



Pittsburgh Regional Healthcare Initiative

Reprinted from *PRHI Executive Summary*, April 2005

Naida Grunden, editor

Ohio Valley General

Pioneering IV pump technology

Some of the most lethal medication errors come through intravenous (IV) infusion. When it comes to the safety of patients receiving IV drugs, the facts are sobering:

- 56% of all medication errors are associated with IV medications.
- 61% of serious and life-threatening medical errors are associated with IVs.

The most common errors associated with infusion devices are:

- Manually programming incorrect infusion parameters (e.g., rate, drug, dose);
- Failure to ensure that the right patient receives the right medication; and
- Tampering of infusion parameters by unauthorized users.

Can technology help stem the tide of IV medication errors? In one study, the University of Wisconsin Hospitals and Clinics showed that implementing barcode scanning technology at the patient's bedside reduced medication errors by 87%.

Automated barcode and "smart" infusion system tested at point of care

Ohio Valley General Hospital has become the first hospital in the United States to implement an automated system that uses barcode scanning and "smart" infusion system technology to help to ensure that patients receive the right IV medication in

the right dose at the right rate. The system also gives nurses, physicians and hospital pharmacists real-time access to vital patient information from anywhere in the hospital where the system is installed.

Ohio Valley's IV Safety System, which replaces paper records, was developed jointly by McKesson Automation Inc., a Pittsburgh-based provider of pharmacy and health care supply automation solutions, and by San Diego-based ALARIS Medical Systems, which develops and markets products for the safe delivery of IV medications.

No more "death by decimals"

"It is well known that the administration of IV medications poses the greatest risk for harm to patients," says Peg Spisak, a registered nurse who serves as Ohio Valley's director of quality and risk management. "Those of us in health care are all too familiar with 'death by decimal' stories. For instance, an infusion pump rate was entered as 90 versus 9.0, or a weight-based drug calculation resulted in a person receiving 60 times the intended dose. Clearly, this system goes a long way toward protecting the safety of our patients."

Recently the Food and Drug Administration (FDA) ruled that barcodes must appear on most prescription drugs and on certain over-the-counter medications. However, FDA did not order health care providers to implement barcode scanning

PPC Principle in play

The Toyota Production System, on which PRHI's Perfecting Patient Care System™ is based, uses certain principles to understand and improve work. The principle of 'fool-proofing' is defined as follows*:

To produce quality products 100 percent of the time, innovations must be made to tools and equipment in order to install devices for the prevention of defects. This is called 'fool-proofing' and the following are examples of [devices that incorporate it]:

- 1. When there is a working mistake, the material will not fit the tool.*
- 2. If there is irregularity in the material, the machine will not start*
- 3. If there is a working mistake, the machine will not start.*
- 4. When there are working mistakes or a step left out, corrections are made automatically and machining continues.*
- 5. Irregularities in the earlier process are checked in the later process to stop the defective products.*
- 6. When some step is forgotten, the next process will not start.*

*(*From Toyota Production System: Beyond Large-Scale Production, by Taiichi Ohno)*

systems. With this system, Ohio Valley has implemented both barcode scanning and infusion technology to improve patient safety. The hospital also uses barcode scanning to ensure the accurate administration of oral medication, too.

How Ohio Valley's IV safety system works

The IV Safety System operates in a three-step process:

Using a hand-held (HH) device with a built-in scanner, the nurse conducts a three-way scan of barcodes: a) his or her identification badge; b) the patient's wristband; c) the IV bag. This confirms that an authorized caregiver is giving the right medication in the right dosage to the right patient.

The nurse uses the same HH device to scan barcodes on the IV system before starting the IV. Patient information is then transferred electronically

from the pharmacy to the IV pump.

The nurse presses a few buttons on the pump to start the IV medication. If an error occurs in matching any of the information, the IV system will not activate, and instead will signal the caregiver to review the data.

The IV Safety System is designed to help verify the "5 Rights" in administering medication to make certain that the right patient receives the right medication in the right prescribed dosage through the right route at the right time.

Ohio Valley uses barcode scanning of IV bags and other doctor-ordered medications to electronically record real-time information in the patient's medical administration record (MAR).

McKesson Automation and ALARIS Medical Systems market their applications as Connect-IV™ and IV-RIGHT™, respectively. These applications



1. Nurse scans his/her ID badge.



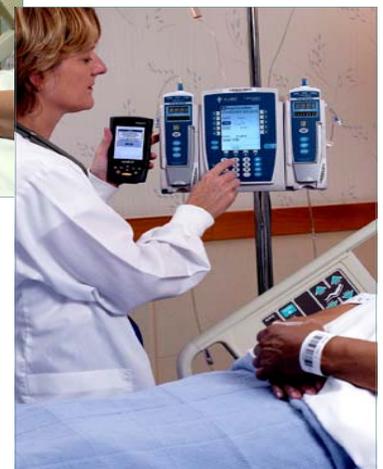
2. Nurse scans patient wrist band.

are available to hospitals using the McKesson Admin-Rx™ barcode medication administration solution with the ALARIST™ Medication Safety system and its Guardrails™ Safety Software.

“This initiative is an integral part of our Quality Assurance and Risk Management Programs,” says William F. Provenzano, FACHE, Ohio Valley’s president. “We take pride in our accomplishments on this front, and we are always looking for ways to strengthen our leadership position in the realm of patient safety.”



3. Nurse scans IV bag, prompting the transfer of information from the pharmacy directly to the pump.



4. Nurse programs pump. If the input is not perfect, the pump won't activate, and it signals the caregiver.

