



Implementing Clinical Decision Support Systems

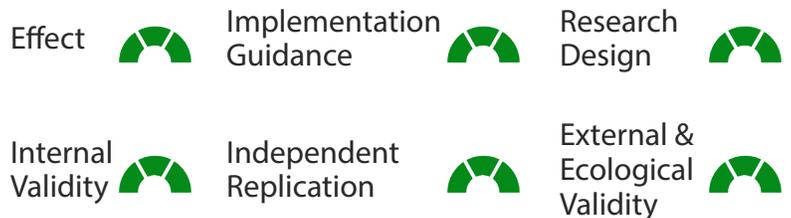
Clinical decision support systems (CDSS) are computer-based programs that analyze data within EHRs to provide prompts and reminders to assist health care providers in implementing evidence-based clinical guidelines at the point of care. Applied to cardiovascular (CVD) prevention, CDSS can be used to facilitate care in various ways—for example, by reminding providers to screen for CVD risk factors, flagging cases of hypertension or hyperlipidemia, providing information on treatment protocols, prompting questions on medication adherence, and providing tailored recommendations for health behavior changes.

Summary

CDSS involves the use of computer-generated reminders and prompts to help health care providers make clinical decisions. It is an effective strategy for increasing the quality of care in screening, testing, and treating patients with high blood pressure and high cholesterol. Evidence that it directly affects health outcomes is lacking.

Stories From the Field: South Omaha Medical Associates, Nebraska Department of Health and Human Services, Douglas County Health Department, and Wide River Health Information Technology.

Evidence of Effectiveness



Legend: Well supported/Supported  Promising/Emerging  Unsupported/Harmful 

Evidence of Impact



Legend: Supported  Moderate  Insufficient 



Evidence of Effectiveness

The evidence base demonstrating the effectiveness of CDSS is very strong. Research studies that examined CDSS had strong internal and external validity, the Community Preventive Services Task Force concluded that CDSS is effective, and CDSS trials have been replicated with positive results. Implementation guidance on CDSS is available from several sources.

Evidence of Impact

Health Impact

A review by the Community Preventive Services Task Force found that CDSS leads to significant improvements in the following three quality of care practices for CVD prevention delivered by health care providers:^{1,2}

- Recommendations for screening (e.g., for blood pressure or cholesterol) and other preventive care (e.g., smoking cessation).
- Evidence-based clinical tests related to CVD.
- CVD-related treatments prescribed.

Evidence exists that CDSS can be tied to lower blood pressure and cholesterol levels, but the findings on this association are inconsistent.

Health Disparity Impact

The ability of CDSS to reduce health disparities is understudied, and several researchers have suggested that further work is needed to directly examine this issue. Some have noted that providers working with underserved communities typically lag behind in the uptake of electronic health records (EHRs) and CDSS, and evidence exists that CDSS leads to successful health outcomes when used in underserved communities.^{3,4} Thus, it is reasonable to conclude that CDSS has the potential to eliminate barriers and reduce disparities in hypertension-related care.

Economic Impact

Economic factors related to the implementation and maintenance of CDSS have not been well-documented. A review by the Community Preventive Services Task Force was inconclusive because of a lack of available data. The Task Force found that current studies are extremely heterogeneous in the range of CDSS functions and CVD risk factors studied and in the completeness or inclusion of major cost factors. Thus, the ability to determine an overall estimate of the cost or economic benefit of CDSS is limited. Of the studies available, health care costs appear to be more likely to decrease than increase after CDSS implementation, but the usefulness of this evidence is limited by incomplete and inconsistent data.⁵ More data on the complete costs of developing, implementing, and operating CDSS systems are needed to fully assess its cost-effectiveness or return on investment.



The evidence base demonstrating the effectiveness of CDSS is very strong.

Stories from the Field

Clinical Decision Support



CDSS at South Omaha Medical Associates

South Omaha Medical Associates (SOMA) is a family-owned, family-operated clinic that is centrally located in South Omaha, Nebraska. It has a higher percentage of low-income patients than clinics in surrounding areas. SOMA collaborated with the Nebraska Department of Health and Human Services, Douglas County Health Department, and Wide River Health Information Technology to assess its technology needs and make plans to implement CDSS. As a result of this assessment, the clinic increased its use of EHRs and implemented systems to better identify patients with undiagnosed hypertension, increase use and monitoring of clinical quality measures, and increase use of clinically supported self-measured blood pressure monitoring. These changes improved workflow at the clinic and led to a 25% increase in patient visits since the start of the collaboration. In addition, Blue Cross Blue Shield awarded SOMA its Blue Distinction Award for meeting overall quality measures for patient safety and outcomes.

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Four Considerations for Implementation

1 Settings

Although CDSS has been implemented in a wide variety of health care settings, most published research has been within the context of primary outpatient care.

2 Policy and Law-Related Considerations

Legal considerations for CDSS begin with the vendors who interpret and translate guidelines into algorithms used by these systems. Vendors must fully disclose the sources used to build the knowledge base for their software and any limitations or weaknesses of the software. Providers must ensure that CDSS programming is updated regularly to account for changes in evidence and guidelines, and that EHRs associated with CDSS include complete and up-to-date information about patients' medical histories and allergies.^{1,8,13} Provider fatigue or avoidance of CDSS guidance has been raised as a barrier to successful outcomes, leading to suggestions that initial and repeat trainings be a mandatory part of CDSS implementation.

3 Implementation Guidance

Implementation guidance for CDSS is available from various sources. The following resources may be particularly useful:

- [Measure Up Pressure Down: Provider Toolkit to Improve Hypertension Control from the American Medical Group Foundation.](#)⁶
- [Clinical Decision Support \(CDS\) Implementation: How-To Guides for CDS Implementation from HealthIT.gov.](#)⁷
- Castillo RS, Kelemen A. Considerations for a successful clinical support system. CIN: Computers, Informatics, Nursing.⁸

4 Resources

CDSS is supported and promoted by many federal initiatives and agencies, including:

- [CDC's Million Hearts Initiative.](#)⁹
- [Office of the National Coordinator for Health Information Technology.](#)¹⁰
- [CMS's Merit-Based Incentive Payment System: Advancing Care Information.](#)¹¹
- [Agency for Healthcare Research and Quality.](#)¹²



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