MEDIA RELEASE

14 April 2009

For immediate release

NUH Patients to Enjoy Safer Care with Automated Medication System - First Comprehensive Inpatient Medication System in Asia Pacific Hospitals

The traditional way of preparing medication for inpatients will soon be a thing of the past at the National University Hospital (NUH). Leveraging automation, an intelligent system will now ensure that the right medication is given to the right patient. This seeks to eliminate human errors and bring patient safety to a higher level.

Besides enhancing patient safety, the solution also improves operational efficiency. Staff can now better focus on patient-centric activities.

NUH is the first hospital in the Asia Pacific region to implement an end-to-end or close-loop inpatient medication management system. It was implemented in the first ward on 4 February 2009 and has since been introduced in seven wards. It is targeted to complete by the third quarter of this year.

The system begins with the prescribing, preparing, dispensing, and ends with the serving of medication to the patients. It incorporates and interfaces the 1) electronic inpatient medication record system (eIMR), 2) inpatient pharmacy automated system (iPAS) and 3) electronic medication administration system (eMAS).

An Enhanced Medication Safety Process

Prior to this system, the inpatient medication process starts with a doctor entering the medication order electronically into the eIMR. The nurse then proceeds to pick the prescribed medication (type and dosage) from the stock in the ward. If it is not available in the ward, the nurse will collect it from the pharmacy.

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1 eIMR – an electronic prescription ordering system which captures patient’s medication record
2 iPAS – it comprises an Automated Tablet Dispensing and Packaging System (ATDPS) and an automated secured medication storage unit
3 eMAS – an electronic system which enables nurses to administer medicine via access to eIMR orders
With an end-to-end automated system, eIMR medication orders are transmitted to a 24-hour automated secured medication storage unit, which are kept in the ward. Each unit can store up to eighty percent of the volume of inpatient medications used in a ward. The remaining twenty percent of medication not kept in the ward includes bulky medications, drugs that require refrigeration and such. This unit allows a 24-hour supply of inpatient medications to be readily available at the ward and this reduces the medication turnaround time.

Access to the unit is controlled in several ways. One of it is by fingerprint (biometric) recognition of authorised staff such as nurses. Once access is granted, the nurse selects the patient’s profile on screen to view the list of medications which are due for serving. The nurse confirms the order via touch screen and this in turn activates the medication drawer. A light guides the nurse to the correct compartment to pick the correct medication to be served to the patient. Controlled and guided access improves medication safety by reducing the potential risk of selecting the wrong medication.

At the final step of the process where medication is served to the patient, accuracy is reinforced through a two-pronged check. First, the nurse will use her Personal Digital Assistant (PDA) to scan the barcode on the medication label. Second, the nurse will scan the barcode on the patient’s wrist tag to capture the patient’s data and verify that it is the right patient. The PDA will confirm that the two sets of data received match to ensure that the right medication will be served to the right patient. If there is a discrepancy, the PDA will give off a beep alarm to alert the nurse.

Dr Sophia Ang, NUH Patient Safety Officer said, “This innovative and leap for medication safety shows our determination to shape medicine for the future. We constantly aim to redefine patient safety by incorporating technology and system engineering to enhance NUH’s staff ability to deliver better and more reliable care to our patients.”

When the unit dose supplies in the automated medication storage unit fall below the par level, a request to pack more unit doses of those medications is automatically sent to the Automated Tablet Dispensing and Packaging System (ATDPS). The ATDPS are operated by pharmacy staff who will assemble and stock up the medications into the unit. (Please see Annex A for the workflow of the end-to-end automated system)

With more time on hand, nurses can now focus more on direct patient care, and pharmacists on monitoring and counseling of patients, and performing medication reconciliation and such functions.

Project Leader, Mr Wu Tuck Seng who is the Deputy Director, Department of Pharmacy, NUH said “When we embarked on this project three years ago, our main goal was to improve patient safety and enhance workflow efficiency for doctors, nurses and pharmacists. The closed-loop medication system utilises technologies from Korea and America to provide drug therapy to patients in a convenient and safe system by employing innovative workflows integrated with technology. It is driven by stakeholders, working together to continually seek to attain a safe and efficient system. We will continue to review the system and incorporate user feedback so that we can fully optimize the efficiency of the system.”
The National University Health System

Established in January 2008 and jointly owned by the Ministry of Health Holdings and National University of Singapore (NUS), the National University Health System groups the National University Hospital (NUH), NUS Yong Loo Lin School of Medicine and NUS Faculty of Dentistry under a common governance structure to create synergies to advance health by integrating excellent clinical care, research and education.

The enhanced capabilities and capacity will enable the NUHS to deliver better patient care, train future generations of doctors more effectively and bring innovative treatments to patients through groundbreaking research.

The National University Hospital

The NUH is a specialist hospital that provides advanced, leading-edge medical care and services. Equipped with state-of-the-art facilities as well as dedicated and well-trained staff, the NUH is a major referral centre that delivers tertiary care for a wide range of medical specialties including Cardiology, Gastroenterology and Hepatology, Obstetrics and Gynaecology, Oncology, Ophthalmology, Paediatrics and Orthopaedic Surgery. Backed by substantive expertise and experience, the NUH was chosen by the Ministry of Health to develop two new national specialist centres to meet the growing need for cardiac and cancer treatments.

In 2004, the NUH became the first Singapore hospital to receive Joint Commission International (JCI) Accreditation, an international stamp for excellent clinical practices in patient care and safety. It was also the first hospital in Singapore to receive a triple ISO certification concurrently for Quality, Environmental, and Occupational Health & Safety Management Systems in 2002.

For more information, please visit [www.nuh.com.sg](http://www.nuh.com.sg)
End-to-End Automated Inpatient Medication Management System

1. **Electronic Inpatient Medication Record (eIMR)**
   - Medication is prescribed by doctors via eIMR
   - Information is transmitted to the Medication Storage Unit and the nurses’ PDA

2. **Medication Storage Unit**
   - Safety features include guiding lights for accurate picking, bin-locked compartments and controlled access such as thumbprint verification
   - Located in wards and offer 24-hour medication supply for 80% of inpatient medicine

3. **Electronic Medication Administration System (eMAS)**
   - Before medicine is served to the patient, the patient’s wrist tag and bar-coded medication labels are scanned by nurses using PDA to ensure that the right medicine is served to the right patient.

**Automated Tablet Dispensing Packaging System (ATDPS)**
- Packs and bar-codes unit dose (1 tablet sachets) from loose tablets/capsules
- Supplies unit doses to Medication Storage Unit housed in the wards