

CLINICAL DECISION-MAKING (PART1):**UNCERTAINTY,
INTUITION
AND BIASES**

In last month's issue of *SMA News*, I wrote about the role of mentors in the practice of medicine and how they help younger doctors navigate and deal with uncertainty in clinical practice. Medicine remains an "uncertain art" despite advances in technology and the development of evidence-based medicine in an attempt to improve the predictability of diagnosis and clinical outcomes.

We are familiar with modern methods of clinical decision-making, such as the use of clinical algorithms, decision trees and practice guidelines. These guidelines are useful, if not essential, in providing a high standard of care for patients and are applicable for the majority of problems that a doctor encounters, as they are backed by statistically proven data. Guidelines set a standard of expected care and thus help to maintain consistency of quality, improve treatment outcomes and ensure patient safety.

There are of course limitations to the use of guidelines — they do not cover each and every clinical situation, they do not take into consideration the individual patients in context, and patients themselves may often present with undifferentiated and vague problems, or complain of multiple interconnected symptoms.

INTUITION

The ability to rapidly assess a given situation, identify the problems and come up with a provisional diagnosis

to make a decision is what we call clinical intuition. A *heuristic* is a "mental shortcut", "rule of thumb", "gut feeling", or a rapid insight that clinicians develop to help them cope with essentially uncertain situations. Doctors commonly use heuristics in clinical decision-making. In emergency situations, being able to rapidly size up a situation and make clinical decisions can be a matter of life and death.

Intuition is certainly useful to enable quick decisions, and mostly serves its purpose in conserving mental energy since most patients present with common symptoms and cases, even if uncertain, can be fairly straightforward. This is especially true in primary care, where family physicians are called upon to make clinical decisions for patients who present with early and undifferentiated symptoms, under the twin pressure of high patient load and shortage of time.

Primary care doctors develop an acute sense of observation that kicks in as soon as patients enter the consultation room, using framing techniques to fit patients into categories, each with certain expected symptoms and outcomes. Through literally thousands of patient encounters, the primary care doctor is able to refine his decision-making skills and develop a sense of the expected outcomes of common diseases. Once a patient does not fit into a recognisable pattern, the difference stands out.

DETECTING ZIKA

The detection of the first locally transmitted cases of Zika virus infection in Singapore in August 2016 was an excellent example of the role that primary care doctors have as the first line of defence in emerging infectious disease outbreaks. It also showed how pattern recognition and intuition played a part in clinical decision-making.

Doctors at Sims Drive Medical Clinic had noticed an unusual spike in patients with fever, joint aches and rash in the community. This unusual "pattern" was noticed by the team of three doctors practising there, and when coupled with the negative test results for dengue, measles and rubella, it triggered the alarm for them to report the cases to the Ministry of Health.

This combination of pattern recognition, clinical experience, high index of suspicion, concern for the welfare of the community, and a network of colleagues that allowed information exchange all came together to enable the cases of Zika infection to be detected.

There was no definitive clinical guideline for Zika detection at that time; the patients presented with vague

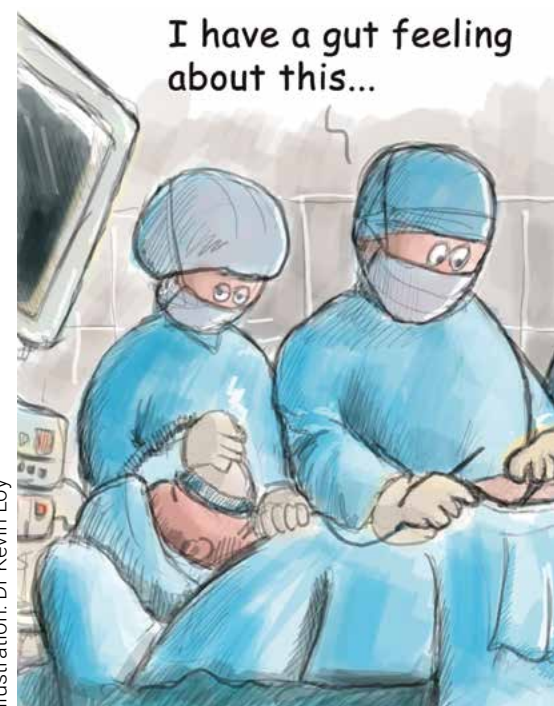


Illustration: Dr Kevin Loy

symptoms and the doctors were all uncertain about the problem. Yet, their intuition told them that something was wrong — the pattern did not fit a usual outbreak of viral fevers.

BIASES

Intuition is refined and improved through a process of observation, practice and feedback. It is a learning process honed through years of clinical experience.

Clinical intuition is widely employed by doctors even if they are not aware of it. I became interested in behaviour and cognition pertaining to doctors when I first read Jerome Groopman's book, *How Doctors Think*. It led to reading about theories of cognition and intuition, which in turn led to a wide field on the study of cognitive errors.

Indeed, intuition can be fallible. Authors of books on intuition are divided on whether it is something that is reliable or misleading. Doctors often make wrong decisions, as heuristics are double-edged swords that can make them fall short on predictions when applied wrongly. Doctors therefore need to be aware of such pitfalls and biases.

Here are some common types of cognitive biases that operate in

clinical decision-making. The list is non-exhaustive; interested readers can refer to the book references at the end of the article.

Attribution errors involve negative stereotypes that lead clinicians to ignore or minimise the possibility of serious disease.

Example: Dismissing "malingers" as medical certificate seekers and missing a serious pathology. A "heartsink" patient who presents for multiple visits often has symptoms ignored or played down.

Anchoring heuristic occurs when physicians are overly influenced by initial pieces of information, leading to biases in subsequent judgements. Once an anchor is set, physicians cling to that initial diagnostic impression despite new information that points to the contrary.

Example: A doctor makes an diagnosis of acute appendicitis in a patient and subsequently dismisses a positive urine culture as a contaminated specimen.

Belief perseverance refers to the tendency to cling to one's belief even after receiving new information that contradicts the basis of that belief. Once an impression is anchored in the mind, the doctor holds on to it. Doctors need to be aware that they can make rapid decisions but should not be trapped with their personal beliefs.

Example: A doctor may have a firm belief that food allergy is the cause of many underlying diseases such as rhinitis, gastroenteritis and dermatitis, even when clinical evidence of another aetiology is present.

Confirmation bias ("seek and ye shall find") is a tendency to search for or interpret information in a way that confirms one's preconceptions, leading to decision errors. It compounds an anchoring error when the physician "cherry picks" available data to fit his initial impression.

Example: In history-taking, doctors can sometimes ask leading questions

PROFILE



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in an attempt to "confirm" their initial first impressions. Once they are satisfied that a conclusion is reached, they end the interview.

Availability heuristic occurs when doctors are influenced by what they have seen recently or what comes to mind easily. Overestimation of probability occurs when the doctor had witnessed a dramatic and eventful case, or is influenced by exposure in a recent lecture or through the media.

Example: The surge of suspected cases of Zika infection being referred for testing because it is constantly reported in the media. On the flip side, public health authorities can use availability bias to saturate the media with information on a disease, so as to improve detection rates during epidemics.

Representativeness heuristic is when clinicians use shortcuts to arrive at a diagnosis based on what is common in their area of practice. This may lead to errors if the *base rate* in the population changes, such as overestimating a patient's disease based on certain clinical features, despite the rarity of the disease in the population.



Example: A medical officer who has just finished a respiratory posting may think that the rate of lower respiratory infection is high based on what he observes in the respiratory ward, leading to overestimating cases of pneumonia when he gets posted to a primary care facility.

Illusory correlation is the phenomenon of perceiving a relationship between variables even when no such relationship exists.

Example: Doctors often believe that their drugs work (eg, antibiotics to treat upper respiratory tract infections) based on personal experience, when in fact most minor ailments are self-limiting. Doctors tend to take too much credit for such self-limiting conditions.

Framing effect refers to drawing conclusions based on how the information is presented. Clinical decision becomes biased by subtle changes in language, perception of risk, and benefit.

Example: The doctor can present a procedure as having a ten percent chance of mortality or a 90% chance of survival, eliciting different decisions from the patient.

INTUITION VERSUS RATIONALITY

Kahneman and Tversky (2011) proposed that the cognitive mind operates in two modes – system 1 is fast and intuitive, while system 2 is slow and rational. How this

influences clinical decision-making will be the topic of another article.

Watch this space. ♦

Further readings

1. Sommers LS, Launer J, eds. *Clinical Uncertainty in Primary Care – The Challenge of Collaborative Engagement*. New York: Springer-Verlag, 2014.
2. Groopman J. *How Doctors Think*. Massachusetts: Houghton Mifflin Harcourt, 2008.
3. Kahneman D. *Thinking, Fast and Slow*. New York: Farrar, Straus and Giroux, 2011.
4. Hertenstein M. *The Tell: The Little Clues That Reveal Big Truths about Who We Are*. New York: Basic Books, 2013.