

Conference papers

Improving the safety features of general practice computer systems

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ABSTRACT

General practice computer systems already have a number of important safety features. However, there are problems in that general practitioners (GPs) have come to rely on hazard alerts when they are not foolproof. Furthermore, GPs do not know how to make best use of safety features on their systems. There are a number of solutions that could

help to improve the safety features of general practice computer systems and also help to improve the abilities of healthcare professionals to use these safety features.

Keywords: computer systems, hazard alerts, safety features

Background

Patient safety is an increasingly important issue in health care, both in the United Kingdom (UK) and worldwide.^{1,2} In July 2001, the UK Government created the National Patient Safety Agency to examine the major problem areas and to start implementing systems to prevent error occurring wherever possible.³

For primary care, there are concerns about patient safety in a number of areas, particularly prescribing errors; failure to complete intended actions, such as patient referrals and medication monitoring; failure to respond to abnormal results or advice from other healthcare professionals; and problems in communication of information between general practitioners (GPs) and patients and professionals in secondary care and community pharmacy.⁴

Primary care in the UK is highly computerised, and the clinical systems in use in 98% of general practices have considerable potential to help GPs to practise safely by providing accurate information on patients and drugs at the point of decision making, effective decision support, intelligent hazard alerts for cautions, contraindications, drug interactions and allergies,

help with timely and appropriate monitoring, help with error trapping, and reporting on patients at risk.^{5,6}

Some systems already provide some patient safety features, for example Figures 1–4 show clear warnings telling the GP that a hazardous drug selection has been made.

Clearly, functionality exists on general practice systems that helps clinicians avoid error – but there are a number of reasons that led to the commissioning of this project by the National Patient Safety Agency. Firstly, GPs and practice staff might not know how to make best use of their systems, and may not use important safety features even when they are present. Secondly, GPs may override hazard alerts. Thirdly, computer systems might not contain all the safety

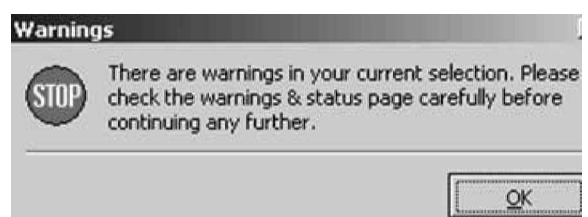


Figure 1 General warning

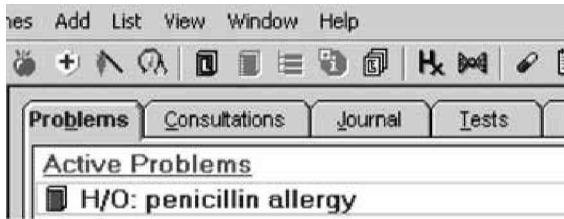


Figure 2 Allergy warning

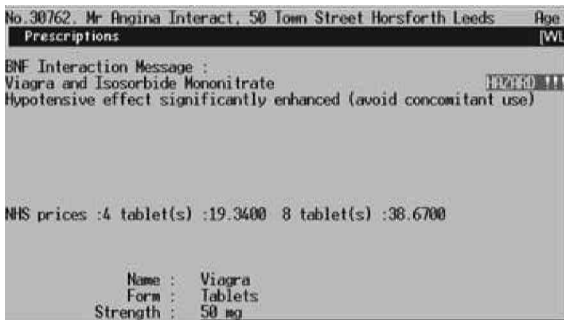


Figure 3 Drug interaction warning (1)



Figure 4 Drug interaction warning (2)

features that are desirable in helping clinicians avoid potentially fatal errors.

Objectives of the project

The National Patient Safety Agency commissioned this research from the University of Nottingham in order to achieve the following objectives:

- to identify the most important safety issues regarding general practice computer systems
- to assess general practice computer systems in terms of these safety features
- to determine GPs' knowledge, usage and training needs in relation to computerised safety features
- to work with stakeholders to produce specifications for general practice computer suppliers and for training practice staff.

Identifying the most important safety issues

Stakeholder interviews and a two-round Delphi approach were used to achieve this objective; these two activities were carried out concurrently.⁷

Stakeholder interviews

The stakeholder interviews were carried out with GPs, computer system suppliers, drug database suppliers, academic health informatics departments, the Royal College of General Practitioners, the Department of Health, the National Health Service (NHS) Information Authority, the NHS Design Authority, the medical defence organisations, patients' representatives and other experts in health informatics.

Key requirements emerging from the stakeholder interviews were:

- a drug dictionary for NHS primary care to improve communication between systems
- drug ontologies that provide sensible alerts and decision support
- ensuring that users record data so that functionality is available when required
- ensuring that users have access to accurate and safe information on which to guide decision making
- ensuring that account is taken of human ergonomics in the ways in which safety information is presented to users and in how they are encouraged to respond
- practitioners making best use of computerised systems for ensuring that intended actions such as patient referrals and medication monitoring are completed
- audit trails
- training in the effective use of systems.

The Delphi exercise

There were 22 participants in this two-round exercise. They were presented with 55 statements, of which 33 were ranked as important or very important for patient safety by over 90% of respondents.

The key issues emerging from this exercise were:

- the importance of computerised alerts
- avoiding spurious alerts
- making it difficult to override critical alerts and having audit trails of such overrides
- support for safe repeat prescribing
- effective computer–user interface
- the importance of call and recall management
- the need to be able to run 'safety reports'.

Assessing general practice computer systems

From the results of the Delphi exercise, a series of vignettes/test cases was developed, and these were used on the main general practice computer systems by creating dummy patient records and test conditions. Suppliers of the systems have been invited to comment on the results.

This assessment verified that systems have already implemented many effective safety features, but some problems were detected:

- lack of alerts in relation to contraindications – for example, there was no warning of the risk of Reyes' syndrome when prescribing aspirin to an eight-year-old child
- spurious alerts – a very long list of possible contraindications when trying to prescribe the oral contraceptive pill, most of which were not relevant to the previous medical history of the patient
- failures of drug allergy warnings – depending on how the allergy history had been recorded (that is, which Read codes had been used), warnings might or might not be displayed
- risks of prescribing drugs with similar names – particularly with penicillin (frequently used) and penicillamine (rarely used and likely to do harm to some patients)
- lack of warning for inappropriate dosages – for example, trying to prescribe methotrexate daily instead of weekly
- 'hidden' alerts – see Figure 5a, in which an attempt has been made to prescribe a beta-blocker to a patient with asthma. The alert is the small red block at the bottom of the screen; this is both too small and also invisible to anyone with red–green colour-blindness. Clicking on this block produces an appropriate alert message (see Figure 5b), but it could easily be missed



Figure 5a Hidden alert

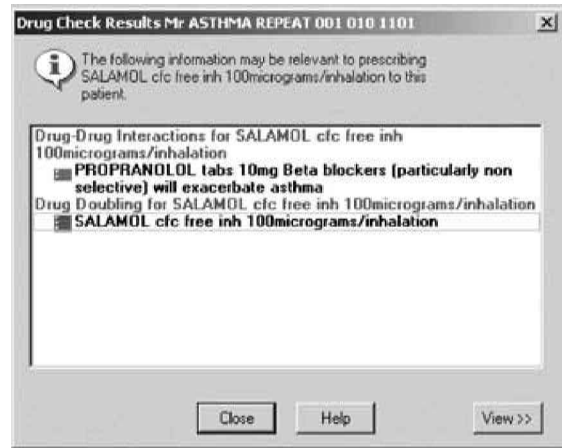


Figure 5b Underlying alert

- it is easy to override most alerts
- lack of audit trails of when such alerts have been overridden.

Determining GPs' knowledge, usage and training needs

We have undertaken a series of interviews with GPs, and ascertained that there was a strong sense that they have come to rely on their computer systems to provide alerts. From these initial interviews, a questionnaire was developed that was sent to 593 GPs in two sites in England. The response rate was 65% (387/593).

We identified some major themes from this questionnaire survey:

- The following are regarded as important by over 90% of GPs:
 - computerised alerts (including contraindication alerts)
 - the need to make it more difficult to override critical alerts
 - systems for recall for patient monitoring.
- GPs are not fully aware of the safety features on their computer systems.
- Only a minority have had training on the use of safety features on their computers.
- The preferred method for learning more about the use of safety features is 'hands-on' learning with tuition (either one-to-one or in a group setting).
- More than 90% of GPs would strongly favour 'the computer system that was best able to support safe clinical practice' if purchasing a new system.
- More than two-thirds of GPs would be willing to pay more for 'the system that was best able to support safe clinical practice'.

Stakeholders' views on how to make improvements to systems

Preliminary discussions with stakeholders on the results of the preceding research components indicate that system suppliers are willing to make changes to their systems, provided that these are sensible and in keeping with GP opinion. They acknowledge that change is more likely to take place if it is made mandatory rather than voluntary, and they feel that working through the National Programme for Information Technology (IT) in the NHS is the best way of ensuring change.

In the short term, a number of suggestions for improvement have emerged:

- action to close the loophole in the recording of allergy alerts
- definition of the most important hazard alerts, ensuring that these are available on all systems and that they cannot easily be overridden
- ensuring that system suppliers make full use of ontologies available to them, for instance for contraindication alerts
- development of a computerised 'query set' for interrogating general practice computer systems to identify hazards.

In the longer term, further actions that could foster improvement in the patient safety features of general practice computer systems include the introduction of a drug dictionary for use throughout the NHS, evaluation of existing ontologies to determine whether these are fit for purpose or whether alternatives need to be developed, ensuring that systems are designed to 'make it easy to do the right thing', ensuring that health professionals are properly trained to make best use of their systems and working to develop a safety culture in primary care.

ACKNOWLEDGEMENT

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CONFLICTS OF INTEREST

None.

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