Computerized Decision Support: Evaluations and Troubles

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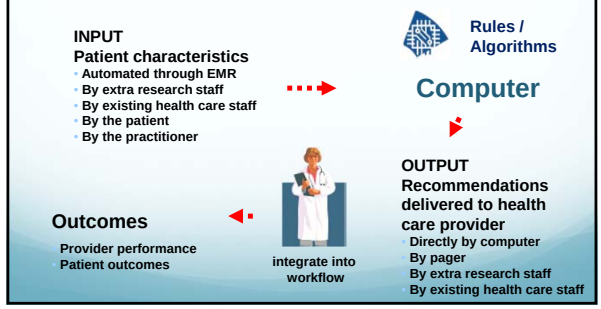
Computerized Clinical Decision Support Systems

- Software designed to directly aid in clinical decision making in which characteristics of individual patients are matched to a computerized knowledge base for the purpose of generating patient specific assessments or recommendations.



Computerized clinical decision support systems: A decision-maker-researcher partnership systematic review of effects on process of care and patient outcomes

Pavel Roshanov, Brian Hemens, Nathan M Souza, Robby Nieuwlaat, Rolf J Sebaldt, Jean A Mackay, Jeanette C Prorok, Lorraine Weise-Kelly, Tamara Navarro, Nancy L Wilczynski, R Brian Haynes and the CCDSS Systematic Review Team

Funding: CIHR
Publications: Implementation Science 2011, 6:87
BMJ 2013, 346:f657

Examples of Clinical Decision Support Systems

Alert	Highlight out of range serum potassium
Remind	Remind about need for hepatitis B vaccination
Critique	Reject med order when allergy present
Interpret	Interpret an electrocardiogram
Predict	Calculate risk for cardiac disease
Diagnose	Algorithm for ruling out fracture in ankle injury
Recommend	Suggest new orders for active care

Research Questions

1) Do CCDSSs improve process of care or patient outcomes?
2) What are the costs, safety, and provider satisfaction with CCDSS?

Costs

- Costs of developing, implementing, and maintaining a CCDSS were partly reported in 15% of trials
- 2 found costs of care were less ↓
- 3 yielded increased cost of care ↑
- 1 showed varied cost minimization data ↓↓

CDSS review - studies showing a positive outcome

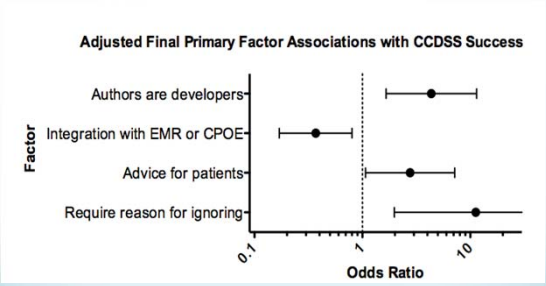
Application	Process of care	Clinical outcomes
Primary prevention	63% (26/41)	34% (4/14)
Acute care	63% (22/35)	15% (3/20)
Chronic disease	47% (26/55)	31% (11/36)
Diagnostic orders	55% (18/33)	NA
Drug orders	64% (37/59)	21% (6/29)
Drug monitoring	60% (18/30)	21% (4/19)
Overall	**60%**	**24%***

*** Most clinical outcomes were not "patient-important"**

Harms & Satisfaction

- Very few trials reported on harm/adverse events possibly associated with CCDSS
- Few trials reported on provider satisfaction with CCDSS
- Only 1 trial reported on patient and provider satisfaction with CCDSS

Predictors of Successful CCDSS



←Associated with Failure||Associated with Success→

Roshanov et al. BMJ 2013

The way forward

- **Legislate requirement for evaluation for health and economic claims of IT for health care**
- **Require reporting of adverse effects**
- **Provide more funding for eHealth research and training**

Some troubles with eHealth*

- **Many eHealth innovations make medical claims, but they are not treated as medical devices**
- **There is no obligation of eHealth innovators to test their products or report their harms, and there is no economic incentive for them to do so**
- **The EMR is structured, excessive, and suppresses narrative aspects of care, and detracts from important aspects of care**
- **Interoperability of the EMR remains a serious problem**

*** American College of Medical Informatics listserve, May 2014**

Table. **Principles of EHR Design, Implementation, and Policy**

Sinsky et al. Ann Intern Med 2014

Patient-centered design
1. The use of an EHR should add value for the patient.
2. The primary function of an EHR is clinical care.
Health care professionals
3. The use of an EHR should improve, or at a minimum not reduce, the well-being of health care workers.
4. The use of an EHR should align the work with the training of the worker.
5. The EHR is a shared information platform for individual and population health.
Efficiency
6. The use of an EHR should minimize waste.
7. Electronic workflows should align with clinical work.
8. Various methods of communication, including nonelectronic forms, will be necessary for optimal patient care.
Regulation and payment
9. Sufficient resources should be available for the new work associated with the advanced use of an EHR.
10. Policies around EHR use should reflect the strength of the evidence base supporting them.
11. Regulatory balance between often competing values (i.e., clinical quality vs. security or efficiency vs. performance measurement) should be sought.