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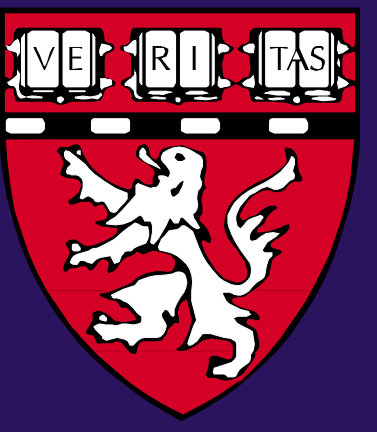
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TRADEOFFS BETWEEN ALLEVIATING EMERGENCY DEPARTMENT CROWDING AND RETURN VISITS

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for the 6th Danish Emergency Medicine Conference



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INTRODUCTION

- Despite multiple attempts to alleviate emergency department (ED) crowding, the problem persists
- High leverage points for ED crowding are yet to be identified

OBJECTIVE

- To analyze the effects of a local protocol with system-wide effect on ED crowding. The protocol is activated when ED predefined census- and boarders levels are exceeded
- To rank other parameters according to ED crowding leverage potential including inpatient capacity, bed assignment time, transfer time, and incoming elective patients

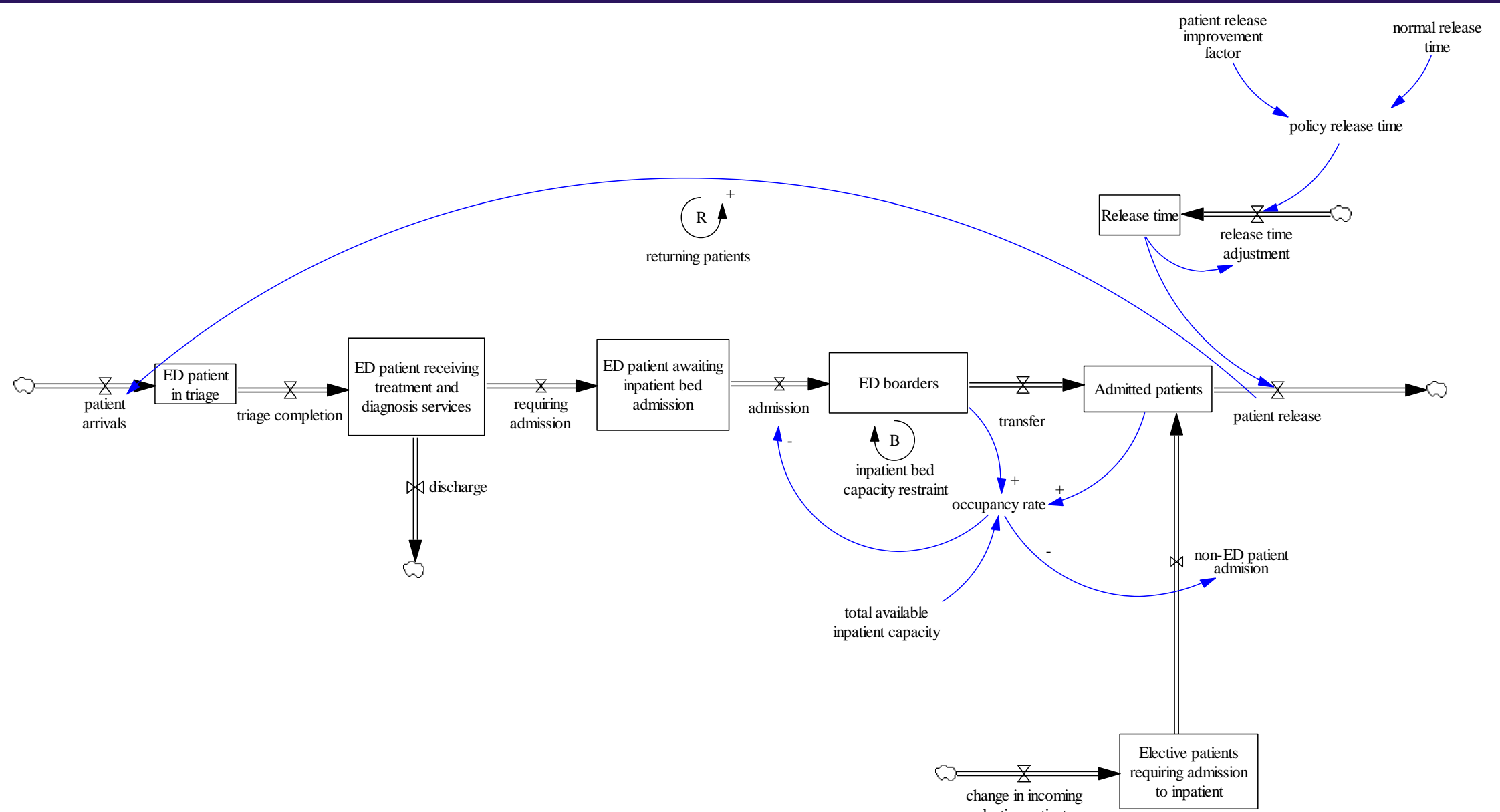
METHODS

- **Setting:** The Emergency Department at Beth Israel Deaconess Medical Center (Boston, MA)
- **Approach:** A system dynamics simulation model depicting 1) the admission process, 2) two feedback loops being the inpatient capacity and returning patients flow upon premature discharge, and 3) flow of incoming elective patients
- **Data:** ED census, hourly patient arrivals, patients awaiting bed assignment, and boarders data from October 2013 utilized
- Baseline model and stressed model used for interpretation

RESULTS

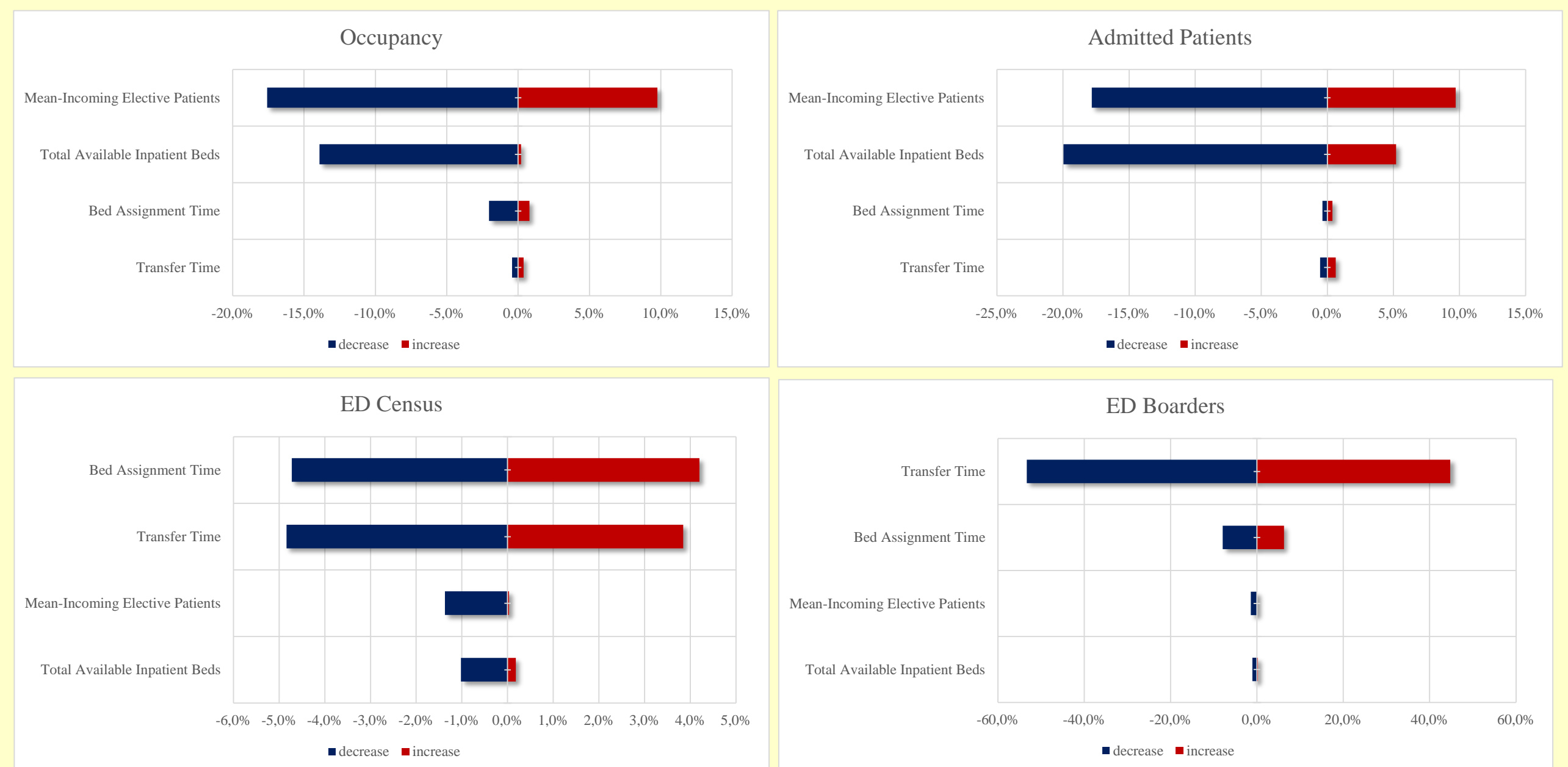
- Tornado graphs (shown on the right) show potential leverage of selected parameters for ED crowding
- **Baseline model:** Changed bed assignment- and transfer times has great effect on crowding but not occupancy. Increased capacity proved not to be a primary means to alleviate crowding
- **Stressed model:** Sensitivity analysis of local protocol show an effect on changing ED boarders trigger. ED census trigger had no effect

METHODS

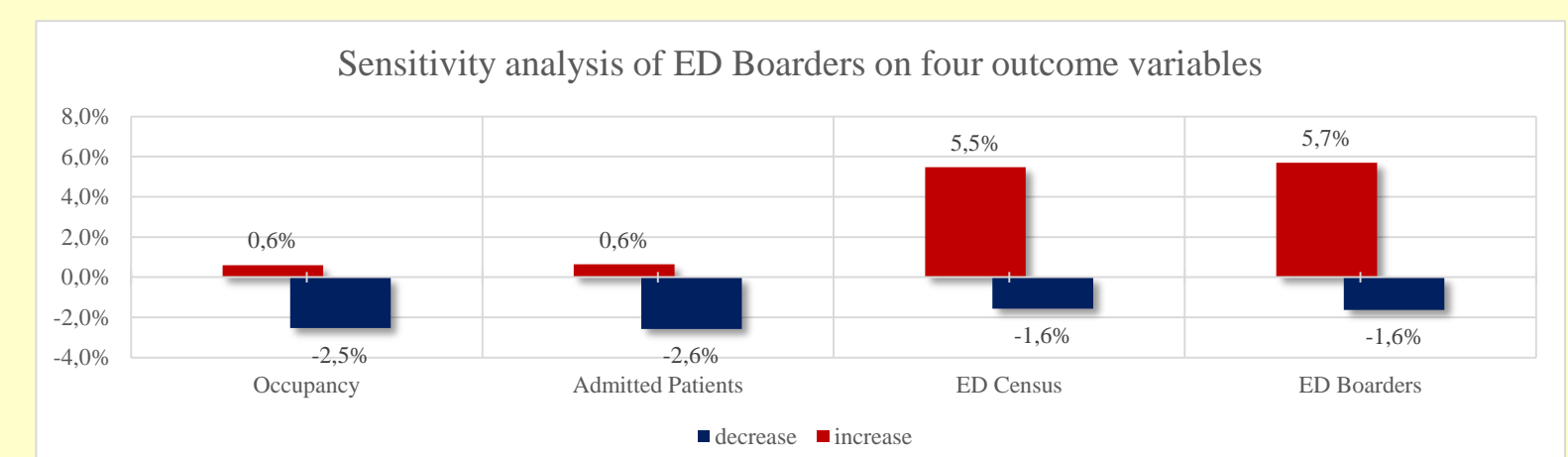


RESULTS

➤ Baseline model:



➤ Stressed model:



DISCUSSION

- Possible to extend model to include human behavior such as work load compliance
- Focus on transition between departments, i.e. broaden system boundaries
- Management flight simulators, as the one developed, enable a better understanding of how the system will behave over time under different policy scenarios

CONCLUSION

- Baseline model identified bed assignment time and transfer time as having most leverage to clear ED congestion
- Stressed model proved that the local protocol was sensitive to changes in ED boarders trigger only
- System dynamics is a promising technique to enhance understanding of complex systems