Falls Protocol Lift Assist Calls: Predictors of Repeat 911 Calls

Lee Van Vleet MHS, NRP[1]; Marty Gray BS, EMD-Q[2]; Dawn Faudere EMT-P, EMD-Q,[3]; Daniel Ashwood, PhD[4]; Alissa Wheeler, BS[4]; Christopher Olola, PhD[4]

1. Durham County EMS, North Carolina, USA
2. Huntsville Emergency Medical Services, Inc., Alabama, USA
3. Johnson County Emergency Communications, Kansas, USA
4. International Academies of Emergency Dispatch, Utah, USA

Corresponding Author
Lee Van Vleet
Durham County
Emergency Medical Services
201 East Main St., Suite 660
Durham, North Carolina 27701
Phone. +1-(919) 560-8234
Email. lvanvleet@dconc.gov

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ABSTRACT

Introduction: Emergency Medical Services (EMS) regularly respond to lift assist calls. Previous studies have shown lift assist calls present a significant risk of morbidity and mortality. This group of callers is also likely to make repeated calls to 911 for EMS assistance. The ability to foresee which of these patients may need to call 911 again within 24 hours could help decrease the risk posed to patients in these situations.
Objectives: To 1) describe calls originating as lift assist calls with repeat calls within 24 hours, 2) explore the relationships for predictive ability of repeat 911 calls for the following: EMS scene time, patient initial and final vital signs, patient age, and gender.
Methods: This was a retrospective descriptive study using de-identified data from three emergency dispatch and emergency medical services (EMS) agencies, collected from January 1, 2017 through July 31, 2018. R statistical software (R, version 3.5.2) was used for data analysis. Descriptive statistics describe lift assist and repeat calls. Fisher's exact and Wilcox rank sum test explored the relationship of possible predictor variables of repeat vs. non-repeat calls.
Results: Of all calls for "fall" (n = 15,666), a total of 6,701 were identified as lift assists. A total of 256 (3.82%) of the lift assist calls were identified as repeats. Gender was similarly represented in repeat calls (63.8% female) and non-repeat calls (61.0% female). Overall patient-caller's median age was 77 (Q1, Q3: 64, 85). Repeat callers were slightly older than non-repeat callers (77 years and 73 years, respectively; p<0.001). Median total EMS scene time differed between non-repeat calls and repeat calls in a statistically significant manner; 18.13 minutes and 19.73 minutes respectively; (p<0.001). Patient gender did not differ significantly by repeat call status (p=0.428). Individual vital signs did not differ by caller group, nor did initial and final vital signs.
Conclusions: Patient age and total EMS scene time were predictors of repeat calls while vital signs did not change between initial and repeat calls. This may indicate that repeat 911 calls within 24 hours of an initial lift assist call are connected to non-medical factors.
Keywords: Emergency Medical Services; Emergency Medical Dispatch; 911; Lift Assist; Falls; Repeat Callers.

INTRODUCTION

Emergency Medical Services (EMS) regularly respond to calls with a primary dispatch determinant of "fall" that do not result in subsequent transport to a hospital.[1,2] A common variant of these minor fall calls is the request for assistance lifting a patient from the floor and placing them back into a position of comfort such as a bed or chair without subsequent EMS transport; these are typically referred to as "lift assist" calls.[1]

Previous studies have shown lift assist calls without subsequent EMS transport present a significant risk of morbidity and mortality to patients.[3,4] Additionally, research suggests that this patient population is also likely to make repeated calls to 911 for EMS assistance.[1,5,6] Such repetition may place excess demand on limited EMS resources in addition to the already heavy load fall calls represent.[7] Consequently, many EMS systems have sought to provide alternative care and transportation/destination pathways to better address this subset of patients.[8]

Of those patients that call 911 for EMS assistance a second time within 24 hours there appear to be widely variable complaints that may or may not be associated with the previous lift assist call.[1] The ability to foresee which of these patients is likely to call 911 again within 24 hours could decrease the risk posed to patients and EMS systems. Knowing what factors may be predictive of a repeat EMS visit will

allow the development of emergency dispatch and treatment protocols to improve patient care practices and allocate resources more efficiently. This study seeks to examine specific call components for the ability to predict repeat calls and to describe the characteristics of lift assist calls with repeat calls to the same patient within 24 hours.

OBJECTIVES

This study has two primary objectives. First, to describe initial and repeat calls to the same patient within 24 hours for calls that originate as lift assist. Second, to explore the relationships for possible predictive ability of repeat calls within 24 hours of the following: total EMS scene time, patient initial and final vital signs, patient age, and patient gender.

METHODS

Design and Setting

This was a retrospective descriptive study using de-identified data from three EMS agencies and their dispatch centers in the United States of America: Huntsville Emergency Medical Services, Inc. (HEMSI), Alabama (IAED accredited center of excellence [ACE); Williamson County Emergency Communications, Texas; and Johnson County Emergency Management & Communications, Kansas. Each of these centers serve primarily suburban populations between 370,000 and 622,000 population. The data were collected from January 1, 2017 through July 31, 2018 using the Medical Priority Dispatch System (MPDS®) Protocol and ProQA dispatch protocol software (MPDS version 13.0, ©2015, Priority Dispatch Corp., Salt Lake City, UT, USA).

Inclusion Criteria

Because of varied terminology used by the EMS systems included, for the purposes of this study "lift assist" calls are defined as: all calls dispatched using MPDS Chief Complaint Protocol 17 (Falls), coded as ALPHA determinant level, regardless of determinant descriptor. These calls were examined to ascertain which had a repeat 911 call(s) to the same patient within 24 hours of the initial dispatch. Due to the lack of more specific post-call EMS coding in the systems enrolled, this definition was chosen rather than the similar ones proposed by Cone (2013) and Leggatt (2017). In each of the EMS systems examined, lift assist calls fall within the 17-ALPHA determinant level.

Outcome Measures

The outcome measures included: (a) description and frequency of calls that originated as lift assist calls with their associated repeat calls, and (b) predictors of repeat calls.

Data Analysis

Patient age, gender, vital signs, paramedic primary impression, and total EMS scene time were examined for each call/repeat call. EMS call report data were abstracted by FirstWatch, (FirstWatch Solutions Corporation, Encinitas, California). R statistical software (R, version 3.5.2) was used for data analysis. Descriptive statistics describe the number of lift assist and repeat calls. Fisher's exact test and Wilcox rank sum test explored the relationship of possible predictor variables for repeat vs. non-repeat calls.

RESULTS

Of all calls originating as MPDS Falls Protocol 17 (n = 15,666), a total of 6,701 met the definition for Lift Assist calls (17-Alpha). A total of 256 (3.82%) of those subjects initially seen for 17-Alpha complaints were identified as repeat patients, having called 911 again for EMS less than 24 hours after the initial 17-Alpha call. Twenty-three cases were removed from final analysis due to missing ProQA determinant codes. This resulted in the final analysis including 6,173 non-repeat calls and 249 (4.0%) repeat calls. MPDS Falls protocol 17 was the most prevalent chief complaint protocol (n = 95, 38%) among repeat callers, followed by MPDS protocol 26 Sick Person, (n = 23, 9%). Gender was similarly represented in repeat callers (63.8% female) and non-repeat callers (61.0% female).

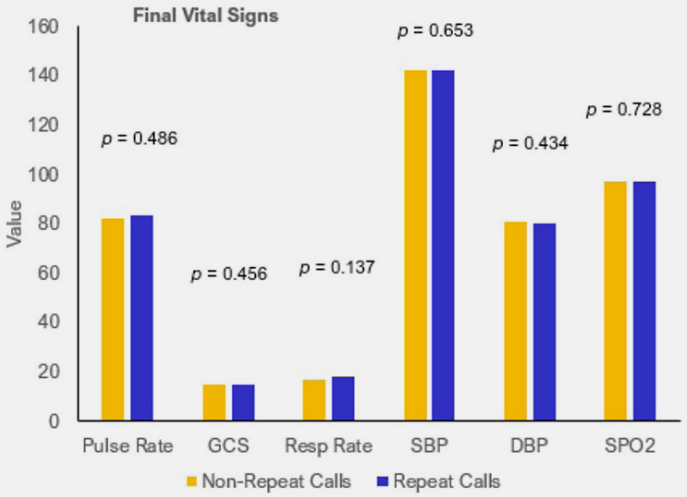
Overall median age of patients was 77 (Q1, Q3: 64, 85). Repeat callers were slightly older than non-repeat callers (77 years and 73 years, respectively; p<0.001).

Total EMS Scene Time

Median total EMS scene time also differed between non-repeat callers and repeat callers in a statistically significant manner: 18.13 minutes and 19.73 minutes, respectively (p<0.001). Patient gender did not differ significantly by repeat call status (p=0.428).

Vital Signs and Dispatch Determinants

Individual vital signs did not differ by call group (initial vs. repeat call), nor did median initial and final vital signs vary greatly, with the majority of initial and final values being the same. (Fig. 1).



GCS, Glasgow Coma Score; SBP, Systolic Blood Pressure; DBP, Diastolic Blood Pressure; SPO2, peripheral capillary oxygen saturation.

Figure 1. Patient vital signs categorized by call type – non-repeat vs repeats calls

The Falls – Not Dangerous (on the ground or floor) [17A02G) had the highest percentage of repeat calls (12.0%), followed by Falls – Public Assist (on the ground or floor) [17A04G) (7.2%) (Fig. 2).

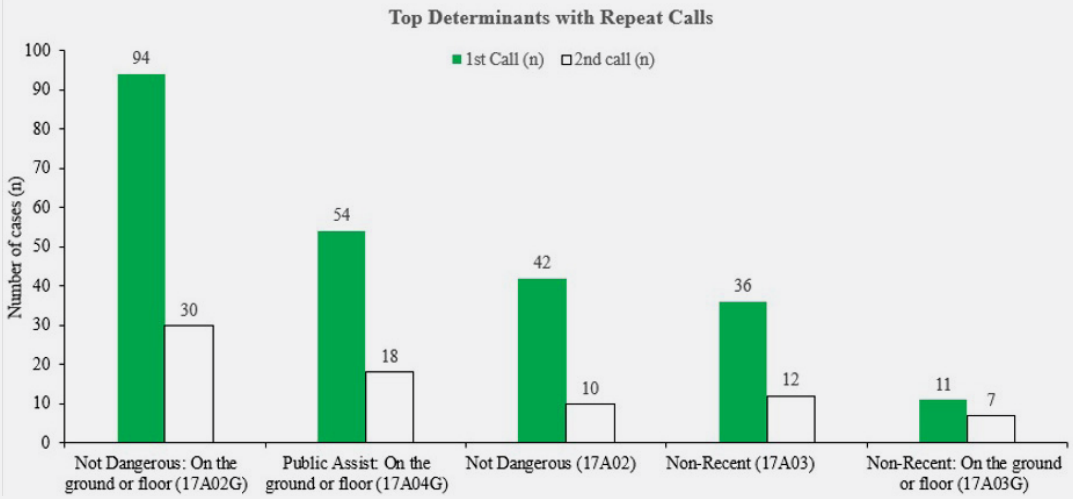


Figure 2. Top 5 determinant codes by first call and second call

DISCUSSION

Patient age and total EMS scene time were statistically significant predictors for repeat calls within 24 hours. Descriptive categorical results suggest calls with a primary impression of "weakness", "pain" or "monitoring required" had a higher occurrence of repeat calls.

Extended EMS scene times may be the result of more complex cases, although the specific reason is unclear; the data set does not allow for further examination of this factor. The finding of older patients being more likely to be repeat callers is consistent with extant research.[2,4] The elderly patient is more likely to possess comorbidities that may prompt further EMS utilization. It remains unclear whether the initial fall call is a "sentinel event" as described by Leggatt,[2] or a symptom of functional decline as discussed by Wilber, Blanda, & Gerson.[9]

According to Argawal et al.,[6] "A growing body of literature studies potential psychosocial factors behind frequent ED usage." extrapolation of this concept to frequent 911 callers is a logical step. The fact that repeat calls varied significantly by age and total EMS scene time, but not patient vital signs, indicates that repeat calls may be influenced more by psychosocial factors than objective biological measures or reported call nature. Future research should explore the possibility of such socio-behavioral elements; this study's data suggest factors that may assist the focus of such examinations. Alternatively, there may be issues with the accuracy of vital signs in an EMS setting as record keeping of vital signs can vary based on the situation, severity of injury, etc. Future studies may also need to examine the accuracy and reliability of such measures.

The description of this subset of patients that are repeat callers to 911 within 24 hours may inform additional research into this caller population. Development of a predictive algorithm for this group of patients would allow for the creation of more specific Emergency Medical Dispatch (EMD) and EMS protocols with concurrent interventions designed to better address the potentially unique needs of these patients.

Limitations

As Brown[10] has pointed out, "lift assist" is an imprecise term. This study does not mirror the definition of Cone et al.,[1] or Leggatt et al.,[2] and the lack of a specific post-call coding for "lift assist" applied by the EMS crew continues to foster this confusion. MPDS terminology may not coincide with local EMS system terminology leaving the definition of "lift assist" unclear when examining multiple systems. Not all 911 calls dispatched as 17-A-4 "lift assist" are coded as such by the responding EMS crew, just as many "fall" dispatches may ultimately be defined by the responding EMS crew as a "lift assist". A standardized definition would facilitate greater specificity and uniformity for future research.

EMD compliance scores were not available for every call center examined, although one of the three centers is an ACE, this remains a limitation for the other two centers. As with any retrospective analysis, incomplete data, and variation in practice across multiple EMS systems in different U.S. states are limitations to the robustness of this study's findings.

CONCLUSION

Repeat calls for EMS within 24 hours of an initial lift assist call are more likely for older patients. Longer total EMS scene time on the initial lift assist call is also predictive of a repeat call within 24 hours. Total elapsed EMS scene time and patient age are the only statistically significant predictors of repeat calls. While paramedic primary impression of "weakness", "pain" or "monitoring required" is associated with increased likelihood of a repeat call within 24 hours of an initial lift assist call. Repeat callers are more likely to be older than initial lift assist callers and females are more represented among the repeat caller group. Vital signs did not vary between initial and repeat calls.

The findings that patient age and total EMS scene time were predictors of repeat calls while vital signs did not change may indicate that repeat 911 calls within 24 hours of an initial lift assist call are connected to non-medical factors. More comprehensive studies are needed to examine these factors in greater detail.

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