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South west Health Centre: Improving Patient Flow in the Intensive Care Unit

Felipe Rodrigues wrote this case under the supervision of Rasha Kashef solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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The South West Health Centre (SWHC) was one of Canada’s largest acute-care teaching hospitals, a multi-site facility comprising University Hospital (UH), the North campus, and the paediatric hospital. Tatiana Hodreska, the director of patient flow at the UH site, was painfully aware of a worrisome fact: for the past couple of years, UH’s occupancy had been steadily increasing. Importantly, in most days in 2018, UH was at or above capacity, a trend shared by many Canadian hospitals. Hodreska closely monitored UH’s occupancy because, when the hospital reached its full capacity, she needed to trigger the use of surge beds to temporarily accommodate the excess demand. This practice was not clinically ideal, and the media had begun to pay close attention, dubbing it “hallway medicine.”[[1]](#footnote-1) Hodreska knew she needed to improve patient flow and provide the best patient care possible by avoiding this practice, most notably for the hospital’s intensive care patients.

Intensive care patient flow usually followed three levels of care. The first and highest level of care was intensive care, or Level 3, which was provided in intensive care units (ICUs). Patients in need for such care usually came from the emergency department (ED) and/or the operating room (OR). In the ICU, most patients needed one-on-one care from a specialized nurse, mechanical ventilation, and/or other organ support equipment. This level of care was often the most intensive and most expensive patient care a hospital could provide.

At some point, patients no longer needed ICU care, either because they died or because they recovered sufficiently to be transferred to a step-down unit. Intended for patients requiring the second-highest level of care, or Level 2, a step-down unit usually assigned one nurse for every two patients, and patients typically had no need for mechanical ventilation but still required some kind of organ support. Finally, beds for patients needing the lowest level of care, or Level 1, were the standard ward beds, where patients had less need for monitoring, and one nurse was assigned for every four or five patients, who required minimal organ support. As such, patients’ health progression was expected to follow such care levels, starting at the ICU (Level 3) and finishing in a standard patient ward (Level 1), from where the patients were discharged to return home.

uh’s ICU PATIENT FLOW

UH’s main intensive care patient flow came from the medical surgical intensive care unit (MSICU). The MSICU was a 25-bed unit that received patients in need of the highest level of care possible, both from the medical ward and from surgery.

Some MSICU patients died, and those who recovered were transferred either to the general medicine (GM) ward, which had five dedicated beds for MSICU patients, or to other specialized wards (see Exhibit 1). However, it was becoming more common for the MSICU to attempt to transfer patients to the GM ward, which was often full. These patients had no choice but to remain in the MSICU, which artificially increased both the MSICU’s patient length-of-stay (LOS) and the unit’s patient costs.

This situation had a ripple effect throughout the hospital. For example, the MSICU itself might become full, which in turn prevented upstream units such as the OR and the ER from sending patients in urgent need of MSICU care. As a result, the OR would need to cancel elective surgeries, and the ER would need to hold patients longer than expected in improvised ER surge beds. Such a situation was suboptimal, both clinically, as patients did not receive the care they needed, and managerially, as patient flow experienced gridlock.

Data collected from the patient information system showed the current capacity of each unit and its patient costs (see Exhibit 2). Conversations with MSICU clinical staff revealed that an average of 60 hours of a total MSICU stay were needed for Level 3 care; this was also the time frame during which most patient deaths occurred. The remaining hours in the MSICU were usually suitable for either Level 2 or even Level 1 care (see Exhibit 3). Some patients died in the MSICU, and patients who recovered could be transferred either to a GM ward or to a specialized ward (see Exhibit 4). Arrival rates and length of stay in the ICU and other wards can be found in the spreadsheet attached.

IMPROVEMENT ALTERNATIVES

Hodreska wanted to determine exactly how the current bed allocation affected upstream patients in terms of access to MSICU beds. Assuming that UH could provide extra capacity, were the current capacities for the GM ward’s beds that were dedicated for MSICU patients in fact the optimal allocations? If not, what would the optimal allocations be? Finally, as UH did not currently have a step-down unit, Hodreska also wanted to analyze both the advantages and disadvantages—in terms of patient flow and costs—of implementing a step-down unit between MSICU and the GM ward.

Exhibit 1: current Patient Flow at university hospital

Upstream Patient Arrivals

Awaiting ICU Bed

MSICU

GM Ward

Discharge

Death

Transfer to Other (i.e., non GM) Wards

Note: ICU = intensive care unit; MSICU = medical surgical intensive care unit; GM = general medicine.

Source: Created by the case authors.

Exhibit 2: current Bed Capacity and patient costs at University hospital

|  |  |  |
| --- | --- | --- |
| **Unit** | **Beds** | **Patient Cost $/hour** |
| MSICU | 25 | 140 |
| GM Ward | 5 | 25 |
| Step-Down Unit | TBD | 80 |

Note: MSICU = medical surgical intensive care unit; GM = general medicine; TBD = to be determined.

Source: Created by the case authors.

Exhibit 3: Components of length of stay in university hospital’s Medical Surgical Intensive Care Unit

Note: MSICU = medical surgical intensive care unit; LoS = length of stay.

Source: Created by the case authors.

Exhibit 4: Patient Flow Matrix

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Destination** | | | | | | |
|  | **MSICU** | **GM Ward** | **Other Wards** | **Death** | **Discharge** | **\*proposed Step-Down** |
| **Origin** | **MSICU** |  | 27% | 52% | 21% | 0% | \*27%  (instead of GM Ward) |
| **GM Ward** |  |  |  |  | 100% |  |
| **\*Proposed Step-Down** |  | 100% |  |  |  |  |

Note: MSICU = medical surgical intensive care unit; GM = general medicine.

Source: Created by the case authors.

1. André Picard, “Hallway Medicine: Do We Really Need More Hospital Beds?,” *Globe and Mail*, November 7, 2017, accessed December 1, 2018, https://www.theglobeandmail.com/opinion/hallway-medicine-do-we-really-need-more-hospital-beds/article36848856/. [↑](#footnote-ref-1)