The Good News about CPOE and Medical Student Ordering Ability

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Abstract
When the quality of orders written by medical students was compared for those who trained at hospitals using computerized provider order entry (CPOE) to those who trained using handwritten orders, no significant differences were found.

Introduction
Some educators believe CPOE may enhance medical students’ learning experiences by exposing them to recommended standards of care and decision support. However, others have expressed concern that CPOE could hinder medical education by decreasing interactions between students and housestaff, and by reducing the need for active thinking by automating the placement of orders for particular clinical situations.

Methods
Subjects included 136 Johns Hopkins University School of Medicine students who began the two-month Basic Medicine clerkship between March 2003 and April 2004. Demographic information was collected at the beginning of the clerkship. Students spent the first half of the clerkship either at a hospital using a home-grown CPOE system (69 students), at a hospital using only paper orders (22 students), or at a hospital that switched midway through the study period from paper orders (22 students) to a commercial CPOE system (23 students). After the first month of the clerkship students were asked to hand-write mock admission orders for a hypothetical elderly patient with pneumonia, hypoxia, uncontrolled diabetes, mild renal failure, and evidence of dehydration. A group of internal medicine faculty and fellows identified admission orders that were at least moderately important to write for such a patient. The recommended orders were grouped according to whether they were Basic Orders (ADC VAA DIML), Lifesaving Orders (acceptable oxygen therapy, acceptable IVF type and rate, appropriate antibiotic chosen, and acceptable dose, route and frequency for the antibiotic), and Other Higher Level Orders (e.g., ordering blood glucose monitoring, diabetes treatment, and follow-up labs), and a scoring tool with high inter-observer reliability was developed. Student orders were independently rated for the presence or absence of each of the recommended orders by two study members blinded to student status. Agreement between the two researchers was high, and discrepancies resolved by consensus. Basic, Lifesaving, Other Higher Level and total scores were then calculated for each student. Score distributions were dichotomized at the median, and Chi Square tests were used to determine if there was a relationship between training at hospitals using paper orders (n=44) or CPOE (n=92) and ordering ability.

Results
Fifty-nine percent of the 136 students were male, 56% white, and 87% in their 3rd year of medical school. 120 students (88%) attempted to write orders for the mock patient. 63% included 9 or 10 of the 10 Basic Orders in their mock admission orders. 62% included at least 1 of the 5 Lifesaving Orders. 61% included 7 or more of the 14 Other Higher Level Orders. 57% included 17 or more of all 29 orders recommended by the faculty and fellows for this patient. Students who trained at hospitals using CPOE were just as likely as those who trained using paper orders to attempt to write orders (p=0.50) and just as likely to include Basic Orders (p=0.28), Lifesaving Orders (p=0.85), Other Higher Level Orders (p=0.75), and all recommended orders (p=0.93). When students who trained at the hospital that switched from paper orders to CPOE were compared to each other, no significant differences were found.

Conclusion
Fears concerning the effects of CPOE on medical student learning experience and abilities do not appear to be justified. Multi-institution studies are warranted, however, as CPOE use increases at teaching hospitals across the country.