



Managing uncertainty in general practice



GPSA

GENERAL PRACTICE SUPERVISION AUSTRALIA



About this guide

The transition from working in the hospital to the community setting is highly challenging for the new GP registrar. The general practice environment is characterised by a wide breadth of (often unfamiliar) clinical problems; complex and chronic disease management; relative independence of decision-making; time pressures; complex practice systems; and financial and billing issues.² On top of all of this, GP registrars must also learn how to manage uncertainty, one of the defining features of general practice.

If there is one certainty in general practice, it is the inherent presence of uncertainty. Undifferentiated presentations are very common in primary care and a firm diagnosis is elusive in many encounters.³ Symptoms are often vague, examination findings unclear, investigation results conflicting, and response to treatment inconsistent. Guidelines may be irrelevant or non-existent. Clinical decision-making may be compromised for a myriad of reasons. As a result, uncertainty is intrinsic to the general practice encounter. Indeed, it has even been proposed that managing uncertainty is the 'specialty' of general practice.⁴

Not surprisingly, (in)tolerance of uncertainty varies from doctor to doctor. The ability to manage uncertainty has been found to influence a range of patterns of practice, including test-ordering behaviour.^{5,6} Most importantly, a lower tolerance of uncertainty has been identified as a cause of stress and burnout in GPs⁷, and GP registrars⁸.

Tolerating and managing uncertainty, while related to the individual doctor's personality, is also a learned skill. Management of uncertainty is a core competency of both the RACGP Curriculum Core Skills Unit⁹ and the Australian College of Rural and Remote Medicine primary curriculum.¹⁰ As part of the apprenticeship model of Australian general practice training, supervisors therefore play a critical role in developing this skill in their registrars.

This GPSA guide aims to support GP supervisors to identify, assess, and facilitate development of, skills in managing uncertainty.

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GPSA produce a number of relevant guides for GP supervisors and practices, visit www.gpsa.org.au to view additional guides.

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We acknowledge the Traditional Custodians of the lands and seas on which we work and live, and pay our respects to Elders, past, present and future. We commit to working together in the spirit of mutual understanding and respect for the benefit of the broader community and future generations.



Your registrar's 'uncertain journey'

Your registrar's experience of clinical uncertainty will be shaped by the context of their experience prior to joining your practice. Though every registrar's 'uncertain' journey will have been different, there are some common features, especially for more junior registrars.

Common experience of a junior doctor in their third postgraduate year

- **Jack of all (hospital) trades, master of none**

Most registrars will have gained general experience in a variety of hospital terms, including ED, medicine, surgery and paediatrics. However, this is often relatively superficial, and sometimes more 'administrative' than 'clinical'. Although they now know how the hospital hierarchy works, who is who, and whom to call, they are still very much a novice in the art and science of doctoring.
- **No general practice experience**

General practice is a very different beast to hospital medicine. Serious disease is much less common. Patients present early in the development of their illness. Patients may be less clear about what they are suffering, or if there is any connection between multiple symptoms. The opportunity to do general practice terms as a junior doctor is very limited, and therefore the nature of general practice medicine is usually very foreign to the junior doctor.
- **Familiar with being part of a larger team, rather than flying solo**

Typically, all major diagnosis and treatment decisions made by the registrar will have been in the context of oversight by a broader team. This is in stark contrast to general practice, where registrars operate relatively independently. Although GP supervisors offer mentorship and support, general practice involves the registrar 'flying solo', which can be especially unsettling in the context of ambiguous or unfamiliar symptoms.
- **Used to seeing the acute phase of illness**

Hospital and ED patients tend to have more acute illness than those in general practice, and junior doctors are often encouraged to perform a 'complete workup' before involving the consultant. This can contribute to registrar anxiety in general practice, where immediate testing may be less available, and indeed unhelpful in resolving the uncertainty inherent in many low acuity consultations.
- **Emerging diagnostic and clinical reasoning skills**

After only two post-graduate years, the registrar's diagnostic skills are still on a steep upward trajectory. So, when presented with the uncertainty of general practice encounters, the fall-back position is often to consider, test and discount every possibility so they 'don't miss anything'.



- **Limited experience of prescribing**

Acute hospital admissions tend to be short, and while medication prescription is common, drugs are usually initiated by others. In contrast, general practice problems often require commencement of long-term medications which commonly need to be increased over repeat visits. Other sources of treatment uncertainty include: pressure from patients to prescribe a 'quick fix' rather than give lifestyle advice; unfamiliarity with available medications; and what constitutes a reasonable threshold for prescribing at all.

Experienced GPs may forget how difficult it is to, for the first time, take just 15 minutes to elicit a good history, perform a targeted examination, come up with a diagnosis and treatment plan and explain it all to the patient, use unfamiliar medical technology to implement and record it, and oh... tick, tock... the next patient is waiting!



Signs of a registrar struggling to manage uncertainty

In a perfect world, a registrar would tell their GP supervisor up front if they needed help managing uncertainty. However, this requires a certain degree of insight and such difficulty is often either unrecognised or undisclosed. GP supervisors can, however, use proxy indicators to help identify a registrar who may be struggling with managing uncertainty. These include:

Long consultations and few patients

For many reasons, patient consultations take considerably longer during the first six months of a registrar's career in general practice. These reasons are well known, and include: the registrar having a lack of 'general practice'-specific clinical knowledge; learning computer and other administrative systems; learning to structure their consultations; seeking GP supervisor support; and appropriately documenting the encounter. This all takes time, and is often reflected in a first-term registrar's patient bookings (and Medicare billings!) during the first few weeks.

There is significant variability in the numbers of patients seen by GP registrars at various stages of training, so it is hard to be proscriptive. However, most registrars would progress to seeing three patients/hour in the first months of GPT1, and many are seeing four patients/hour in GPT2. Excessively long consultations and an unwillingness to increase the number of patients seen are both potential indicators of a registrar struggling with managing uncertainty.

Non-rational test ordering

A review of the investigations your registrar has ordered can provide great insight into their clinical reasoning and their ability to manage uncertainty. Anxiety about 'missing something' and fear of a bad outcome can lead to a 'scattergun' approach to test ordering. Random case analysis¹¹ and formal pathology inbox reviews¹² are excellent supervision tools to appraise test ordering practice, explore clinical reasoning and assess tolerance to uncertainty.

Non-rational prescribing

Similarly, conducting a prescribing audit of your registrar's clinical notes¹³, and exploration of the underlying decision-making processes, is a valuable way of assessing tolerance to uncertainty. Non-rational prescribing may indicate discomfort and fear of missing serious disease e.g. antibiotic prescribing for simple viral URTIs.

Seeking GP supervisor help frequently

As a GP supervisor, you can expect to be interrupted and it is important to talk to your registrar about how you will both manage this. You can also expect the impost on your time to progressively reduce as the registrar moves through the training program. A registrar who constantly seeks verification of their diagnosis and treatment plan may be an indicator for difficulty managing uncertainty.

Professionalism issues

There are a number of 'professionalism' issues which may indicate that your registrar is struggling with uncertainty, or feeling burdened by anxiety. These include lateness coming to work or absenteeism, irritability or brusqueness with staff (and possibly patients), refusal to see 'fit-ins', delays in checking results or report writing, and lack of contribution to the practice team.



Strategies for managing uncertainty

Numerous strategies have been described for managing uncertainty in the general practice setting.^{14,15,16} For the purposes of this guide, these have been synthesised into seven broad strategies, as below.

STRATEGIES FOR MANAGING UNCERTAINTY IN GENERAL PRACTICE





Accept that uncertainty is inevitable

As in life more broadly, uncertainty in clinical medicine is inevitable and unavoidable. However, many doctors find this uncertainty discomfiting, and feel driven to seek greater clarity in situations where this may not be possible. This can lead to stress for both doctor and patient. A greater acceptance of the inevitable lack of diagnostic certainty in general practice can be beneficial in managing undifferentiated presentations.

Gather sufficient data

Comprehensive data gathering is fundamental to quality care. The old adage, *"A good history is the basis of the clinical examination"*¹⁷ remains as relevant in today's high-tech health care system as it was in William Osler's day. In the presence of an ambiguous presentation, take a comprehensive history and repeat this each time you see the patient. In particular, seek appropriate red flags, symptoms or signs to help identify or rule out a serious condition.

Similarly, performing an appropriate physical examination (and correctly interpreting physical signs) is a fundamental element of comprehensive clinical assessment. Other sources of data to help minimise diagnostic uncertainty are medical investigations, specialist and other health professional assessments, and hospital records.

Identify the patient's agenda

In the patient-centred clinical method, the doctor's aim is to ascertain the patient's agenda and to reconcile this with his or her own to develop a management plan.¹⁸ Patient-centred care has been shown to enhance patient satisfaction and lead to better health outcomes.¹⁹

Identifying the patient's agenda is a key strategy in managing uncertainty. However, hidden agendas are very common in the general practice setting and often only emerge late in the consultation, if at all.²⁰ Pendleton introduced the notion of identifying the ideas, concerns and expectations of the patient as key elements of better understanding the reasons for presentation.²¹ This can be remembered by the acronym 'ICE', for Ideas, Concerns and Expectations. Using this framework, useful questions to help identify the patient's agenda include:

- *"What do you think is going on?"* (ideas)
- *"What are you particularly worried about?"* (concerns)
- *"What were you hoping to get out of the visit today?"* (expectations)

What do you think is going on?

What are you particularly worried about?

What were you hoping to get out of the visit today?



Reason analytically

Clinical reasoning is the process of making sense of the breadth of clinical information related to a patient's presentation to decide on the optimal plan of management. Managing uncertainty is a core element of effective clinical reasoning. Conversely, aspects of good clinical reasoning assist in the capacity to better manage uncertainty.

The literature on clinical reasoning describes a dual process model of thinking.²² Non-analytic reasoning, or type 1 thinking, is defined by rapid, intuitive, and automatic processing, and relies on the use of cognitive tools such as pattern recognition, spot diagnoses and heuristics (rules of thumb). Sherlock Holmes, based on one of Conan Doyle's medical professors no less, exemplifies type 1 thinking.

In contrast, analytic reasoning (also known as hypothetico-deductive, or type 2 thinking), is a more deliberate process of hypothesis generation and testing. It manifests as detailed history taking, the specific seeking of confirmatory and contradictory information, and a deliberate, conscious analysis of the data. Hercule Poirot is a classic type 2 thinker, although unlike us GPs, he inevitably achieves a position of certainty by the final scene!

While type 1 thinking is increasingly common with greater clinical experience, a challenging presentation often leads the expert clinician to revert to a more analytic approach. It has been argued that managing uncertainty is a type of metacognition. This refers to the ability to consciously think about one's own cognitive processes, particularly one's subjective perception of ignorance.²³ We should become aware of, as Donald Rumsfeld famously put it, "our known unknowns".

One valuable strategy in managing uncertainty is therefore to consciously revert to a more deliberate, analytic way of reasoning in the context of an ambiguous presentation.²⁴

A number of other specific diagnostic reasoning strategies, valuable in managing uncertainty are described in detail in the companion GPSA guide Teaching Clinical Reasoning and briefly listed below.²⁵

Restricted rule-out (Murtagh's Process)

The restricted rule-out is a diagnostic strategy that identifies the most common cause of the presenting problem and a list of serious diagnoses that must be ruled out.²⁶

Clinical prediction rules

A number of validated clinical prediction rules can support the diagnostic process, e.g., Ottawa ankle rules for exclusion of fracture²⁷, and Wells criteria for diagnosis of pulmonary embolus.²⁸

Diagnostic pause

The diagnostic pause is a useful tool to aid reflective practice and minimise diagnostic error.²⁹ This involves the GP taking a deliberate time-out from the encounter, e.g., while hand washing. The diagnostic pause is particularly useful to overcome the inherent biases of non-analytical thinking.

Gut feelings

Responding to gut feelings (a sense of reassurance or a sense of alarm) can play an important role in managing uncertainty.³⁰

Test of time

One reason undifferentiated presentations are common in general practice is that patients present early in the course of the illness, when classic symptoms and signs have yet to develop. As a result, time has often been described as the best investigation in general practice.³¹



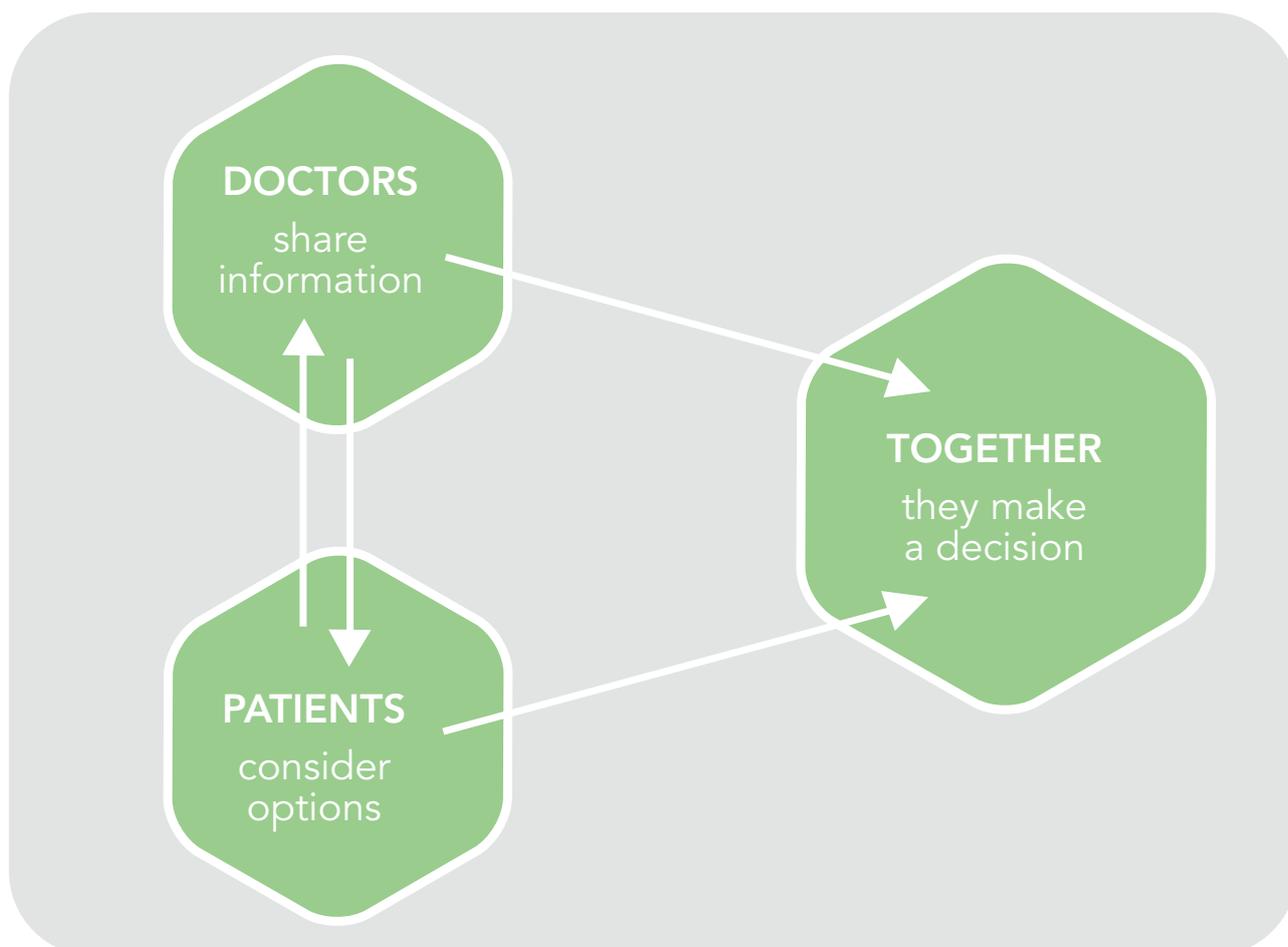
Share decision-making

Patient-centred care also embraces the idea of enhanced patient autonomy and engagement through the process of shared decision-making (SDM).^{32,33}

The five components of shared decision-making are:

- defining the problem;
- providing information;
- exploring patients' ideas, concerns, and expectations (ICE);
- checking their desire for involvement in a decision about their health care; and
- arranging for a future review of the decision.³⁴

SDM can be negatively influenced by clinical uncertainty when there is a reluctance to disclose ambiguity, particularly for less experienced clinicians. Conversely, however, SDM can be a positive strategy in managing uncertainty, enabling patients to jointly deliberate on decision options in the context of specific unknowns.³⁵ This involves the GP explicitly sharing diagnostic or therapeutic uncertainty, in a manner that is not anxiety-provoking for the patient. One practical tip to reinforce the partnership approach in management is to use plural pronouns like 'we' and 'our', e.g., *"Where do you think we should go from here?"*





Wherever possible, incorporate both the relevant clinical guidelines plus the patient's personal views into deciding on the optimum management plan.

Seek evidence

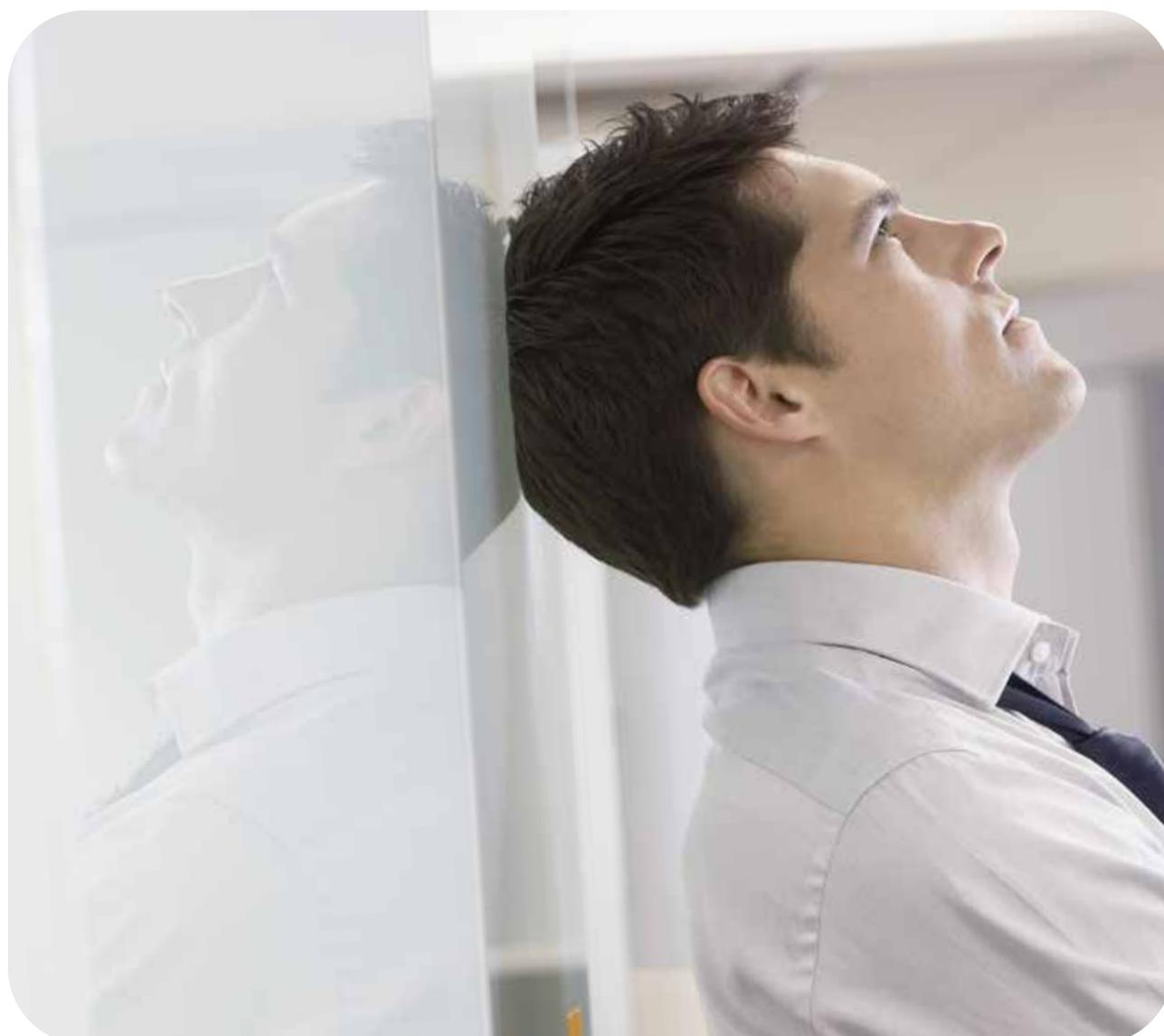
Evidence-based medicine has been described as a technique to combine the physician's clinical expertise with the best available evidence. Judicious use of clinical evidence is a core ingredient of quality decision-making and dealing with uncertainty. Clinical evidence, in the form of systematic reviews or guidelines, should be included in decision-making wherever possible, and the patient's personal views incorporated into the management plan.

Safety net

The term 'safety netting' was introduced by Roger Neighbour as a key strategy in managing uncertainty.³⁶ It comprises

- communication of uncertainty
- advising what to look out for (including red flags)
- how to seek further help, and
- what time course to expect.³⁷

Safety-netting is particularly important in the context of undifferentiated presentations with the potential for serious illness (febrile child); diagnoses with a known risk of serious complications (bronchiolitis); and patients at increased risk of complications (older age, comorbidities).





Strategies for teaching skills in managing uncertainty

GP supervisors can use a variety of approaches to assess and teach skills in managing uncertainty (see below).

Strategies for assessing and teaching skills in managing uncertainty

- Incorporate management of uncertainty into teaching:
 - Foster tolerance of uncertainty
 - Use consultation analysis.
- Develop clinical reasoning and decision-making skills.
- Use role modelling.
- Support evidence-based practice.

Incorporate managing uncertainty into teaching

Foster tolerance of uncertainty

The concept of managing uncertainty and its application to general practice is likely to be relatively unfamiliar to GP registrars. Traditionally, doctors are trained to seek certainty in diagnosis and management – indeed managing uncertainty is arguably a neglected area in undergraduate medical curricula.³⁸ The GP supervisor should therefore explicitly articulate the nature of clinical uncertainty as an inevitable element of general practice.

Discussing concepts related to ambiguous presentations may help foster a greater tolerance to uncertainty in registrars. For instance, it is possible to have certainty, even in the presence of uncertainty, i.e., there may be some aspects of the presentation about which one can be certain (e.g., the patient is safe, the diagnosis is not meningitis). As well, registrars can be reminded that the probability of serious disease in general practice is considerably lower than in hospital. In particular, GP supervisors need to reflect on their own attitudes to uncertainty, and communicate this to their registrars.

Consultation analysis

Assessment and teaching of skills in managing uncertainty can be performed as part of standard methods of consultation analysis, such as problem case discussion, random case analysis and direct observation. In relation to data gathering, GP supervisors can observe and provide feedback on the comprehensiveness of history taking and examination.

Additionally, the appropriateness of investigations can be assessed. The ability to manage uncertainty in the general practice consultation appears to influence test ordering behaviour³⁸, and doctors with higher anxiety about uncertainty have higher costs of investigation and treatment.³⁹ While ordering tests is an important element of the diagnostic process and in managing uncertainty, tests can also be unhelpful, and on occasions even harmful to the patient. A judicious approach to investigation ordering is therefore recommended.⁴⁰



GP supervisors can assess the effectiveness of the registrar's identification of the patient's agenda ("Why do you think the patient came today?"), and use of the ICE questions. As well, they can evaluate the extent to which the registrar shared diagnostic uncertainty and/or management decisions with the patient. One of the key tasks of the general practice consultation is explaining to the patient the provisional and differential diagnosis, their likelihoods and the clinical reasoning underpinning this assessment. This is true even in the context of an ambiguous presentation. However, saying the equivalent of "I'm not sure" or "I don't know" to patients is a challenge for many GP registrars, and GP supervisors can play a key role in facilitating skills in this area.

Arranging timely follow-up for patients is a core strategy in managing uncertainty but is a skill often unfamiliar to many registrars, especially those new to practice. Registrars should be taught to be explicit about follow-up plans and encouraged to have a low threshold for asking patients to return. As well, appropriate and comprehensive safety-netting should be continually reinforced during teaching.

GP supervisors can undertake specific tutorials targeting uncertainty as part of in-practice teaching. Fatigue is the most common unexplained complaint presenting to GPs and an excellent clinical topic to explore strategies to manage uncertainty.⁴¹ As well, the potential for diagnostic uncertainty is compounded by somatisation, when psychological conditions, e.g., anxiety, present as physical symptoms. Such presentations make great tutorial topics.

Develop clinical reasoning and decision-making skills

GP supervisors play a key role in the development of clinical reasoning skills in their registrars, particularly how to think like a general practitioner.⁴² Errors in diagnosis more commonly result from flaws in thinking than a lack of clinical knowledge.⁴³ These include cognitive biases, flawed patterns of thinking by the individual clinician. The most common cognitive bias leading to diagnostic error, premature closure, has been described as "the tendency to end the decision-making process too

early, i.e., the diagnosis is accepted before it has been fully verified".⁴⁴

As part of consultation analysis and other teaching, the GP supervisor can therefore assess the registrar's clinical reasoning processes and their impact on managing uncertainty. This includes identification of any cognitive biases and use of specific diagnostic strategies like the diagnostic pause or restricted rule-out.

Assessing and teaching clinical reasoning is explained in detail in the companion *GPSA guide Teaching Clinical Reasoning*.

Role modelling

Role modelling has a strong influence on registrar behaviour and previously has been described as "the primary teaching strategy of clinical education"⁴⁵. Approaches to managing uncertainty can be effectively taught via the GP registrar sitting in on the GP supervisor's consultations. This provides an excellent opportunity for the GP supervisor to role model their diagnostic approach, as well as demonstrate involvement of the patient in the decision-making process.

Support evidence-based practice

Judicious use of clinical evidence is a core ingredient of dealing with uncertainty. Clinical evidence should be accessible to all registrars in training and GP supervisors should encourage information-seeking both within and after the consultation, as appropriate. However, the availability of evidence that is recent, relevant and robust is often limited.

Uncertainty can result from limitations in the medical knowledge base, as well as one's incomplete mastery of that knowledge base – and it has been suggested that anxiety stems from not knowing the difference.⁴⁶ One academic, writing in this area, stated "The limits of evidence-based medicine and guidelines use in clinical practice may be found in the grey zones of uncertainty where science meets art."⁴⁷ The GP supervisor can therefore play a role in supporting registrars to navigate this grey zone by helping their registrars bridge the (scientific) evidence with the (artistic) experience.

Teaching skills in managing uncertainty - a practical example

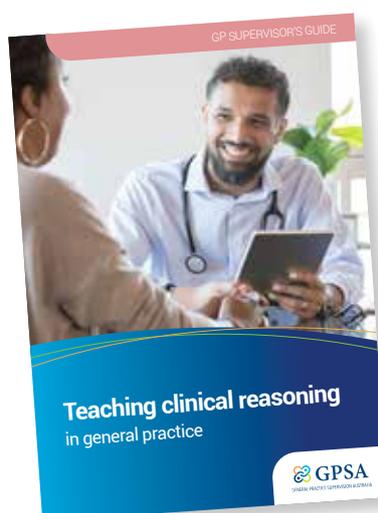
You are a GP supervisor in an outer metropolitan practice and your current registrar is Sally. Sally is in her second term of training and has been in the practice for about two months. Sally is popular with patients and clinically sound but lacks confidence and frequently asks for your assistance. You sat in with her early in the term and it was apparent she found the uncertainty of general practice unsettling. More recently, you have observed that she seems to be more anxious about missing something in ambiguous patient presentations and she is adopting a more scattergun approach to testing. Last week, at the end of a busy day, Sally admitted to not sleeping well on a couple of nights because she was “stewing” about her patients.

You decide to dedicate some time in supporting Sally to better manage uncertainty. As part of your next quarantined teaching session, you talk about the inevitability of uncertainty in general practice and how you also struggled with it during your early years as a registrar. You invite Sally to present the patients that caused her the sleepless nights, and, not surprisingly, the presentations she describes are typically vague and ambiguous. You are satisfied Sally has been comprehensive in her clinical assessment but identify she is not confident in sharing her uncertainty with the patient. As a result, you role play such a scenario to demonstrate how this can be done in a reassuring way. You then discuss some other specific strategies you have found useful in managing undifferentiated illness – asking the patient what they are concerned about (patient agenda), tapping into your gut feelings, and thorough safety-netting.

You then suggest Sally sit in with you for a few patients to model some of the techniques you have discussed. Fortunately, you encounter a wonderfully illustrative case during the session of a university student with fleeting arthralgias and tiredness, and a probable (hidden) diagnosis of generalised anxiety.

Over the next month or so, your impression is that Sally seems to be managing uncertainty a bit better and is less worried about her patients. You have an opportunity to observe this directly at your next direct observation session.

A father brings in his six-year-old son, Zac, whom he has picked up from school early because the teacher noted he was sleeping at lunch. Sally takes a comprehensive history and explores red flags. On examination, Zac’s temperature is 38.7 degrees and he looks tired but is alert and not dehydrated. Sally does an appropriate examination to exclude a rash and any significant ENT, respiratory or abdominal signs. A urinalysis shows a trace of protein and a trace of leucocytes. Sally tells Zac’s father that his fever is confusing but it could be a urine infection, “*which often causes what we call a fever of unknown origin*”. She orders a blood test (FBE, ESR, CRP) and urine culture, and advises reception will phone when the results are in to book another appointment.



You explore the case afterwards with a specific focus on Sally’s clinical reasoning and her management of the uncertainty, as below (using the framework from the [GPSA Guide Teaching Clinical Reasoning](#))



The GP Supervisor Registrar Interaction

The following questions are a sample of the types of questions you can employ in your teaching with a registrar applied to Zac's presentation.

Overview

- *"Please summarise the key features of Zac's presentation and your differential diagnosis in two or three sentences."*

Data gathering

- *"What did you understand about the home situation and the father's understanding and capacity?"*
- *"Are there any other red flags that you could have sought?"*
- *"Why did you choose these pathology tests? How will they change your management?"*

Weighting

- *"How does a temperature of 38.7 influence your thinking?"*
- *"What weight do you put on the urinalysis result?"*

Synthesis

- *"How sick is this child? On what do you base that impression? What were your gut feelings?"*
- *"How might his early presentation have affected his symptoms and signs?"*
- *"What is the likelihood of a UTI (e.g., out of 10 such presentations)?"*

- *"How far should we go to rule out important alternatives? Is ruling out even possible?"*
- *"Where might you seek guidance on how to investigate and manage this patient?"*

Alternative scenarios

- *"What if the father and son were itinerant, with no access to a car?"*
- *"What will you do if the blood tests come back mildly abnormal, or the urine shows possible skin flora contamination?"*

Reflection

- *"Have you seen many febrile children without being certain of the diagnosis?"*
- *"What might the father have assumed from your explanation? Could you have improved your wording?"*
- *"How well do you feel that you safety-netted?"*
- *"How did being uncertain of the diagnosis in this case affect you, and what are some ways of dealing with that discomfort?"*

As a result of the case discussion, you identify two ongoing learning needs – shared decision-making and comprehensive safety netting – and agree with Sally to review these again later in the term.



References

1. Osler W. *Aequanimitas, with Other Addresses*, 3rd ed. Philadelphia: Blakiston; 1932.
2. Illing J, Taylor G, van Zwanenberg T. A qualitative study of pre-registration house officers in general practice. *Med Educ* 1999; 33: 894-900.
3. McWhinney IR. *A textbook of Family Medicine*. 2nd edition London: Oxford University Press, 1997.
4. Pimlott N. Managing uncertainty. *Can Fam Physician* 2007; 53: 1000.
5. Geller G. Tolerance for ambiguity: An ethics-based criterion for medical student selection. *Acad Med*. 2013; 88: 581-4.
6. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA*. 2009; 302: 1294-1300.
7. Bachman KH, Freeborn DK: HMO physicians' use of referrals. *Soc Sci Med* 1999; 48: 547-557.
8. Cooke G, Doust J, Steele M. A survey of resilience, burnout, and tolerance of uncertainty in Australian general practice registrars. *BMC Med Educ* 2013; 13: 2.
9. Royal Australian College of General Practitioners (RACGP) website. Core Skills Unit, Melbourne, 2016. Available at <https://www.racgp.org.au/education/education-providers/curriculum/curriculum-and-syllabus/home> [accessed 10 September 2016].
10. Australian College of Rural and Remote Medicine (ACRRM). Primary Curriculum. Available at <https://www.acrrm.org.au/resources/training/curriculum> [accessed 28 March 2016].
11. Morgan S, Ingham G. Random case analysis. A new framework for Australian general practice training. *Aust Fam Physician* 2013; 42: 69-73.
12. Morgan S, Saltis T, Coleman et al. Test result audit and feedback (TRAFk) as a supervision method for rational test ordering in general practice training. *Aust Fam Physician* 2016; 45: 518-22.
13. Morgan S. Teaching rational prescribing to general practice supervisors: A guide for supervisors. *Aust Fam Physician* 2017; 46: 160-3.
14. O'Riordan M et al. Dealing with uncertainty in general practice: an essential skill for the general practitioner. *Qual Prim Care* 2011; 19:175-81
15. Ghosh AK. Dealing with medical uncertainty: a physician's perspective. *Minn Med* 2004; 87: 48-51.
16. Biehn J. Managing uncertainty in family practice. *Can Med Assoc J* 1982; 126: 915-7.
17. Murtagh J. *John Murtagh's General Practice* 4th ed. Sydney: McGraw-Hill, 2007.
18. Stewart M, Brown J, Weston W, et al. *Patient-Centred Medicine: Transforming the Clinical Method*. 2nd edition Oxford: Radcliffe Medical Press, 2003.
19. Stewart M. Effective physician-patient communication and health outcomes: a review. *Can Med Assoc J* 1995; 152: 1423-33.
20. White J, Levinson W, Roter D. "Oh, by the way...": the closing moments of the medical visit. *J Gen Intern Med* 1994; 9: 24-8.
21. Pendleton D, Schofield T, Tate P, Hevelock P. *The consultation: an approach to teaching and learning*. Oxford: Oxford University Press, 1984.
22. Croskerry P. Clinical cognition and diagnostic error: applications of a dual process model of reasoning. *Adv Health Sci Educ* 2009; 14: 27-35.
23. Han PJK, Klein WMP, Arora NK. Varieties of uncertainty in health care: a conceptual taxonomy. *Med Dec Making* 2011; 31: 828-38.



24. Moulton CE, Regehr G, Mylopoulos M, MacRae HM. Slowing down when you should: a new model of expert judgment. *Acad Med* 2007; 82(Suppl 10): S109-16.
25. Heneghan C, Glasziou P, Thompson M et al. Diagnostic strategies used in primary care. *BMJ* 2009; 338: 1003-6.
26. Murtagh J. Common problems: a safe diagnostic strategy. *Aust Fam Physician* 1990; 19: 733.
27. Bachmann LM, Kolb E, Koller MT et al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot: systematic review. *BMJ* 2003; 326: 417.
28. Wells PS, Anderson DR, Rodger M et al. Excluding pulmonary embolism at the bedside without diagnostic imaging: management of patients with suspected pulmonary embolism presenting to the emergency department by using a simple clinical model and d-dimer. *Ann Intern Med.* 2001; 135: 98–107.
29. Trowbridge R. Twelve tips for teaching avoidance of diagnostic error. *Med Teach* 2008; 30: 496-500.
30. Stolper E, Van Royen P, Van de Wiel M et al. Consensus on gut feelings in general practice *BMC Fam Pract* 2009; 10: 66.
31. Morgan S, Coleman J. 'We live in testing times' – teaching rational test ordering in general practice. *Aust Fam Physician* 2014; 43: 273-6.
32. Charles C, Gafni A, Whelan T. Shared decision-making in the medical encounter: what does it mean? (or it takes at least two to tango). *Soc Sci Med* 1997; 44: 681-92.
33. Mead N, Bowel P. Patient-centredness: a conceptual framework and review of the empirical literature. *Soc Sci Med* 2000; 51: 1087-1110.
34. Elwyn G, Edwards A, Kinnersley P, Grol R. Shared decision making and the concept of equipoise: the competences of involving patients in healthcare choices. *Br J Gen Pract* 2000; 50: 892–897.
35. Berger Z. Navigating the Unknown: Shared Decision-Making in the Face of Uncertainty. *J Gen Intern Med* 2015; 30 :675-8.
36. Neighbour R. *The inner consultation: how to develop an effective and intuitive consulting style.* 2nd ed. Oxford: Radcliffe Medical Press, 2004.
37. Almond S, Mant D, Thompson M. Diagnostic safety-netting. *Br J Gen Pract* 2009; 59: 872-4.
38. Oliver CM, Hunter SA, Ikeda T, Galetly DC. Junior doctor skill in the art of physical examination: a retrospective study of the medical admission note over four decades. *BMJ Open* 2013; 3:e002257.
39. van der Weijden T, van Bokhoven M, Dinant G, van Hasselt C, Grol R. Understanding laboratory testing in diagnostic uncertainty: a qualitative study in general practice. *Br J Gen Pract* 2002; 52: 974-80.
40. West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD: Association of resident fatigue and distress with perceived medical errors. *JAMA.* 2009; 302: 1294-1300.
41. Morgan S, van Driel M, Coleman J, Magin P. Rational test ordering in family medicine. *Can Fam Physician* 2015; 61: 535-7.
42. Koch H, van Bokhoven MA, ter Riet G, et al. Ordering blood tests for patients with unexplained fatigue in general practice: what does it yield? Results of the VAMPIRE trial. *Br J Gen Pract.* 2009; 59: e93-100.
43. Atkinson K, Ajjawi R, Cooling N. Promoting clinical reasoning in general practice trainees: role of the clinical teacher. *Clin Teach* 2011; 8: 176-80.
44. Scott I. Errors in clinical reasoning: causes and remedial strategies. *BMJ* 2009; 339: 22-5.
45. Graber ML. Diagnostic error in internal medicine. *Arch Int Med* 2005; 165: 1493-9.
46. Irby DM. *Clinical Teaching and the Clinical Teacher.* *J Med Educ* 1986; 61: 35-45.
47. Naylor CD. Grey zones of clinical practice: some limits to evidence-based medicine. *Lancet.* 1995 Apr 1;345(8953):840-2. doi: 10.1016/s0140-6736(95)92969-x. PMID: 7898234.



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