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APPLYING VALIDATE APPROACH TO A MEDICATION ADECUACY CLINICAL DECISION SUPPORT SYSTEM: INNOVATING OR GOING BACK TO BASICS?

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BACKGROUND

- Current HTA doers → narrowed its scope to mainly **clinical** and **economic** benefits.
- 21st century technology challenges emphasize the need for **holistic assessments** to obtain accurate recommendations for decision-making, as it was in HTA's foundations[1].
- VALIDATE[2] approach → holistically approach through analysis of stakeholder's views heterogeneity, contrasting
  - **Facts:** published data; effectiveness and CE
  - **Values:** information on ELSI (ethical, legal & social implications) & multiple stakeholders' views.
- **Medication adequacy CDSS**: computer-based programs that analyze data to provide prompts/reminders to assist health professionals in the decision making process.
- Even though its efficacy has been proved, they are **not being fully implemented and used**, probably due to other factors that depend on context and stakeholder's views.

OBJECTIVE

Provide with an **optimal implementation and evaluation framework** for CDSS (using VALIDATE approach) to be implemented at Hospital Clinic Barcelona

METHODS

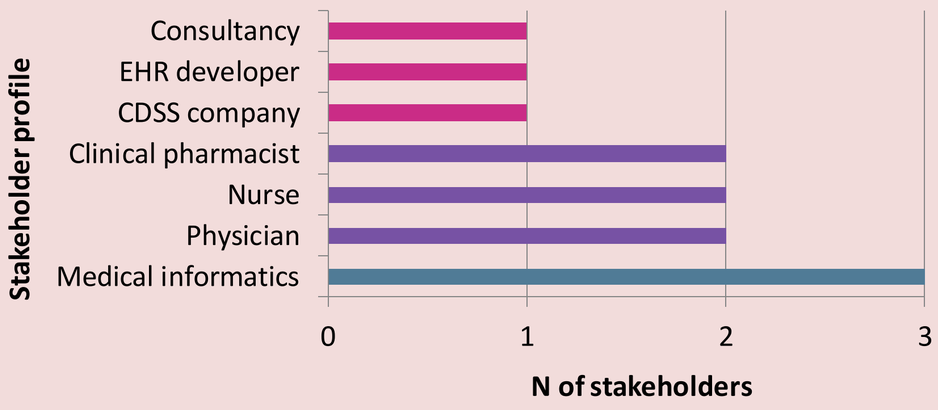
1. SR of empirical evidence on CDSS. PubMed, Cochrane and Web of Science databases were searched between 2000-2020 following PRISMA guidelines.

Data was extracted from the selected articles with the following **outcomes** being considered in the analysis:

- Clinical outcomes (length of stay, ADR, death),
- CE measures (cost per ADR avoided),
- Facilitators and barriers for CDSS implementation and
- Reasoning for the overridden alerts by healthcare providers.

2. Qualitative Survey: SR areas where little to no information was found were selected as inputs to the **semi-structured interviews** with different hospital stakeholders.

- The main focus areas in the interview were the following :
  - **Problem definition**: ME, description, daily implication, how is it a problem for them
  - **Judgement of solution**: how to prevent ME, potential solutions, relevant results to be measured for CDSS implementation
  - **Background theory**: how will this affect clinical practice, need for other tools/support to prevent ME
  - **Barriers & facilitators**: what prompts and prevents adoption and use of technologies and programs with regards to previous experiences with CDSS or other technologies.
- The following stakeholders, regardless of their previous experience with CDSS, were selected (n=12):



- Content analysis was used for survey data analysis.

RESULTS

1. SR results:

- A total of 410 articles for facts and 209 articles for values were initially identified. After duplicates removed and abstract screened 21 and 12 articles were selected for inclusion, for facts and values, respectively.
- **Facts:** there is consensus regarding the effectiveness and CE of CDSS
- **Values:** Not fully accepted in clinical practice. Main reason appears to be alert fatigue. Published data only available from physician perspective.

2. Semi-structured interviews' content analysis: only information differing published evidence is reported here (no differing data for Background theory).

PROBLEM DEFINITION

- **Relevance of ME**: most stakeholders are fully aware about the existence and relevance of both ME and CDSSs .
- **Occurrence of ME**
  - **Timing: all stages** of a patient treatment can lead to ME (prescription, validation, distribution, administration). It is of **all stakeholder's** interest future CDSSs' development and extension to cover all the care process areas.
  - **Organizational problems**:
    - Lack of a **reference person** at all times in case non-experts have doubts regarding a medication
    - **Patient education & empowerment** should be a must in stopping ME
    - **Human interaction** can lead to ME (e.g. Being interrupted when preparing a medication)
  - **Technological limitations: no traceability** of which **medication** has actually been taken

JUDGEMENT OF SOLUTION

- **CDSS metrics**
  - **Inputs**: data quality being used to populate CDSSs' should be measured and analyzed as a metric to control CDSSs' performance
  - **Outputs**: alert override rate is a good metric only if it is context adapted (user's professional experience, healthcare facility, etc.); otherwise it can be irrelevant as a metric

BARRIERS & FACILITATORS

- **Barriers to implement**
  - **Not** seeing **immediate results** on the clinical practice
  - Hospitals **not focused on research & innovation** but rather mainly health care provision, hindering the development & implementation of new technologies
- **Facilitators to adopt**
  - **Easy** and **automatable** generation of **ME reports**
  - **CDSSs' context adaptation** to end users and care facilities would **increase relevance** for each of the **stakeholder's** interacting with the CDSS
  - **Tailored incentives**, such as monthly reports, to show progress towards a set goal for a specific professional community
  - **Visual cues** can help reduce ME
  - **Generational replacement** will prompt CDSSs' use by a more technology savvy community
  - **Peers** recommending CDSSs' use
  - **Justification** of alarms with **evidence-based resources** easily available to increase CDSSs' trustworthiness

CONCLUSIONS

- Published literature has very little information regarding values in CDSS. The only available evidence is from the physicians' perspective.
- There are differences between published data and data extracted from multi-stakeholders' interviews. Thus, an evaluation framework taking into account all multi-stakeholder's perspective needs to be developed in order to properly evaluate CDSSs', as it was framed in HTAs' foundations.
- The lack of an inclusive multi-stakeholder scoping can lead to inaccurate information, leading in this particular case to suboptimal CDSS implantation and biased figures concerning decision-making for the technology being evaluated.

Acronyms
HTA: Health Technology Assessment
CDSS: Clinical Decision Support System
VALIDATE: VAlues In Doing Assessment of health TEchnologies
SR: Systematic Review
CE: Cost-Effectiveness
ADR: Adverse Drug Reaction
ME: Medication Error

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