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Is Clinical Decision Support the Missing Link in Prevention?

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Electronic health records (EHRs) are touted as a key strategy for reducing costs and improving quality in our healthcare system, which are both urgent goals. The short-comings of our current system are perhaps most apparent in the provision of preventive services. Contrasted with treatment services focused on addressing symptomatic and/or preexisting disease, preventive services aim to forestall or decrease future adverse health outcomes and thus improve quality of life, as well as lifespan. Prevention can potentially stem the tide of high-cost care by reducing later occurrences of expensive and life-threatening diseases. Numerous barriers, however, inhibit the implementation of proven preventive interventions. Electronic health records, particularly those systems providing clinical decision support (CDS), offer an appealing solution to the status quo whereby busy clinicians all too often lose sight of longitudinal prevention targets while prioritizing immediate treatment goals. The US government has thus allocated billions of dollars in the last three years to invest in health information technologies in order to improve health care quality, decrease morbidity and mortality, and reduce costs (1).

Holbrook and colleagues' study (2), however, contributes to a growing body of evidence suggesting that CDS is not the magic bullet that many proponents envision. While numerous reports from flagship institutions indicate that CDS *can* have a measurable impact on local health care quality (3, 4), most studies with a broader focus suggest that CDS has a limited impact on improving health in more conventional settings (5, 6). Furthermore, our analysis of outpatient quality effects of CDS use at a national level in the U.S. has provided discouraging results (7). While it seems logical that providing physicians with high quality, longitudinal, and actionable information about their patients should contribute to better care, numerous barriers remain to be addressed, such as ineffective reimbursement, limited physician skills and knowledge, insufficient patient engagement, lack of physician time, and poorly integrated workflow.(8).

This pragmatic randomized controlled trial among family physicians in Ontario, Canada fills important gaps in our understanding of CDS effectiveness. The intervention focused on cardiovascular risk factor management for moderate- to high-risk patients in family physician practices. A color-coded dashboard report within clinicians' EHR depicted intervention patients' risk factors for vascular disease. Holbrook and colleagues simultaneously assessed improvement in risk factor assessment (whether physicians addressed risk factors) and improvement in intermediate patient outcomes (whether vascular disease risk factors changed). The year-long study period allowed sufficient time for physicians to adapt to the CDS tool and for patients to modify risk factors. The intervention led to increased provider monitoring of patient risk factors; however, participants showed no significant improvement in risk factor profiles over control patients. The study lacked statistical power to compare more definitive outcomes (e.g., cardiac events).

There are important limitations to this study. The intervention was conducted in 2005, a relatively distant time given the rapid changes in health information technology and electronic decision-support tools. Additionally, the Canadian study's results may not transfer to other countries with different health systems. The quantification of process and risk factor improvement relied on simple summation of risk factors, which does not account for interrelated and nonequivalent risks associated with these factors. For example, smoking cessation is counted as numerically equivalent to increased fruit and vegetable intake. An alternative method for risk measurement would be the use of a validated risk scoring system such as the Framingham Risk Scores, although these tools also have important limitations (9). Additionally, several risk factors were reasonably well managed at baseline, so their inclusion added little to the results. Certain prevention goals, such as smoking cessation, may simply be difficult to attain in the context of a busy primary care practice. Holbrook and colleagues observed sizable improvements in the control group, which may represent secular trends or the impact of the initial risk factor screening conducted by telephone. This finding reinforces the importance of a control arm in trials of health care process changes.

Despite these limitations, this study suggests that providing physicians with accessible and actionable information does not directly improve patient outcomes. The data suggest that health care processes can improve without a corresponding improvement in outcomes. This does not suggest that CDS should be abandoned as a health care improvement tool, but rather that it is only one of many existing strategies to improve patient care. Furthermore, it is crucial that enthusiasm for CDS not detract from attention to other strategies such as reimbursement reform and community-based health promotion.

We need to fundamentally re-envision how health care is provided. It is not clear that physicians can or should be tasked with managing risk factors longitudinally, nor that a computerized algorithm can easily capture the complexity of risk factor management. In particular, we may do better with a team approach involving health educators, dietitians, physicians, and patients partnered with a public health approach of increasing availability of healthy foods, decreasing availability of unhealthy ones and increasing opportunities for walking, such as adding sidewalks to neighborhoods lacking them. Addressing prevention issues at a community level may help address factors even further upstream from patients' visits to their doctors' offices (10). We need to realign incentives in our antiquated fee for service reimbursement system to reward the complexity and importance of performing prevention activities. As we seek to develop efficacious and cost-effective strategies to improve care, health information technology should be part of a comprehensive solution, but its utility and costs deserve ongoing scrutiny. It is crucial to standardize EHR tools to improve interoperability, provide better training to clinicians as technologies evolve, and proactively plan for changes in work flow that result from CDS use. Health information technologies may offer important disease prevention tools; however, improving the quality of care in practice requires an evidence-based approach that considers the potential costs and benefits of CDS and places them in the context of other efforts to improve quality, reduce costs, and achieve better patient outcomes.

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