

Title: Evaluating Interfacility Transports and Medical Transports in South Carolina

Introduction: The South Carolina Office of EMS has, for the first time, seen a reduction in total EMS call volume. The decrease from 2016 to 2017 was driven by a reduction in interfacility transports and medical transports. 9-1-1 call volume and all other call types continued to increase in 2017. It is assumed that a change in medicare reimbursement rules may be responsible for this decrease. To fully understand this reduction it is important to compare specific elements of these types call in 2016 and 2017. Further, it is unknown if there are disparities in care that have arisen due to the decrease in call volume.

Objective: To describe differences in interfacility and medical transports in 2016 to those in 2017 and identify disparities if they exist.

Methods: This retrospective observational study examined all interfacility transports and medical transports in South Carolina in 2016 and 2017. Study data were obtained from the South Carolina State EMS Data System located within the EMS Performance Improvement Center at the University of North Carolina - Chapel Hill. This study evaluated patient demographics and call data obtained from Prehospital Care Reports. Specifically, this study analyzed information on patient demographics, the community size, and the types of facilities that patients were transported to and from. To facilitate statistical analysis, the facilities that patients were transported to were categorized as health care facility, home or residence, and other. The other category included street or highway, businesses, residential institutions, public buildings, and place of sport or recreation. The destination location was also collapsed into the following categories: hospital, home, medical office or clinic, nursing home, and other. Descriptive statistics were calculated. Chi-square and Wilcoxon Rank Sum tests were performed to test for statistical significance.

Results: In 2016 there were 93,896 interfacility transports and 482,427 medical transports in South Carolina. In 2017 there were 86,774 interfacility transports and 462,854 medical transports. This represents a 7.6% decrease in interfacility transports and a 4.1% decrease in medical transports ($p < 0.001$). When examining interfacility transports, the duration of calls in 2017 was significantly longer than 2016 ($p < 0.001$). In 2016, the average interfacility transport was 76.05 minutes (standard deviation 34.96) with a median of 70.7 minutes (interquartile range 50.73 to 96.00). In 2017, the average interfacility transport was 81.92 minutes (standard deviation 35.32) with a median of 81.92 minutes (interquartile range 56 to 103). There was also a statistically significant difference noted when examining the facility from which the patient was transported ($p < 0.001$). In 2016, 89.3% (79,540) of calls were transported from a health care facility, 9.4% (8,338) were transported from a home or residence, and 1.3% (1,174) were transported from a facility categorized as other. In 2017, 83.2% (67,280) were transported from a healthcare facility, 6.4% (5,178) were transported from a home or residence, and 10.4% (8,438) were transported from a facility categorized as other. In 2016, 48.2% (43,421) of patients were transported to a hospital, 18.2% (16,382) were transported to a nursing home, 16.0% (14,423) were transported to a medical office or clinic, 12.4% (11,135) were transported to a home, and 5.3% (4,756) were transported to an institution categorized as other. In 2017, 51.2% (39,643) of transports were to a hospital, 19.4% (15,017) of transports were to a nursing home, 13.3% (10,322) were transported to a medical office or clinic, 9.0% (6,986) of transports were to a home, and 7.1% (5,498) were transported to a facility categorized as other. The difference in transport destinations from 2016 to 2017 was statistically significant ($p < 0.01$). When evaluating patient demographics, in 2016, the average age of interfacility transport patients was 63.1 years (standard deviation 21.1) with a median of 68 years (interquartile range 55 to 78). In 2017 the average age was 62.1 years (standard deviation 21.4) with a median of 67 years (interquartile range 53 to 77). The difference in age was statistically significant ($p < 0.001$). There was also a statistically significant difference for patient sex ($p < 0.001$). In 2016, 51.53% (47,942) of patients were female and 48.5% (45,089) were male. In 2017, 50.1% (42,708) of

patients were female and 49.9% (42,567) or patients were male. There were 43.3% (38,411) of patients who were black or African American in 2016, 55.1% (48,892) who were white, and 1.7% (1,515) that were categorized as other. In 2017, 41.2% (31,517) of patients were black or African American, 56.2% (43,031) were white and 2.6% (1,996) were categorized as other. The difference in race from 2016 to 2017 was statistically significant ($p<0.001$). Finally, when evaluating the community size where the interfacility transport took place, in 2016, 77.2% (70,044) were in urban areas, 22.0% (19,919) were in rural areas, and 0.8% (738) were in super rural areas. In 2017, 79.0% (62,838) were in an urban area, 20.2% (16,066) were in a rural area, and 0.8% (676) were in a super rural area. The difference in community size was statistically significant ($p<0.001$).

When examining medical transports, the duration of calls in 2017 was significantly longer than 2016 ($p<0.001$). In 2016, the average medical transport was 69.71 minutes (standard deviation 34.85) with a median of 64.00 minutes (interquartile range 44.00 to 90.00). In 2017, the average medical transport was 70.69 minutes (standard deviation 34.86) with a median of 65.00 minutes (interquartile range 45.00 to 90.40). There was also a statistically significant difference noted when examining the facility from which the patient was transported ($p<0.001$). In 2016, 65.4% (302,802) of calls were transported from a health care facility, 23.0% (106,671) were transported from a home or residence, and 11.5% (53,433) were transported from a facility categorized as other. In 2017, 61.5% (267,154) were transported from a healthcare facility, 23.0% (100,013) were transported from a home or residence, and 15.5% (67,549) were transported from a facility categorized as other. In 2016, 13.8% (57,903) of patients were transported to a hospital, 23.8% (100,398) were transported to a nursing home, 32.2% (135,731) were transported to a medical office or clinic, 26.5% (111,686) were transported to a home, and 3.7% (111,686) were transported to an institution categorized as other. In 2017, 13.8% (53,884) of transports were to a hospital, 23.5% (91,808) of transports were to a nursing home, 26.8% (104,412) were transported to a medical office or clinic, 26.1% (101,637) of transports were to a home, and 9.8% (38,382) were transported to a facility categorized as other. The difference in transport destinations from 2016 to 2017 was statistically significant ($p<0.01$). When evaluating patient demographics, in 2016, the average age of medical transport patients was 68.2% years (standard deviation 15.1) with a median of 70 years (interquartile range 60 to 79). In 2017 the average age was 68.3 years (standard deviation 15.2) with a median of 70 years (interquartile range 61 to 79). The difference in age was statistically significant ($p<0.001$). There was not a statistically significant difference patient sex ($p<0.322$). In 2016 and 2017, 53.9% of patients were female and 46.1% were male. There were 56.7% (255,382) of patients who were black or African American in 2016, 41.9% (188,601) who were white, and 1.5% (6,676) that were categorized as other. In 2017, 55.2% (231,925) of patients were black or African American, 42.9% (180,559) were white and 1.9% (8,024) were categorized as other. The difference in race from 2016 to 2017 was statistically significant ($p<0.001$). Finally, when evaluating the community size where the medical transport took place, in 2016, 72.7% (320,281) were in urban areas, 26.6% (117,017) were in rural areas, and 0.7% (3,214) were in super rural areas. In 2017, 70.5% (293,006) were in an urban area, 28.6% (118,978) were in a rural area, and 0.9% (3,585) were in a super rural area. The difference in community size was statistically significant ($p<0.001$).

Conclusion: Although many comparisons between 2016 and 2017 interfacility and medical transports revealed a statistically significant result, most were not practically significant. Results from this study do not suggest that any disparities in care resulted from the drop in call volume over the study period. The most notable difference found was a 5 minute increase in call duration for interfacility calls. This study does provide important benchmarks that may help EMS stakeholders evaluate interfacility and medical transports going forward. Future research should seek to evaluate patient outcomes for interfacility and medical transport patients.