

# A Case Control Study to Improve Accuracy of an Electronic Fall Prevention Toolkit

Patricia C. Dykes DNSc, RN<sup>a</sup>, Evita Hou I-Ching RN, MSN<sup>b</sup>,  
Jane R. Soukup<sup>a</sup>, Frank Chang MSE<sup>c</sup>, Stuart Lipsitz ScD<sup>a</sup>

<sup>a</sup>Brigham and Women's Hospital, Boston, MA, <sup>b</sup>National Taiwan University Hospital, Taipei, Taiwan, <sup>c</sup>Partners Healthcare System, Boston, MA

## Introduction

Patient falls are a serious and commonly reported adverse event in hospitals [1]. In 2009, our team conducted the first randomized control trial of a health information technology-based intervention that significantly reduced falls in acute care hospitals [2]. However, some patients on intervention units with access to the electronic toolkit fell. The purpose of this case control study was to use data mining and modeling techniques to identify the factors associated with falls in hospitalized patients when the toolkit was in place.

## Methods

Descriptive statistics using two-by-two tables were generated to describe demographic data of cases and controls including percentages within each case/control group. Differences in patient characteristics for cases and controls were evaluated using conditional logistic regression. A priori variables considered for a multivariate conditional logistic regression model included the following significant intervention variables ( $P < 0.05$ ): Document previous fall, out of bed with assist, 1-person assist, 2-person assist, cane, bed/chair alarm, bed close to nursing station, and frequent checks/reorientation. Due to the relatively small sample size, after adjusting for significant patient characteristics, we entered one FTTK intervention exposure into the model at a time. Exact P-values were calculated where feasible. All P-values were two tailed and a P value  $< 0.05$  was considered statistically significant.

## Results

A total of 67 patients fell on intervention units during the 6-month intervention period. Of the patients who fell, one was excluded due to incomplete data. Of the remaining cases, 48 had three or more matches for gender, age (within 5 years), first MFS total score and unit length of stay) for a total sample size of 192.

The univariate conditional logistic regression analyses were completed to answer the research question, “*What factors are associated with falls in older patients?*” Significant associations were found for the following three interventions: ambulatory aid: cane, out of bed with assistance, and two person assist. These three variables were entered into the conditional logistic regression equation and findings suggest that cases (fallers) were significantly less likely than matched controls (non fallers) to be patients who before the fall did not use a cane as an ambulatory aid. Fallers were also 10.1 times more likely than matched controls (non fallers) to be patients who were before the fall known to require assistance getting out of bed (e.g., the FTTK recommended this intervention based on the MFS fall risk profile) and were 14.26 times more likely than non fallers to be known before the fall to require 2 people for assistance when getting out of bed or walking (e.g., the FTTK recommended this level of assistance based on the MFS fall risk profile).

## Discussion

Our ultimate aim was to apply our findings to improve the toolkit logic and to generate practice recommendations. The results of our evaluation suggest that the fall prevention toolkit logic is accurate but strategies are needed to improve adherence with the fall prevention intervention recommendations generated by the electronic toolkit.

## References

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2. Dykes PC, Carroll DL, Hurley A, et al. Fall prevention in acute care hospitals: a randomized trial. *JAMA* 2010;304:1912-8.