Title: Breaking Point: Unraveling the Strain on Emergency Medical Services (EMS) in Colorado and the Rising Role of Interfacility Transports

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Introduction: Reliance on Emergency Medical Services (EMS) has become increasingly evident over time. The Bureau of Labor and Statistics projects the need for EMTs and Paramedics is primed for above-average growth [1], and in Colorado, the demands for EMS are increasing at an unsustainable rate with the current workforce [2]. These rising strains lead to staff burnout [3] and inevitable recruitment and retention issues. Communities need and expect 911 coverage, as well as access to higher levels of definitive care via interfacility transport. As the requests continue to grow, it is critical to understand how to optimize resources by studying the utilization of these services within the larger healthcare system; "Patient movement data is central to strategic resource management… [and] will better equip [EMS administrators] to appropriately match resources to service area needs" [4]. Interfacility transports (IFTs) move patients from one healthcare facility to another and consume an increasingly large proportion of EMS resources, often in under-resourced systems. Currently, there is little research devoted to the incidence and impact of IFTs on EMS systems. This study is the first of its kind to use longitudinal data to introduce a critical discussion of the expanding pressures on EMS systems and the role interfacility transports play.

Objective: 1) Describe the use of interfacility transports in Colorado, 2) Understand how utilization has changed over time, and 3) Examine its impact on the EMS system.

Methods: Data for this study were extracted from electronic patient care reports (ePCRs) within the state-managed data repository, overseen by the Colorado Department of Public Health and Environment (CDPHE). All licensed Emergency Medical Services (EMS) agencies across Colorado are required to capture and transmit information that follows national standards anytime patient contact is made, including key incident details like response times, locations, primary impressions, and patient demographics.

The study dataset covers five years, from July 1, 2018, to June 30, 2023, and includes data from licensed air and ground ambulance agencies. To ensure consistency and facilitate analysis, the data are organized by the state fiscal year (FY), beginning July 1 and concluding June 30 each year. Prior to analysis, duplicates were removed using key identifiers, and incidents outside Colorado were excluded. Colorado transitioned from NEMSIS version 3.4 to version 3.5 during the study, requiring certain data elements to be combined for accurate analysis. This was achieved by aligning older NEMSIS codes with their updated counterparts, maintaining consistency throughout the study timeframe. These meticulous steps ensure the dataset's comprehensiveness, consistency, and accurate reflection of EMS activities in Colorado during the specified timeframe.

Interfacility transport was defined as the transport of patients between two healthcare facilities or between a healthcare facility and a non-healthcare facility, such as a hospital and a patient's home. This study utilized data from the National Emergency Medical Services Information System (NEMSIS) data element, 'Type of Service Requested' (eResponse05) to differentiate interfacility transports from other emergency responses. Incident dates and times were determined using NEMSIS 3.5 data elements 'Unit Notified by Dispatch Date/Time' (eTimes03). A unique metric in this study, "time on task," was calculated by determining the duration between an EMS unit's notification by emergency dispatch and the time the same unit indicated they were ready for service again ['Unit Back in Service Date/Time' (eTimes13) - 'Unit Notified by Dispatch Date/Time' (eTimes03)]. These specific time points were chosen for calculation, as they are timestamps mandated for documentation by local, state, and federal authorities, underscoring their significance, reliability, and validity.

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Results: The analysis encompassed a total of 3,460,794 records, with 751,588 records from July 1, 2022 - June 30, 2023. Within this dataset, 161,964 (22%) interfacility transports were documented in fiscal year 2023. The majority of these transports were conducted via ground ambulances, while a notable subset, comprising nearly 8,000 patients, were transported utilizing fixed or rotor wing aircraft. The temporal distribution indicated a peak between 2pm and 5pm, constituting 20% of all interfacility transports; however, unexpectedly, 13% (over 20,000 transports) occurred between midnight and 6 am. Demographic analysis showed that 48% of transported patients were 65 years of age or older. The most common reasons for interfacility transports were medical specialty care, psychiatric/behavioral care, and extended care, reflecting the diverse healthcare needs prompting patient transfers.

The study data revealed the growing demand for EMS responses; Colorado saw 116,796 more responses in 2023 than in 2019. The use of interfacility transport has demonstrated an especially substantial increase, with 161,964 transfers recorded in 2023, marking a 25% rise from 130,094 transfers observed in 2019. Notably, this surge in interfacility transports outpaces the growth rate of emergency responses, which increased by only 17% during the same period.

Furthermore, the data reveals a 39% increase in the amount of time spent on interfacility transfers (time on task), which escalated from 229,083 hours in 2019 to 317,504 hours in 2023. The average duration spent on ground interfacility transfers also saw a notable uptick, rising from 99.5 minutes in 2019 to 111.5 minutes in 2023. These trends underscore the growing demand for resources to accommodate interfacility transports, highlighting the interagency strains on the healthcare system; “Transfers have gone farther and farther because of less staff at hospitals, and less bed availability. All of this takes resources away from 911 coverage”-Rural EMS Chief. Overall, these findings emphasize the evolving landscape of interfacility transport in Colorado and its undeniable impact on the EMS system, warranting continued assessment and optimization to effectively address the escalating demands for these healthcare services.

Conclusion: This study provides a novel glimpse into the growing utilization of interfacility transports by an already under-resourced system. Rising healthcare stressors have significant downstream effects and suggest an imminent breaking point. One EMS director starkly explains, “Staff are on the verge of quitting because they were being asked to do multiple transfers without regard to time of day, road conditions, or staff or patient safety”. These data reveal a significant volume of transports occur during night hours that are often more dangerous. This coupled with the increases in call volume and excessive time on task have a resounding impact on provider retention, satisfaction, and safety as well. Tragically, a recent line-of-duty death in rural Colorado epitomizes the risks of overburdening EMS providers. Patients are consistently being transported hundreds of miles away from their homes, often by agencies with dwindling staff, forcing them to remove critical response capabilities in their communities. Additional research is necessary to identify factors that contribute to this growing burden, minimize non-urgent transports during dangerous times, and facilitate more provider and patient-centered solutions for improved resource utilization.

References

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