

# Chapter XIX

## Information Processing in Clinical Decision Making

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### ABSTRACT

*This chapter outlines an information-processing model of clinical decision-making which is described as a function of the task, the decision maker, and the context. Attributes of the task, the decision maker, and the decision environment are highly interrelated and often interdependent. They directly affect the use of clinical evidence. We argue that information processing is modified significantly by the decision-making context and decision task characteristics. Knowledge of clinical decision-making is therefore becoming increasingly important when designing an intervention that will produce sustained behavioural change. An exploration of the context and information seeking aspects of prescribing is emerging as a first step towards building the concept of task-specific decision support design.*

### BACKGROUND

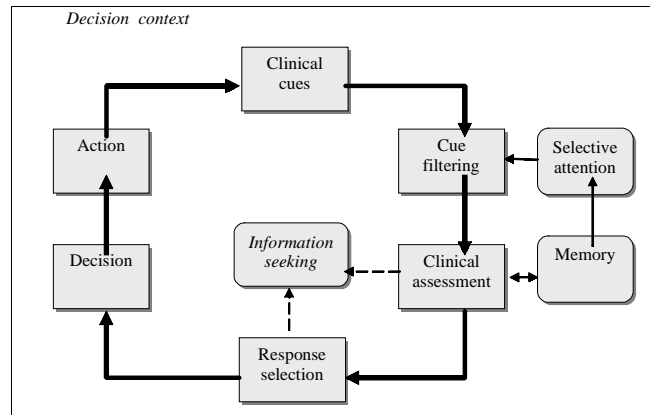
The information-processing approach focuses on information seeking and use as the key attribute in any decision making. It describes decision making as a process of information inputs and outputs, and identifies parts of decision making that may benefit from decision support (Elson, Faughnan, & Connelly, 1997).

An information-processing model of clinical decision making explaining the information flow during a clinical encounter is shown in Figure 1.

First, the decision maker must seek information cues from the environment, such as clinical signs and symptoms, medical history, or results of diagnostic investigations. Selective attention based on beliefs of the individual clinician plays a critical role in the filtering of which cues to process and which to ignore (Wickens & Hollands, 1999).

The information cues selected form the basis for the situation assessment, which includes the identification of decision goals, an assessment of how critical the problem is, and

Figure 1. An information-processing model of decision making (Modified from Wickens & Hollands, 1999)



the risks associated with possible outcomes, as well as a comparison of the result of this assessment with previous experience.

It is believed that clinical assessment or problem solving is based on external information cues and knowledge stored in working and long-term memories, and that medical expertise is based more on knowledge than on expert reasoning. The concept of the mental schema, or clusters of related information that can be accessed rapidly and then utilised for decision making, has been introduced to explain how humans acquire and store information. The number, size, and range of mental schemas or illness scripts, and the ability to retrieve and apply this information correctly form the foundation on which expertise resides.

Research from a number of domains has demonstrated the importance of situation assessment as it assists in matching the type of reasoning used by a decision maker to the characteristics of the task. A medical practitioner, for example, uses different decision-making strategies to manage a patient depending on the clinical problem and the urgency of the task. For instance, the assessment of every impor-

tant possible outcome and their implicit utilities is more likely to occur for nonurgent healthcare decisions, but resource-saving reasoning heuristics are often applied by a clinician who is examining an acutely ill person in an emergency department where there is time pressure on the staff (Kushniruk, 2001; Patel & Kaufman, 1998).

During clinical problem solving, a number of diagnostic hypotheses and management options are generated. This number is limited by a person's short-term memory. Relevant mental schemas or clusters of related information available are reviewed and matched. The matching of schemas seems to be more rapid than hypothetico-deductive reasoning as it imposes less of a cognitive load than reasoning (Schmidt, Norman, & Boshuizen, 1990). However, when there is no acceptable match between selected cues and mental schemas, more cognitively demanding reasoning strategies are applied. If data gathering and processing steps of clinical assessment provide insufficient information for selecting a response, then the decision maker may seek additional information cues and use decision-support tools. The alternative options

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