

# Coping with uncertainty in clinical practice: a narrative review

Ian A Scott<sup>1</sup> , Jenny A Doust<sup>2</sup> , Gerben B Keijzers<sup>3</sup>, Katharine A Wallis<sup>1</sup> 

In the words of renowned American surgeon, writer and public health researcher Dr Atul Gawande, “The core predicament of medicine — the thing that makes being a patient so wrenching, being a doctor so difficult, and being a part of society that pays the bills they run up so vexing — is uncertainty ... Medicine’s ground state is uncertainty. And wisdom — for both the patients and doctors — is defined by how one copes with it”.<sup>1</sup>

The ever-increasing novelty, complexity and, sometimes, insolubility of modern medicine brings decisional uncertainty for clinicians (Box 1). Although diagnostic conundrums attract considerable attention, uncertainty pervades many other areas of practice, such as how to deal with incidental or ambiguous findings from an ever-increasing array of laboratory investigations,<sup>2</sup> what treatments to prescribe for conditions for which there are multiple options,<sup>3</sup> how to predict illness trajectories and navigate the care of patients through a complex health system,<sup>4</sup> and how to ethically decide what care to provide while reconciling patient wishes with likelihood of benefit and limited resource availability.<sup>5</sup> In addition, scientific evidence is non-existent, conflicting, inconclusive or not applicable for many clinical questions, so deciding what constitutes best care in a particular set of circumstances remains uncertain (epistemic uncertainty).<sup>6</sup> Equally, even with high quality evidence, it can be difficult to predict the effects of interventions in individual patients (aleatory uncertainty).<sup>7</sup> Contextual factors can also inject more uncertainty into clinical encounters by disrupting reasoning processes, these being clinician-related (eg, fatigue, hunger), patient-related (eg, poor English proficiency, presentation complexity) or environment-related (eg, noise, distractions, time pressures).<sup>8</sup>

Despite the ubiquity of uncertainty in medicine, clinical culture too often fails to acknowledge it, explore how it affects individual clinicians, or consider what can be done to mitigate it.<sup>9</sup> Professional training and socialisation have traditionally placed value on certainty over uncertainty,<sup>10</sup> and how to minimise or eliminate uncertainty rather than in how to tolerate or manage it. Clinicians respond to uncertainty in various ways through the interplay of a series of cognitive, emotional and ethical reactions.<sup>11</sup> Stress from uncertainty is increasingly recognised as a likely driver of professional burnout in health care,<sup>12</sup> reducing clinician engagement and productivity, posing risks for patient safety as a result of more errors,<sup>13</sup> and exacerbating workforce shortages by inducing early retirement or change of occupation.<sup>14</sup> Acquiring the adaptive ability to understand and tolerate clinical uncertainty and guide patients in trusting relationships amid such uncertainty are important challenges facing clinicians,<sup>1,15</sup> and are now recognised as core clinical competencies for medical graduates and trainees.<sup>16</sup> Modern computerised decision support systems currently lack intelligent inference mechanisms for handling uncertainties in scientific knowledge and its application to specific clinical scenarios.<sup>17</sup> Evidence-based clinical decision rules do not necessarily improve care processes

## Summary

- Clinicians must make decisions amid the uncertainty that is ubiquitous to clinical practice.
- Uncertainty in clinical practice can assume many forms depending on its source, such as insufficient personal knowledge or scientific evidence, limited practical understanding or competence, challenging interpersonal relationships, and complexity and ambiguity in clinical encounters.
- The level and experience of uncertainty varies according to personal traits, clinical context, affective factors and sociocultural norms.
- Clinicians vary in their tolerance of uncertainty, and maladaptive responses may adversely affect patient care and clinician wellbeing.
- Various strategies can be used to minimise and manage, but not eliminate, uncertainty and to share uncertainty with patients without compromising the clinician–patient relationship or clinician credibility.

or patient outcomes,<sup>18</sup> and although precision medicine using artificial intelligence, machine learning and big data seeks to lend greater certainty in personalising care, the information explosion that it brings will likely increase rather than decrease levels of uncertainty.<sup>19</sup>

The aims of this narrative review are to: i) characterise the various types of uncertainty; ii) define the adverse effects, clinician characteristics and clinical contexts associated with intolerance of uncertainty; iii) identify means for assessing intolerance of uncertainty at an individual level; and iv) present strategies that clinicians and their patients can use to cope with uncertainty after doing what can be reasonably done to minimise it. This review is based on original articles and systematic or narrative reviews obtained from a search of MEDLINE, PsycINFO, SocINDEX, CINAHL, Web of Science and Google Scholar published between 1 January 1995 and 30 September 2022 using search terms “uncertainty”, “ambiguity”, “tolerance”, “confidence” and “coping”. We selected articles relating to clinicians providing direct patient care and excluded those relating to more indirect care provided by clinicians in disciplines such as pathology and radiology.

## Characterising clinical uncertainty

As there is no universal definition of clinical uncertainty, we will define it simply as the state clinicians are in when they are unsure of the diagnosis, the care to be recommended and delivered, or their understanding of the patient, their problem, or its trajectory. Clinical uncertainty is common, with one study of doctors interacting with older male patients verbally expressing uncertainty in up to 70% of all encounters.<sup>20</sup> In primary care, one British study of 50 new patients presenting with a diagnostic issue revealed a certain diagnosis was forthcoming by the end

## 1 Examples of clinical uncertainty

Type of uncertainty	Example
Diagnostic	Child with irritability and fever — is it meningitis?  Older patient with exertional dyspnoea and who is overweight, smokes and has cardiac risk factors — is it heart failure, chronic obstructive pulmonary disease, or deconditioning?
Therapeutic	Patient with reduced exercise tolerance, fatigue and “brain fog” post- coronavirus disease 2019 (COVID-19) — what treatments may help?  Older multimorbid patient with heart failure, chronic kidney disease, Parkinson disease, polypharmacy, and declining function — will starting a new drug to treat one of these conditions make another condition worse?, will ceasing a drug potentially improve or worsen their clinical state?
Prognostic	Patient with a new presentation of depression — are they suicidal and is there an increased risk of suicide if they are started on an antidepressant?  Older frail patient with hearing impairment presenting for driving assessment — are they fit to drive for another year?
Investigational	Patient with unintentional weight loss and fatigue but no other specific symptoms or signs — what tests will be most useful in diagnosing underlying disease?  Otherwise well person presenting with mild cough and elevated white cell count — is further investigation required?
Interpretive	Patient with slight enlargement of retroperitoneal lymph glands found incidentally on abdominal computed tomography scan performed to investigate flank pain — is this pathological?
Supportive	Older frail patient living alone who is cognitively impaired and presents with recurrent falls — will a home care package be sufficient or do they need residential aged care?
Triaging	Patient with cardiac risk factors who presents following an episode of retrosternal chest pain, but has normal physical examination and electrocardiogram — should they be referred immediately to an emergency department or urgently to a chest pain clinic, or should they be closely monitored by their general practitioner with further investigations?
Procedural	Patient with suspected giant cell arteritis who needs a temporal artery biopsy — how to organise this and who does it? Vascular surgeon, general surgeon, ophthalmic surgeon, rheumatologist?
Ethical	Morbidly obese patient with poorly controlled diabetes and severe interstitial lung disease who develops severe community-acquired pneumonia with septic shock and acute respiratory failure — will mechanical ventilation be of benefit despite their wishes for full cardiopulmonary resuscitation?  Male patient with newly acquired chlamydia urethritis after an overseas work trip asks you not to inform his wife who is also your patient — what is the appropriate course of action?
Contextual	Patient who is a female refugee, speaks little English and has cultural sensitivities about being physically examined by a male doctor — how should the required clinical information be obtained?  Patient who is new to the clinic and has several urgent and complex problems — how to prioritise to make best use of limited time?

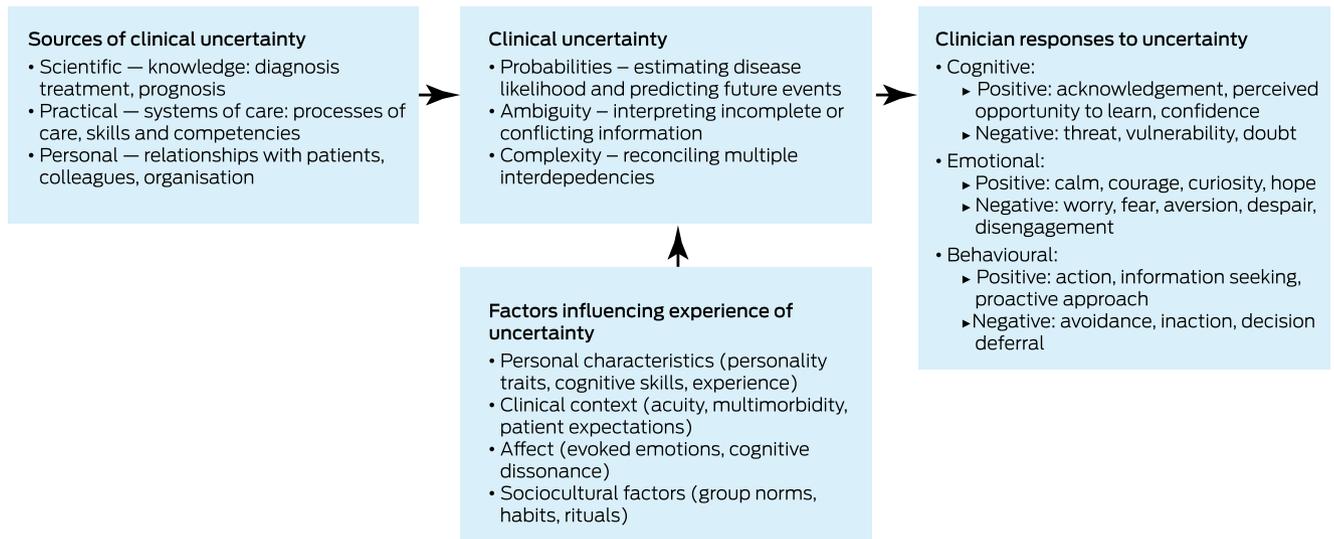
of the first consultation in less than half of the cases.<sup>21</sup> Among 592 patients presenting acutely with dyspnoea to one emergency department in the United States, almost a third of cases remained undiagnosed after a full standard work-up.<sup>22</sup>

Not surprisingly, clinical uncertainty can take various forms according to the decisional context and goals, as denoted by various conceptual frameworks and taxonomies of uncertainty. An initial framework proposed three types of informational uncertainty: technical (due to limited scientific data or practical skill), personal (arising from gaps in understanding patients' wishes), and conceptual (resulting from the application of abstract criteria, such as guideline recommendations or protocols, to concrete clinical scenarios).<sup>23</sup> Another framework states uncertainty can be about the research evidence, the patient's story, what best to do for a specific patient with a particular set of circumstances, and the interactions between humans and between humans and technology.<sup>24</sup> A third framework classifies uncertainty as being centred on probability (ie, inability to predict future outcomes), ambiguity (ie, lack of information or conflicting evidence or opinion) or complexity (ie, multiplicity of causal factors, relationships and interpretations).<sup>25</sup> The same authors also identify loci of uncertainty as being disease-centred (diagnosis, prognosis, treatments), system-centred (structures

and processes of care, networking, teamwork) and patient-centred (psychosocial and existential effects of illness and its treatment on patients' perceived meaning of life and personal relationships). A fourth framework similarly categorises uncertainty as arising primarily from deficits in scientific knowledge about disease, insufficient practical understanding of how systems of care operate (eg, lack of clarity about expected skills, how to access or implement different forms of care, what policies and procedures to follow), and inability to predict the aforementioned effects of illness and treatments on patients.<sup>26</sup> However, this framework also includes ethical aspects of clinicians reconciling their personal values with those of their patients and with the sociocultural and practice codes of the craft groups and institutions within which they work.

More recently, different researchers have formulated frameworks that not only identify the types and sources of uncertainty, but also include factors that influence how much an individual clinician perceives uncertainty (eg, the clinical context or situation, personal moderators such as personality, cognitive capacity, level of experience, sociocultural influences), and categorise how individuals respond to uncertainty in cognitive, emotional and behavioural terms, both positive and negative.<sup>27-29</sup> In [Box 2](#), we have constructed a schema that integrates these

## 2 An integrated theoretical framework of clinical uncertainty



various frameworks, while noting that dimensions of probability, ambiguity and complexity can be difficult to disentangle, and boundaries between source domains of scientific, practical and personal, and between response domains of cognitive, emotional and behavioural are blurry and often intertwined.

### Effects of uncertainty on clinicians and patient care

Like all humans, clinicians will often think and do things in an attempt to extract themselves from situations of uncertainty which are experienced as being uncomfortable or even stressful. When confronted with uncertainty in decision making, clinicians may deny it and apply accepted rituals, simply adopt the practice of their peers, or rely on heuristic reasoning (use of mental shortcuts or rules of thumb).<sup>30</sup> In other instances, acknowledging uncertainty may serve as a self-protective or motivational force, resulting in increased information seeking or considered selection of preventive, diagnostic and therapeutic actions.

Unfortunately, maladaptive reactions induced by an intolerance of uncertainty and desire for decisional comfort can have adverse consequences for patient care. Clinicians with higher intolerance of uncertainty may be more likely to avoid certain kinds of patients with complex needs, such as substance users, the poor, older patients and the underserved, contributing to health inequities.<sup>31</sup> Studies show that intolerance of uncertainty can impair clinical decision-making skills,<sup>32</sup> manifesting as misperceptions of clinical goals of care, greater vulnerability to reasoning biases (eg, premature closure in diagnostic reasoning) and lower diagnostic performance,<sup>33</sup> overuse and misuse of diagnostic tests,<sup>34</sup> prescribing of inappropriate interventions,<sup>35</sup> more unnecessary referrals,<sup>36</sup> and reduced engagement with colleagues and patients in decision making.<sup>32,37</sup> This can all result in compromised doctor–patient relationships and decreased patient satisfaction, confidence and trust in the medical system.<sup>38</sup>

Intolerance of uncertainty is also associated with more psychological distress and burnout,<sup>8,39</sup> loss of self-compassion,<sup>40</sup> career dissatisfaction and disengagement at work, more discomfort dealing with death and grief,<sup>41</sup> more concerns about malpractice risk, less propensity to adopt new and effective

clinical interventions,<sup>32</sup> and more limited leadership abilities.<sup>42</sup> Clinicians with higher intolerance of uncertainty may also avoid certain career paths, such as primary care, emergency medicine, psychiatry or geriatric medicine, as these are perceived as disciplines likely to evoke more decisional uncertainty.<sup>14,32,43</sup>

### Personal and contextual factors associated with intolerance of uncertainty

Evidence of any associations between intolerance of uncertainty and clinician and contextual factors is, to date, inconsistent, although some studies suggest a higher propensity towards intolerance of uncertainty among female clinicians,<sup>37</sup> general practitioners,<sup>37</sup> and surgeons.<sup>44</sup> Clinicians with more experience or who are less risk-averse tolerate uncertainty more than less experienced<sup>37,45</sup> or more risk-averse<sup>46</sup> colleagues, and lacking a trusted advisor is also associated with greater intolerance of uncertainty.<sup>37</sup>

Regarding contextual influences, clinicians are less tolerant of uncertainty when dealing with acute undifferentiated clinical scenarios, especially in settings where access to advice is reduced,<sup>46,47</sup> or when interviewing more educated persons who show a greater desire for information,<sup>48</sup> or with patients who present with mental health or psychosocial issues rather than biomedical ones.<sup>49</sup> Other patient characteristics such as age, gender or race appear to exert no influence.

### Assessing individual tolerance of uncertainty and response

In measuring a clinician's level of intolerance of uncertainty and response, the 1995 version of the Physician's Reactions to Uncertainty (PRU) scale is the most widely cited and validated tool (Box 3).<sup>50</sup> This 15-item, Likert-scale questionnaire has two parts, the first assessing the level of stress arising from uncertainty in terms of anxiety and concerns about bad outcomes, and the second determining the extent to which uncertainty results in reluctance to disclose uncertainty to patients or disclose mistakes to other clinicians. The points for each item are summed to give a final score, with a higher score indicating

### 3 Assessing clinicians' reactions to uncertainty using the Physician's Reactions to Uncertainty (PRU) scale\*<sup>50</sup>

#### Stress from uncertainty

- Anxiety due to uncertainty (five items):
  - ▶ "I usually feel anxious when I am not sure of a diagnosis or course of action"
  - ▶ "I find the uncertainty involved in patient care disconcerting"
  - ▶ "Uncertainty in patient care makes me uneasy"
  - ▶ "I am quite comfortable with the uncertainty in patient care"<sup>†</sup>
  - ▶ "The uncertainty of patient care often troubles me"
- Concern about bad outcomes (three items):
  - ▶ "When I am uncertain of a diagnosis, I imagine all sorts of bad scenarios — patient dies, patient sues etc"
  - ▶ "I fear being held accountable for the limits of my knowledge"
  - ▶ "I worry about malpractice when I do not know a patient's diagnosis"

#### Reluctance to disclose uncertainty

- Reluctance to disclose uncertainty to patients (five items):
  - ▶ When clinicians are uncertain of a diagnosis or treatment, they should share this information with their patients<sup>†</sup>
  - ▶ "I always share my uncertainty with my patients"<sup>†</sup>
  - ▶ "If I shared all of my uncertainties with my patients, they would lose confidence in me"
  - ▶ "Sharing my uncertainty improves my relationships with my patients"<sup>†</sup>
  - ▶ "I prefer patients not know when I am uncertain about what treatments to use"
- Reluctance to disclose mistakes to colleagues (two items):
  - ▶ "I almost never tell my colleagues about diagnoses I have missed"
  - ▶ "I never tell other colleagues about mistakes I have made in patient care"

\* Items are rated on a 6-point Likert scale: 1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = slightly agree; 5 = moderately agree; 6 = strongly agree. The scale is scored by summing the responses to each item, noting some items are reverse-scored.

† Items that are reverse-scored. ♦

greater intolerance of uncertainty. The PRU scale is limited in that it addresses only emotional reactions to uncertainty, rather than those of a cognitive and ethical nature.<sup>9,37</sup>

The PRU scale helps to identify different clinician phenotypes in terms of affective and maladaptive response to intolerance of uncertainty. In one cross-sectional analysis of 1209 clinical encounters involving 594 Australian general practice trainees to whom the PRU scale was applied,<sup>51</sup> the anxiety and concern subscales were associated with female gender, less experience in hospital before commencing general practice training, and graduation overseas. On the other hand, the reluctance to disclose subscale was associated with urban practice, health qualifications before studying medicine, practice in an area of higher socio-economic status, and being trained in Australia.

### Strategies for managing uncertainty

As tolerance of uncertainty is thought, at least partly, to be determined by situational factors, it may be amenable to change through educational and experiential processes. Much of the research on such processes involves novice clinicians (medical students, residents, trainees or newly qualified specialists), although the insights gained have application to all grades of experience. At the outset, novice clinicians should expect uncertainty to be part of their routine work, and manage the expectations of all parties involved in delivering care, including themselves, about how much they are capable of eliminating it.<sup>52</sup> Where uncertainty results from limited knowledge and experience, information-seeking actions can be constructive, but, at some point, clinicians have to

accept they will never know everything they need to know and no amount of study or decision support will eliminate uncertainty.

Evidence is emerging of the value of incorporating formal teaching in how to characterise uncertainty and how to cope with it into undergraduate and postgraduate curricula, best integrated with courses in clinical reasoning.<sup>53</sup> Various educational formats have been shown to have favourable impact, including clinical debriefs, small group exercises, role plays, simulations, standardised cases, chart-stimulated recall interviews, peer-to-peer conversations, and reflective learning and assessment, including narratives from mentoring clinicians which express and normalise their own vulnerability to uncertainty.<sup>46,54-56</sup> Discussing uncertainty with members of multidisciplinary teams allows others to offer advice and perspectives that can decrease errors and cognitive overload.<sup>57</sup> Commitment to lifelong learning and intellectual curiosity are also strengths, as researching a patient's illness and possibly becoming aware of new case reports or new treatments may benefit existing or future patients.

However, others argue the acquisition of appropriate reactions to uncertainty will mostly occur over time with more experience.<sup>58</sup> In reality, a complex balance of education and experience is most likely, while recognising that fixed personality traits and deeply imprinted prior experiences may predispose individuals to specific psychological responses.<sup>59</sup> Of concern is the observation in some studies of medical students becoming more intolerant of ambiguity, losing empathy and seeking decisional perfectionism as they progress through their course.<sup>43,60,61</sup>

Acting with confidence while simultaneously remaining uncertain in dealing with complex, ill-defined problems epitomises expert practice. In such situations, clinicians continuously reconstruct and redefine their understanding of the problem, even as they are trying to solve it.<sup>62</sup> This goal of becoming comfortable with uncertainty and remaining able to make decisions is different to being certain but uncomfortable, where one perceives a clear understanding of the problem but realises one is incapable of managing it. Clinicians with intolerance of uncertainty often perceive uncertainty as a threat to self-identity, and in reducing such existential distress, cognitive dissonance provoked by uncertainty must be transformed into self-directed learning moments, whereby clinicians become aware of, and are shown how to lower, perceived threats while improving resilience.<sup>63</sup> Recent articles offer various strategies for coping with uncertainty in routine practice,<sup>64-67</sup> as summarised in [Box 4](#).

### Communicating uncertainty with patients

In an era of shared decision making, whether to share uncertainty with patients is not the issue, rather the question is how best to communicate it without causing undue anxiety or loss of trust, which both become more likely the longer uncertainty persists.<sup>68</sup> Clinicians who perceive their patients as more likely to have negative reactions to uncertainty may make unilateral and premature decisions about preferred care and withhold interventions where there is uncertainty about benefits and harms.<sup>69</sup> In contrast, disclosing and managing uncertainty may actually strengthen the therapeutic clinician-patient relationship depending on how uncertainty is communicated, and what strategies are used to prioritise continuity of care, patient-centred communication, and trust.<sup>70</sup> Acknowledging uncertainty and

4 Strategies for clinicians in managing uncertainty<sup>64-67</sup>

Element	Explanation	Coping strategy
Understand your own affective (or "gut") reactions and level of tolerance to uncertainty	<ul style="list-style-type: none"> <li>Reflect on the emotions and thoughts triggered by uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>Assess your reactions to uncertainty and level of tolerance using the Physicians' Reactions to Uncertainty scale<sup>50</sup></li> <li>Reflect on your reactions to uncertainty and attempt to gain more control over them — consciously choose more functional rather than dysfunctional ways to deal with uncertainty</li> </ul>
Identify the type of uncertainty you are facing in a particular instance	<p>Determine if the uncertainty is primarily:</p> <ul style="list-style-type: none"> <li>Scientific (knowledge about diagnosis, prognosis, treatment)</li> <li>Practical (knowledge about structures and processes of systems of care)</li> <li>Personal (psychosocial, existential and ethical dimensions of the clinician-patient relationship)</li> </ul>	<ul style="list-style-type: none"> <li>Search medical literature (eg, PubMed Clinical Queries), apply validated prediction rules, use decision support systems, refer to local evidence-based clinical guidelines or pathways, consult a subject matter expert</li> <li>Discuss with line or practice managers, executive officers, system analysts; consult work procedures or instructions</li> <li>Requires an individualised nuanced approach; consult multidisciplinary teams and/or clinical ethicist</li> </ul>
Feel your way through a problem	<ul style="list-style-type: none"> <li>Definitive solutions to a problem may remain elusive until more information becomes available, but solving the problem still remains within one's realm of expertise</li> </ul>	<ul style="list-style-type: none"> <li>Avoid trying to second-guess every possible outcome and adopt a pragmatic, analytical approach to dealing with uncertainty — "I think this is where I should leave things for the moment as I am satisfied with the current plan based on the information available and I will see what plays out"</li> </ul>
Let go of the need to know for sure	<ul style="list-style-type: none"> <li>Absolute or near-absolute certainty about how to define or manage a problem is rare in clinical practice and should not be seen as a prerequisite for committing to action</li> <li>What matters is not the absence of uncertainty but rather the processes and thinking patterns one uses to manage it</li> <li>Medical science has its limitations in providing definitive evidence for diagnosing or managing certain conditions</li> </ul>	<ul style="list-style-type: none"> <li>Decide and justify the level of uncertainty you are willing to tolerate, taking the clinical and/or system context into account and the seriousness of the problem — "I am not sure of what is wrong with this patient but I am sure of what they do not have"</li> <li>Avoid paralysing or distorting your reasoning by the fear of uncertainty and adopt a flexible approach — "Few things in medicine are black and white, as the textbooks would have me believe; there will often be shades of grey and differences of opinion"</li> <li>Seek closure and avoid becoming fixated on a single problem which constrains the ability to direct attention to new problems — "I have given this a lot of thought and have arrived at a decision, so I need to live with it and move on to the next task"</li> <li>Accept there are limits to what is currently knowable — "Current guidelines and expert opinion are unable to tell me precisely what causes this problem and how to manage it"</li> </ul>
Deprioritise uncertainties that are less relevant or consequential	<ul style="list-style-type: none"> <li>Clinical scenarios can be multifaceted and include a hierarchy of urgent and non-urgent issues</li> <li>Information and opinions may arise that do not directly bear on the current problem</li> </ul>	<ul style="list-style-type: none"> <li>Filter out the issues that do not require in-depth analysis and solutions at the present time — "These issues (about the patient's lack of sleep, work pressures, psychosocial supports) are not things that I need to worry about right now even though I don't fully understand them; their dyspnoea and chest pain are the current priorities"</li> </ul>
Anticipate and prepare for scenarios associated with uncertainty	<ul style="list-style-type: none"> <li>Rather than being blindsided by challenging encounters, arm yourself with more coping strategies in advance</li> </ul>	<ul style="list-style-type: none"> <li>Identify <i>a priori</i> topics or situations where you are likely to feel more uncertain (eg, a particular type of patient, a difficult procedure, complex care pathways)</li> <li>Implement deliberate practices that impart greater knowledge and confidence in such situations (eg, when you are about to see a transplant patient, read up on how to diagnose and manage frequently encountered problems and complications; be ready to involve other specialists in care) — "I need to step outside my comfort zone and deal with this problem the best way I can"</li> </ul>
Identify and counter cognitive biases	<ul style="list-style-type: none"> <li>Feeling uncertain can force quick, intuitive decisions that may be flawed due to false assumptions and errors in reasoning</li> </ul>	<ul style="list-style-type: none"> <li>Self-monitor your thinking processes and guard against premature closure, stereotypical thinking, bravado and overconfidence — "Do I feel confident in my reasoning and the decisions I have made or is there something I have left out or prefer not to consider?"</li> <li>Think out loud, articulate your reasoning, and employ probabilistic (or Bayesian) thinking — "What do I think is most likely as the diagnosis or best treatment, and why do I think that?"</li> </ul>
Exercise humility and acknowledge your limits	<ul style="list-style-type: none"> <li>Many clinicians exhibit obsessive-compulsive traits that drive a sense of responsibility for solving intractable problems, of "sticking with things to the bitter end"</li> </ul>	<ul style="list-style-type: none"> <li>Set boundary conditions that signal a problem is progressing beyond your capacity to manage it with a sufficient level of confidence — "I feel I am losing control of this situation and I should seek help"; "it's OK not to have all the answers because I have been diligent and done the best I can, and it is now time for someone else to have a go"; "I should not be hard on myself because I could not work this out and think that others could have done a better job"</li> </ul>
Employ safety netting and follow-up	<ul style="list-style-type: none"> <li>In the face of diagnostic or management uncertainty, formulate and communicate a plan for dealing with contingencies, and organise close follow-up</li> </ul>	<ul style="list-style-type: none"> <li>Consider all plausible patient trajectories and forward plan for those which place patients most at risk of adverse outcomes</li> <li>Select investigations that can reliably rule out worst-case diagnoses in the short term and adopt a wait and see approach — "If I'm right, what do I expect to happen? How will I know if I'm wrong? What would I do then?"</li> </ul>

#### 4 Continued

Element	Explanation	Coping strategy
Share uncertainty with colleagues	Discussing clinical conundrums with colleagues lends more confidence to your decisions and builds a group culture that accepts and embraces uncertainty	<ul style="list-style-type: none"> <li>• Avoid the “lone ranger” mentality, having to work problems out by yourself</li> <li>• Accept that not knowing the answer to a problem is not a mark of incompetence — “I am sure I am not the only one who would struggle with this problem”</li> <li>• Colleagues will often have encountered the same problem and can share their collective experience — “My colleagues have my back; they can help get me out of this morass”</li> <li>• In handovers and transitions of care, ensure receiving clinicians are aware of the level of uncertainty inherent to current care plans — “I just need you to know that I am not certain we have the final diagnosis (or management plan) for this patient’s problem”</li> </ul>
Promote curiosity and flexibility over certainty	Curiosity and an openness to new ideas and knowledge are a basic element of human cognition and a fundamental motivator of learning	<ul style="list-style-type: none"> <li>• Encourage open-ended, flexible thinking by asking the “how” and “why” rather than just “what” and “when” — “This problem is unusual but interesting and I really want to get to grips with it for my own edification as well as for the benefit of my patient”</li> </ul>
Share uncertainty with patients	Admitting uncertainty will not lead to a loss of patient confidence if it is appropriately expressed (Box 5)	<ul style="list-style-type: none"> <li>• Be open and honest in expressing your uncertainty to patients and use patients as allies in shared decision making — “I don’t know what’s going on with you right now, but we will stick together until we figure it out or you get better”</li> </ul>

exercising appropriate safety netting build patient confidence in their clinician’s care, contrary to beliefs that such admissions may imperil clinician credibility and authority.<sup>15</sup> Instructing a patient to call if any change or clinical worsening occurs and being specific about what the patient should look for and how

to seek medical attention build patient trust and confidence. Similarly, sharing uncertainty with colleagues applies when patients are being discharged from hospital. The clinician who will assume follow-up (likely the patient’s general practitioner) should be contacted directly by the inpatient team, and any

#### 5 Communicating uncertainty to patients<sup>71-74</sup>

Aim	Recommendation	Example statements
Preparing for the discussion of uncertainty	<ul style="list-style-type: none"> <li>• Clarify the patient’s perception of their problem, their concerns, and their expectations of this encounter</li> <li>• Validate patient’s physical and mental distress while acknowledging uncertainty</li> <li>• Warn patients for the possibility of uncertain decisions or outcomes</li> <li>• Explore patients’ preferences and coping styles regarding uncertainty and adapt your communication accordingly</li> </ul>	<ul style="list-style-type: none"> <li>• “Before we discuss my initial thoughts about your health, what do you think is going on?”</li> <li>• “While the two of us work on figuring out what the problem is and how to treat it, I think it is important for me to understand what concerns you most”</li> <li>• “I am going to do my best to help you, but can I ask what you were hoping to get out of our conversation today?”</li> <li>• “Your pain is real. Just because we don’t know why it’s happening does not mean we don’t believe it’s real”</li> <li>• “There are things I am not certain of at the moment, which means I do not have all the answers for you right now”</li> <li>• “Do you want to discuss all the possibilities and options now or perhaps at a later time?”</li> </ul>
Informing patients about uncertainty	<ul style="list-style-type: none"> <li>• Openly acknowledge uncertainty and explain the limitations of available evidence</li> <li>• Outline all potential scenarios and discuss their implications for the patient’s wellbeing</li> <li>• Explain uncertainty in an understandable, structured and fluent manner</li> <li>• Confirm the patient’s understanding of the uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>• “Unfortunately, I cannot say for sure what causes your complaint as there are no laboratory or imaging tests that can accurately diagnose it”</li> <li>• “I cannot predict exactly how your condition will develop and how we might treat it, but there are basically three scenarios: scenario 1 is ...”</li> <li>• “Perhaps we should discuss the most important things right now, but if you need more details, please feel free to ask me”</li> <li>• “Now I just want to check if I have explained clearly what we know and what we don’t know. What did you understand to be the key messages about your condition?”</li> </ul>
Helping patients deal with uncertainty	<ul style="list-style-type: none"> <li>• Working with patients, identify suitable coping strategies and responses to future uncertainty</li> <li>• Provide some sense of control</li> <li>• Provide hope</li> <li>• Facilitate and support patients’ emotional responses to uncertainty</li> <li>• Emphasise ongoing involvement in the patient’s care</li> </ul>	<ul style="list-style-type: none"> <li>• “What might help you (and me) in dealing with this uncertainty? Talking to your family and friends, or wanting more information, or just mulling things over for a while? What would you prefer?”</li> <li>• “This is what we will do to try to become more sure of what is causing your problem”</li> <li>• “While I cannot be sure how your condition will evolve, what we do know is that you are getting better, which is a good thing”</li> <li>• “I realise it may be difficult to deal with all this uncertainty; how do you feel about hearing all this?”</li> <li>• “Even though our treatment choices are limited and may not work as well as we would hope, we will be there with you all the way”</li> </ul>

uncertainty regarding the patient's diagnosis or plans of care should be made clear. The same principle applies during a hospitalisation, as care is transitioned from one shift to another or from one clinician to another.

Despite the growth in studies exploring multiple sources and types of uncertainty, most continue to focus on identifying, testing and evaluating strategies to communicate probabilistic risk.<sup>70</sup> This may not always be appropriate due to the increasing realisation of limitations in scientific evidence and a multiplicity of alternative care options. Consequently, more focus needs to be given to improving communication of uncertainty inherent in ambiguous and complex scenarios.<sup>70</sup> Box 5 provides a structured approach to communicating uncertainty to patients based on findings from recent reviews.<sup>71-74</sup> However, successfully enacting this approach requires both clinicians and patients to be free of time pressures, distractions and competing priorities.

## Conclusion

Uncertainty is intrinsic to clinical practice, affecting both trainees and experienced clinicians. As Sir William Osler wrote: "Medicine is the science of uncertainty and the art of probability".<sup>75</sup> Limitations in knowledge, complexities of care, and variation in patient preferences contribute to uncertainty. Personal factors such as personality traits and resilience influence

one's tolerance of uncertainty and responses to it. Clinicians need to be able to recognise and manage uncertainty in its various forms, communicate uncertainty to patients, and normalise and openly discuss clinical uncertainty with their peers. At the same time, the current design and funding of health care favour investigations and procedures over potentially lengthy and cognitively demanding discussions between clinicians and patients and shared decision making in the context of irreducible clinical uncertainty. Clinicians and managers must together advocate for system of care reforms that support the recognition, acceptance and management of uncertainty, and the means for minimising its potentially harmful effects on patient care and clinician wellbeing.

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