Hospital-based diagnoses demonstrated moderate concordance with prehospital data (Cohen's $\kappa = 0.59$).

Conclusions: We found moderate concordance between EMS primary impression and hospital diagnoses. The EMS encounter is brief and without capabilities of advanced testing, but initial impressions may influence the basis of the triage assignment and interventions during the hospital-based encounter. By evaluating EMS impressions and ultimate hospital diagnoses, pediatric protocols may be streamlined, and specific training emphasized in pursuit of improving patient outcomes. Future work is needed to examine instances of discordance and evaluate the impact on patient care and outcomes.

ARTICLE HISTORY
Received 26 March 2024
Revised 30 May 2024
Accepted 10 June 2024

Introduction

Emergency medical services (EMS) comprise a critical component in the care of ill and injured children. Approximately 5-10% of EMS encounters in the United States (U.S.) are for children (1, 2), of whom two-thirds are transported to the emergency department (ED) (3–5). Children brought to the ED by EMS have greater acuity of illness compared to those brought to the hospital by other means, reflected by hospitalization rates, vital sign abnormalities, and triage assignment (6).

The EMS clinicians' initial field diagnoses, termed "impressions," are used to apply protocols for the management of prehospital emergencies. An accurate impression is essential for the application of disease-based clinical protocols and initiation of prehospital interventions for conditions such as asthma, anaphylaxis, behavioral health emergencies, trauma, and seizures (7–10). In the prehospital setting, the impression forms the basis of the triage assignment and may influence interventions during the hospital-based encounter. An incorrect EMS impression may potentially result in a delay or failure in the initiation of the appropriate hospital-based treatment plan. These scenarios are described in concepts of therapeutic momentum or inertia, where clinicians are hesitant to escalate or alter a treatment plan put forth by a previous clinician (11–14). For multiple reasons, obtaining an accurate

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/10903127.2024.2370511.

clinical impression may be challenging in the prehospital setting. Prior research has suggested that EMS clinicians have difficulty in assessing patient acuity compared to clinicians working in other settings (15). Assessments in children may be less thorough compared to adults (16, 17), and EMS clinicians are provided with less pediatric-specific training (18–20). These gaps in knowledge are further compounded by the relative infrequency of pediatric EMS encounters (1, 2), limiting the role of experiential training (16, 21).

The concordance of initial patient assessment by EMS with their hospital evaluation has been difficult to assess due to limited availability of linked prehospital and hospital data. Studies reporting hospital-based outcomes of children transported to the hospital by EMS have been largely limited to in-hospital data, without any information linked to the prehospital record (6, 22). Assessing the concordance between EMS impression and hospital diagnosis may help to inform future EMS protocol development and clinician education, which may ultimately improve patient outcomes. We therefore sought to evaluate the agreement between the prehospital initial impression to the hospital-based diagnosis for children transported from the scene by EMS.

Methods

Data Source

We conducted a cross-sectional retrospective multiagency study using de-identified prehospital patient records from the ESO Data Collaborative. The ESO electronic health record software captures patient demographics, dispatch records, clinical presentation, and assessments completed by EMS clinicians and is one of the largest EMS electronic health record providers in the U.S. This de-identified EMS dataset has been used to evaluate several research questions related to the care of children with out-of-hospital emergencies (23–25). For a subset of EMS agencies and facilities participating in bi-directional health data exchange, the dataset contains hospital outcome information, which is linked back to the EMS record using standard Health Level Seven messaging (HL7, Ann Arbor, MI). Performance of this study was approved by the Ann & Robert H. Lurie Children's Hospital of Chicago Institutional Review Board.

Inclusion

We used electronic health record data for EMS encounters from the calendar year January 1, 2021 to December 31, 2021, excluding encounters with a missing age or adults ($\geq$18 years). We excluded encounters without a documented primary impression by EMS; if they did not originate as a 9-1-1 encounter from the scene; or if they did not result in transport to the hospital, lacked in-hospital diagnosis data, or lacked a corresponding Diagnosis Grouping System (DGS) category available to assign to the primary diagnosis.

EMS Data

For each encounter, we included demographic, EMS, and hospital-based data. Demographic data included patient age, gender, race, and ethnicity (classified from this dataset as White Non-Hispanic, Black Non-Hispanic, Hispanic or Latino, other or more than one, and missing). The EMS data included dispatch date and time, region, scene type, level of service (basic life support [BLS], advanced life support [ALS], or critical care), primary EMS impression and interfacility transport status. To categorize EMS impression data, we cataloged these within the twenty-one previously established major categories of the DGS (26, 27). Two authors (T.FC. and S.R.) reviewed all classifications to categorize groupings and reached a consensus on any differences.

Hospital-Based Data

For the hospital-based discharge diagnosis, we used ED discharge diagnosis for patients who were discharged from the ED. For children who were admitted to the hospital, we gave priority to their ED diagnosis when available. If no ED diagnosis was available, we then utilized the hospital discharge diagnosis. We prioritized ED diagnosis due to the proximity to the EMS encounter, as additional or new conditions may arise while hospitalized, impacting hospital discharge diagnosis. Diagnosis codes were reported by hospitals using *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) codes. If no priority was provided, the first diagnosis code listed was used, unless it began with U, V, Y or Z, (which are used to document influencing health status and social determinants of health rather than the presenting illness or injury) (28). In the event of an inexact match, we utilized approximate string matching (29). This method evaluates ICD-10-CM codes based on string distance, selecting the closest match based on having identical initial strings. This optimizes the ability to identify potential matches within the hospital data. To assess concordance between hospital-based diagnoses and EMS impressions we categorized hospital-based ICD-10-CM codes using the DGS (26, 27), a system developed specifically for pediatric ED encounters which groups diagnoses into twenty-one major groups. For descriptive purposes, we additionally grouped diagnoses within the Pediatric Clinical Classification System (PECCS) (30), which groups diagnoses into pediatric-specific, mutually exclusive diagnostic categories with increased granularity. We additionally abstracted the hospital-based disposition and the occurrence of in-hospital mortality.

Analysis

Given the large number of transports excluded based on missing hospital-based data, we described characteristics and EMS impression DGS category of pediatric transports with and without in-hospital data available. Within this sample, we described the most common EMS primary impressions and hospital diagnoses. To evaluate concordance between

EMS impression and hospital diagnosis, we calculated Cohen's κ. We used the following parameters to interpret the κ statistic: less than 0.40, poor to fair; 0.41 to 0.60, moderate; 0.61 to 0.80, substantial; and greater than 0.80, almost perfect (31). Using the major subgroup of the DGS, we calculated the percent match rate between each EMS impression and hospital impression. We constructed an alluvial plot of the EMS impressions to visualize the similarities or changes in clinical impressions between the EMS clinician and hospital. We described the most common hospital-based diagnoses in further detail using PECCS stratified by the EMS impression using DGS. Analyses were performed using the *psych* (v.2.3.6), *fuzzyjoin* (v0.1.6), *easyalluvial* (v0.3.1) packages in R, version 4.3.2 (R Foundation for Statistical Computing, Vienna, Austria).

Additional Analysis

In order to evaluate for potential discrepancy when utilizing hospital discharge diagnosis versus ED discharge diagnosis we performed several sensitivity analyses. We evaluated concordance by determining an overall raw match rate and Cohen's κ in each of our analyses. First, we gave priority to primary hospital discharge diagnosis, rather than giving priority to ED discharge diagnosis. Secondly, we limited our study to only include encounters with an ED discharge diagnosis. Lastly, we limited our study to only include encounters with a hospital discharge diagnosis.

Results

The 2021 ESO incident dataset included 11,074,469 encounters. After applying exclusions, we identified 240,210 pediatric encounters with a primary impression transferred to the hospital, for whom in-hospital diagnosis data were available for 35,833 or 14.9% (Figure 1). Demographics and EMS primary impression of both the included sample and of excluded transports without in-hospital data are provided in Table 1. The median patient age was 11 years (interquartile range, 3-15 years) and approximately half were male (50.9%). When comparing pediatric transports with and without in-hospital data, the included sample had a higher proportion of encounters occurring from the home, a lower proportion of encounters from the Midwest and a higher proportion of encounters from the South and West. Most included encounters were transported by ALS units. The EMS impressions did not meaningfully differ between the included and excluded transports. Within the included

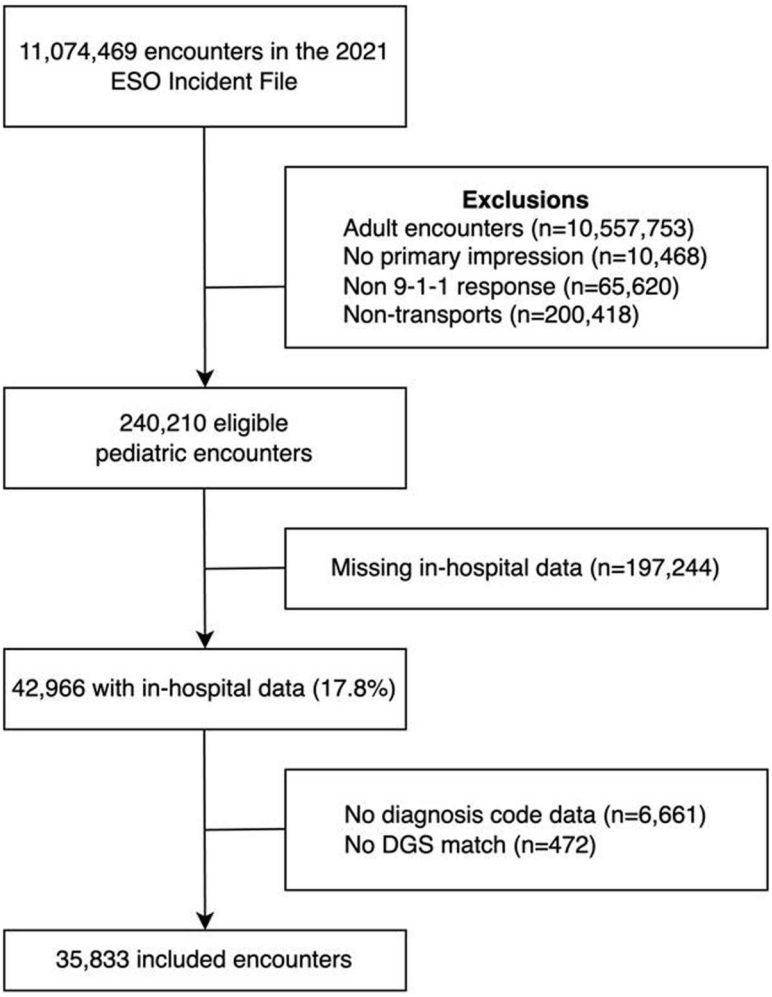

Figure 1. Inclusion diagram.

Table 1. Characteristics and EMS impression by DGS category of transports with and without in-hospital data.

	Included Pediatric Transports, n (%)	Excluded Pediatric Transports, n (%)
	35,833	204,377
Age, median years (IQR)	11 (3-15)	11 (3-15)
Gender		
Male	18,241 (50.9)	102,463 (50.1)
Female	17,509 (48.9)	101,140 (49.5)
Missing	83 (0.2)	774 (0.4)
Race and ethnicity		
White Non-Hispanic	13,352 (37.3)	88,842 (43.5)
Black Non-Hispanic	10,524 (29.4)	57,001 (27.9)
Hispanic or Latino	5,876 (16.4)	29,231 (14.3)
Other or more than one	2,134 (6.0)	11,611 (5.7)
Missing	3,947 (11.0)	17,692 (8.7)
Location		
Home/residence	20,668 (57.7)	116,799 (57.1)
Street or highway	5,452 (15.2)	34,631 (16.9)
School	3,168 (8.8)	15,440 (7.6)
Hospital	151 (0.4)	2,366 (1.2)
Other	6,383 (17.8)	35,134 (17.2)
Missing	11 (0.0)	7 (0.0)
Level of care		
ALS	31,685 (88.4)	177,318 (86.8)
BLS	4,004 (11.2)	22,713 (11.1)
Critical Care	113 (0.3)	2,359 (1.2)
Missing	31 (0.1)	1,987 (1.0)
Region		
South	20,245 (56.5)	103,479 (50.6)
West	7,305 (20.4)	22,899 (11.2)
Midwest	5,411 (15.1)	56,134 (27.5)
Northeast	2,299 (6.4)	19,649 (9.6)
Missing	573 (1.6)	2,216 (1.1)
Weekend transports	5,137 (14.3)	28,751 (14.1)
Time of day		
Daytime	14,039 (39.2)	80,917 (39.6)
Evening	16,534 (46.1)	94,641 (46.3)
Overnight	5,260 (14.7)	28,819 (14.1)
EMS Impression DGS Category		
Trauma	9,355 (26.1%)	48,939 (23.9%)
Neurologic diseases	6,778 (18.9%)	36,862 (18.0%)
Psychiatric and behavioral diseases and substance use disorder	3,971 (11.1%)	27,016 (13.2%)
Respiratory diseases	4,223 (11.8%)	23,830 (11.7%)
Other	1,629 (4.5%)	14,784 (7.2%)
Systemic States	2,490 (6.9%)	11,506 (5.6%)
Gastrointestinal diseases	2,221 (6.2%)	11,620 (5.7%)
Toxicologic emergencies (including environment)	1,493 (4.2%)	9,446 (4.6%)
Musculoskeletal and connective tissue diseases	1,070 (3.0%)	6,314 (3.1%)
Allergic, immunologic and rheumatologic diseases	1,169 (3.3%)	4,648 (2.3%)
Circulatory and cardiovascular diseases	580 (1.6%)	3,635 (1.8%)
Genital and reproductive diseases	125 (0.3%)	1,598 (0.8%)
Fluid and electrolyte disorders	218 (0.6%)	1,153 (0.6%)
Endocrine, metabolic, and nutritional diseases	180 (0.5%)	1,139 (0.6%)
ENT, dental and mouth diseases	139 (0.4%)	666 (0.3%)
Skin, dermatologic and soft tissue diseases	66 (0.2%)	344 (0.2%)
Diseases of the eye	39 (0.1%)	300 (0.1%)
Child abuse	44 (0.1%)	271 (0.1%)
Urinary tract diseases	17 (0.0%)	153 (0.1%)
Hematologic	24 (0.1%)	139 (0.1%)
Neoplastic diseases (cancer, not benign neoplasms)	2 (0.0%)	14 (0.0%)

sample, 3,860 (10.8%) were admitted to the hospital. In-hospital mortality occurred in 268 patients (0.7%), of whom 203 (75.7%) died in the ED.

EMS Impressions and Hospital-Based Diagnoses

Within the included sample, the most common EMS impressions as categorized by the DGS major groups were trauma (26.1%), neurologic diseases (18.9%), psychiatric and behavioral diseases and substance use disorder (11.8%), and respiratory diseases (11.1%). The most common in-hospital diagnoses in the sample included: trauma (24.6%), neurologic diseases (16.4%), psychiatric and behavioral diseases and substance use disorder (11.6%), and respiratory diseases (9.5% Table 2).

Matched Diagnoses

Both EMS impressions and hospital-based diagnoses occurred in similar percentages. A total of 23,224 out of 35,833 patients, or 64.8%, had concordant EMS impressions and hospital-based diagnoses. The percent match between EMS impression and hospital diagnoses for the most common presentations were as follows: trauma 77.3%;

Table 2. Most common EMS primary impressions and hospital diagnoses, grouped by major DGS category among included pediatric transports ($n = 35,833$).

Primary impression	EMS impression, n (%)	Hospital-based diagnosis, n (%)
Trauma	9,355 (26.1)	8,814 (24.6)
Neurologic diseases	6,778 (18.9)	5,868 (16.4)
Respiratory diseases	4,223 (11.8)	3,403 (9.5)
Psychiatric and behavioral diseases and substance use disorder	3,971 (11.1)	4,150 (11.6)
Systemic States	2,490 (6.9)	2,850 (8)
Gastrointestinal diseases	2,221 (6.2)	2,193 (6.1)
Toxicologic emergencies (including environment)	1,493 (4.2)	1,489 (4.2)
Allergic, immunologic and rheumatologic diseases	1,169 (3.3)	1,010 (2.8)
Musculoskeletal and connective tissue diseases	1,070 (3)	2,029 (5.7)
Circulatory and cardiovascular diseases	580 (1.6)	380 (1.1)
Fluid and electrolyte disorders	218 (0.6)	136 (0.4)
Endocrine, metabolic, and nutritional diseases	180 (0.5)	456 (1.3)
ENT, dental and mouth diseases	139 (0.4)	1,294 (3.6)
Genital and reproductive diseases	125 (0.3)	335 (0.9)
Skin, dermatologic and soft tissue diseases	66 (0.2)	260 (0.7)
Child abuse	44 (0.1)	128 (0.4)
Diseases of the eye	39 (0.1)	69 (0.2)
Hematologic	24 (0.1)	85 (0.2)
Urinary tract diseases	17 (<0.1)	235 (0.7)
Neoplastic diseases (cancer, not benign neoplasms)	2 (<0.1)	4 (<0.1)
Other	1,629 (4.5)	645 (1.8)

Table 3. Match rate of EMS impression to hospital diagnosis by DGS major group.

EMS Impression	Total, n	Number of patients with matching in hospital diagnosis, n (%)
Child abuse	44	38 (86.4)
Allergic, immunologic and rheumatologic diseases	1,169	922 (78.9)
Endocrine, metabolic, and nutritional diseases	180	141 (78.3)
Trauma	9,355	7,232 (77.3)
ENT, dental and mouth diseases	139	107 (77)
Psychiatric and behavioral diseases and substance use disorder	3,971	2,935 (73.9)
Hematologic	24	17 (70.8)
Neurologic diseases	6,778	4,764 (70.3)
Respiratory diseases	4,223	2,725 (64.5)
Gastrointestinal diseases	2,221	1,333 (60)
Genital and reproductive diseases	125	74 (59.2)
Systemic states	2,490	1,403 (56.3)
Toxicologic emergencies (including environment)	1,493	712 (47.7)
Skin, dermatologic and soft tissue diseases	66	27 (40.9)
Circulatory and cardiovascular diseases	580	236 (40.7)
Musculoskeletal and connective tissue diseases	1,070	406 (37.9)
Urinary tract diseases	17	5 (29.4)
Diseases of the eye	39	10 (25.6)
Other	1,629	124 (7.6)
Fluid and electrolyte disorders	218	13 (6)
Neoplastic diseases (cancer, not benign neoplasms)	2	0 (0)

neurologic diseases 70.3%; respiratory diseases 64.5%; and psychiatric and behavioral diseases and substance use disorder 73.9% (Table 3). For example, matches included children with an EMS impression of emotional state/behavioral whose common primary in-hospital diagnoses included suicide and self-inflicted injury, anxiety disorders, and mood disorders. For those with respiratory impressions, the most common diagnoses included asthma, croup, and bronchiolitis (Table S1).

A comparison of EMS primary impression and hospital diagnosis using major diagnosis group of the DGS system demonstrated substantial overlap between diagnostic impressions (Figure 2). Cohen's κ between EMS impression and hospital diagnosis was 0.59 (95% CI 0.59-0.60), indicating moderate agreement. A listing of discordant impressions (defined as discordances occurring in $\geq$1% of cases) suggested similarities between EMS impression and hospital-based diagnoses in many of these, despite differences in grouping classification (Table S2). For example, the most common disagreement (which occurred in 8.1% of cases) was in patients with an EMS impression of trauma with hospital-based impression classified as a musculoskeletal and connective tissue disease. The second most common area of disagreement (4.8%) was between a prehospital impression of neurologic disease (which included diagnoses such as unconsciousness, febrile seizures, and dizziness) and a hospital-based diagnoses of systemic states (which included diagnoses such as viral, bacterial and fungal illnesses, fever and other chronic systemic states).

Sensitivity Analyses

When giving priority to primary hospital discharge diagnosis, instead of ED discharge diagnosis, we included 35,824 patients. With this approach, overall raw match rate was 64.7% and Cohen's κ was 0.58 (95% CI 0.57-0.59).

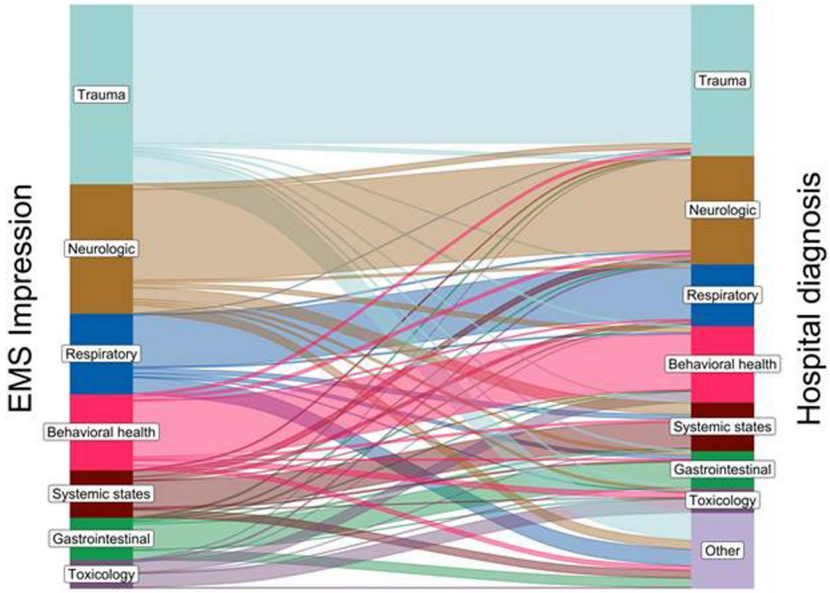

Figure 2. Alluvial plot demonstrating the most common EMS impressions to the Diagnosis and Grouping System categories for hospital-based diagnosis.

When limiting only to encounters with an ED diagnosis ($n = 33{,}624$), the raw match rate was 64.4%, with Cohen's κ of 0.57 (95% CI 0.56-0.59). When limited only to encounters with a hospital diagnosis ($n = 3{,}933$), the raw match rate was 69.0% and Cohen's κ was 0.59 (95% CI 0.56-0.63).

Discussion

We performed a retrospective cross-sectional study to evaluate the concordance between EMS clinician impression and hospital diagnosis in pediatric patients who were transported by EMS to the hospital. We found the most common EMS impressions to be trauma, neurologic diseases, respiratory diseases, and psychiatric and behavioral diseases and substance use disorder. The most common hospital diagnoses were trauma, neurologic diseases, psychiatric and behavioral diseases and substance use disorder, and respiratory diseases. When further evaluated using PECCS, the most common hospital-based diagnoses included convulsions, superficial injury, syncope, simple febrile convulsions, and suicide and intentional self-inflicted injury. There was moderate agreement between EMS impression and hospital diagnosis. Areas of highest match included child abuse; allergic, immunologic and rheumatologic disease; and trauma. Areas of lowest match included conditions such as urinary tract infections, diseases of the eye, and fluid and electrolyte disorders.

Our findings contribute to the known literature evaluating the epidemiology of EMS prehospital care in children. The most common EMS impression categories included trauma, neurologic diseases, respiratory diseases, and psychiatric and behavioral diseases and substance use disorder, which are consistent with prior research of EMS impressions for children in the prehospital setting (2, 4). New to the literature, we evaluated the concordance between EMS impressions and hospital diagnoses. For the common EMS impressions of trauma, neurologic diseases, and respiratory diseases, diagnosis match rates exceeded 65%. Among common diagnoses with a mismatch, our findings may be due to a difference in prioritization between diagnosis codes as related to specific limitations in EMS impression. For example, a patient classified with respiratory disease who is given a diagnosis of acute upper respiratory infection falls under systemic states per DGS major groupings. In areas of a lower percent of matches between EMS impression and in-hospital diagnosis, the importance of this match is likely of lesser consequence. For example, a mismatch between an oncologic EMS impression and hospital diagnosis may be due to how primary diagnoses are classified within these patients (where a diagnosis code for cancer for a patient with known cancer may be classified as a secondary diagnosis). Additionally, every classification structure has inherent intricacies, (such as "systemic states", when using the DGS) which may lead to potential mismatch with less clinical significance. Similarly, there is a minimal role for the prehospital management of urinary tract infections, another area of greater mismatch between impression and in-hospital diagnosis. This and other more nuanced conditions such as disease of the eye or fluid and electrolyte disorders are ones for which EMS curricula provide a general awareness but limited detail as there are few or no interventions that can be provided prior to hospital arrival to fully identify or initiate treatment for these conditions.

Protocols for EMS clinicians are recognized as important in management of numerous conditions including trauma, asthma, anaphylaxis, and seizures (7–10). These conditions are consistent with our findings of the common impressions of patients transported to the ED *via* EMS. An analysis of prevalent symptoms and definitive diagnoses of children transported to the hospital can provide opportunities to further optimize protocols for children cared for by EMS clinicians. This is of particular relevance given that prior work has suggested that EMS clinicians cite challenges in pediatric knowledge, application of pediatric specific protocols, and the implementation of related training programs (18–20). Discordance between EMS clinician impression to

hospital-based diagnoses suggest potential need for additional education and learning. These scenarios are described in concepts of therapeutic momentum or inertia, where clinicians are hesitant to escalate or alter a treatment plan put forth by a previous clinician. For example, in evaluation of respiratory diseases, the appropriate identification of auscultatory findings can assist in discerning the need for bronchodilators, corticosteroids, or other therapies. If the EMS clinician's interpretation of the auscultatory findings informs their decision incorrectly to initiate bronchodilator therapies, subsequent clinicians may be hesitant to stop or alter the therapeutic momentum of the treatment (11–14). Differences in impression to diagnosis may inform EMS medical directors on areas where further assessment may lead to better categorization into treatment groups. By improving concordance, clinicians may improve upon initiation of clinical therapy that will be continued or expanded on upon arrival to the hospital.

Limitations

Our findings are subject to limitations. This was a retrospective study, which may be subject to inaccuracies in charting and incomplete data. In-hospital data were missing for a large proportion of EMS transfers, preventing their inclusion into the study sample. However, the overall number of included patients remained high (more than 35,000 children), and these patients had similar demographics to the broader group for most of the evaluated variables except for regional differences. Additionally, several encounters in the data did not have an exact match for ICD-10-CM code, and ICD codes are reported primarily in the context of billing which may alter or influence which diagnoses are listed or prioritized. To optimize the identification and categorization of diagnosis codes, we used approximate string matching. While these optimize the finding of matches and help to overcome limitations with incomplete diagnosis codes, this approach may come at the cost of accuracy. A reference standard for both the hospital-based and EMS impressions is lacking. Our analysis was limited to the use of only primary impressions, given the need to classify each impression into mutually exclusive categories. We therefore did not use secondary EMS impressions and/or multiple hospital-based diagnoses. Their consideration, however, would only improve the frequency of concordant findings. Despite these limitations, the findings from this study provide a useful starting point to evaluate the concordance between prehospital impressions and hospital-based diagnoses for children transported to the hospital by EMS.

Conclusions

Using a large dataset of linked prehospital and in-hospital encounters, we found moderate agreement between EMS impression and hospital diagnosis, highlighting areas for improvement and the need for further evaluation and study of linked prehospital and hospital data. By evaluating EMS impressions and ultimate hospital diagnoses, pediatric protocols may be streamlined, and specific training emphasized to better optimize the care of children with prehospital emergencies.

Declaration of Generative AI in Scientific Writing

The authors did not use a generative artificial intelligence (AI) tool or service to assist with preparation or editing of this work. The author(s) take full responsibility for the content of this publication.

Disclosure Statement

The authors report there are no competing interests to declare.

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