Crowding in the Emergency Department: Assessing Relationship with Worker-Directed Violence

Laetitia Zhang[1], Karl Jablonowski, MS[3,4,5], Marie C. Vrablik, MD, MCR [mentor][2,3,4,5]

1: School of Arts and Sciences, Johns Hopkins University 2: Harborview Injury Prevention & Research Center
3: School of Medicine, University of Washington 4: Harborview Medical Center 5: University of Washington Medical Center

Background

- Violence in the emergency department (ED) affects 1 million workers nationwide[1]
- Costly impact of occupational violence, including
  - Financial burden on industry
  - Emotional burden on the victim
- Rising occupational injury rates indicate inadequacy of current interventions[2]
- Crowding in the ED associated with adverse consequences
  - Increased length of stay, compromised care, and high stress[3]
  - Potential association between occupancy rates and rates of ED violence[3]
- Knowledge gaps exist in understanding factors contributing to ED violence
  - Violent events severely underreported[2]
  - Limited studies on environmental circumstances including crowding
  - Previous studies rely on retrospective study design[3]

Aims

- Obtain a more complete understanding of worker-directed violence in the ED through direct observation
- Compare crowding on days with and without observed violent events

Methods

- **Direct observation**
  - Setting: Harborview Medical Center (HMC) ED
  - Convenience sampling
  - Recorded violent events, defined as acts of aggression
    - Directed against healthcare workers
    - Perpetrated by patient or visitor
  - Types of aggression
    - Verbal (e.g. yelling at provider, cussing, derogatory statements)
    - Physical (e.g. threatening gestures, kicking, punching, biting)

- **Crowding metrics**
  -

Total patients	Total number of patients in ED that day
Time to bed	Median time (min) from arrival at ED to obtaining a bed that day
Length of stay (LOS)	Median length of stay (min) of patients that day
Boarder hours	Total time (min) boarders* reside in ED that day *Defined as patients residing in ED for over two hours upon decision of admission

  - Used as indicators of crowding in the ED

- **Data collection days**
  - **Violent**: having one or more violent events within collection period
  - **Nonviolent**: having no violent events within collection period
  - Compared difference in daily metrics from monthly averages to adjust for seasonal fluctuation in crowding

Results

Comparison of Crowding Metrics

Figure 1. Total patients on days with and without violence

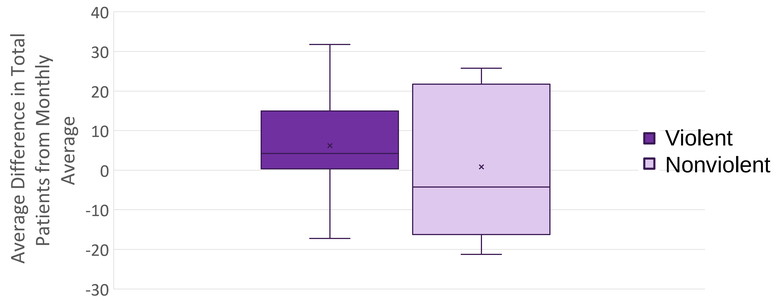
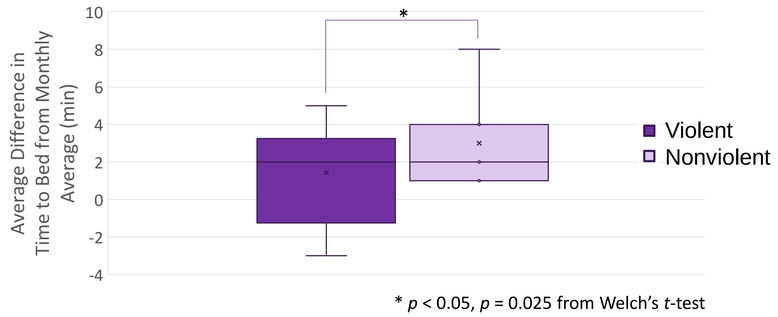


Figure 2. Time to bed on days with and without violence



* $p < 0.05$, $p = 0.025$ from Welch's t-test

Figure 3. LOS on days with and without violence

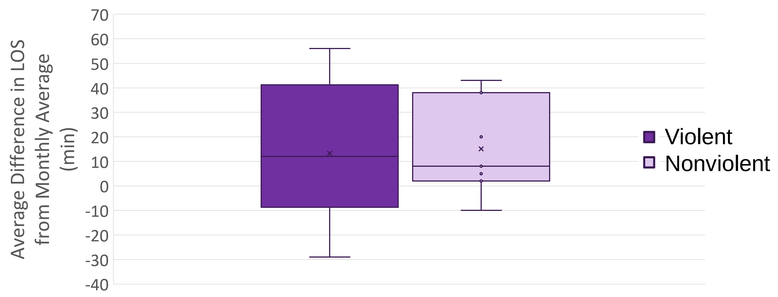


Figure 4. Boarder hours on days with and without violence

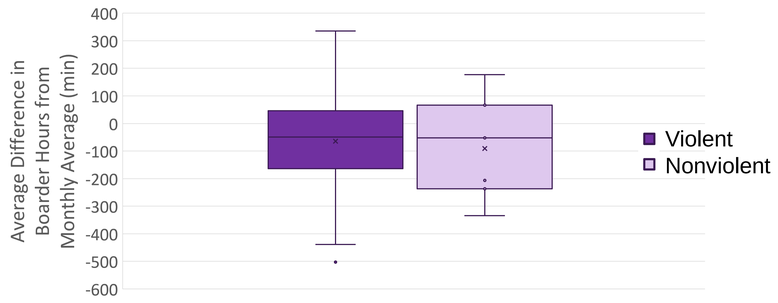


Table 1. Observation summary

Observation Hours	Total hours (hr)	123
	Average collection period (hr)	5.6
Data Collection Days	Total days (dy)	22
	Violent (dy)	15
	Nonviolent (dy)	7
Violent Events	Total events	29
	1 event every *x* hours	4.2

Conclusions

- Mixed results concerning relationship between crowding and violence
  - Higher crowding on nonviolent days indicated by time to bed
  - No significant difference indicated by other metrics
- May not be a compelling approach to address ED worker-directed violence by targeting crowding

Limitations

- Unrecorded events due to convenience sampling
- Limited indication of crowding at the time of the event
- Inability to access monthly averages for June 2017 and July 2017
  - Used monthly metrics from previous year
  - May underestimate LOS and overestimate boarder hours
- Does not reflect staffing or other factors that may influence burden on the ED

Next Steps

- Continue needs assessment of ED worker-directed violence
  - Abstract crowding metrics from hours leading up to each event
  - Increase observation hours
  - Compare other ED settings
  - Investigate patient-level characteristics
- Offer evidence-based recommendations for intervention toolkit

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References

1. Mayer BW, Smith FB, King CA. Factors associated with victimization of personnel in emergency departments. *J. Emerg. Nurs.*1999;25(5):361-366.
2. US Government Accountability Office. *Workplace Safety and Health: Additional efforts needed to help protect health care workers from workplace violence*. Washington, DC; 2016.
3. Dylan B. Medley, James E. Morris, C. Keith Stone, Juhee Song, Thomas Delmas, Kunal Thakrar, An Association Between Occupancy Rates in the Emergency Department and Rates of Violence Toward Staff, The Journal of Emergency Medicine, Volume 43, Issue 4, 2012, Pages 736-744, ISSN 0736-4679, http://dx.doi.org/10.1016/j.jemermed.2011.06.131.