

**Ensuring effectiveness of computerised clinical decision support at the point of prescribing medicines**  
**Oluwabemileke Ojeleye and Yogini Jani**

**Introduction**

The seventh principle of the NICE guidance on medicines optimisation focuses on computerised clinical decision support as a means to improving medication safety at the point of prescribing.<sup>1</sup> The PRACTiCe study conducted in England showed that medication errors occurred for one in eight patients and involved one in 20 prescriptions items, with one severe error in 550 prescription items.<sup>2</sup> The complexities of the prescribing process and the multi-factorial nature of iatrogenic harms mean that a single approach to prescribing safety is insufficient. Clinical decision support (CDS) embedded in general practice (GP) computers have shown great potential in facilitating safe prescribing by performing background safety checks and providing clinical advice and alerts to prescribers.<sup>3</sup> A number of definitions exist for CDS. In this article, we define a clinical decision support system as software designed and embedded in GP computers that provides intelligently-filtered, evidence-adaptive knowledge or person-specific information, to directly support clinical decision-making at the point of prescribing medicines.

**Key themes in the NICE guidance**

The NICE guidance highlights some challenging aspects of designing and developing effective clinical decision support systems (CDSS). However, it did not specify how computerised CDSS should be designed or implemented, to encourage innovation and solutions that are fit for purpose. A summary of the recommendations and the implications for general practice is presented in Table 1.

**Table 1 Summary of the NICE guidance on computerised clinical decision support in primary care**

Summary of recommendations	Implications for practice
Organisations are encouraged to use CDSS taking into account existing systems and resource implications to support clinical decision-making and prescribing, but ensure that these do not replace clinical judgment	Organisations should provide CDSS  Clinicians should use the CDSS provided but remember that their clinical judgement supersedes any advice that may be offered by such systems.
Organisations should ensure that robust and transparent processes are in place for developing, using, reviewing and updating computerised CDSS.	Organisations should ensure that the system is up to date and provide facility for giving feedback about the performance of the system to facilitate further improvement.  Clinicians should avoid creating work-arounds because these can cause errors.
Organisations are to ensure that clinicians using CDSS at the point of prescribing have the required knowledge and skills, including an understanding of its limitations. <sup>4</sup>	Clinicians need to make sure that they have the necessary knowledge and skills to use CDSS effectively, including knowing the capabilities of the CDSS at their disposal.  They also need to identify their own development and training needs to help them and their organisations meet prescribing safety goals
CDSS for clinical decision making and prescribing support, should: <ul style="list-style-type: none"> <li>• Identify important safety issues</li> <li>• provide facility for health professionals to acknowledge mandatory alerts and this should not be customisable for alerts relating to medicines-related 'never events'</li> <li>• reflect the best available evidence and is up-to-date</li> </ul>	Clinicians should not turn off mandatory alerts. Rather, they should review and action or acknowledge such alerts.  Clinicians should review and reflect on how they use CDSS in practice and whether this is at a level that continually optimises prescribing

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>contains useful clinical information that is relevant to the health professional to reduce 'alert fatigue'</li> </ul> |  |
|--|--|

**Recommendations for optimal use of CDSS: how might your prescribing practice be affected?**

- Ensure you have correctly recorded all necessary patient information, such as date of birth, weight and allergy status in the GP computer system. This will ensure that the safety alerts generated by the GP computer system reflect patient specific information. If you have decided after careful evaluation that the benefits of prescribing a medicine singly or in combination with other medicines outweigh the risks and elect to override an alert, then this should be clearly documented in the patient record and highlighted on the prescription.<sup>5</sup>
- Give specific instructions when prescribing. For example, instructions such as, 'as directed,' 'as required' or 'prn' are not useful if the dose of a medicine is required in tailoring clinical advice and alerts.
- One of the key priorities of the NICE guidance is implementing a 'system for identifying, reporting and learning from medicines-related patient safety incidents'. CDSS can help with identifying patients who may have been subject to medication errors or adverse drug events in the past so that on subsequent visits, clinicians are warned to avoid any potential error or harm.
- Adopt a culture of safety and encourage appropriate safety behaviour devoid of fear of being disciplined unnecessarily. Evidence suggests that prescribers override alerts even when few false positive alerts are displayed.<sup>6</sup> Avoid ignoring alerts without review and remember to flag false, inappropriate, or unnecessary alerts you come across to other clinicians and system developers.
- Provide regular evaluation and feedback on the performance of GP computer systems including the integrated CDS, to help inform current and future development. Collaboration with CDS creators and system vendors will help optimise the design and effectiveness of CDSS.
- Be aware of how the CDSS alert information is updated. Any new information should be clearly and easily identifiable by users to ensure they do not miss important information.

**Opportunities for further improvements**

The NICE guidance presents a good opportunity to address recurrent and difficult problems associated with safety alerts generated by CDS in GP computer systems. The results of a previous questionnaire survey of general practitioners from six English primary care trusts regarding the safety features of GP computer systems showed that many were unsure as to whether the system they were using had some of the safety features specified in the survey. Additionally, some of the respondents incorrectly believed that their clinical computer systems would warn them about potential hazardous situations, such as contraindications, abnormal doses and frequencies and only a few of the respondents said they had received formal training on how to use the safety features in their GP computer system.<sup>7</sup> Although the study needs to be updated in light of current practice, it is a window into some of the key prescribing and medication safety problems facing clinicians in practice.

The guidance could be extended to provide clear recommendations and specify responsibilities for managing patients who may have shared care arrangements.

**Conclusion**

CDSS are useful tools for making clinical and prescribing decisions, and can optimise medicines use. The risks associated with prescribing and use of CDSS must be recognised, managed and controlled ideally by adopting a human factors approach. Regular review and feedback on the effectiveness of features and functionalities of CDSS are essential for accurate, consistent and quality clinical decision-making and prescribing medicines safely.

**References**

1. NICE. Medicines optimisation: The safe and effective use of medicines to enable the best possible outcomes. 2015. Available from: <https://www.nice.org.uk/guidance/ng5/chapter/1-Recommendations#clinical-decision-support> [accessed 14 December 2015].

2. Avery T, Barber N, Ghaleb M, et al. Investigating the prevalence and causes of prescribing errors in general practice: The PRACTiCe Study. London: GMC; 2012. Available from: <http://www.gmc-uk.org/about/research/12996.asp> [accessed 14 December 2015].
3. Bryan C, Boren SA. The use and effectiveness of electronic clinical decision support tools in the ambulatory/primary care setting: a systematic review of the literature. *Inform Prim Care*. 2008;16:79-91.
4. Goodman KW, Berner ES, Dente MA, et al. Challenges in ethics, safety, best practices, and oversight regarding HIT vendors, their customers, and patients: a report of an AMIA special task force. *J Am Med Inform Assoc*. 2010;18:77-81.
5. Johnson KB, Ho Y-X, Cala CM, et al. Showing Your Work: Impact of annotating electronic prescriptions with decision support results. *J Biomed Inform*. 2010;43:321-5.
6. Slight SP, Seger DL, Nanji KC, et al. Are We Heeding the Warning Signs? Examining Providers' Overrides of Computerized Drug-Drug Interaction Alerts in Primary Care. *PLoS One*. 2013;8:e85071.
7. Morris CJ, Savelyich BSP, Avery AJ, et al. Patient safety features of clinical computer systems: Questionnaire survey of GP views. *Qual Saf Health Care*. 2005;14:164-8.