

# Exercises in CLINICAL ACCURACY CHECKING

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**T**his is the fourth set of clinical accuracy exercises to be published in *Hospital Pharmacist*. Readers who have been following the series will have noted that the exercises attempt to address the pharmaceutical and medical issues that arise in different specialties. In this issue, two prescriptions are given for assessment, both dealing with the use of drugs in patients

whose renal function is impaired. Readers are invited to identify the problems and determine solutions for them. The prescriptions are followed by a discussion of the significant issues.

It must be emphasised that these tests were introduced to assess the performance of checkers in a dispensary situation where time is at a premium.

It should also be noted that these prescriptions have passed through the dispensary at Addenbrooke's NHS trust, although the patients' names have been changed to maintain confidentiality. The check list used by candidates is shown in Figure 1.

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## CLINICAL ACCURACY CHECKING TEST

### Task

1. You have – **minutes** to review the following prescription charts and identify the problems. You have – **minutes** to document your answers

### Total time allowed:– minutes

2. You are only able to make **ONE** intervention per prescription  
**For each of the prescriptions**, using the answer sheets provided:

- Document the ward and clinical specialty
- List briefly the endorsements you would make to the chart
- List briefly the patient's major medical problem(s) suggested by the drug therapy

6. List briefly the most important pharmaceutical problems you would try to resolve **if you were checking the chart at ward level** (maximum of **SIX** problems)

7. State the **ONE priority intervention** you would make for **EACH of the charts** given that you are **checking the chart in the dispensary**

8. Briefly state the **action** you would take to resolve the priority intervention

9. State the urgency of the **priority** intervention from one of the following:

Urgent = chart must be amended by a doctor or pharmacist before being dispensed

Less urgent = any other action, such as sending an intervention note to the doctor, highlighting the problem to the ward pharmacist, phoning a nurse or doctor for further information.

10. Materials allowed:

Martindale's extra pharmacopoeia	BNF
Paediatric formulary	Hospital formulary
Compendium of data sheets and SPCs	Calculator
Trissel's handbook of injectable drugs	Hospital IV monographs
Renal drug handbook	
List of wards — specialty and current ward pharmacist	

Answer sheet (Candidate name:.....)

Prescription number 1

Review panel:

Ward Clinical specialty

Chart endorsements:

Medical problems:

- |    |    |
|----|----|
| 1. | 5. |
| 2. | 6. |
| 3. | 7. |
| 4. | 8. |

Pharmaceutical problems:

- |    |    |
|----|----|
| 1. | 4. |
| 2. | 5. |
| 3. | 6. |

Priority intervention number 1 2 3 4 5 6  
(circle the appropriate box)

Suggested action to resolve the priority intervention:

Urgency: Urgent Less urgent  
(circle the appropriate box)

Figure 1: Instructions for candidates: state the ward and clinical specialty in order to focus attention on likely problems. For example, if the patient was on a medical ward specialising in renal disease, the pharmacist must be particularly vigilant about renally excreted drugs. The chart endorsements refer to the discharge or to take out (TTO) prescription where one exists or otherwise to the inpatient chart. Please note: candidates are given six minutes to review each prescription, and three minutes to document their answers for each prescription



Prescription Chart					
Surname Dickens		Hospital No 123456		Weight	
First Names Douglas		Date of Birth 10.10.29		Sex M	
Consultant JF		Ward Renal		Height	
DRUG SENSITIVITIES					
Doctor must also enter this information on FRONT of case folder must not be administered unless this box has been completed					
Date 4.4.01		Drug/Substance Nil known		Signature A DOCTOR	

Figure 6: Patient's details on the chart for prescription 2

Regular Prescriptions					
Month and date _____					
Tick times or enter other times _____					
DRUG (APPROVED NAME)					
Asprin					
Dose	Route	Start Date	Stop Date	6	8
750mg	PO	4.4.01		*	AN AN
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Amiodarone					
Dose	Route	Start Date	Stop Date	6	8
100mg	PO	4.4.01		*	AN AN
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Omperazole					
Dose	Route	Start Date	Stop Date	6	8
20mg	PO	4.4.01			
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Calcichew					
Dose	Route	Start Date	Stop Date	6	8
500mg	PO	4.4.01		*	AN AN
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Simvastatin					
Dose	Route	Start Date	Stop Date	6	8
20mg	PO	4.4.01			
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Alfacalcidol					
Dose	Route	Start Date	Stop Date	6	8
0.75mcg	PO	4.4.01		*	AN AN
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
E45 Cream					
Dose	Route	Start Date	Stop Date	6	8
smear	TOP	4.4.01		*	o/s o/s
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
DRUG (APPROVED NAME)					
Ciprofloxacin					
Dose	Route	Start Date	Stop Date	6	8
500mg	PO	4.4.01		*	AN AN
Signature A Doctor		Pharm		12	14
Additional Instructions				18	22
AS REQUIRED					
DRUG (APPROVED NAME)					
Pethidine					
Dose	Max Frequency	Route	Start Date	Date	
25mg	prn	IM	4.4.01	Time	
Signature A Doctor		Stop Date	Pharm	Dose	
Additional Instructions / Max. dose in 24 hours				Route	
				Given by	
DRUG (APPROVED NAME)					
Paracetamol					
Dose	Max Frequency	Route	Start Date	Date	
1g	prn	PO	4.4.01	Time	
Signature A Doctor		Stop Date	Pharm	Dose	
Additional Instructions / Max. dose in 24 hours				Route	
				Given by	
DRUG (APPROVED NAME)					
Chlorpheniramine					
Dose	Max Frequency	Route	Start Date	Date	
4mg	prn	PO	4.4.01	Time	
Signature A Doctor		Stop Date	Pharm	Dose	
Additional Instructions / Max. dose in 24 hours				Route	
				Given by	

Figure 7: Patient's regular drugs (prescription 2)

Once Only Prescriptions								
Pharm	Date	Drug (approved name)	Dose	Route/other directions	Time to be given	Signature	Given by Initials	Time
	4.4.01	Vancomycin	2g	IP	stat	A Doctor	AN	1300
	4.4.01	Ciprofloxacin	1g	PO	stat	A Doctor	AN	1410
	4.4.01	Heparin	1000u	IP	stat	A Doctor	AN	1350

Figure 9: Patient's "once only" drugs

## — PRESCRIPTION 1

This is a prescription for a renal patient and the main pharmaceutical care issues have to do with the requirement for dose reduction in patients with renal failure. It also highlights a potential drug-alcohol interaction.

The endorsements required would be “before food” for Titalac and to specify the brand of epoetin being used. (See Figure 3 p!!.) Instructions for administration are not routinely endorsed on charts at Addenbrooke’s NHS Trust as all wards have an intravenous (IV) drug administration guide which nursing staff are required to follow.

Large doses of calcium preparations such as Titalac or Calcichew are commonly used in patients with renal failure as phosphate binders to prevent absorption of dietary phosphate, in addition to their calcium supplementation role. These agents need to be taken 15 to 30 minutes before meals to bind phosphate effectively. It is important that nursing staff understand this and that the chart is endorsed with the appropriate administration times. However, care should be taken to check the indication for these calcium preparations. For example, calcium supplementation is also used after a parathyroidectomy operation and in this case it should be administered between meals to maximise calcium absorption.

The possible requirement for dose reduction is an important issue when clinically checking prescriptions for renal patients. Some clues that should alert a pharmacist to the fact that the patient has renal failure include a prescription chart coming from a ward specialising in renal medicine and the prescribing of medication used in patients with end-stage renal disease, such as epoetin, calcium carbonate or acetate, aluminium hydroxide and calcitriol or alfacalcidol.

Before advising on dose adjustments, the pharmacist needs to obtain information on the extent of renal impairment and whether or not the patient is receiving renal replacement therapy. In addition, information obtained from the literature, together with possible drug toxicity as well as the patient’s clinical state must be considered before giving specific recommendations about dose reductions. The Renal Drug Handbook is the reference most commonly used at the Addenbrooke’s.<sup>1</sup>

Morphine has been prescribed in the “as required” part of the chart (Figure 4 p!!). Opiates should be used with extreme caution in patients with renal failure. Accumulation of active metabolites and increased susceptibility to central nervous system effects means that doses should be started low and increased slowly.<sup>1</sup> The candidate should advise the doctor to reduce the initial dose range of 2.5 to 10mg IV when required to 2.5mg, and then to increase cautiously if pain is not controlled. Nurses should be advised to monitor the patient carefully for signs of opiate toxicity such as sedation and respiratory depression.

Gabapentin is mainly excreted renally, and a significant dose reduction is recommended in those with renal impairment. The pharmacist would need to establish if this patient is receiving haemodialysis, in which case the dose should be given after each dialysis session.<sup>1</sup>

The dose of antibiotics prescribed for this patient should be questioned. Normal doses of metronidazole and flucloxacillin are relatively safe to use in patients with renal failure,<sup>1</sup> but patients with renal failure are more susceptible to neurotoxic effects, such as seizures, from benzylpenicillin. Doses above 3.6g daily should be avoided if possible in severe renal failure.<sup>1</sup>

The disulfiram-like interaction between metronidazole and alcohol has been well described in the literature.<sup>2</sup> Although this interaction is unpredictable, the pharmacist should recommend withholding alcohol during metronidazole therapy. If necessary, an appropriate regimen for treatment of alcohol withdrawal can be suggested.

It is often useful to hold brief teaching sessions for nursing and medical staff who are new to the renal ward. These sessions should highlight important pharmaceutical issues, such as the principles of dose reduction in renal impairment or renal failure and the timing of

phosphate binder administration. The availability of references for checking dose reductions should also be emphasised.

A competent candidate would be expected to recognise that this patient is likely to have renal failure and should check if dose adjustment is needed for any of the drugs. Candidates should also highlight the drug-alcohol interaction and suggest the appropriate action to rectify it.

## — PRESCRIPTION 2

The requirement for dose reduction in patients with renal failure once again features in this prescription. This is in addition to a clinically significant drug-drug interaction between ciprofloxacin and calcium. (See Figure 7 p!!.)

The endorsements required would be “with food” for aspirin, “before food” for Calcichew and to specify a maximum daily dose for paracetamol and chlorpheniramine.

A recommendation for dose adjustment should follow the advice outlined in Prescription 1. A dose reduction for ciprofloxacin is recommended in the literature for patients with renal impairment. However, protocols for treatment of peritonitis associated with peritoneal dialysis commonly use standard doses.<sup>1</sup> The protocol at Addenbrooke’s is 1g stat, then 500mg twice daily.

Interactions between quinolone antibiotics such as ciprofloxacin and calcium are clinically significant, and co-administration may result in inadequate treatment of a potentially serious infection such as peritonitis.<sup>2</sup> Care must be taken to separate administration times by at least two hours.<sup>3</sup> At Addenbrooke’s, the practice of giving the calcium before meals and ciprofloxacin at 10am and 10pm has been used to successfully treat peritonitis associated with peritoneal dialysis.

Alfacalcidol was prescribed for this patient as intermittent pulse therapy twice weekly. However, it was administered on two consecutive days. Renal patients who develop hyperparathyroidism may be given alfacalcidol or calcitriol to suppress parathyroid hormone secretion and it is hoped, to delay the progression of renal bone disease.<sup>3</sup> Patients requiring pulsed alfacalcidol therapy at Addenbrooke’s are advised to take their dose at night to reduce the risk of developing hypercalcaemia.<sup>4</sup> The pharmacist should establish the days of the week alfacalcidol is to be given, and endorse the administration “boxes” on the drug chart with an “X” marked in the days on which the drug should not be given. The medical and nursing staff should be notified of this error and monitoring of serum calcium level is recommended.

The majority of patients with end-stage renal failure require epoetin to prevent anaemia associated with reduced renal erythropoietin synthesis. The pharmacist should investigate if this patient requires epoetin and whether it was overlooked on admission to hospital.

A competent candidate must again identify that this patient is likely to have renal failure and mention the need to check for dose adjustments. Candidates should highlight the administration of alfacalcidol and suggest appropriate action to take. The ciprofloxacin-calcium interaction should also be mentioned.

*N.B. Solutions to these exercises are shown in Figures 10 and 11 on the next page.*

## REFERENCES

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