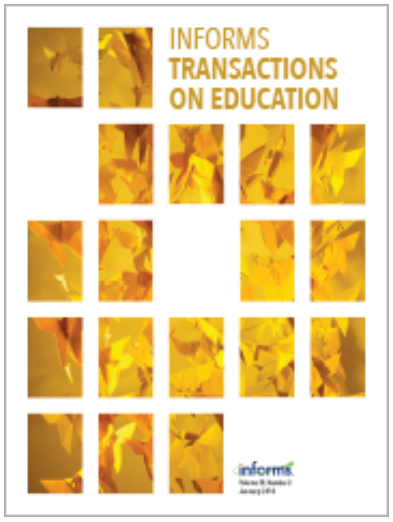
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Case

Medication Waste Reduction in an In-Hospital Pharmacy, Part A

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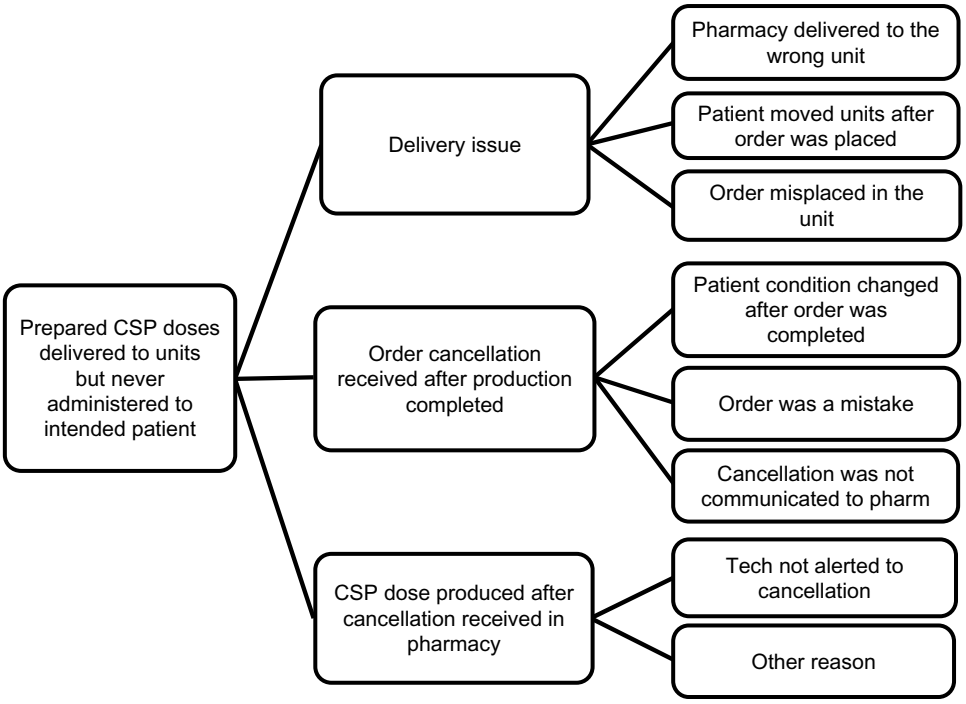
Keywords: developing analytical skills; spreadsheet modeling; teaching with projects; teaching inventory management; teaching healthcare operations
History: Received: August 2015; accepted: September 2015.

Hannah Jones was working as a pharmacist in the outpatient pharmacy of a large academic hospital. The work was demanding, requiring careful attention to detail. Hannah was good at her job, and she was also ambitious, planning to take on more managerial responsibility in the pharmacy. A year earlier, she had enrolled in a part-time Master's of Medical Management (MMM) program, taking classes in the evenings and on weekends. Hannah was convinced that earning this master's degree would further her career. She had finished her coursework, and the only requirement remaining was a project. Hannah decided not to wait until a project was assigned to her by the MMM program director. She took the initiative to propose working on reducing in-hospital waste of compounded medication; and got the project approved by the program director.

One of the functions performed by in-hospital pharmacies is the custom compounding of medication both for inpatients and outpatients (e.g., patients who receive chemotherapy treatments in the hospital). Most compounded medications are chemically stable for a relatively short time; this is why they are manufactured in powder or concentrate form and need to be custom compounded prior to being administered to a patient. These medications are usually administered directly into a patient's bloodstream, and therefore strict sterility procedures must be followed in preparing them. Compounded sterile medications (CSP) may end up unused, and therefore wasted, for a number of reasons: a patient's condition could change after the medication has already been prepared; the medication could be delivered to the wrong unit, requiring that another dose be compounded and sent to the correct unit; or the medication could be delivered to the right unit, but get misplaced. Hannah knew that, with the cost of medication rising, the pharmacy management considered the waste of the compounded medication to be an important problem. Hannah used a diagram, Figure 1, to summarize her current understanding of the waste problem.

Earlier in the year, a Lean Team working in the pharmacy conducted a five-day waste audit to quantify medication waste. During the audit, pharmacy technicians, who normally delivered medication *to* hospital units, gathered medication that was not used. All returned products were gathered in one holding area in the inpatient pharmacy, and designated technicians noted information about each returned product (description, number of doses, unit from which the medication was returned, patient ID, and date and time when the medication label was printed at the pharmacy). The information was then transcribed into a spreadsheet (available as supplemental material at http://dx.doi.org/10.1287/ited.2015.0147csA). Later, a pharmacist assigned a dollar cost to each medication. The cost was based on the cost of ingredients only. It did not include the cost of labor used in preparing the compounded medication.

Figure 1 Hannah's Issue Tree for Understanding the CSP Medication Issue



The five-day audit found that 645 doses were wasted, and the cost of materials was $7,578. That implied an *annual* waste of 47 thousand doses, and more than half a million dollars. Reducing this waste could result in real savings, especially over multiple years. Hannah was looking at the audit spreadsheet with the waste data and pondering what her next step should be.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/ited.2015.0147csA.

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