Computerized Physician Order Entry: Is Additional Time Required?

Overhage JM, Perkins S, Tierney WM, McDonald CJ. Controlled trial of direct physician order entry: effects on physicians' time utilization in ambulatory primary care internal medicine practices. J Am Med Inform Assoc 2001;8:361–71.

Study Overview

Objective. To determine whether additional time per patient visit is required for physicians to write orders using a direct physician order entry system compared with a paper-based system.

Design. Randomized, non-blinded controlled trial. Analysis was not by intention to treat; 1 practice that did not successfully implement the intervention (due to high staff turnover) was not included in the intervention group. A time-motion study was performed to measure the effects of the intervention.

Setting and participants. 34 internists practicing at 6 community health centers and 5 commercial practices affiliated with a single university medical center in central Indiana were studied. None of the practices had computerized order entry prior to the study, but approximately 25% of the physicians had some experience using the system previously.

Intervention. Community health centers and commercial practices were randomized separately. Practices in the intervention group had the Medical Gopher direct physician order entry system installed over the course of a year. Physicians received 30 minutes of training prior to using the system. During the study period, physicians were to use the Gopher system to record billing diagnoses, prescriptions, allergies, tests ordered, referrals, nursing intervention orders, and optionally notes.

Main outcome measures. Trained observers used hand-held computers to precisely record the type and duration of physician activity during half-day observation periods performed over a 2-year period. The primary outcomes were overall physician time spent per patient and the time spent per patient on writing tasks related to individual patient care. The primary outcomes were adjusted using a regression model to account for differences in the distribution of providers in the different location types. Other outcomes included differences in time use between the first and last observation periods for providers in the intervention group who were observed more than once, time spent doing redundant documentation, number of drug–drug interactions reacted to by physicians, and opinions of physicians in the intervention group.

Main results. 14 physicians in the intervention practices and 20 in the control practices were observed for a total of 110 half-day observation periods. The average observation period was 3.5 hours with a mean of 6.8 patients seen per period. The adjusted average time spent per patient overall was 2.12 minutes longer and writing-specific time spent was 0.61 minutes longer in the group using the Gopher system compared with controls. None of the adjusted comparisons reported showed a significant difference between groups. 95% confidence intervals were not reported. When time spent performing redundant documentation tasks was removed, the overall time per visit was only 0.92 minutes longer, and the writing-specific time was 0.55 minutes shorter in the intervention group compared with the control group. During the observed periods, 20 drug-interaction warnings were reacted to by physicians, leading to 19 prescription cancellations. Comparing the first and last observation periods for individual providers in the intervention group, there was a nonsignificant 3.73 minute decrease in overall time spent per patient. Of the physicians in the intervention group, 86% responded to the opinion survey. In general, respondents thought speed, ease, quality of documentation, and quality of care were improved by the addition of the direct order entry system, and they did not wish for the system to be removed from their practices.

Conclusion. In a group of university-affiliated internal medicine practices, addition of the Medical Gopher computerized physician order entry system did not lead to large increases in time spent performing documentation activities.

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If redundant paperwork is removed, this study suggests the system may be potentially time-saving. The system was generally viewed favorably by users.

Commentary

The major strength of this paper is the use of a time-motion study with many hours of observation to measure the time impact of adding a direct order entry system to clinical practice. There are, however, several aspects of this study that limit its ability to definitively address its objectives. Since the number of practice sites and practitioners included in the randomization was small, potentially important differences existed in the comparison groups at baseline. To compensate for this, Overhage and colleagues chose to adjust for some of the baseline differences (eg, distribution of providers in the 2 location types) in their comparison groups, a method generally not employed in the presentation of the results of randomized controlled trials. While these adjustments may have corrected for specific differences between the groups, other confounders could easily be present. Since this study attempted to demonstrate equivalence between 2 groups, it would have been desirable to know outright its power to detect small differences in overall and writing-specific time spent per patient. Giving 95% confidence intervals would also have served to define the maximal differences between the groups still compatible with the findings they observed. Also, it is not clear how generalizable the outcomes reported here are to different providers, practice settings, or users of direct order entry systems other than the 1 studied here.

Applications for Clinical Practice

This study partially addresses the concerns of those who worry that switching to a computerized order entry system for outpatient practice would lead to too much lost time. In addition, its discussion raises some of the advantages of this type of system, namely, records are legible and can be made available via home computers, drug–drug interactions can be detected, and some ancillary paperwork can be eliminated. For those planning to add computer order entry to their practices, these findings are encouraging. However, questions still remain as to the upper limit of the time increase that may occur on switching to this type of system.

– Review by Stephen D. Persell, MD