emCompanion – an electronic all-in-one bedside companion and reference for emergency physicians and nurses

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Introduction
Emergency physicians and nurses may need to refer to clinical guidelines and protocols in their daily practice to facilitate clinical care of patients. Although various systems and hardcopies are in place for them to use, the process was found to be inefficient and environmental unfriendly.

Objectives
To develop a user-friendly, all-in-one and cross-platform electronic system that integrated all clinical references for emergency physicians and nurses.

Methodology
emCompanion was developed in March 2013 and launched in March 2014. It was an online platform located at local intranet which integrated all references and documents used by emergency physicians and nurses. It could be accessed in all working terminals through the shortcut to http://ntwc.home/emc. The system is composed of 9 modules, including (1) calculator on gestation and injury date; (2) eAdmit, an electronic patient admission system; (3) Paediatric drug dosage calculator for common oral and emergency drugs; (4) Adult resuscitation medications dosage and administration details; (5) Toxicology module composing of digital modified Rumack Matthew nomogram plotting for Panadol overdose, N-acetylcysteine dosage calculator, toxic dose calculation, and common antidotes dosage; (6) Burn module composing of Parkland formula for fluid dosage, burn area assessment by rules of nine and Lund Browder chart, referral criteria to burn center; (7) Neonatal jaundice nomogram plotting for thresholds of phototherapy; (8) Document module composing
of all departmental guidelines, protocols, clinical references, patient information, pamphlet and advice sheets; (9) Custom-printed consent system, an electronic consent form printing system for common ED procedures.

**Result**
The system functions were used for more than 43000 times since March 2014 and it was equivalent to a daily use of around 150 times. It could enhance clinical efficiency by saving time on searching for clinical reference material. Furthermore, it could ensure medication safety by providing quick and accurate reference on drug dosage, precautions, dilution, mode and rate of administration for all emergency and commonly used medications. The system is particularly useful in emergency departments with high turnover of medical staff. The function could be accessed in all CMS terminals and could be extended to be used in mobile devices or in electronic dashboard in resuscitation rooms.