# Leveraging Enterprise Risk Management (ERM) and Human Factors Analysis and Classification System (HFACS) Principles to Enhance Medication Safety

Abigail Linsey Rimalos, Marionette Catahan, Mary Rose Malinao, Annellee Camet, Helen de Chavez, Pang Nguk Lan and Joseph Manuel Gomez

KK Women's and Children's Hospital
SingHealth

SingHealth
Defining Tomorrow's Medicine

Singapore Healthcare Management 2016

## Introduction

The medication-use process at any stage is potentially high-risk and error-prone. Harm to patients may occur at any stage from selecting, procuring and prescribing, to storing, preparing, dispensing, administering, and monitoring. By integrating human factors principles and conducting risk assessment and mitigation process, risks are systematically identified and effective controls are prioritised.

## Objective

To gather and analyse data on the **contributory causes of medication errors** using HFACS and ERM concepts and identify targeted solutions/specific interventions to help **improve human performance** and **reduce the risks of errors.**

## Methodology

**DATA GATHERING** — Data gathering using the KKH Medication Error Review (MER) Checklist

**PILOT STUDY** — 3-month pilot study on the use of MER checklist was conducted

**DATA ANALYSIS** — Data analysis was done using the HFACS framework as a guide

**RISK ASSESSMENT** — Risk assessment was done using the SingHealth ERM Template; Results were presented to and validated by the MER Workgroup

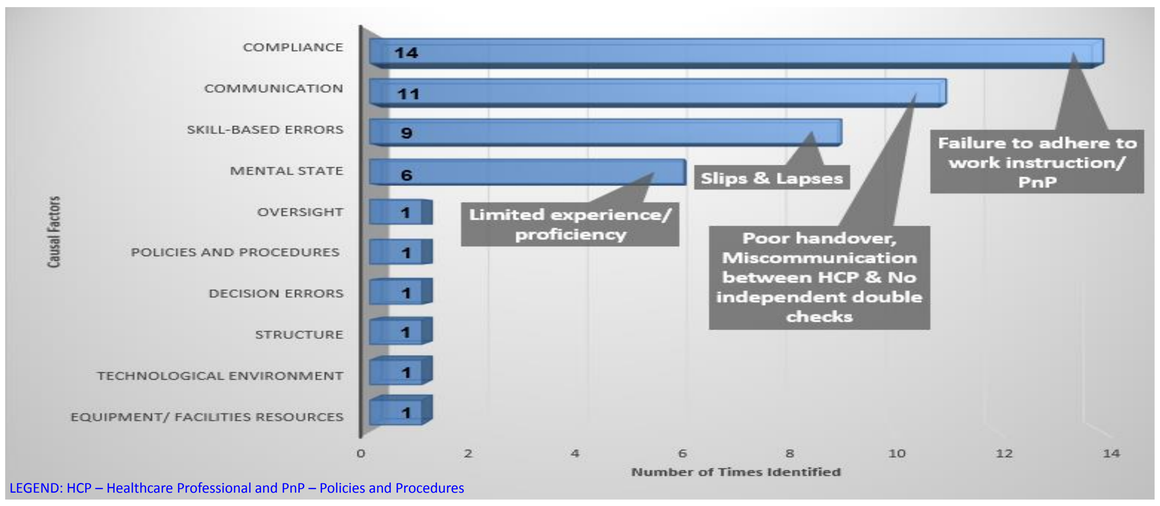
**FEEDBACK SURVEY** — A survey was conducted among the workgroup to gather their feedback on the comprehensiveness, reliability and usability of the MER checklist



## Results

### HFACS ANALYSIS

**Figure 1. HFACS Causal Factors Identified in Medication Errors from August to October 2015**




LEGEND: HCP – Healthcare Professional and PnP – Policies and Procedures

The 35 medication errors over the period of August 2015 to October 2015 were categorised based on their causal factors using the HFACS® Checklist for Medication Errors as shown in Figure 1. The preventive measures to address the identified causal factors were further classified according to organisational, communication and task-related interventions to provide mitigating solutions targeted to correct failures occurring at any level.

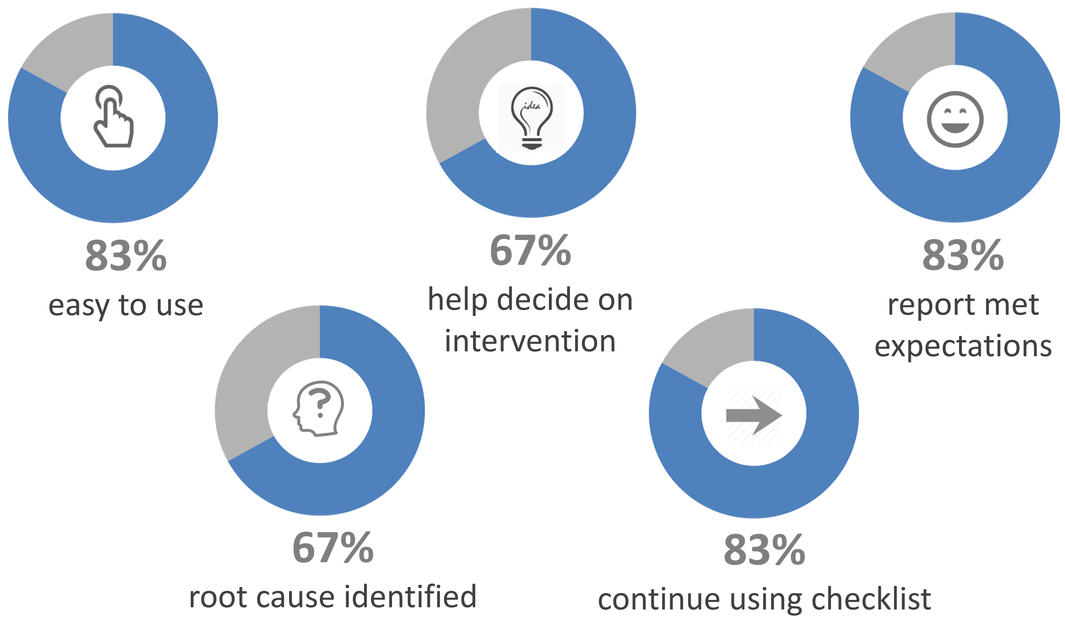
### ERM ANALYSIS

**Table 1:** The top 3 intervention categories [Organisational, Communication and Task-related] were further analysed using the SingHealth ERM template. The identified risks were best managed by adding control measures targeted to physically remove or replace (elimination and substitution controls) the risks and isolate the people from the risks (engineering controls).

| RECURRENT RISK | CURRENT CONTROLS | EFFECTIVNESS OF CONTROLS | ADDITIONAL CONTROLS |
|---|---|---|---|
| **[Organisational]** Risk of staff not complying to Work Instructions/Policies and Procedures due to skill-based errors | 1. Counselling and re-training of staff on Work Instructions/ Policies and Procedures | Under-controlled | 1. To engage user when developing policies and procedures |
| **[Organisational]** Risk of staff not complying to Work Instructions/Policies and Procedures due to action-based errors | 1. Do compliance audits for medication administration<br>2. Provide adequate staff orientation | Potentially Under-controlled | 1. Conduct regular cross-department compliance audits<br>2. HOD to implement competency checks to assure staff is adequately trained to perform the assigned tasks |
| **[Communication]** Risk of miscommunication among staff due to memory lapses | 1. Visual Cues (i.e. red card) | Potentially Under-controlled | 1. Implementation of task board to list down procedure/medication administration status<br>2. To engage HFACS Specialist to seek advice on the proposed task board (e.g. location, accessibility, visual presentation) |
| **[Communication]** Risk of miscommunication among staff due to poor hand-over | 1. Reinforce using SBAR for effective verbal handover<br>2. Do proper documentation | Potentially Under-controlled | 1. Implement a standardised framework for effective handover (written/verbal) to all department/ units<br>2. Explore the use of proposed safety huddle board during the handover process |
| **[Task]** Risk of staff committing error due to limited experience and/or lack of proficiency | 1. Provide adequate training and mentorship to the staff<br>2. Independent double checks | Potentially Under-controlled | 1. Conduct competency check and provide staff with feedback on progress<br>2. Provide different format of training (i.e. simulation exercise)<br>3. Reassigning other responsibilities to the staff and focus on the task |
| **[Task]** Risk of staff committing error due to skill-based / action-based errors | 1. Counselling of staff | Potentially Under-controlled | 1. Redesign the task/ process (simplify or remove unnecessary steps)<br>2. For skill-based errors, create a reminder checklist that systematically help the staff not to miss any steps in the processes |

### SURVEY ANALYSIS

**Figure 2. Feedback of MER Workgroup (April 2016)** — Total number of Respondents = 6




Majority of the respondents provided positive feedback on the usability of the HFACS Checklist in reviewing and evaluating medication related incidents as reflected in Figure 2. The generated report met their expectations and the workgroup has decided to continue using the checklist in analysing medication errors.

## Conclusion

By integrating human factors principles in the risk assessment and mitigation process, recurrent risks are systematically identified and proactively mitigated. Targeted risk management strategies effectively mitigate the risks and enable to track the effectiveness of the interventions to improve patient safety and reduction of error for medication related incidents.

## Acknowledgement

KKH Medication Error Review Workgroup
Ms Ng Mee Yoke, SingHealth - ORS
Ms Lin Xinyan, SingHealth - ORS

**REFERENCES:** 1) Wiegmann DA, Shappell, SA. A Human Error Approach to Aviation Accident Analysis: The Human Factors Analysis and Classification System. Burlington, VT: Ashgate Publishing; 2003; 2) Diller T, Helmrich G. Dunning S, Cox S, et al. The human factor analysis classification system (HFACS) applied to healthcare. American Journal of Medical Quality 2014; 29 (3): 181-190; 3) National Medication Safety Taskforce "System Analysis Framework for Adverse Drug Events; 4) KKH Guide for Root Cause Analysis and Risk Management Incident Reporting System; and 5) Review of Medication Errors: A Human Factors Approach.