

Issues pertaining to the implementation
of a clinical decision support system for
diagnostic test ordering

English summary

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SUMMARY

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Introduction

Diagnostic tests, when relevant, play a key role in the process of disease diagnosis, treatment and follow-up. Thus, health professionals must decide whether or not to order a diagnostic test based on their clinical judgment and a variety of complex information. This can sometimes pose a important challenge, for which one promising solution is the use of clinical decision support systems (CDSSs), which have been shown to be effective in many areas of health.

The Ministère de la Santé et des Services sociaux (MSSS) therefore asked INESSS to identify the barriers and facilitators related to implementing a CDSS for diagnostic test ordering.

Methodology

This state-of-knowledge report is based on a rapid literature review conducted in accordance with INESSS's methodological standards. To be included, studies had to meet the following criteria: the study population had to include patients and caregivers, health professionals, and health managers; the exposure factor had to include any facilitators of or barriers to implementing a CDSS for diagnostic test ordering, whether the CDSS was technically linked to an electronic prescriber or not; and the implementation outcomes had to include acceptability, adoption, relevance, feasibility, adaptability, penetration and sustainability. The literature search was conducted in January 2022 in MEDLINE (via Ovid), Embase, EBM Reviews and in the grey literature. The studies' methodological quality was assessed using the MMAT (Mixed Methods Appraisal Tool). Barriers and facilitators were coded and classified according to the Consolidated Framework for Implementation Research (CFIR) constructs. Data synthesis was performed and was structured using a conceptual framework based on the CFIR constructs and the implementation outcomes.

Results

A total of 23 studies with acceptable methodological quality were included. Most of them were recent (50% published after 2017) and were conducted in North America (17/23) and in primary care settings (13/23). The methodology used in the selected studies varied. Some used specific conceptual frameworks/models for assessing barriers and facilitators (9/23). The semi-structured interview was the most commonly used data collection method (11/23). The analyses performed in the studies were qualitative and/or descriptive. The participants' profile varied as well, although physicians were included in all the studies. Most of the CDSSs studied were multifunctional (19/23), mainly covered specialized areas of health (17/23) and were mainly intended for health professionals

only (20/23). For the most part, the CDSSs were linked to an electronic health record (17/23), and their content was often based on patient data and evidence-based practice guidelines or recommendations (16/23). Use (16/23), adoption (5/23) and acceptance/acceptability (2/23) were the three outcomes analyzed in relation to the barriers and facilitators. The CDSS implementation barriers and facilitators were multidimensional, covered all the CFIR domains and were from the studies of the pre-implementation (10/23) and post-implementation phases (13/23).

Integrating all the scientific data led to the following findings for the five CFIR domains:

During the pre-implementation phase, barriers and facilitators were assessed for the possible implementation of a CDSS or during the pilot phase of the implementation of such a CDSS, while during the post-implementation phase, the barriers and facilitators were assessed after full implementation.

1. Characteristics of the DCSS

The barriers and facilitators in this area were mostly the same in the pre- and post-implementation phases.

Main barriers:

- Inaccurate CDSS content;
- Inconsistency between the recommendations generated and those of the health system;
- Technical and technological challenges (non-integration with existing systems, alert fatigue and unsuitable visual layout);
- Inadequate funding for covering the tests;
- Inadequate funding for training, technical support or maintenance of the CDSS;
- Medicolegal concerns.

Important facilitators:

- Content based on practice guidelines and meeting health professionals' and patients' needs;
- Recommendations generated consistent with those of the health system;
- CDSS integrated into the existing systems;
- Adequate budgeting for implementation.

2. Characteristics of the external context

The barriers and facilitators identified for this area differed somewhat between the pre- and post-implementation phases, but were complementary.

Main barriers:

- Inconsistency between the policies and the practice guidelines used in the CDSS;
- Issues related to computer security and protection of data shared with outside parties (computer viruses, confidentiality and proprietary issues);
- A lack of standardization of the documentation on diagnostic tests.

Important facilitators:

- Consistency between the policies and the practice guidelines used in the CDSS;
- Patients' needs taken into consideration when implementing the CDSS.

3. Characteristics of the internal context

The barriers and facilitators in this area were mostly the same in the pre- and post-implementation phases.

Main barriers:

- No scientific evidence-based organizational culture;
- No information technology-based organizational culture;
- Incompatibility of the CDSS with the implementation setting (existing systems, workflow, resistance to change);
- Expectations and responsibilities not clearly communicated;
- Lack of educational, medical and/or information technology resources.

Important facilitators:

- A culture of policies based on evidence and close collaboration between healthcare personnel and information technology personnel;
- A centralized organizational structure for implementing and managing the CDSS;
- Clarification of expectations and responsibilities through executive leadership;
- The scope of qualified users expanded to include non-physician health professionals;
- Communicating the benefits of CDSS;
- Integrating the CDSS into the workflow;
- The availability of concise, tailored training and of adequate medical and information technology resources.

4. Characteristics of the individuals involved

The barriers and facilitators related to the characteristics of the individuals involved were mostly the same in the pre- and post-implementation phases.

Main barriers:

- A lack of knowledge about the content or the recommendations generated;
- A negative perception of the use of the CDSS (a lack of skills, an impediment to clinical judgment).

Important facilitators:

- The involvement of motivated, computer-literate, competent users;
- The perception of the CDSS as a tool with concrete educational and informational benefits;
- Recognition of the CDSS's importance in clinical practices.

5. CDSS implementation process

The barriers and facilitators identified for this area differed somewhat between the pre- and post-implementation phases, but were complementary.

Main barriers:

- A lack of stakeholder involvement in the CDSS's implementation;
- A lack of understanding of the quality indicators incorporated into the dashboard.

Important facilitators:

- Clinical leadership coordinated by dedicated staff;
- The involvement of representatives from all the health professions who might need to use the CDSS;
- Planning the quality indicator calculation;
- Producing individual reports at the implementation settings' request.

Conclusion

This rapid review has identified and provided a structured portrait of the barriers to and facilitators of implementing a CDSS for diagnostic test ordering in terms of its acceptance, adoption and use. The determinants identified cover all the CFIR domains. Although these determinants are exploratory and require contextualization in Québec's health system, they should guide the MSSS in the development, planning, execution and evaluation of the implementation of a CDSS for the ordering of medical imaging tests.

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