ISABEL: Support with clinical decision making

Keeping up with clinical evidence is becoming increasingly difficult, particularly in rapidly changing areas such as critical care, but there are tools to help, as Helen Fisher and colleagues explain.

Healthcare professionals are currently working in an age where the amount of knowledge that they have to remember on a daily basis is increasing exponentially (Wyatt 1991), but where information technology is becoming more freely available. In response to this, clinical decision support tools have evolved which aid the dissemination and recollection of this information. Morris (2002) and Hunt et al (1998) believe that computerised decision support tools can aid clinical decision-making and therefore have a favourable impact on patient outcome.

ISABEL is a paediatric clinical decision making and support system which is available to healthcare professionals, free of charge, via the web at: www.isabel.org.uk

ISABEL objectives

The ISABEL Medical Charity originated in April 2000 after a three-year-old child developed multiple organ failure, and required four weeks in a paediatric intensive care unit due to toxic shock syndrome and necrotising fascitis following chickenpox. While both of these are well described and documented complications of chickenpox, (Pollard et al 1996) they were not recognised by junior doctors. The parents and consultant of the child felt there was a need for a clinical decision making support system to assist healthcare professionals, and the family provided initial funding themselves. Subsequent funding has come from charities.

The main objective is to improve the healthcare processes and therefore the ultimate outcome for the children who use the current healthcare system. It endeavours to achieve this by providing systems and structures to facilitate knowledge provision to those who have primary contact with children, thus reversing the inverted pyramid of knowledge that currently exists within the NHS (Ramnarayan and Britto 2002), where the first assessment of a potentially critically sick child is often performed by the healthcare professionals with the least paediatric experience.

We live in an ever-increasing consumer society where children and their families deserve and demand the highest possible quality care. Indeed, the Prime Minister (DoH 1997) admits that as a result of high-profile cases of mistakes that have occurred with dreadful consequences, the public needs to be reassured that they will receive an efficient and effective service. To this end the Quality Framework (NHSE 1999) was developed in order to improve the standard of care delivered. ISABEL sits well within this quality framework by aiming to minimise clinical risk and improve the quality of care delivered (see figure 1).

Main features of ISABEL

ISABEL comprises a differential diagnostic tool, treatment algorithms, APLS guidelines, an image library, and experience section. The differential diagnostic tool works by using sophisticated pattern recognition technology (Autonomy TM). This searches databases of paediatric textbooks to find the diseases matching the clinical features that have been entered by the healthcare professional. ISABEL is not designed to give the healthcare professional the definitive diagnosis, rather to remind them of potential diagnoses. Consequently the tool provides a list of differential diagnoses that the healthcare professionals can choose from – all at the click of a button and in less than a second. One of the major advantages of this tool is that the ease of availability and the speed with which results are returned allows healthcare professionals to spend more time on the management of children.

ISABEL also includes treatment algorithms. Currently many paediatric treatment guidelines are available only...
in text format – often in textbooks or folders – and are therefore not necessarily readily available where needed at the patient’s bedside. ISABEL provides peer-reviewed, national and internationally approved treatment plans in an algorithmic format, again, at the click of a button, thereby allowing the most effective treatment to be instigated promptly.

The image section provides a range of clinical photographs, radiographs, CT/MRI scans and haematology slides to help aid diagnosis.

ISABEL’s experience section recognises that inevitably even the most diligent and experienced healthcare professionals will make errors or have clinical case histories to share with others. It takes forward the NHSE (1999) desire for an open and participative culture by encouraging healthcare professionals to share their experiences (both positive and negative) and the lessons that they have learned.

Finally the APLS guidelines have been reproduced with the permission of the Advanced Life Support group.

Impact on outcomes
Some believe that evaluation of CDSS tools is unnecessary (McManus 1996). However the NHSE (1999), in their vision for clinical governance, extol the virtues of a culture in which research is valued and expected. The team behind ISABEL have adopted this philosophy and ISABEL has therefore undergone rigorous testing. This has been undertaken in three stages:

Stage 1: This aimed to discover whether or not the concept and software worked, i.e. to discover whether, when clinical features were submitted to ISABEL, the correct final diagnosis was present in the list of differentials. It used case scenarios from experts with expected diagnoses. Out of 99 case scenarios ISABEL showed the expected diagnosis in 91 cases – giving 92 per cent reliability.

Stage 2: In this stage the clinical features from 100 patients were entered into a trial site. This was another attempt to see if ISABEL would return the correct final diagnosis within the list of differentials. The correct, final diagnosis was present in 83 out of the 100 cases – although in 13 cases the final diagnosis was non-specific and therefore without these cases the tool was found to be 95 per cent accurate.

Simulated field trial: After the first two stages the team were confident that ISABEL would provide sensible results. It was then necessary to evaluate whether healthcare professionals who used the tool were more likely to come to the correct diagnosis, order the right tests and administer the correct treatment, than when ISABEL was not used. A simulated field trial was designed in which 24 case histories and the initial presenting features were entered onto a trial site. Seventy-six consultants, registrars, SHOs and medical students entered the presenting symptoms of the children, their diagnosis and management plans into the trial site. ISABEL then gave them a list of differential diagnoses and they were asked to make any changes to their diagnosis and management plan based on these differential diagnoses. It was established that in 12.7 per cent of cases a clinically significant diagnosis was considered only after consultation with ISABEL.

The final stage of the trial is now underway. This clinical trial will aim to discover whether the use of ISABEL in the paediatric departments of a range of district general hospitals leads to better diagnostic and management plans.

In recognition of the fact that access to desktop computers is often problematic, a Personal Digital Assistant (PDA) version has been designed and is being trialed to discover whether ISABEL is accessed more often with a hand-held device.

Future developments
ISABEL has been well received and evaluated to date (Greenough 2002). Funding for an adult version of ISABEL is close to being finalised, and further evaluations are taking place in order to try and secure funding for further developments from the Department of Health.

Fig. 1. ISABEL’S place within the quality framework

REFERENCES


