# *ABC of health informatics*
# Why is this patient here today?

Frank Sullivan, Jeremy C Wyatt

Defining the reason for a patient's consultation may seem straightforward, but often deeper consideration is required. Information tools are less important in this phase of the consultation than other phases, but may augment the interpersonal skills of the doctor. At this early stage an open question like "How can I help you today?" and attention to non-verbal cues are more likely to be productive than launching into a closed question and answer session.

If the doctor knows Mr Evans (see box opposite), he will already have noticed the sad expression on the patient's face when he went to the waiting room to call him in to the consultation. The slow, hesitant speech with which Mr Evans talks of his headache is another item of non-verbal information indicating a possible diagnosis of depression.

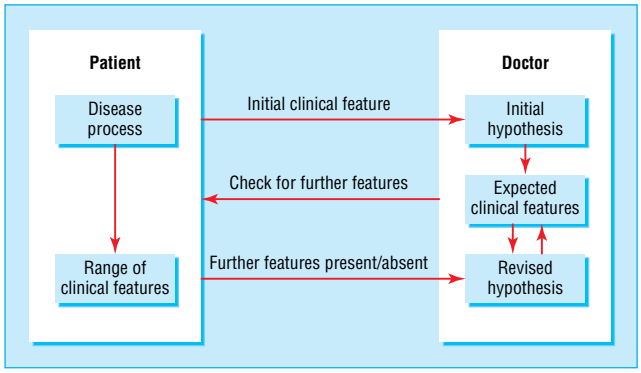
**This is the third in a series of 12 articles**
**A glossary of terms is available at http://bmj.com/cgi/content/full/331/7516/566/DC1**

**Mr Edward Evans is a 49 year old, recently unemployed, pharmaceutical company representative who presents with headaches. He also has symptoms of early morning wakening and erectile dysfunction**

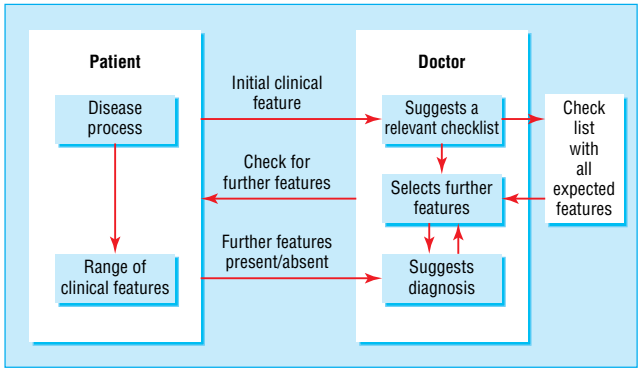
## Diagnostic process

Mr Evans has come to see his general practitioner (GP) because of headaches, sleep disturbance, and sexual difficulties. These problems need to be considered in detail. The symptoms are common in general practice, and most experienced doctors and nurse practitioners will have an approach to assessment with which they are comfortable. Experienced doctors use hypothetico-deductive reasoning methods when assessing patients' problems. An initial clinical feature, headache perhaps, prompts a doctor to recall an "illness script" derived from his or her experience and education that seems to explain a patient's problems. The doctor hypothesises that the diagnosis is, in this case, possibly depression, and tests this hypothesis by asking further questions, examining the patient, or doing laboratory tests to confirm or rule out the diagnosis.

Less experienced doctors may use a checklist or, when an unusual presentation occurs, they may return to inductive reasoning learnt as an undergraduate or trainee. This more exhaustive process involves taking a complete history, carrying out a full systematic examination, and then developing a differential diagnosis list. The process may be made more efficient by using a reference folder that contains checklists describing a clinical examination for headache, for example. These checklists or protocols may be stored on desktop computers or other devices. Another option is to access an information source like the *BMJ*'s 10 minute consultation series, which may provide a framework to assess the problem.




The hypothetico-deductive process used by skilled decision makers when assessing patients




Inductive process using a checklist of symptoms. This way of assessing patients' problems is used by doctors who have less experience or experienced doctors who are dealing with an unfamiliar problem

## Medical history

Each consultation has been likened to a "single frame in a long running cine film." GPs have repeated opportunities to understand their patients' problems. Until this visit, Dr McKay had not seen Mr Evans for about a year. Then, Mr Evans had been made redundant and was having difficulty sleeping. During the current visit, Dr McKay notes from the electronic record that Mr Evans saw another partner in the practice a month ago for tiredness. In the United Kingdom, almost all of a patient's hospital medical records are copied to their GP and this forms a record "from the cradle to the grave." Some data can be lost when patients move practices if a different computer system is used, although in the UK a process for transmitting

records between GPs has been developed. In other countries patients are able to consult more than one primary care provider and a record held by the patient, such as a smart card, may be a more effective means of collecting the information needed to provide medical care safely. An alterative to smart cards might be subdermal devices that would allow access to data supplied by the patient anywhere in the world (see www.4verichip.com/verichip.htm).

## Family history

Many causes of illness have intergenerational roots because of genetic or psychosocial factors. A doctor who knows that Mr Evans' mother had committed suicide when he was a child will be aware that both sets of factors may be operating in this case. On paper records, this information may not be identified easily on the summary sheet. Electronic records, however, present this information clearly as they contain information on past problems and current or active problems. Family doctors may have medical records of several members of extended families. The records can be accessed electronically, or the paper records can be read to identify patterns of illness that may not be apparent at the first consultation.

## Drug history

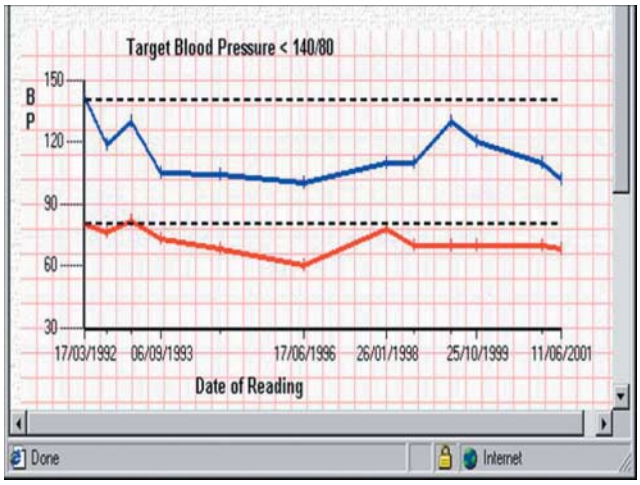
In UK primary care, the repeat prescribing record is one of the most reliable components of the electronic record. As practices become increasingly paperless, more acute prescribing is captured electronically. The prescribing record can provide insights into the reason for the patient's attendance. Mr Evans has no diagnosis of depression in his record, but he did receive a tricyclic antidepressant twice before. Scanning the patient's treatment summary before calling him from the waiting room may alert the doctor to this possible reason for attendance.

## Laboratory results

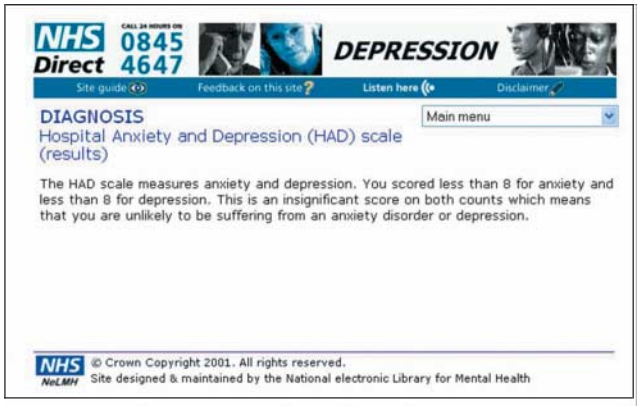
The slight macrocytosis and raised γ-glutamyltransferase levels detected after Mr Evan's visit to the practice a month ago alert Dr McKay to the possibility of an underlying alcohol problem. Mr Evans had been asked to come in again and the tests were repeated yesterday, and are now available on Dr McKay's computer to discuss with Mr Evans. Single results are often less informative than repeated values, which produce a discernible pattern. Some patients consult to obtain laboratory results. Results of tests sent out by mail are often delayed and patients appreciate the rapid access to results that laboratory links to practices allow. The need to interpret many results, taking into account a variety of factors, means that few results are sent directly to patients in the UK (in contrast to the United States). Decision support tools that annotate clinical, laboratory, or electrocardiogram reports with an interpretation may be helpful, and they are increasingly being used routinely.

## Preconsultation screening

Dr McKay thinks that Mr Evans has psychological problems. This assessment is based on Dr McKay's knowledge of the patient and his family. This is confirmed when Mr Evans hands him the printed report from the hospital anxiety and depression rating scale, which he had completed on a computer in the waiting room. Preconsultation screening tools will probably become important features of family practice when their diagnostic and prognostic value is realised.


Cumulative recording of blood pressure




The NHS Direct service, used 8 million times a year in England and Wales, electronically delivers problem solving algorithms to assist triage nurses and patients to decide if a consultation is necessary. In the case of depression, a patient may believe that a GP is likely to offer drugs, and they may prefer to try non-pharmacological treatment

## Direct patient data collection to replace follow-up consultations

Technological advances mean that temperature, pulse, blood pressure, peak flow rate, coagulation, blood, and urine chemistry can all be monitored at home and these data made available in graphical or tabular format during or instead of a consultation. Ambulatory blood pressure monitoring helps differentiate between a casual elevated blood pressure and sustained hypertension. Technology means that many of these data could be available continuously. Computer assisted interviews may also be used to obtain information before a follow-up visit to a doctor. A variety of health status measures with global and multidimensional scales can provide information to augment the clinical encounter.

**In vulnerable, elderly patients, it may be particularly valuable to be able to measure temperature, pulse, blood pressure, peak flow rate, coagulation, blood, and urine chemistry at home and have these data made available for doctors**

## Coding of clinical data

Text, images, sounds, and many other sources of data can be stored and retrieved by computers, but for computers to "understand" the data it must be put into a code. Until the onset of the information age coding and classification of data in any format was not considered an urgent task during consultations. Medical records have often been viewed mainly as aides memoire and secondarily as legal documents. To manage patients within an integrated health service it is becoming more important to communicate information from one setting in a digital format while retaining meaning when viewed in a different context. Although computerised text retains its meaning when communicating between humans, there are a variety of systems for coding and classification used to communicate meaning to computers. Two of the most widely used coding systems are Read (developed by Dr James Read and about 2000 other doctors), and SNOMED (Systematised Nomenclature of Medicine). The two systems are being combined into SNOMED CT. Technically, these systems are multiaxial and hierarchical, but there are other classification systems with their own characteristics. Fortunately, most data can be interchanged from one to the other, albeit with loss of definition. The quality of coding, which varies between doctors, clinics, wards, and practices, will probably improve, driven by financial imperatives and facilitated by better functionality of the electronic record.

**Coding and classification**

- Code—the numeric or alphabetic representation of data for the purpose of computer communication or processing
- Classification—a systematic arrangement of similar kinds of concepts such as diseases, on the basis of how they differ (for example, by aetiology)

## Using data from confidential sources

Family members may impart information about other members of their household to the GP, and by so doing, invite the doctor to act. In this case Mrs Evans had reported her husband's excessive alcohol consumption, his mood swings, and her fear of violence. Recording the allegation in his wife's notes is a straightforward and necessary step, as is making a record about advice given to her about her own safety, and a request that she ask Mr Evans to consult. Placing a record of this uncorroborated allegation in Mr Evans record, however, is more hazardous. Even referring to the suspicion when he does consult may cause marital difficulties if he exercises his rights under the data protection act 1998 to read his medical records.

**Further reading**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The series will be published as a book by Blackwell Publishing in spring 2006.

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