Published in final edited form as:
*Arch Intern Med*. 2011 May 23; 171(10): 903–905. doi:10.1001/archinternmed.2010.518.

# Clinical Decision Support and Rich Clinical Repositories

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## Clinical decision support and rich clinical repositories – a symbiotic relationship

In their paper, Romano and Stafford1 studied the effect of electronic health records (EHRs) – both with and without clinical decision support (CDS) – on physician adherence to evidence-based guidelines. They used data from the National Ambulatory Medical Care Survey2 (NAMCS) and the National Hospital Ambulatory Medical Care Survey3 (NHAMCS) to evaluate physician performance on 20 quality indicators. The results Romano and Stafford found were dismal. The investigators observed no consistent difference in guideline adherence among providers who used paper medical records compared to those that used either an EHR alone or an EHR with CDS.

This lack of effect of CDS on provider behavior was surprising given the strong effects previously reported in randomized controlled trials (RCTs) of these systems. In their most recent review of CDS systems in 2005,4 the McMaster group examined 100 well-designed studies on outcomes of CDS, which together evaluated a total of 3,826 practitioners or practices and more than 92,895 patients. Seventy-three percent of the 60 trials evaluating CDS systems that gave providers guidance without being asked for help (akin to the ones considered in the current study) showed that automated CDS had positive and often large effects on provider behavior and care processes.

Many differences between the design and guideline targets of the trials summarized by the McMaster group and the current observational study could explain the discordance between their outcomes. First, and most important, the current paper tells us nothing about which CDS guidelines were implemented in the systems that they studied. Practices and EHRs vary considerably in the number and type of CDS rules they implement, and we do not know if the CDS rules implemented by the practices that participated in the surveys addressed any of the 20 quality indicators evaluated by Romano and Stafford. Second, the current study and the McMaster review considered very different categories of guidelines. Most (60%) of the guidelines in the current study are about medication use; none of them deal with immunizations or screening tests, which were the dominant subjects in the studies reviewed by the McMaster group. Further, in our experience, care providers are less willing to accept and act upon automated reminders about initiating long-term medication than about ordering a single test or immunization. The third difference is that the current study examined the outcome of a single visit, while most of the McMaster trials observed the cumulative effect of the CDS system on a patient over many visits. Lastly, the data available from NAMCS/NHAMCS may be limited compared to what is contained in most of the EHRs used for McMaster's trials. For example, the NAMCS/NHAMCS survey instruments only have room to record 8 medications, even though at least 17% of people over age 65 take 10 or more medications.5

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Regardless of the differences, we know from multiple RCTs that well-implemented CDS systems can produce large and important improvements in care processes. What we don't know is whether we can extend these results to a national level. The results of Romano and Stafford's study suggest not. However, we suspect that the EHR and CDS systems in use at the time of this study were immature, did not cover many of the guidelines the study targeted, and had incomplete patient data; a 2005 survey of Massachusetts physicians supports this concern.6 On the other hand, we are not surprised that EHRs without CDS do not affect guideline adherence, because without CDS, most EHRs function primarily as data repositories that gather, organize, and display patient data, not as prods to action.

Although EHRs without clinicial decision support may not improve adherence to clinical guidelines, they are 1) a necessary precondition for having CDS (without electronic data there can be no electronic support functions), 2) valuable for maintaining findable, sharable, legible, medical records, and 3) when they are amply populated, i.e., they contain at least a year or two of dictations, test results, medications and diagnoses/problems, physicans love them because there are are no more lost charts or long waits on the telephone for lab results. Most large institutions create rich clinical repositories by pulling in all of the data from their internal laboratory, pharmacy, radiology and dictation systems. They can do this because they control their source systems and can distribute the linking costs over a large base of users. Office practices, on the other hand, have neither of these advantages because they are smaller units of care and obtain their corresponding data from external sources; thus, their efforts to create repositories are stunted by the high costs of interfacing to the external system and translating that content into something their system can understand. It does not have to be this way. The standards needed to deliver data from external sources to office practices already exist. Indeed, an implementation guide for laboratory messages was promulgated by the Department of Health and Human Services in 2008.7

The Clean Water Act puts the responsibility on the upstream producers of impure water to clean it up. It does not make economic sense for each of the downstream users to do the cleanup work before they can use the water. The same principle should apply to health care data. The upstream data producers should deliver clean data that can be imported into downstream EHRs without additional work or cost. Compared to the work that would be required for each site to clean and standardize the data they receive, it would take just a fraction of the effort for the data sources to tighten up their electronic reporting so that it strictly conforms to national format, content, and code standards.8 We could imagine it being as easy as the importing of bank statements to Quicken. Though many large national laboratories do offer electronic reports which follow such format and code standards, most diagnostic services, hospitals, dictation services and other clinical data sources do not, because the current national incentives to automate and standardize medical data apply to the downstream EHRs, not to the systems that feed them. This has to change. Office practices and the medical societies that represent them have to demand clean, well-standardized data feeds for their EHRs, and policymakers need to support this requirement. Only when EHRs carry rich repositories, can we expect EHRs to reach their promise and CDS to have measurable effects on a broad range of quality measures at the national level.

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