Impact of Computerized Physician Order Entry on Physician Time

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ABSTRACT

We examined the effect of computerized physician order entry on housestaff time use patterns, using time motion techniques. For both medical and surgical house officers, writing orders on the computer took about twice as long ($p<0.001$), or 44 minutes for medical and 73 minutes for surgical house officers. Medical house officers recovered about half this time because some administrative tasks--e.g. looking for charts--were made easier. Within types of orders, sets of stereotyped orders took much less time with order entry, but one-time orders took longer. We have since developed strategies to make it easier to enter one-time orders.

INTRODUCTION

Computerized physician order entry, in which all orders are written directly on a hospital information system by physicians, has enormous potential for improving care, because it allows structuring of orders, and offers the opportunity to give providers feedback at the time they make decisions.[1] Nonetheless, experiences with order-entry to date have been mixed; a major problem has been that such systems take providers longer than pen and paper.[1,2]

We have recently implemented a physician order entry system at Brigham and Women's Hospital. To evaluate the effect of order entry on medical and surgical housestaff time, we undertook a study with the following goals: 1) to measure the time spent before and after order entry in ordering; 2) to evaluate specific types of ordering to determine whether they were differentially affected; 3) to measure time spent in activities which might be simplified using order entry.

METHODS

We studied medical interns, and first and second-year surgical residents, as they write most orders in our hospital. We refer to the period before implementation of order entry as Phase 1, which included 22 medical interns and 7 surgical house officers, and to the period after as Phase 2, including 28 medical and 5 surgical house officers. In Phase 1, a trained observer followed medical interns; each physician was observed continuously between 8 am and 5 pm. The physician's activity was recorded every thirty seconds. In Phase 2 medical data collection, and in both phases for surgeons, we used random reminder pagers to measure time use.

RESULTS

When time spent ordering was compared between Phase 1 and Phase 2, the percent for medical interns increased from 5.3% to 10.5% ($p<0.001$), representing 44 additional minutes per day, while for surgical house officers the corresponding figures were an increase from 6.4% to 15.5% ($p<0.001$), 73 minutes per day. However, the medical interns (but not the surgeons) recovered some time because of decreased time to perform activities expected to take less time after order entry: 9.4% to 6.1% ($p<0.001$), 27 minutes per day.

Daily and one-time orders accounted for the majority of this change, increasing almost threefold in percent total time (2.2% before, vs. 7.2% after order entry). However, sets of orders took less total time after order entry (1.7% vs 3.1%).

DISCUSSION

While physician order entry has tremendous potential for reducing costs and improving quality,[1] the first requirement is that it be fast enough to be usable. Computer order entry takes physicians about twice as long as paper ordering, and adds more time for surgeons than for medical interns, although it is faster for orders which are written in groups, and some time is recovered because of reduced time needed to perform other activities. We are currently implementing strategies to reduce the time required to write one-time orders.

1. Tierney WM, Miller ME, Overhage JM, McDonald CJ. Physician inpatient order writing on microcomputer workstations. JAMA 1993; 269:379-383.

2. Massaro TA. Introducing physician order entry at a major academic medical center. Acad Med 1993; 68:20-25.

0195-4210/94/$5.00