

# Online Appendix for “Time Dependency in Physician Decision-Making”

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This online appendix consists of two parts. First, we provide a more detailed description of the institutional setting studied in the paper. Second, we provide a figure that plots patient characteristics and predicted admission rates over time of day.

## **I. Institutional Setting**

We study a large ED that operates 24 hours a day. Physicians work in shifts, and the shift timing is varying widely. For example, they may work from 7 am to 3 pm, 8 am to 4 pm, 9 am to 5 pm, 11 am to 7 pm, 3 pm to 10 pm, or 5 pm to 12 am, and night shifts such as 9 pm to 7 am or 10 pm to 8 am. This variation in shift schedules allows us to identify time-of-day effects separately from other effects that depend on shift starting time, such as fatigue.

Upon arrival at the ED, patients are assessed by a triage nurse and categorized into one of three severity levels, where level 1 refers to the most severe cases, level 2 to major emergencies, and level 3 to minor emergencies. Severity level 1 and level 2 cases (we refer to these as “severe cases”) are usually seen in the acute care area, and level 3 cases (“non-severe cases”) in the

urgent care section. The proximity of the two treatment areas allows physicians to cross-cover areas during surge periods when there is an imbalance of attendances between the two areas.

The order and priority of emergency treatment is determined by patients' triage severity level and arrival time. A patient scheduling system automatically assigns waiting patients to available physicians. In the acute care area, severity level 1 patients are always picked up before level 2 patients. For each of the three severity levels, patients are sorted by the time of triage. Physicians generally attend to a new patient at the top of the category queue, which ensures that for a given severity level, the earliest arrival is treated first.

This institutional setting ensures that patients and physicians are almost randomly matched in the ED (Chan, 2016, 2018). The rationale is twofold. First, ED visits are unplanned; patients are not likely to select their physicians due to the unexpected nature of emergency care. Second, the internal shift scheduling of physicians is predetermined, and physicians cannot control the volume of ED arrivals or the types of patients assigned. As a result, the match between patients and physicians is largely random.

Also, physicians' decisions in the ED we study are not influenced by financial incentives. Government subsidies are provided for every ED patient regardless of nationality, and all patients incur a fixed attendance fee upon registration. Physicians are paid a basic monthly salary with a fixed shift allowance, and are compensated based on neither the quality nor quantity of work during the scheduled shift.

## II. Figure A1: Patient Characteristics and Predicted Admission Rate by Time of Day

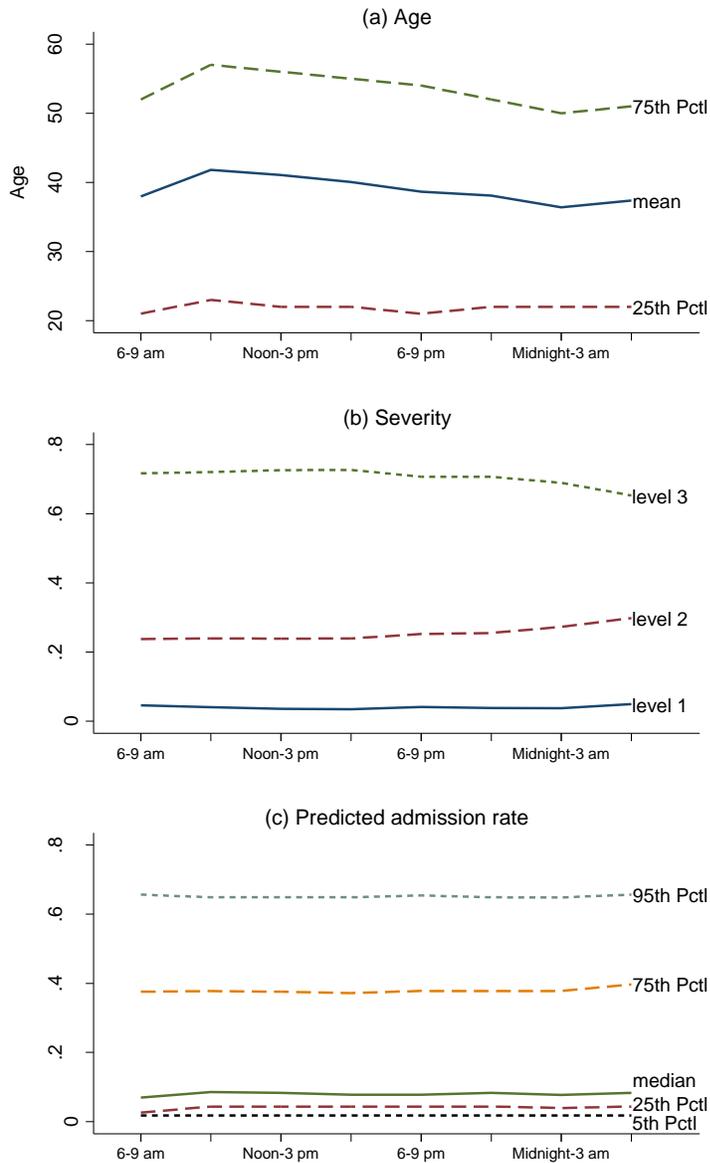


FIGURE A1. PATIENT CHARACTERISTICS AND PREDICTED ADMISSION RATE BY TIME OF DAY

*Note:* This figure depicts statistics for the distribution of characteristics and predicted admission rate for patients starting consultation at different times of the day. Panel (a) shows mean age (solid line) and 25th and 75th percentiles of age (dashed lines). Panel (b) shows proportions of patient severity levels evaluated by the triage nurse. Severity level 1 refers to the most severe cases (solid line), level 2 to major emergencies (dashed line), and level 3 to minor emergencies (short-dashed line). Panel (c) shows quantiles of predicted patient admission rate by time of day. Admission rates are predicted by patient age, gender, indicators for triage severity, and indicators for race. The solid line shows medians; dashed lines show 25th and 75th percentiles; and short-dashed lines show 5th and 95th percentiles.

## References

- Chan, David C. 2016. “Teamwork and Moral Hazard: Evidence from the Emergency Department.” *Journal of Political Economy*, 124(3): 734–770.
- Chan, David C. 2018. “The Efficiency of Slacking Off: Evidence from the Emergency Department.” *Econometrica*, 86(3): 997–1030.