The impact of computerized physician order entry on medication errors in chemotherapy

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Background & Aim
Antineoplastic agents are considered high-risk medications due to their narrow therapeutic window and high toxicity. The workflow of chemotherapy process is complex with prescribing, ordering, reconstituting and administrating of drugs occurring in distinct steps. Computerized physician order entries (CPOE) are commonly introduced to improve medication safety (1), however, the adoption of a computerized system may elicit novel medication errors (ME) and safety risks (2). We aimed to evaluate the impact of implementation of a CPOE on medication errors in chemotherapy within a tertiary care university hospital.

Materials and Methods
ME reports concerning parenteral chemotherapy were selected for this study. Types and number of ME reports during 12-month study periods before and after CPOE were investigated. The after-period started 9 months after implementation of CPOE. Approximately ~70% of orders were made through CPOE on the after-period. (Figure 1). Qualitative analysis evaluated the causes of MEs and the functionality of safety barriers during prescribing, ordering, and delivering parenteral antineoplastic agents through the CPOE system (Figure 2 and Table 1).

Conclusions
• Adoption of CPOE has the potential to alter the occurrence and type of medication errors
• It is crucial to identify the pitfalls of a computerized system and develop adequate barriers to prevent novel types of errors from reaching patients.

Results
Overall, despite a reduction in MEs related to manual transcribing, total number of reported MEs did not differ before and after CPOE (Figure 1).

Dose errors are among the most hazardous type of MEs related to chemotherapy. When comparing CPOE to the paper-based process, dose errors were more frequently reported, and erratic doses were more often delivered to patients in the CPOE process (Figure 2).

Qualitative analysis of MEs revealed that both the usage skills and usability of the CPOE system were critical factors during adoption of CPOE.

Table 1: Causes of medication errors (ME) after adoption of CPOE

<table>
<thead>
<tr>
<th>Problem</th>
<th>ME (examples)</th>
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<tbody>
<tr>
<td>Usage skills of CPOE (n=18)</td>
<td>Erratic user input (dose, patient weight)</td>
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<tr>
<td>Usability of CPOE (n=7)</td>
<td>Features of CPOE</td>
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*Data in table are collected from 12 months after the adoption of CPOE.

References