

# Analysis of Pediatric Patient Transfer: Patient Characteristics and Distribution of Departments after Admission

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## Abstract

**Objective:** This study aims to analyze the characteristics of inter-hospital transferred pediatric patients and the distribution of departments receiving these patients from January 1, 2024, to October 31, 2024, in order to assess the effectiveness and efficiency of the transfer services and to identify potential areas for improvement. **Methods:** We conducted a retrospective study, reviewing 731 patient transfers conducted by the pediatric transfer team of the transfer center during the aforementioned period. Data were sourced from electronic medical records of inter-hospital transfers. We analyzed the hospital level of demand for transfer patients, their place of origin, age distribution, diagnostic classification, need for respiratory support, and distribution of admitting departments. **Results:** The study results showed that the majority of transferred patients came from tertiary hospitals (65.94%), with urban patients accounting for 37.21%, and a smaller proportion of patients from outside the province (5.47%). The age distribution was highest for patients aged 1 month to 1 year (37.94%), with respiratory issues being the most common reason for transfer (31.74%). In terms of respiratory support, patients on invasive ventilation accounted for 23.94%, those on non-invasive ventilation accounted for 8.76%, patients on oxygen therapy accounted for 36.53%, and patients without the need for respiratory support accounted for 30.78%. The Pediatric Intensive Care Unit (PICU) was the primary admitting department (52.53%), followed by the Department of Pediatrics (20.52%) and the Department of Pediatric Surgery (10.53%). **Conclusion:** Our study revealed the characteristics of transfer demand for pediatric patients requiring inter-hospital transfers. The results

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highlighted the high demand for transfer services from tertiary hospitals and urban patients from within the province, as well as the reliance of patients with respiratory issues and infants on high-quality, comprehensive medical care and nursing provided by national-level children's medical centers. These findings are significant for optimizing the allocation of transfer resources and improving service quality.

## Keywords

Pediatric Transfer, Patient Destination, Admitting Department, Resource Allocation, Medical Efficiency

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## 1. Introduction

With the advancement of medical technology and the in-depth development of children's health needs, transport medicine has evolved from a simple patient transfer into a complex process involving multidisciplinary cooperation, providing continuous medical and nursing care (Alamshaw et al., 2024). Establishing an efficient transport system not only saves the lives of critically ill children in a timely manner but also provides them with continuous professional medical and nursing services, thereby improving the overall quality of medical services. Transport medicine requires close collaboration between various departments, including the transport center, pediatric emergency, pediatric wards, and pediatric intensive care units. Continuously exploring more effective transport models and methods and coordinating resources from various departments can provide stronger protection for the health of pediatric patients (Stroud et al., 2013). In a retrospective study conducted from January 1, 2024, to October 31, 2024, over a period of ten months, we aimed to deeply analyze the characteristics of inter-hospital pediatric patients and the distribution of departments receiving these patients after transfer. This study not only focused on the effectiveness and efficiency of transport services but also identified potential areas for improvement, with the expectation of enhancing the quality of medical services (Ljungholm et al., 2022).

The goal of transport services is to ensure that critically ill and complex pediatric patients can receive appropriate medical resources and professional nursing services in a timely manner (Gantayet-Mathur et al., 2022). Dedicated pediatric transport teams play a crucial role in this process; they are not only responsible for the safe transfer of patients but also involved in the continuity of patient care and the assurance of medical quality. Dedicated pediatric transport teams can provide better care for pediatric patients and improve their outcomes (Khatrri et al., 2023).

The purpose of this study is to analyze the characteristics of inter-hospital pediatric patients and the departments they are admitted to after transfer, as well as how these data reflect the allocation of transport service resources and medical

efficiency. By analyzing the transport data of 731 patients, we aim to reveal the characteristics of transported patients, including their age distribution, diagnostic categories, and respiratory support status, thereby providing a basis for optimizing the transport process and resource allocation.

## 2. Materials and Methods

This study employs a retrospective research design aimed at analyzing the pediatric transport activities carried out by our transport center's specialized pediatric transport team from January 1, 2024, to October 31, 2024. The study subjects include all pediatric patients transported by this team during the period, covering all age groups from infants to adolescents, but did not include data on newborn patients. We extracted relevant data from the electronic medical records of the transports.

### Data Collection

Data collection includes the level and geographical location of the hospital where the patient was before transport, the patient's age, initial diagnosis, respiratory support status during transport, and the final admitting department.

### Patient Screening

In the initial screening, we excluded cases with incomplete or insufficiently obtainable data. Additionally, we excluded all neonatal transport cases, as these have a fixed age range and admitting departments.

### Data Analysis

Data analysis primarily focuses on several key indicators: the level and geographical location of the hospital where the patient was before transport, the patient's age, initial diagnosis, respiratory support status during transport, and the final admitting department. We use the SPSS 26.0 statistical software for statistical analysis, representing count data in terms of frequency and percentage.

## 3. Results

During the study period from January 1, 2024, to October 31, 2024, our transport center's specialized pediatric transport team conducted a total of 731 patient transports. The following results provide a detailed description of the transport characteristics of these patients and the admitting departments after a transfer, offering us an in-depth understanding of the utilization of transport services.

### Referring to Hospital Level and Geographic Distribution

We first analyzed the level and geographical distribution of the source hospitals for inter-hospital patients to identify the main demand hospitals for inter-hospital transport services and their regions (**Table 1** and **Table 2**). The results show that tertiary hospitals contributed the majority of transported patients, which may reflect their professional capabilities in treating complex cases. The proportion of transported patients from urban hospitals is relatively low, while a significant proportion comes from hospitals outside the city but within the province, which may be related to the geographical distribution and cooperative relationships between

hospitals.

### Distribution of Ages of Transported Patients

The analysis of age distribution revealed differences in the demand for transport services among children of different age groups (Table 3). We found that infants and toddlers were the main utilizers of transport services, which may be related to the higher medical needs of children in this age group.

**Table 1.** Hospital level of the transferring party.

Hospital Level	Number of Patients Transferred	Percentage
Tertiary hospital	482	65.94%
Secondary hospital	233	31.87%
Primary hospital	16	2.19%

**Table 2.** Distribution of the transferring hospital's location of ownership.

Place of Affiliation	Number of Transferred Patients	Percentage
Intra-city	272	37.21%
Other cities within the province	419	57.32%
Other provinces	40	5.47%

**Table 3.** Age distribution of transferred patients.

Age Group	Number of Transferred Patients	Percentage
29 days to 1 year	299	37.94%
1 to 3 years old	105	13.32%
3 to 6 years old	124	15.74%
6 to 12 years old	158	20.05%
12 to 15 years old	40	5.08%
15 to 18 years old	5	0.63%

### Diagnosis Categories of Transported Patients

The analysis of diagnosis categories revealed the main medical issues that necessitate pediatric transport (Table 4). Respiratory issues topped the list of reasons for transport, which may be related to the high prevalence of respiratory diseases among children.

### Respiratory Support Status of Transported Patients

The analysis of respiratory support status revealed the demand for different levels of respiratory support among transported patients (Table 5). The proportion of patients on invasive ventilation is relatively high, which may be related to the proportion of critical cases among the transported patients.

### Admission Department Distribution of Transported Patients

The analysis of admission department distribution revealed the main destinations of transported patients upon arrival at the destination hospital (**Table 6**). The PICU (Pediatric Intensive Care Unit), being the primary admitting department, reflects the high proportion of critical cases among transported patients.

**Table 4.** Diagnostic categories of transferred patients.

Diagnostic Classification	Number of Transferred Patients	Percentage
Respiratory	232	31.74%
Neurologic/psychiatric	85	11.63%
Pediatric Surgery/Surgical/trauma	85	11.63%
Metabolic disease/Diabetic ketoacidosis	18	2.46%
Hematology/oncology	37	5.06%
Cardiac	44	6.02%
Infection	86	11.76%
Shock/organ failure/CPR	93	12.72%
Ingestion/overdose/poisoning	4	0.55%
Gastrointestinal	31	4.25%
Foreign body	4	0.55%
Kidney	12	1.64%

**Table 5.** Respiratory support status of transferred patients.

Respiratory Support Status	Number of Transferred Patients	Percentage
None	225	30.78%
Oxygen therapy	267	36.53%
Non-invasive ventilation	64	8.76%
Invasive ventilation	175	23.94%

**Table 6.** Distribution of admitted departments for transferred patients.

Admitted Department	Number of Transferred Patients	Percentage
CICU	16	2.19%
NICU	14	1.92%
PICU	384	52.53%
SICU	23	3.15%
Pediatric Emergency	67	9.17%
Pediatric Internal Medicine	150	20.52%
Pediatric Surgery	77	10.53%

## 4. Discussion

This study analyzes the data of 731 pediatric patient transfers from January 1, 2024, to October 31, 2024, revealing the utilization of transfer services and the characteristics of patient destinations upon admission. Our findings provide valuable insights for understanding and optimizing the transfer process.

### The Demand and Supply of Transfer Services

The study results indicate that tertiary hospitals are the primary source of pediatric patient transfers, which may be related to these hospitals' ability to handle complex cases (Handley & Lorch, 2022). This finding emphasizes the central role of tertiary hospitals in the transfer network and the high dependence of these hospitals on transfer services. At the same time, the high proportion of transfers from hospitals outside the city but within the province suggests that our transfer services have wide coverage, which is of great significance for providing regional medical services.

### Age Distribution and Transfer Demand

The age distribution data shows that infants and toddlers (1 month to 1 year) are the main users of transfer services, which may be related to the higher medical needs of children in this age group (Black et al., 2016). This finding suggests that transfer services should pay special attention to the unique needs of the infant and toddler population, including the provision of appropriate medical equipment and professional personnel.

### Diagnostic Categories and Reasons for Transfer

Respiratory issues, as the most common reason for transfer, highlight the high incidence and severity of respiratory diseases in children (Kjærgaard et al., 2019). This result is consistent with global studies on the burden of pediatric diseases, where respiratory diseases are one of the leading causes of hospitalization and death in children (GBD 2021 Lower Respiratory Infections and Antimicrobial Resistance Collaborators, 2024). Therefore, our transfer services should prioritize equipping the capability and resources to handle respiratory emergencies.

### Respiratory Support Needs and Patient Severity of Illness

Data on respiratory support indicate that a significant proportion of patients require invasive or non-invasive ventilation support, which further emphasizes the severity of the conditions of the patients being transferred (Miura et al., 2024). This finding suggests that the transfer team should be capable of handling various respiratory support needs to ensure the safety and stability of the patients throughout the entire transfer process.

### Admission Department Distribution and Patient Destinations

The fact that the Pediatric Intensive Care Unit (PICU) is the primary admitting department reflects the high proportion of critical cases among transferred patients. This finding indicates that our transfer services play a crucial role in ensuring that critically ill children can quickly receive appropriate medical treatment and care (Steffen et al., 2020). At the same time, it also suggests that the planning of transfer services should be closely coordinated with the hospital's resource al-

location and departmental capabilities (Slater et al., 2021).

## 5. Summary

In summary, this study provides a comprehensive understanding of pediatric patient transfer services, including the origin, age, diagnosis, respiratory support needs, and admitting departments of the patients. This data is crucial for evaluating the effectiveness of transfer services and guiding future resource allocation. The results of our study provide an empirical basis for the optimization of pediatric patient transfer services. By identifying the main demands of transfer services and patient destinations, we can better plan resource allocation, improve service quality, and ultimately improve patient outcomes.

## Authors' Contribution

Yueting Liu contributed to the manuscript draft. Wenqiong Chen carried out a statistical analysis. Xiaowei Fan and Daoju Jiang contributed to data collection. Peiqing Li contributed to the formal analysis. Weijun Li, Meiling Liao and Yongxian Liang for clinical quality control. Guangming Liu contributed to editing the manuscript. Qiang Wang contributed to the study design and review of the manuscript. All authors read and approved the final manuscript.

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## Data Availability Statement

All data generated or analyzed during this study are included in this published article.

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## Conflicts of Interest

The authors declare that they have no competing interests.

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