

APPENDIX 1: Data sources and statistical analysis

- GIM census, transfer and discharge data was available from 2016 to 2019
- ED consult data was available from January, 2016 to December, 2018
- Paging data were available from February 2018 to February 2019
- Since paging data were only available from February 2018 to February 2019, we estimated resident utilization using this one-year period for all data sources (except cardiac arrests).
- Cardiac arrest data were only available from 2013 until June 2017, so we used the one-year period from February 2016 to February 2017, and aligned it with the other data sources.
- For each day, the number of patients to round on is set equal to (8:00 AM census - patients discharged during 8:00 AM to 6:00 PM) × (percentage of patients to round on), every day of the week. "Percentage of patients to round on" is set to 90% for weekdays, 75% for weekends. For each day in Scenario 1, rounding is allocated to the first period (which starts at 8:00 AM), until the resident hours in that period are fully utilized, and then remaining rounds are allocated to the following period. In Scenarios 2 and 3, rounding is allocated between the first two periods in a manner such that the resident utilizations in the two periods are equal.
- When a cardiac arrest occurs, we assume that the number of residents who are occupied by the cardiac arrest is 3 or the total number of residents on the responsible team, whichever is less.
- ED consult durations for senior residents, junior medicine residents, and junior non-medicine residents (Appendix Table 1) are used to compute a weighted average ED consult duration during each period of the week. The weighted average is based on the ratios of junior and senior residents working on the CTU. When one or more junior residents are working, we assume that one is medicine and the rest are non-medicine.

Appendix Table 1

Task	Duration (minutes)	Sensitivity analysis
ED consult (Senior Resident, per consult)	60	90
ED consult (Junior Medicine Resident, per consult)	90	135
ED consult (Junior Non-Medicine Resident, per consult)	150	225
ICU transfer (per patient)	60	90
Page (per page)	5	7.5
Cardiac arrest (per instance)	22	33
Cancelled cardiac arrest (per instance)	2	3
Rounding (per patient)	20	30
Discharge (per patient)	30	45
Non-patient-related ward tasks (per resident per day)	120	180

Appendix Table 1: Durations used for each patient care task in the modeling of demand. Cardiac arrest durations were estimated using the median duration in the hospital's database. Durations for all other tasks were estimated from interviews with staff and residents.