

On-call scenarios

Introduction

Sometimes you will be called upon to carry out an agreed protocol when you are on-call. For example, perhaps your Trust has procedures for supplying medicines out-of-hours or for dealing with a product recall. However, you will also be faced with clinical problems to solve during your on-call hours, in the same way as when you work during the daytime. We're going to present you with a range of scenarios to help you prepare for this **clinical problem solving role**. Read the scenarios, answer the questions for yourself, and then compare your answers to our suggested approach.

Bear in mind that the answers we give here are simply suggestions: they are not recommended examples of clinical practice, and should not be used outside the context of this training.

If you find this training helpful, you may also like to look at our tutorial on [Decision-making](#).

Scenario 1 Injection compatibility

Introduction



"Hello. It's one of the midwives on the antenatal unit. I have a patient with a magnesium infusion running but she needs a dose of cefuroxime and metronidazole too. Can they all go down the same line?"

Of course you'll need more information than this, which you'll get by asking questions about the caller, the patient, her medicines, and the clinical situation. This is what you discover...

Caller: Sue Harding, midwife, antenatal ward, ext 6077.

Patient: Michelle Cox, hospital no. 1414777.

Medicines: Magnesium sulphate 20% intravenous infusion running at 1 gram (5ml) per hour. Total volume of infusion 50ml as per your Trust's protocol. No known drug allergies.

Clinical problem: Patient has eclampsia and is having an emergency caesarean section this evening. She has been prescribed intravenous cefuroxime 1.5 grams and metronidazole 500mg to be given at anaesthetic induction. A midwife has already added the dose of cefuroxime to the 100ml metronidazole infusion bag. Patient is difficult to cannulate but has a single lumen peripheral line.



Where could you look for information to answer this question?

Sources

These sources hopefully sprang to mind:

- SmPCs for some of the medicines concerned via the [eMC](#)
- [Injectable Medicines Guide](#)
- [Handbook on Injectable Drugs](#) ('Trissel')
- Your local obstetric prescribing guidelines or protocols

You quickly check your local protocols and are reassured that the magnesium is being given appropriately for eclampsia, and that these antibiotics are safe and recommended in women undergoing caesarean section.

Then you work through your other information resources and find data to suggest that magnesium sulphate and cefuroxime are physically **incompatible** when mixed at room temperature. There are some compatibility data for mixing metronidazole and magnesium sulphate, but the concentrations don't quite match what you've been asked about and the diluents are different.



How can you turn this information into practical advice to help the midwife to manage her patient? Do you need to think about alternative approaches?

Resolution

What an on-call pharmacist could advise...

Since cefuroxime and magnesium sulphate appear to be physically incompatible, the two infusions cannot be administered through the same single lumen line. However, you can't just provide this information – you need to offer some practical advice for the midwife and her patient. She has already indicated that the patient was difficult to cannulate and so inserting another line might not be straightforward.



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In some situations, it might be suitable to **temporarily discontinue a continuous intravenous infusion**, to quickly give an intravenous injection or a very short infusion. In this scenario although the cefuroxime could be given as an intravenous injection over 3 to 5 minutes, the metronidazole would need to be given over at least 20 minutes. Any decision to stop magnesium sulphate for this length of time would need to be made by the consultant caring for the patient.

An alternative way forward might be to consider **administering the antibiotics via a different route**. It might be clinically acceptable to use the rectal route for the metronidazole and the intramuscular route for the cefuroxime, but these routes might not be as acceptable to the patient. Alternatively, the metronidazole infusion might be run with the magnesium sulphate (but bearing in mind the limitations of the compatibility data you have found), and then the cefuroxime given intramuscularly.

A final option might be to **switch to a different antibiotic** that could be given as an intravenous injection.

So, you have three practical options to discuss with the midwife.

Follow up

The next morning, ensure that you let the antenatal unit pharmacist know about the enquiry and the advice that you gave. Ask them to find out what course of action the midwife took so you can document the outcome and share your experience with your on-call colleagues.



Scenario 2 Administration of medicines

Introduction



"Hello. I'm on Alexandra ward. Can I just ask you how to swap a patient with Parkinson's disease from her tablets to a rotigotine patch?"

You need more information before you can go further.



What questions would you ask the person who's called you?

Questions

There are four questions that you may find yourself asking a lot when you're on-call, and they all apply in this situation. Here they are:

1. Who are you?

Maybe you'll want to ask this less bluntly. Perhaps something like "*I'm sorry, I didn't catch your name*" or "*Are you one of the medical team?*" You need to know what authority the person has to change the patient's medication. A junior doctor might need some coaching about how to prescribe a non-formulary drug, for example, or might welcome advice on using the e-prescribing system. If you're speaking to a nurse, then you might need to ask to be referred on to a doctor at some stage. Always find out who you're speaking to and how to get back to them. It's not rude.

Answer: Dr Rahul Kotecha, FY2 on Medicine, bleep 3344.

2. What's the patient's name?

Always take this information and another identifier like an age or hospital number in case you need to look up something about them on a Trust computer system. Also if you end up speaking to a different healthcare professional about this case, you can avoid all ambiguity by clearly identifying the patient.

Answer: Amy Steer, aged 78.

3. Which medicines are they taking?

You'll need a drug history in case of potential interactions, or perhaps you'll identify other issues about this patient's medicines once you know the full story.

Answer: Co-beneldopa dispersible 25/100 QDS and ropinirole 2mg TDS. Nil else.

4. Why are you asking about this?

Again, you may want to phrase this differently: "*What made you want to switch to a patch?*" or "*Why do you want to change the patient's medicines?*" An open question like this should prompt the caller to give you a brief outline of the patient's clinical situation.

Answer: Patient having their medicines through a nasogastric tube but they keep trying to pull it out. Thinking of changing their Parkinson's medicines to a rotigotine patch but need to know the dose conversion.

Now that you have more information about the patient, you ring off and start to look for an answer to this clinical problem.



Which information sources would you use?

Sources

Here are some places that you might have looked for information about converting a patient on oral medicines for Parkinson's disease to a rotigotine patch:

- [BNF](#)
- [SmPC](#)
- [Martindale](#) and/or [AHFS Drug Information](#)
- [Drugdex](#) (if you have access)
- Your local guidelines
- [NICE Evidence Search](#)
- [Google](#)

Is this list similar to the one that you constructed?

However, when you work through the BNF, SmPC, Martindale and AHFS, you are surprised to find no guidance on how to switch between oral Parkinson's medicines and a rotigotine patch. NICE Evidence Search isn't helpful, you have no local guidelines, and you struggle to find a term in Embase for dose conversion.

Finally, you attempt to search Google and bring up more hits than you can possibly handle. A quick scan of the first few pages reveal some guidelines from other acute NHS Trusts, advice from expert groups such as Parkinson's UK, opinions given in various online forums, and some protocols from hospitals outside the UK. You are now faced with too much information.



What will you do now?

Resolution

What an on-call pharmacist could advise...

You need to quickly [assess and prioritise](#) the web sources of information and advice. The guidelines that you find online from other NHS Trusts vary in their quality: some lack references, others are missing authors and publication dates. Those that do include references often cite a paper published in the BMJ several years ago. The [Parkinson's UK website](#) signposts you to a different tool called the [OPTIMAL](#) calculator. You decide to dismiss the opinions you find in several discussion forums as you can't assess their accuracy. As practice may vary in different countries, you also decide not to review the protocols from outside the UK.



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Using several different NHS Trust guidelines and the [OPTIMAL calculator](#), you calculate the dose conversion and reassuringly most sources give you a similar answer. You relay this information to the doctor and suggest a possible starting point for a rotigotine patch dose, explaining the limitations of your advice.

Have a go at using the [OPTIMAL calculator](#) yourself to see what dose of rotigotine patch might be recommended in this scenario. Remember that our patient, Amy Steer, was taking co-beneldopa dispersible 25/100 QDS and ropinirole 2mg TDS.

If at any stage you had felt out of your depth with this question you could have phoned a more senior pharmacist for advice: maybe a neurology, elderly care, or MI pharmacist. If not confident about your answer, you might also ask Dr Kotecha if the answer could wait until the next working day for you to discuss with a colleague.

Follow up

The next morning you document your recommendation of administering rotigotine 16mg/24 hours, and speak to the pharmacist looking after the patient. She has already seen the patient on the ward round this morning and actually advised that the team start with a slightly lower dose as the patient has dementia. They will titrate the dose as necessary according to the patient's response.



Scenario 3 Interacting medicines

Introduction



"Hi. I'm a registrar on G9 and I just need some quick advice. I'm trying to prescribe clarithromycin but the e-prescribing system keeps flashing up an interaction with citalopram. What do I do about it?"

You'll have to put some questions to the registrar before you can advise further, and you ask him for his contact details, the identity of the patient, the patient's medicines, and their clinical details. This is what you find out...

Caller: Peter Deakin, admissions registrar, bleep 2221.

Patient: Maria Lopez, aged 58 years.

Medicines: Citalopram 10mg OD, omeprazole 20mg OD, salbutamol inhaler when required.

Clinical problem: Patient just admitted with community acquired pneumonia (CAP). Doctor needs to prescribe IV clarithromycin 500mg BD. Patient takes citalopram for depression. Proven allergy to penicillins (anaphylaxis).



Where could you look for information to solve this clinical problem?

Sources

Information sources that you might have thought about looking in, include:

- [BNF](#)
- SmPCs via the [eMC](#)
- [Stockley's Drug Interactions](#)
- [Drugdex](#) (if you have access)
- There is guidance on the [SPS website](#) entitled "*What issues should be considered regarding drug induced QT prolongation?*" You can see it [here](#).

The SmPC for citalopram contraindicates its use with other drugs that prolong the QT interval because of the additive risk. Therefore, according to the UK licence, the combination would be contraindicated. Clarithromycin may also increase the plasma levels of citalopram through a CYP3A4 mediated interaction and could put the patient at a further increased risk of side effects.



Now that you have this information, how will you advise the registrar?

Resolution

What an on-call pharmacist could advise...

There are several ways forward. The preferred option is to use an alternative antibiotic. Your hospital CAP guidelines might suggest an alternative, or you might need to seek expert microbiology advice.

If there are no suitable alternatives, then on balance, despite the contraindication, you might decide with the doctor that using the combination of citalopram with clarithromycin is in the patient's best interests. This will involve a careful and detailed assessment of their risk factors for developing QT-interval prolongation such as their cardiac history and their electrolyte status. The lowest effective dose of clarithromycin should be used and the patient should undergo ECG monitoring. The patient's response to treatment should be checked at regular intervals, and the antibiotic reviewed as appropriate.



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Follow up

The next day ensure that you explain your decision to the clinical pharmacist caring for the patient and any further action required (such as ensuring the patient is monitored and reviewed appropriately). Document your advice and find out what happened to the patient, so you can record this too. Think about sharing your experience with your on-call colleagues and find out what they would have done faced with a similar situation.

Scenario 4 Children

Introduction



"Hi. I'm Zoe on the paediatric admissions unit and I've got a young boy here who takes azathioprine but his parents have run out of it. Can you come in and supply it, please? I think we're going to have to crush the tablets for them, and I'm just trying to find out how best to do that."



What questions would you ask Zoe?

Questions

Here are four questions you might have asked Zoe:

1. Who are you and how can I get back to you?

Always find out who you're speaking to and their contact details.

Answer: Zoe Cook, nurse practitioner, ext 6579.

2. What's the patient's name?

You can avoid all ambiguity later by clearly identifying the patient.

Answer: Archie Spencer, 4 years old.

3. Which medicines are they taking?

A drug history helps identify e.g. potential interactions or other supply issues that you may be able to advise about.

Answer: Azathioprine 35mg OD, tacrolimus 2.25mg BD, prednisolone 10mg OD, aspirin 18.75mg OD, ranitidine 30mg BD, co-trimoxazole 180mg ON.

4. Why are you asking about this?

An open question should prompt the caller to give you an outline of the patient's clinical situation.

Answer: It's Christmas Eve and a patient's mother has presented to the Paediatric Assessment Unit with a nearly empty bottle of azathioprine suspension. Her community pharmacist normally orders it in for her especially but she forgot to collect her child's prescription. Her child normally takes 35mg daily post renal transplant and they don't have enough for tomorrow morning's dose. The nurse practitioner was thinking of advising the mother to crush the 25mg tablets and then mix them with water and draw up the required dose.



Where would you look for the information you need?

Sources

Information sources that you might have thought about looking in, include:

- Your pharmacy stock control system
- [BNF](#)
- SmPCs via the [eMC](#)
- [Evelina London Paediatric Formulary](#) (formerly Guy's Paediatric Formulary)
- [Drug Administration via Enteral Feeding Tubes](#)
- [NEWT Guidelines](#)

A check of these information resources reveals that there is a ready-made azathioprine suspension available to buy, but your Pharmacy has none in stock. Crushing azathioprine tablets may pose a risk to the mother and the child. The risk to the mother comes from the cytotoxic dust that may be produced when crushing the tablets. The risk to the child from administration in this way arises because the tablet may not be fully dispersed/dissolved; this might mean that he is either under- or over-dosed, both of which could have serious consequences.



Now that you've more information, how can you advise the nurse?

Resolution

What an on-call pharmacist could advise...

There are several possible solutions to this problem.



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The safest option is to find and supply azathioprine suspension, if possible. However, it's a special and is not in stock at your hospital. Think about whether other more specialist hospitals such as your regional renal centre might have a supply. You could also speak to the special's manufacturer if they have an out-of-hours service and investigate whether you can order some in, but this is a most unlikely possibility over Christmas.

Depending upon where you are working, compounding an in-house special may be an option but not all hospitals have this facility. You could phone a colleague from your production/technical services team and ask them about this.

If these options are not possible, then an alternative way forward may be to disperse the azathioprine tablet in a 'closed system'. An azathioprine tablet is placed in the barrel of a syringe, the plunger is replaced and water is drawn up. The syringe is agitated until the tablet disperses, and the appropriate dose is given by mouth. This option isn't without risk, as the entire syringe could be given by mistake exposing the child to a higher dose than prescribed. Also there is a risk to the mother if a spillage occurs, and so gloves should be worn.

Follow up

At the earliest opportunity, speak to your paediatric pharmacist and explain the problem and your decision. They can liaise with the family and the community pharmacy to reduce the risk of this issue happening again.

Scenario 5 Renal replacement therapy

Introduction



"Is that the on-call pharmacist? I'm Dr Baker. I'm sorry to phone you so late, but I wondered if I could run a question about ceftriaxone dosing past you. Micro have advised us to double the dose but I'm a bit worried about the drug accumulating."

You need more information, and you question the doctor accordingly. This is what she tells you...

Caller: Dr Samantha Baker, bleep 1189, locum cardiology consultant.

Patient: Bharti Popat, aged 64.

Medicines: Dopamine, heparin, fentanyl infusions. No known drug allergies.

Clinical problem: Patient has an infected sternal wound after atrial valve replacement surgery. On ceftriaxone 2 grams daily but the microbiology team want to increase the frequency to BD as the infection seems more severe than was first thought. The patient is receiving continuous venovenous haemofiltration (CVVH) and so the consultant is concerned about the risk of drug accumulation, which can cause fitting. The patient received a dose earlier today at 8am; it's now 11pm can they give another dose now? No other significant co-morbidities.



Where could you look for information?

Sources

You might have thought about sources such as these:

- [SmPC](#)
- [Renal Drug Database](#)
- [Martindale](#)
- [Drugdex](#) (if you have access)
- [Embase](#) and/or [Medline](#) - sometimes a helpful last resort
- Your expert critical care or microbiology pharmacists (at home)

You initially check the product SmPC which gives no specific advice on dosing in CVVH. It does state that ceftriaxone is eliminated mainly as unchanged drug: approximately 60% of the dose being excreted in the urine (almost exclusively by glomerular filtration), and the remainder via the biliary and intestinal tracts. The SmPC also states that in patients with renal or hepatic dysfunction, the pharmacokinetics of ceftriaxone are only minimally altered and the elimination half-life is only slightly increased. If kidney function alone is impaired, biliary elimination of ceftriaxone is increased; if liver function alone is impaired, renal elimination is increased. The licensed dose in severe infections is 2-4g daily given normally as a once daily dose, and the SmPC confirms that administration of cephalosporins may result in convulsions.



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The Renal Drug Database advises that doses used in continuous arteriovenous/venovenous haemodialysis (CAV/VVHD) patients can be used in CVVH and continuous arteriovenous haemofiltration (CAVH) patients, bearing in mind that drug clearance in CAV/VVH might be lower. For CAV/VVHD the recommended dose is 2 g every 12–24 hours. Protein binding is 85-95%.

You are reassured by what you have found so far but are concerned about the relatively high degree of protein binding of ceftriaxone.

You remember that drugs that are highly protein bound are less likely to be removed by haemofiltration. Now what would you do? You take a look at Martindale which

doesn't give any advice about dosing in haemofiltration. It does, however, mention that levels of ceftriaxone can be measured to assess whether dose adjustment is needed.

You think about ringing your critical care pharmacist at home but because of the time of night you try Embase first. This isn't a source that you will use very often when on-call, but do remember that it's there and that it might sometimes be your only source of information. Your search brings up a couple of papers, including [a small clinical study](#).



Have a think about what you would do next. How would you advise the consultant?

Resolution

What an on-call pharmacist could advise...

The study that you have found on Embase is very small, but it advises that the dose of ceftriaxone does not need to be adjusted in patients on CVVH. It explains that the drug is cleared more effectively than the protein binding would predict. This is backed up by what you found in the Renal Drug Database.

Therefore you decide to advise the doctor that the patient may be given a second dose of ceftriaxone as per microbiology advice.



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Follow up

The following morning you hand over the patient to the critical care pharmacist and explain your reasoning. Together you decide to explore the possibility of monitoring ceftriaxone levels and to try to track down some of the other papers you picked up on your Embase search. Since ceftriaxone is normally given as a single daily dose and the patient is now prescribed 2 grams twice daily, you discuss the risks and benefits of changing to a 4 gram once daily regime. What do you think these might be and what would you advise?

Scenario 6 Pregnancy

Introduction



"Hi. Can I get some advice about managing a patient in A&E with neuropathic pain? She's pregnant, and I just want to make sure there's something we can use that's safe."

As usual you'll begin by asking four questions to get the basic background info needed. This is what you find out...

Caller: Eve Wood, bleep 9943, specialist pain nurse.

Patient: Chloe Diaz, 40 years old.

Medicines: Sertraline 50mg OM. No known drug allergies.

Clinical problem: Patient has attended the Emergency Department with severe neck and arm pain. Team are investigating the cause but suspect it might be nerve impingement. Patient is 35 weeks pregnant and pregnancy is progressing uneventfully; she has received codeine and tramadol via her GP but to no effect. Specialist nurse thinking about advising use of neuropathic agents; she would prefer pregabalin but might also consider gabapentin.



Where could you look for more information?

It's helpful that you know which medicine Eve would prefer to use, as this narrows down your search for information on safety in pregnancy. Sometimes a question about safe prescribing in pregnancy can wait until the next working day for you to seek expert advice. However, in this instance where the pain was so severe that the patient attended A&E, you decide to start to investigate the problem. Think about where you would look in this situation, then read on to see our ideas.

Sources

Here are some information resources you might have thought about:

- [UK Teratology Info Service monographs](#) – these assessments of the safety of medicines in pregnancy are found on the Toxbase website. You'll need your Trust password and login to see the detailed healthcare professional versions, but there are good [summaries for patients](#) available without a password.
- SmPCs via [eMC](#) – they don't commonly have practical advice on medicine use in pregnancy but some do. SmPCs are good for interactions though, such as between sertraline and pregabalin or gabapentin.
- You may have local access to books about prescribing in pregnancy such as 'Briggs' and 'Schaefer'.
- Does the [Royal College of Obstetrics & Gynaecology](#) have guidelines on managing this kind of pain in pregnancy?
- [Stockley's Drug Interactions](#) offers practical advice on many interactions.
- NICE [Clinical Knowledge Summaries](#) can help you with alternative treatment options.



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Using these resources, you quickly establish that the data on **pregabalin** are so limited that it is not possible to undertake an informed assessment of the risks posed by the drug during pregnancy. For **gabapentin**, you run into the problem that most pregnancy exposures have occurred in women with epilepsy. This makes it difficult to tease apart any effect of the drug over the disease. In addition, opinion as to whether gabapentin may be used during pregnancy for pain is conflicting: some resources advise to avoid its use completely, and others are less conservative. Data specifically on problems encountered when the drug is used during the third trimester are lacking. The SmPC doesn't mention any interaction between gabapentin and sertraline.

Faced with a lack of information or conflicting information, one way forward is to explore whether there are any other adjuvant analgesics that the team might consider. You might find that there is more experience during pregnancy with older drugs, for example.

You review the NICE [Clinical Knowledge Summaries](#) and find that **amitriptyline** is an alternative agent for neuropathic pain. You check your specialist pregnancy resources, and these advise that amitriptyline may be used as an adjuvant analgesic if clearly indicated.

You think you have a solution to the problem, but you then remember that the patient is taking sertraline. A check of the SmPC and Stockley's Drug Interactions reveals that there is the potential for sertraline to increase the levels of tricyclic antidepressants unpredictably; the combination might also cause [serotonin syndrome](#) too.



What would you do now in terms of advice?

Resolution

What an on-call pharmacist could advise...

This is a difficult problem with no ideal solution and you'll need to discuss with the nurse which is the 'least worst option'. Gabapentin does not interact with sertraline but has limited and conflicting information about its safety in pregnancy. There is more information about using amitriptyline in pregnancy but it might interact with sertraline. In trying to make the decision, it can help to think through the consequences of each course of action and what you can do to manage any risks.



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In this scenario there is not a great deal you can do to plug the knowledge gap around gabapentin use in pregnancy. However, what you can do is to manage the risk of an interaction between amitriptyline and sertraline by recommending a lower amitriptyline dose, and making sure the patient and the professionals looking after them are aware of the potential side effects.

Finally, you might ask the specialist pain nurse if, in her opinion, the patient might be suitable for a non-drug treatment like manipulation or percutaneous electrical nerve stimulation. This is not your area of expertise, but always consider non-drug options during pregnancy.

Sometimes when you are on-call you may feel pressurised to try and find the perfect answer, but there may not always be one. It's important to reflect on this. Pharmacists want to be helpful, and when you're the only one on duty you may feel this responsibility even more strongly, yet you also have to be honest about the limitations of the data available.

Follow up

At the earliest opportunity, find out if the patient has been admitted to your hospital or discharged. If she has been admitted then speak to the pharmacist caring for her and explain the clinical advice you have given and the reasoning behind your decision. Can you document your input in your hospital's e-prescribing system or the patient's health records? If she has been discharged, then you should check the patient's discharge summary to make sure that the GP and community midwife are aware of the risks of using amitriptyline and

sertraline together, and any monitoring that is required.

If the amitriptyline (and sertraline) continue for the remainder of the pregnancy then the healthcare team also need to remember the risk of a neonatal withdrawal syndrome and think about the potential safety of these medicines in breastfeeding.

Non-clinical scenarios

Of course, you'll be called upon to solve problems while on-call that don't necessarily involve clinical decisions. You'll be consulted about all sorts of other matters such as legal, procedural, and supply issues.

To complete this scenario section, consider the questions below. You may never be faced with these situations, but think about them now and chat to a senior colleague about the approach to take if you're not sure. What other information do you need? It's good to have thought about them in advance.

- **Ward nurse:** We've lost the keys to our drugs trolley and can't get into it to give patients their evening doses.
- **On-call pharmacist for another local Trust:** Sorry to call you out, but we desperately need some more noradrenaline injection for two ITU patients. Can you loan us some and send it over by taxi?
- **Switchboard:** The pharmacy alarm is going off. Can you come in and sort it out please?
- **Duty manager:** We've had some controlled drugs go missing in theatres. Should we call the police?
- **Community pharmacist:** I'm the late night pharmacy for the city tonight and I've got an FP10(HP) here for linezolid tablets that was prescribed at the hospital this afternoon. The patient's wife insists that it's for a serious infection and must start immediately, but I don't have any in stock. Can you supply it please, or dispense the FP10(HP)?
- **Ward nurse:** We've always been taught that nurses are not supposed to give IV potassium on the ward, but our locum registrar insists we've got to do it. Can you tell her that we're not allowed to do it please?

You've now reached the end of this training that introduces you to decision-making while on-call.

Good luck when you start your new role.