As part of our ongoing support of Pharmacy, Pharmaceutical Partners of Canada is proud to bring you a special feature article on the ground breaking barcode-driven safety process at the Toronto General Hospital.

How Barcodes Can Save Lives

Toronto General Hospital's Cutting-Edge Patient Safety Initiative

Each year in North America, tens of thousands of hospital patients experience the adverse effects of being administered the wrong drugs, or the wrong concentration of drugs. Regardless of how conscientious and highly trained health care professionals are, human error is nearly always the major factor in these incidents. At Toronto General Hospital, the risk of medication error in the operating rooms is being tackled with a cutting-edge barcode-driven safety process.

Co-developers **Esther Fung**, Manager of Pharmacy, and **Dr. Ludwik Fedorko** MD, PhD hope that the new process will help to expand the practice of bar coding by manufacturers here in Canada, and save lives in the process. The technology, which Ms. Fung and Dr. Fedorko believe is a significant improvement over existing methods, is already being viewed with some interest by hospitals south of the border, where drug bar coding is mandatory on unit-of-use labels by FDA. In Canada, Pharmaceutical Partners of Canada is one of only two pharmaceutical companies with a complete product line of bar-coding. Despite these challenges, Ms. Fung and Dr. Fedorko say the need is great for an operating room safety process such as this to help eliminate potential human error.

"There is a lot of pressure on operating room anesthesiologists, who work in a fast pace and often tense OR (operating room) situation," says Esther Fung. "There is no current process to double check that the anesthesiologist has not made an error in the preparation or administration of a drug. They are the only ones responsible for the drugs in the OR – they have no one else there to check them ."

Dr. Fedorko, an anesthesiologist at Toronto General Hospital, explains that the drug preparation process in most operating rooms is currently manually driven, and as such is prone to human error. “With poor visibility and multiple distractions, there is always a chance that the anesthesiologist could get drug vials mixed up or put the wrong label on a drug, with dire consequences.”

Administration of the correct drug presents another challenge. In some operating rooms there could be as many as 20 syringes beside the patient, all with hand-written labels.

It is estimated that as many as 7% of adult hospital patients will experience some kind of medication error during a hospital stay. That number increases to 12% in the case of children, where the administration of the correct drug concentration is much more complex.

Esther Fung

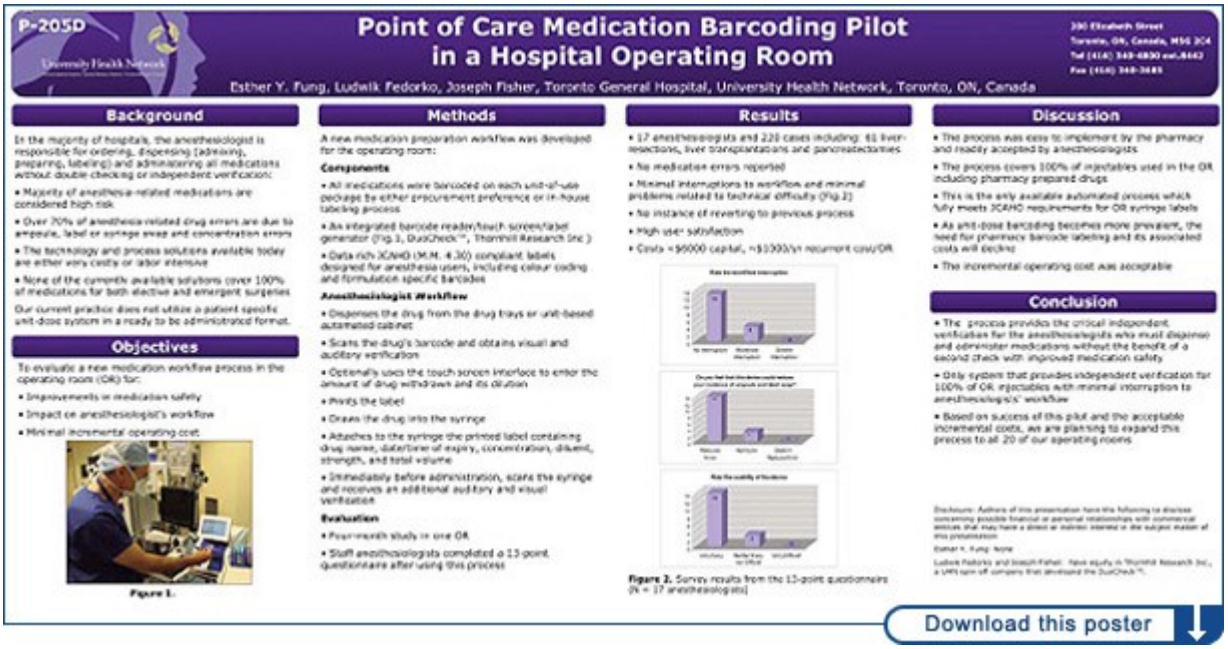
“The induction of anesthesia constitutes the injection of lethal drugs, every time”, says Dr. Fedorko. “Essentially we take away the patient’s brain and muscle function. It is safe because we know how to administer these drugs. Nonetheless, an anesthesiologist administers about 10,000 doses per year, and even if the error rate is extremely low, each year an anesthesiologist can be expected to commit a certain number of errors.”

As Esther Fung says, “The manual drug handling process really needs an electronic double-check that helps to remove the element of human error. The purpose of our project was to develop a method that would improve safety, without incurring overly high operating costs or interfering with the anaesthesiologist’s workflow.”

Dr. Ludwik Federko

The new anesthesiologist medication preparation workflow process ensures that all medications provided by the pharmacy to the operating room have a barcode on each unit-of-use package. An essential component of the process is the **DuoCheck**™, a device engineered by Thornhill Research Inc. of Toronto. The DuoCheck is capable of scanning high density barcodes on drug vials, calculating diluted concentrations, providing audible feedback to confirm the identity of the drug scanned, and generating accurate and legible syringe labels. During medication preparation, the anesthesiologist scans each drug vial to obtain a visual and audio confirmation of the medication before drawing it into a syringe. If the medication is correct, the anesthesiologist touches the device screen to generate a label, and then places the label on the syringe. Each label contains the medication name, its ASTM color code, the volume drawn into the syringe, diluted concentration, diluent, time of preparation, expiry date and a barcode with all this information. Just before administering the drug to the patient, the anesthesiologist scans the barcode on the syringe’s label to get an independent verification, via the visual and audio feedback, that the intended medication is being administered, thereby preventing potential syringe swap errors.

The DuoCheck



"This new bar coding process allows the anesthesiologist to verify that the drug being given is the intended drug," says Esther Fung. "It's like having an electronic helper to double check for you."

Dr. Fedorko amplifies the importance of the new system: "Electronic barcode identification is approximately 10,000 times more accurate than identification by the human eye. A system like this can virtually eliminate certain kinds of errors," he says.

So far, the pilot program has been implemented in two of the 20 operating rooms at Toronto General Hospital, but based on the success of the program, and its relatively low capital cost, it could soon be expanded to all 20 operating rooms. During the two-month evaluation period in a live clinical environment, participating anaesthesiologists encountered no technical difficulty or interruption of workflow, and there was never a need to revert back to the previous process.

This new safety system developed at the Toronto General Hospital could make drug bar coding an even more crucial means of drug identification in Canadian hospitals and beyond. But most importantly, it has the potential to save lives.

For more information on the Toronto General Hospital bar coding process contact Esther Fung at: Esther.Fung@uhn.on.ca