



## Incorporating IV Room Efficiencies While Striving Toward Improving Patient Care

### Peninsula Regional Medical Center (PRMC)

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Dennis Killian  
Director of Pharmacy Services  
Peninsula Regional Medical Center

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# OVERVIEW

Peninsula Regional Medical Center (PRMC), a 358-bed tertiary care hospital in Salisbury, Maryland, has been a leader in blending digital technology and patient safety since the 1990's. The award-winning facility ranks in the top 5% of hospitals nationally for overall pulmonary services and critical care, and has placed among the nation's top 25 rural hospitals in communities of its size.

PRMC touches 500,000 patients a year through its inpatient, outpatient, diagnostic, subacute and emergency care departments. Specialty services include cardiovascular care, a laparoscopic and robotic surgery center, orthopedics and oncology.

Oncology has been a recent growth area for PRMC. In 2006, the hospital purchased Salisbury's largest oncology physician practice. In 2008, the hospital opened a 36,000 square foot, state-of-the-art cancer institute. The Richard A. Henson Cancer Institute offers surgery, radiation and chemotherapy. It houses physician offices, a dedicated pharmacy and laboratory and an outpatient infusion center that serves over 60 patients daily.

## THE SATELLITE ONCOLOGY PHARMACY

To serve this busy infusion center, the oncology pharmacy processes as many as 85 orders a day. For any pharmacy, preparing chemotherapy doses requires adherence to strict protocols so that the cleanroom environment remains clean and uncontaminated – and technicians stay safe – while handling these hazardous medications. Adding to the intensity of this work environment, these compounded sterile preparations (CSPs) are customized for each patient and have a limited shelf life. Further, they can cost thousands of dollars per dose. In fact, the majority of PRMC's \$28 million annual pharmacy budget is devoted to chemotherapy preparations.

At PRMC's Richard A. Henson Cancer Institute, the oncology pharmacy is located directly in the infusion center. A buffer room opens into two cleanrooms that separate hazardous and nonhazardous medications. When an order is ready, nurses pick it up at the pharmacy window, verify it against the medication order and deliver it to the patient's bedside. Prior to administration, a different nurse scans the medication's bar code for a second check.

# CHALLENGE

Until recently, PRMC's oncology pharmacist verified infusions using the "syringe pullback method." This means a technician filled the syringe with the ordered medication and injected it into an IV bag. The technician then pulled the syringe back to the fill line and left it on the workstation counter as evidence of the dose used. Later, the pharmacist entered the cleanroom, looked under the hood and verified how much drug was injected against the original order.

The PRMC pharmacy's workflow challenges began in 2004 with the publication of the US Pharmacopeia's Chapter 797 (USP <797>) a sweeping regulation that changed how hospitals monitor and assure the quality of CSPs. USP <797> – Pharmaceutical Compounding: Sterile Preparations – requires that pharmacists checking a technician's work wear appropriate cleanroom garb to enter a cleanroom. Due to this rule, a pharmacist would need to leave the patient care area, scrub down and don a sterile gown before entering the IV room to verify a CSP. Additional USP <797> guidelines address the requirements for personal protective equipment (PPE) in order to handle hazardous drugs safely.

"Things really started to back up when we became USP <797> compliant in 2004, with all the gowning up," said Dennis Killian, Director of Pharmacy Services, Peninsula Regional Medical Center.

Delays got worse in 2007 as the hospital's oncology service grew. The pharmacy's workload tripled, and when they were crunched, some technicians prepared multiple doses in one batch. Pharmacists were constantly pulled away from clinical duties to monitor CSP preparation and approve doses. They reported delays of an hour or more in getting medicines to patients.

# SOLUTION

The hospital's pharmacy director knew his cancer facility needed a system to streamline their manual workflow, optimize the use of clinical pharmacists and verify compounded sterile products (CSPs). At the American Society of Health System Pharmacists (ASHP) meeting in 2007, Morrell Delcher, then PRMC's Director of Pharmacy, learned of **DoseEdge** Pharmacy Workflow Manager. The **DoseEdge** System is software that was developed to improve and document workflow in the pharmacy and to help reduce opportunities for errors. Delcher was excited about the **DoseEdge** System, immediately seeing how it could help his pharmacy staff. The **DoseEdge** System is a cleanroom workflow dose management system that – among other features – allows staff pharmacists to remotely verify the preparation of CSPs.

With the **DoseEdge** System, staff pharmacists can enter orders from the patient floor or any workstation with Internet access. The information is transmitted to a computer screen inside the cleanroom, with orders appearing in an electronic queue. The software automatically calculates the right amount of each ingredient for each preparation, providing “recipes” for proper preparation. As technicians assemble the ingredients, they scan each medication bar code to ensure the right drug is being used. If the wrong drug is scanned, the machine stops, and alerts the operator of the error. After a syringe of medication is pulled, but before it's injected into the bag, the technicians take a picture of the dose. Outside on a computer, staff pharmacists are able to review images and bar codes to verify that right products were used in the right amounts to make the ordered doses.

The **DoseEdge** System introduces checkpoints at critical risk points in the medication preparation process. It also enables clinical pharmacists to avoid having to gown up and step into the cleanroom to review and verify doses. Further, it can store images for 90 days or longer, in the event pharmacy managers need to research a past dose.

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## IMPLEMENTATION

PRMC adopted **DoseEdge** System in August 2008. Other than making some minor adjustments to the frequency of photo capture, the Richard A. Henson Cancer Institute reports it was easy to implement **DoseEdge** System into their existing pharmacy workflow. Pharmacy staff working with **DoseEdge** System spent three weeks tying **DoseEdge** System into their pharmacy's medication order entry system. PRMC added patient's names to the barcoded label that appears on the IV bag.

“The installers were very helpful,” said Oncology Pharmacist Elizabeth Katondo. “In the beginning, you just have to get used to stopping and taking images. But it didn't take long for people to get familiar, and the techs are okay with it.”

# RESULTS

Richard A. Henson Cancer Institute pharmacy managers say that **DoseEdge** System has helped eliminate their medication delays. At the same time, pharmacists are no longer traveling back and forth from the cleanroom, but putting their clinical skills to use with physicians and patients. In addition, pharmacy managers believe the system has helped prevent errors related to compounding because technicians could no longer prepare multiple CSPs at the same time – **DoseEdge** System won't allow it.

**DoseEdge** System is so well-liked that PRMC plans to bring it into the medical center's main pharmacy. In the mean time, as the Richard A. Henson Cancer Institute expands, PRMC won't need to hire additional pharmacy staff, Killian believes. At PRMC, the efficiencies created by the **DoseEdge** System dose management process has allowed their existing staff to handle a larger workload.

Finally, the data storage capabilities of **DoseEdge** System can help answer dose-related inquiries. Killian recalls a recent request to review a medication. A rheumatology patient had received an infusion but reported little benefit from it. The doctor asked the pharmacy department to find out if it had been properly made. "They asked us to review this, and we could actually send the patient a picture of the medications," said Killian. "We satisfied the patient's concern that they were properly dosed."

## SUMMARY

One year after going live with the **DoseEdge** Pharmacy Workflow Manager, the PRMC satellite oncology pharmacy continues to utilize the system – with the goal of creating workflow efficiencies and improved dose preparation safety for patients. The product's capabilities - remote pharmacist verification, image capture during product preparation, and data backup - assist with these goals, allowing the pharmacist to spend more time on clinical duties and patient care.

The **DoseEdge** System is not intended to replace the knowledge, judgement or expertise of pharmacist and pharmacy technicians in the preparation of IV admixtures or oral liquid doses.

For safe and proper use of the **DoseEdge** System, refer to the appropriate manual.

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