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Automating the Medication Distribution System

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Automating the Medication Distribution System

Fact: Every hospitalized patient receives medication. New admission. Work-up the patient. Do an H and P. Order lab tests. Order drugs.

Fact: A typical Jefferson patient receives 25 doses of medication every day. Review the lab results. Change the med orders.

Fact: The Pharmacy receives more than 3000 medication orders every day. More than 300 an hour at peak times.

Hurry up, the clock is ticking. Stabilize the patient. Reduce the length of stay. Change the med orders.

The reality of the current hospital environment is that acuity is up and manpower is down. Clinical decisions are made, reviewed and modified with increasing rapidity. As orders are written, there is the expectation that they are implemented accurately and in a timely manner. The sheer volume of activity creates an enormous challenge to meet this expectation.

The Departments of Pharmacy, Nursing and Hospital Administration are continually reviewing opportunities for addressing this challenge. Aside from sheer volume of activity, other issues include:

- lack of automated integration among existing databases; notably the medical record, the Nursing medication administration record and the Pharmacy medication profile;

- lack of automated transfer of information, resulting in delays in transcribing and transferring information among departments;

- human transcription of orders, creating the potential for error;

- unclear, unintelligible and inaccurate orders requiring the need for clarification, resulting in delays.

It is incumbent upon all of us to use our increasingly limited resources to the greatest advantage of our patients. We must utilize existing and emerging technologies to assist us. The automation of the medication use system will require the integration of numerous software and hardware enhancements into the existing system and the Hospital recently took a major step by purchasing a robotic arm to assist the Pharmacy in its dispensing function. Located on the second floor of the Gibbon Building, the Automated Pharmacy Station (or APS) utilizes bar code technology to assure the accuracy of its function.

Upon receipt of an order in the decentralized pharmacies, pharmacists review the order for accuracy and enter the order into the pharmacy's mainframe automated patient medication profile system which contains an accurate, current listing of all active orders for each patient. Through its local area network of integrated personal computers, the APS has direct real-time access to these profiles. The APS is also

integrated with barcode labeling and printing equipment. To dispense orders for a patient, the APS reads a barcoded translation of the patient's encounter number, retrieves the listing of active medication orders, and instructs its robotic arm to select the appropriate number of each prescribed medication from storage. Each dose of medication is barcoded in advance and the robotic arm utilizes these barcoded identifiers to assure the accuracy of its product selection. The robotic arm selects more than 500 doses of medication an hour.

The APS is only one of several major interventions being explored to improve the medication use cycle. One logical extension of the APS' activities would be the use of point-of-care (bedside) terminals by which nurses could scan a patient's barcoded wristband and scan the barcoded medication dose to ensure the accuracy of the medication administration function prior to administering each dose of medication. Such a system would also provide accurate and timely documentation of medication administration. The manufacturer of the APS is one of several companies offering point-of-care systems.

There are also several firms marketing automated dispensing machines that are intended to be located in the nursing units. These devices are conceptually similar to the banking industry's ATM devices except they store and dispense medications instead of money. These 'point-of-care' machines can be integrated with the mainframe computer system and provide a method by which to more accurately record the dispensing of floor-stocked medications, including narcotics and 'stat' medications in the intensive care units. The introduction of these devices into selected locations at Jefferson is currently underway.

But by far the most important upgrade required to achieve an automated medication dispensing system is the implementation of a medical information system. Using an automated order-entry process that assists physicians in writing clear, complete and accurate orders, the information system would circumvent time delays and transcription errors by automatically transmitting the new orders to the appropriate departments. Such systems are currently in various stages of use at all the other academic medical centers in Philadelphia and Jefferson has begun a process to design and develop a University-wide medical information system that would incorporate order-entry capabilities.

It is unlikely that we will ever achieve complete accuracy in prescribing, dispensing, administering and monitoring the 5 million doses of medication used annually at Jefferson. However, the responsible incorporation of technology is essential in our pursuit of this goal.

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