"SMART" Medication Management in Hospitals: Improving Medication Safety and Efficiency with Automated Medication Cabinets

*By **Ms Ellen Lai,** Clinical Pharmacist in-charge, Pharmacy Department, Grantham Hospital*

"Smart cabinets" are medication management systems with safety features for electronic medication dispensing. They are employed as night drug cabinets, dangerous drugs cabinets, and ward stock cabinets. Examples of safety features include fingerprint or access card for user identification, secure drug bins with guiding lights for drug retrieval, barcode scanning for patient and drug identification, and interfacing for patient's allergy and profile checking.

Smart cabinets have been shown to reduce medication errors and facilitate timely medications administration. They can increase time spent by nurses on interaction with patients, and reduce the time spent by pharmacists on medication management.

Smart cabinets can be operated in three modules:

Increasing level of clinical verification

Patient profile module
Interfaced with Clinical Management System (CMS) and Pharmacy Management System (PMS), medications can only be retrieved after pharmacist's verification of patient's medication profile.

Alert checking module
Interfaced with CMS, medications can only be retrieved after checking against patient's allergy, adverse drug reaction and G6PD information.

Standalone module
No interfacing, for medication retrieval only.

Patient profile module with pharmacist verification is a potential strategy to help maximise safe and efficient use of smart cabinets. Other strategies include streamlining medication varieties and optimising "cabinet override function" to emergency. These strategies together with the workflow design should be carefully considered by a multidisciplinary team at the planning stage of smart cabinets implementation.

Barcode scanning for patient and drug identification

Secure drug bins with guiding light for drug retrieval and stocking

Editorial Comments

The acquisition of smart medication cabinets not only makes the pharmaceutical services more efficient and safer, but also improves patient safety and helps free the nurses' time to better attend to their patient's needs. It is an investment in the medical safety in the hospitals by reducing the risk of human error and irregularities.

Dr W M KWAN, Chief Manager (Clinical Effectiveness & Technology Management), HAHO

Closing the Loop in Laboratory and Radiology Exam Results: Electronic Result Screening App

*By **Ms Daisy Au**, Health Informatician, Information Technology and Health Informatics Division, HAHO*

Doctors need to screen a pile of printed Laboratory and Radiology reports in outpatient clinics. These printouts are manually allocated to different subspecialties for doctor's screening. To reduce the huge number of paper consumption, as well as closing the result acknowledgement loop, the HOIT team has built a closed-loop result management application, the electronic Result Screening App.

Goals and Objectives

CMS IV - Result Screening Project

Mobile → Closed-Loop → Paperless → Automation
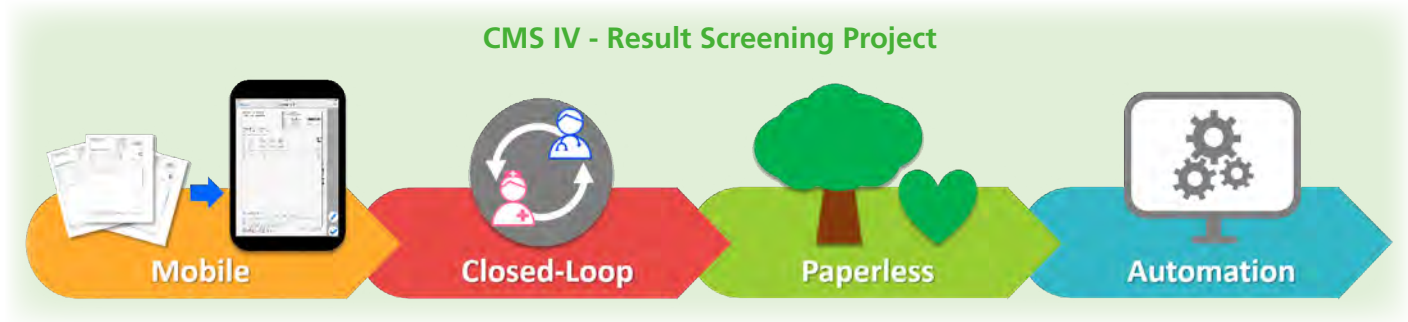
The App was piloted in PMH Specialist Outpatient Department (SOPD) and TKOH SOPD since 2020. Positive user experience was shared by frontline doctors and nurses as it has greatly enhanced clinical workflow and efficiency at SOPDs. The manual distribution and handling of printouts was minimised. Furthermore, the well documented records of medical and nursing actions is helpful in follow-up actions and patient communications, which also minimise the risk of missing results and follow-up.

For cases required early attention and follow-up, clinical documentations were automatically generated in the Clinical Management System (CMS) for closed-loop communication. Since piloted in 2020, we have saved over 825,000 pieces of paper, which are equivalent to 100 trees at the age of 20, as well as around 53 packs of printer cartridges.

The App is now ready for hospital adoption and implementation. Software configurations and training resources are packaged to facilitate the co-delivery process. In the future, result management will be explored for inpatient settings. We will continue to make an effort to improve the quality and safety of our services.
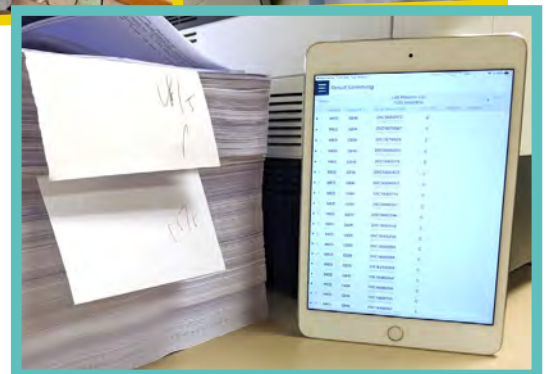
Printed reports Vs electronic Result Screening App on iPad

Editorial Comments

The new electronic Result Screening App is an excellent application of technology that automatically document results requiring early attention and follow-up, the risk of overlooking or misplacing results is minimised. No less importantly, it achieves a gratifyingly positive impact on the environment. This system should contribute to personal and environmental health as greatly when applied to the inpatient setting, and is eagerly awaited.

Hon. Assoc. Prof. William C M CHUI, *Clinical Stream Coordinator (Pharmacy), HKWC*

Leveraging Technology to Optimise Informed Consent Process

*By **Department of Quality and Standards,** Quality and Safety Division, HAHO*

eConsent app

Informed Consent in HA

Informed consent for operations, procedures and treatments is part of quality care, professional responsibility and also a legal requirement. It must be properly explained to the patient about the nature, effect, risks and possible complications of a proposed treatment and any alternative options, including the option of no treatment. The patient should be given reasonable time to enable the patient to make the decision properly. A patient's refusal of proposed investigation must be respected and documented.
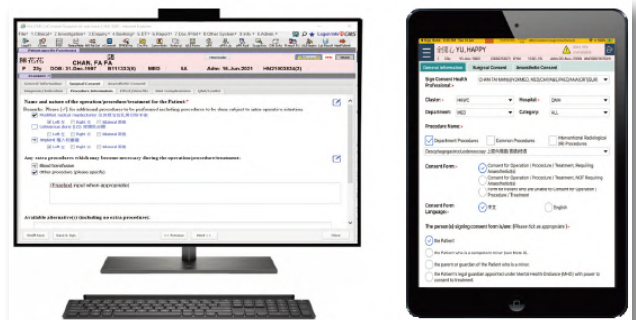
The informed consent mechanism in HA has been regularly reviewed with ongoing improvement since its establishment in 2005. The Web-based Custom Print Informed Consent Form (ICF) system, introduced in December 2015, is the essential tool for informed consent in HA. As of 2020, there were over 3,000 consent form data developed in the ICF database and over 1 million of paper informed consent forms generated from the system.

eConsent is available in desktop and mobile version.
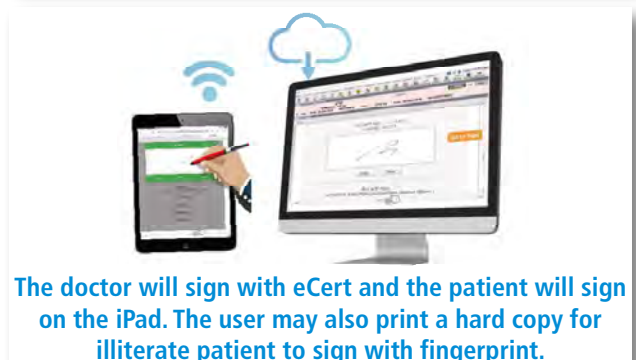
To Go Smart to Informed Consent: eConsent

To further improve the workflow of informed consent in daily clinical practice and achieve full integration with Clinical Management System (CMS), the eConsent has been developed with the following objectives:

- To optimise the consent process with integration to other clinical systems

- To enhance documentation and data management

- To go paperless through electronic signature and online input of consent information

The eConsent has been piloted in Tin Shui Wai Hospital and Tseung Kwan O Hospital in February and March 2021 respectively and planned to be launched in other HA hospitals by 2021/22. With the implementation of eConsent, the informed consent process for operations, procedures and treatments would be more accurate, effective and environmental friendly. The Working Group on Informed Consent for Operation/Procedure/Treatment will continue to work with HO IT/HI on system enhancement to support clinical operations.

The doctor will sign with eCert and the patient will sign on the iPad. The user may also print a hard copy for illiterate patient to sign with fingerprint.

Overview of econsent status from Consent Form List

Editorial Comments

Consent is part of quality care and also a legal requirement. "eConsent" enhances the documentation and data management that ensure the explanation to patients on the nature, effect, risks and possible complications of a proposed treatment and any alternative options, including the option of no treatment are well documented. It also accommodates the workflow of both surgeons and anaesthetists in the consent process. Looking forward to the full implementation on other HA hospitals soon.

Mr S H LAU, Cluster Manager (Quality & Safety), KWC

CLUSTER SHARING

Kowloon East Cluster

Sharing on Smart Operating Theatre in Tseung Kwan O Hospital

By **Dr Dione Szeto,** Chief of Service, Department of Anaesthesia & Operating Theatre Services, Tseung Kwan O Hospital


Smart Dashboard at OT Control

The operating theatre (OT) service is a highly coordinated system. In Tseung Kwan O Hospital (TKOH), we have developed smart OT initiatives to improve work efficiency, reduce errors, enhance patient safety, as well as helping collect big data and maintain sustainability.

The followings are some of our smart initiatives:

1. **Electronic patient records**, including anaesthetic record, nursing record, eConsent and surgical safety checklist, integrate patient information during all perioperative phases. They are essential for good record keeping and data collection.

2. **The smart dashboard at OT Control** provides an effective means for OT manpower, facility and equipment management, mutual communication between the OT Control and individual OT rooms and the data collection of OT staff competency.

3. **The 5G-enhanced operating room** facilitates teleconsultation and remote supervision of operation, allowing real-time communication between the operating surgeon and the off-site supervisors for advice and decision making.

4. **The mobile Surgical Instrument Tracking System (SITS)** ensures accurate instrument counting and facilitates the instrument flow and surgical safety.

5. **The radio-frequency identification (RFID) store** greatly improves the efficiency of the OT stock management.

With the implementation of the smart OT initiatives, the patient care, workflow, surgical safety and OT efficiency are much enhanced.
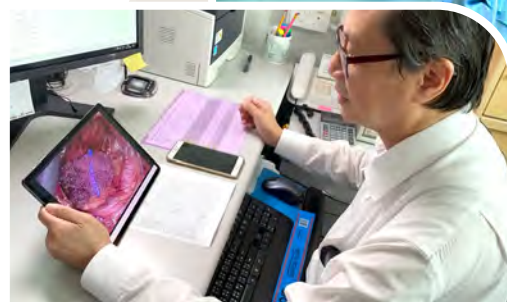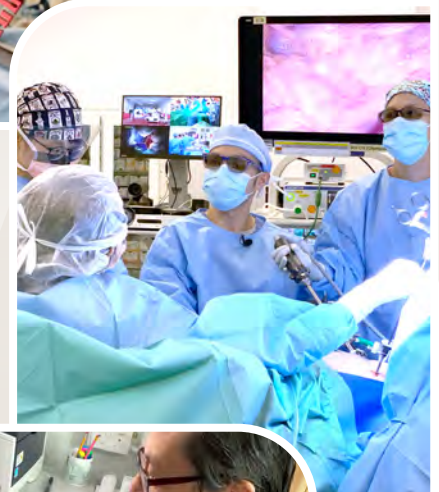
Editorial Comments

Advances in information technology has inspired innovations to improve work efficiency and enhance healthcare services. The 'Smart Hospital' concept has been explored and deployed in various way at different hospitals. Initiatives implemented in Smart OT in TKOH illustrates the enormous benefits of leveraging the advances in information technology in healthcare services to both patients and healthcare professionals. The use of information technology and artificial intelligence in healthcare service is the new horizon for healthcare professionals.

Dr Osburga CHAN, Service Director (Quality & Safety), KCC

Comments are welcome

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