Emergency department revisits at thirty days are associated with caregiver burden: a prospective cohort study

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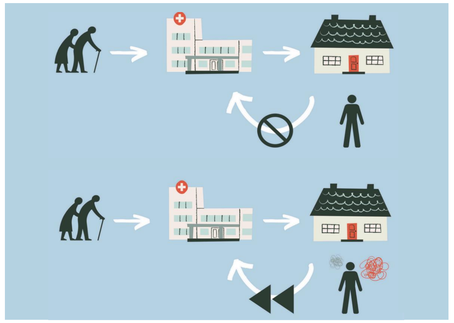
Importance and objective

- Caregivers play a protective role in emergency department (ED) care transitions [1]
- When the demands of caregiving result in caregiver burden, ED returns can result [2]
- We developed logistic regression models describing how caregiver burden may predict ED revisits and admissions up to thirty days after discharge



Can caregiver burden predict emergency department (ED) revisits and admissions within 30 days of discharge among older adults?

Design

This prospective cohort study nested within the LEARNING WISDOM [3] clinical trial included older adult (aged 65 and up) patients who:

1. Visited the ED from one of four acute care hospitals and were triaged to a stretcher within the ED
2. Underwent a transition of care from one of four EDs in the Chaudière-Appalaches region
3. Were discharged between January 1st, 2019, and December 21st, 2021

We contacted patients after their index visit, and then their caregivers

Main Outcomes and Measure

Revisits to the ED were defined as a return to any ED in the 4-hospital network

Caregiver burden was collected using the brief twelve-item Quebec French version of the Zarit Brief Burden Interview (ZBI) [4]

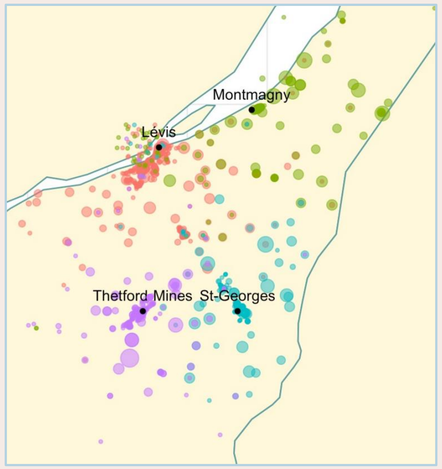


Figure 1. Map showing the four acute care hospitals (black dots) where patients were recruited. Each colored dot represents a patient's postal code. Larger and darker dots mean more patients came from that area.

Analysis Plan

Power Analysis

- A priori simulations using ZBI scores
- Sample size of 700 patients estimated to provide 80% power
- Models designed to include up to 3 covariates and 3 interaction terms

Statistical Modeling

- Logistic regression with a purposeful selection algorithm [5]
- Outcomes:
  - ED revisits at 3, 7 and 30 days
  - ED revisits at 30 days resulting in hospital admissions
- Predictor of interest: Caregiver burden (ZBI scores)
- Moderator: COVID-19 pandemic period
- All clinically relevant variables included as covariates
- Analyses conducted in R (version 4.3.0)

Sensitivity & Exploratory Analyses

- Assessed potential bias from timing of ZBI score collection (some questionnaires collected after the revisit)
- We compared model results between dyads with ZBI collected before versus after ED revisit

Results

From the 5,016 participants in the LEARNING WISDOM cohort, 1,409 patient-caregiver dyads were included.

ZBI Scores	**Average: 7.33 (SD = 7.11); Cronbach's alpha = .87 (95% CI [.86, .89])**
Patients	Women: 49.5%, Men: 50.5%, aged 77 on average (SD = 7)
Caregivers	Women: 69.6%, Men: 30.4%, aged 64 on average (SD = 12)
Caregiver-Patient Relationships	Parent-Child: 48.0%, Spouses: 37.9%, Other: 14.1%
ED Revisit Rates	30 days: 20.7%, 7 days: 9.4%, 3 days: 5.3%, Admission within 30 days: 6.2%

Table 1. Summarized demographic characteristics

Model	Main Results
30-day ED Revisits	ZBI scores and ED visits in the past year positively predicted revisits. The COVID-19 period moderated the effect of ZBI scores on revisits and attenuated the association during the period between Wave 2 and Wave 3.
7-day ED Revisits	Female sex, ED visits in the past year, CTAS triage level 2, patients living alone, caregiver residing home alone positively predicted revisits. ED length of stay on stretcher negatively related. ZBI scores not significant.
3-day ED Revisits	ED visits in the past year, CTAS triage levels 4, 3, 2 positively predicted revisits. ED length of stay on stretcher, caregiver living alone or in care/retirement home protective. ZBI scores not significant.
30-day Admissions	Walk-in arrival, Charlson comorbidity index positively predicted revisits. Higher annual caregiver revenue protective. ZBI scores not significant.
Sensitivity Analyses	Caregiver burden measured before ED revisit improved predictive ability. Coefficient for ZBI scores did not change significantly.

Table 2. Summarized results from logistic regression models and sensitivity analyses

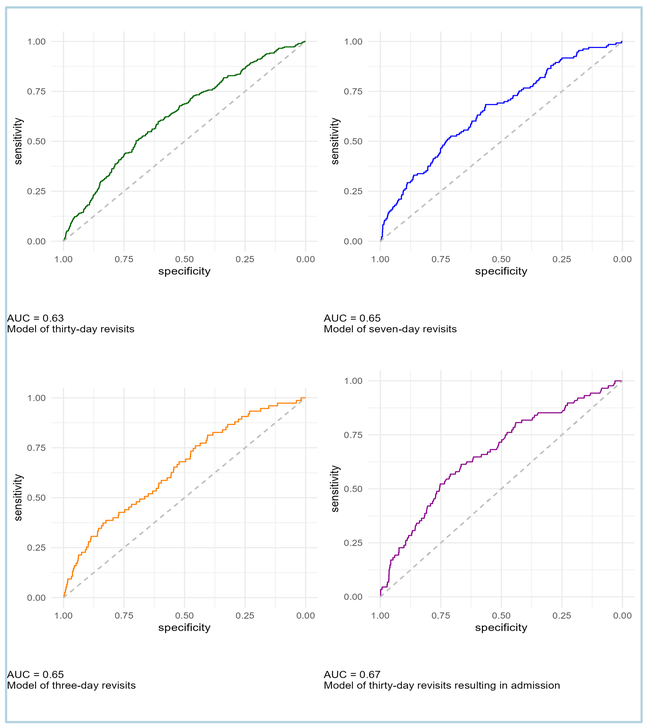


Figure 2. Receiver operating characteristics (ROC) curves associated with each logistic regression model.

Key finding: Each point increase on the caregiver burden (ZBI) scale was associated with a 2.8% increase in the odds of a 30-day revisit to the ED (OR = 1.03, *p* = 0.03), but not in models with shorter time windows, nor for admissions.

Conclusions and Relevance

- Caregiver burden might modestly predict ED revisits over 30 days—effect sizes for burden tend to be small [6]
- The modest area under the curve (C-statistic) for all regression models suggest there are important missing variables at play, like frailty of patients and their caregivers
- In qualitative analyses, burden for caregivers in this cohort already experiencing caregiver burden increased slightly following the index visit of an ED care transition [7]
- In practice at the ED, an ultra-short version of the ZBI (the ZBI-1) [8] could be tested prospectively to screen caregiver burden in the ED
- Mitigation strategies for burden put in place prior to ED discharge could reduce ED revisits [9]

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