The Role of Clinical Decision Support Systems in Preventing Cardiovascular Disease

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Based on evidence from the Njie et al.[1] systematic review, the Community Preventive Services Task Force recommends clinical decision support systems (CDSS) due to sufficient evidence of effectiveness to improve cardiovascular disease (CVD) risk factor screening and practices for CVD-related preventive care services, clinical tests, and treatments; however, evidence was lacking for effectiveness to improve CVD risk factor outcomes from several studies with inconsistent conclusions.[2] These findings are particularly important in the current national atmosphere that encourages clinicians to use electronic health records (EHRs) and the health information technology (IT) capacity within those systems, including clinical decision supports, to meaningfully improve the quality of delivered care, reduce costs, and improve population health management practices.[3] Effective CDSS are, most often, computerized information systems that use knowledge bases and patient information at the point of care to drive evidence-based treatment. They can provide the right information to the right people, both clinicians and patients, in the right format (e.g., alerts, order sets, protocols, info buttons) through the right channels (e.g., via an EHR, a smartphone app, or computerized physician order entry) at the right time in the clinical workflow.[4] These recommendations from the Community Preventive Services Task Force are important in moving the needle on CVD prevention.

Each year, there are 1.5 million heart attacks and strokes,[5] major contributors to CVD, the leading cause of death in the U.S. One in three deaths is attributable to CVD, representing almost 800,000 annual deaths, many of which are avoidable.[6,7] To address the burden of CVD, in 2012, the U.S. DHHS launched Million Hearts®, a national initiative, co-led by CDC and the Centers for Medicare & Medicaid Services, with the goal of preventing one million heart attacks and strokes by 2017 by implementing proven interventions in clinical settings and communities.

In the clinical arena, Million Hearts® actively promotes the full deployment of health IT to improve risk factors with the greatest impact on CVD prevention: aspirin when appropriate, blood pressure control, cholesterol management, and smoking assessment and treatment, that is, the "ABCS." Two key Million Hearts®–supported interventions that are greatly facilitated by health IT are (1) focusing clinicians and health systems to improve

performance on a small set of clinical quality measures for the ABCS[8] and (2) using standardized hypertension treatment protocols.[9,10] CDSS can play an important role in both of these strategies.

Thoughtful, judicious, and evidence-based CDSS can be embedded throughout the electronic clinical workflow to detect care gaps and drive improvement on the ABCS clinical quality measures. For example, CDSS can enhance performance by displaying abnormal blood pressure or cholesterol values in red text or prompting an inquiry about tobacco use and subsequent referral of smokers to a quitline or electronic prescription of cessation medications.

Standardized, evidence-based treatment protocols can have a powerful impact on improving hypertension control by clarifying medication intensification intervals and treatment options, expanding the types of staff that can assist in timely follow-up with patients, and when embedded in EHRs, serving as clinical decision support at the point of care so no opportunities are missed to achieve control.[9] The Office of the National Coordinator for Health IT, in support of Million Hearts® and in collaboration with CDC, recently launched the EHR Innovations for Hypertension Challenge.[11] This challenge was designed to gather effective electronic clinical decision support tools that are being successfully used in clinical settings to support a standardized approach to hypertension treatment.

In both of these examples, CDSS are a critical utility within a comprehensive service delivery model, enabling team-based care and a focus on outcomes. One of the challenges highlighted in the Community Guide review is that most pertinent evidence on CDSS assesses them as a lone intervention and not as part of a broader context of coordinated care delivery.[1] As a result, it will be extremely important to continue exploring the use of CDSS for not only CVD-related quality of care outcomes but also CVD-related risk factor outcomes like hypertension control and cholesterol management.

The landscape of EHR technology, and all of the facets that help make EHR systems "meaningful," is changing rapidly. In addition, given the lag from study completion to publication, most technology studies are outdated by the time they are published. This is particularly true of systematic reviews where the review is often published 2–3 years after the last included study was published. Hence, the scientific literature does not yet reflect the full impact of meaningful use–driven CDSS.

As EHR technology becomes more prevalent and clinicians become more comfortable with it, the utility of CDSS will likely grow as clinicians and vendors further refine and streamline CDSS and optimize their use to improve outcomes. It will be especially important to assess effectiveness of CDSS that include culturally tailored interventions to address the needs of different racial/ethnic populations, patients of low SES, or patients with limited English proficiency. Another challenge to tackle is the incorporation of patient-reported outcomes and patient-generated data into EHRs and, as useful, into CDSS.

This is a time of great transition in health care, with an increased focus on improving quality, outcomes, and cost and millions more people gaining access to care through the Affordable Care Act. The administrative burden and clinical demand on providers calls out for well-

designed, customizable, and evidence-based CDSS to help ensure that effective treatments are delivered to all those deemed eligible, that those who do not respond as expected are efficiently identified and managed, and that no opportunities to deliver high-quality care are missed. CDSS can be an invaluable "team tool" by facilitating appropriate sharing of care responsibilities among physicians, nurses, pharmacists, physician assistants, and others.[9] This Community Guide review tells us that CDSS are effective at improving the processes that lead to better CVD outcomes; with more widespread use and continuous improvement, CDSS will contribute to excellence in the ABCS—and millions fewer cardiovascular events.

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