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## **Diagnostic Errors and Patient Safety: Implementation of a Knowledge Base to Enhance Diagnostic Consultation Outcomes**

### **Abstract:**

Medication errors have become the main focus of quality improvement initiatives in the last decade, yet errors in diagnosis constitute a significant cause of preventable adverse events and lead to patient harm. Causes for diagnostic mishaps include cognitive biases in decision making and inexperienced junior clinicians making vital decisions at the frontline.

Isabel ([www.isabelhealthcare.com](http://www.isabelhealthcare.com)) is a Web-based diagnostic reminder system, originally developed following a misdiagnosis in the UK. It is currently used by staff at 25 hospitals globally, including in many teaching hospitals in the USA. The system uses widely available medical content in its database to suggest possible diagnoses for a patient's clinical features (e.g. headache, chest pain). Users can enter data in natural language, without the use of a controlled vocabulary. Diagnostic suggestions are intended to remind the clinician of potential hypotheses, not to provide the 'correct' diagnosis. Clinicians can refer to further medical information provided against each diagnosis in the form of textbooks, image libraries and links to latest knowledge. A novel feature provides clinicians with access to clinical pitfalls highlighted in clinical case vignettes.

The Isabel system has been extensively evaluated in clinical studies in the UK and USA, and has recently been introduced into Australia. The system performs with >90% accuracy in including the 'final' diagnosis in the list of its suggestions in a series of hypothetical and real life cases. In addition, Isabel-naïve clinicians who used the system benefited in a significant number of cases, both in a simulated and real life setting (being reminded of the 'correct' diagnosis in 1 out of every 8 cases). Most users found the system easy to use with minimal training. Clinical features can be automatically picked from various clinician desktop software. Studies have also shown that entering the entire consultation notes in free text without any modification does not result in significant loss of diagnostic accuracy.

Diagnostic errors pose a significant threat to patient safety. Technological solutions such as Isabel may play a key role in quality improvement by providing clinicians with expert knowledge and evidence based recommendations at the point of care.