

FRCPath Part 2 Practical Examination in Clinical Biochemistry – Oral

The following oral questions have been retired from the question bank and will not appear again in their exact current format. The topic areas remain very much in scope for future exams.

Dr Kevin Deans – FRCPath Clinical Biochemistry Panel Chair June 2026

The Oral examination comprises two sections, each with a pair of examiners. In the first, candidates are given two questions, one on a managerial topic and the other on either a clinical scenario (for medically-qualified candidates) or analytical issue (for scientifically-qualified candidates). Candidates are allowed 30 minutes before the oral examination to review these questions and prepare their answers to them. The second section comprises four questions covering patient and laboratory safety and two more clinical scenarios; candidates are not allowed to review the questions in this section before the oral.

Part 1

Question 1: Management (All Candidates)

You are the Head of Department in the Biochemistry Department of a large 1150 bed city centre teaching hospital. The laboratory also serves a 250 bed children's hospital on the same hospital campus and approximately 110 GP practices. There are another two smaller teaching hospitals in your network which in total serve a population of 1.2 million people. The adult hospital has full emergency and intensive care facilities, a renal unit, maternity and is a tertiary referral centre for surgery. The children's hospital has a separate paediatric emergency department and is the specialist centre for the area. Your laboratory has a large core automated lab and is also a referral centre for immunology, toxicology and metabolic disease investigations.

All three hospitals have large tracked automated laboratories and share an equipment supplier and a laboratory information system.

Your equipment supplier is in the process of replacing the track and analysers across the network, and as part of this process you have been informed that you will need to run without a track for a 5-month period. This process has already been undertaken at the other two smaller sites in the network.

Describe your concerns and what factors need to be taken into account to ensure samples are managed effectively during this period and what plans you intend to put in place to ensure that the clinical service is not impacted adversely.

Examiner notes:

- Identifying and Triaging samples according to priority – colour coded labels or forms. Could ED use plasma as this will have different colour caps?
- Create an “Emergency Bench”
- Capping/De-capping – can you get an automated decapper?
- Centrifugation – do you need extra centrifuges – need to write a procedure for managing these, don’t wait until they are full
- Staff – more labour intensive – more MLAs to “act as a track” moving samples around the lab
- Analysers – may require additional maintenance as not being fed by a track. How do you load balance? What happens when things go wrong? If an analyser goes down you don’t want all your samples on one analyser
- Paediatric samples – has the process changed? Did you put these on the track previously?
- GP work – can the other sites help? Could you redirect a van?
- Work Outstanding – Requires frequent generation of work outstanding lists
- Sample storage capacity – is this less. Do you need to reduce storage time? How do you manage storage, LIMS or Middleware?
- Add on work – is it easier to get a new sample. How do you manage these and retrieve samples.
- Can you get temporary automation? Standalone sample sorter or a small track connecting selected analysers. This may cost more and may delay your final implementation as this would need to be configured. However benefits may outweigh the costs.

Part 2

QUESTION 3 – LAB SAFETY

A biomedical scientist is found on the floor unconscious in front of a large, automated analyser, whose front panel has been removed. The scientist has a screwdriver in their hand and it is suspected they have suffered an electric shock.

- (a) What is your immediate action?
- (b) What action would you take regarding the analytical service?

Examiner notes:

This question deals with the candidate's ability to recognise that the staff member's wellbeing is the priority and that the danger may not be over. Concerns over the service impact are secondary but still need addressing.

Immediate Action

- The staff member's safety and survival is the priority. Ensure the power to the analyser is turned off/disconnected – this should be done at a distant power source and not by touching the analyser. Ensure the staff member is not touching or connected to the analyser. Administer the necessary first aid (via qualified first aiders ideally) and call emergency line for ambulance – phoning 999 may be appropriate or alternative contingency plan/number within your lab.
- Do not switch the analyser back on/restore power until fully assessed by a qualified maintenance worker or hospital estates. Keep all other staff away.
- Evaluate the impact of not being able to use this analyser and invoke contingency plans for alternative analysis or delay. Consideration that there may be samples stuck within the analyser for a time may also need addressing.
- Appropriate DATIX/Incident recording should be completed as soon as possible.

QUESTION 4 – CLINICAL SAFETY

You receive a complaint from an Endocrinologist who believes that your laboratory's reference limits for Adjusted Calcium are incorrect as they have received an increasing number of referrals for the investigation of borderline hypocalcaemia over the last 6 months in clinically asymptomatic, well individuals. What action would you take?

Examiner notes:

Assure that you will investigate in the first instance.
Likely to be the assay rather than the reference limits

- Check EQA and IQC
- Check patient means
- Has there been a shift?

Has the assay changed - kit, lot or calibrators? Has the albumin method changed?

What was the source of the reference interval?

- Kit insert
- In house study
- Pathology Harmony - candidates should recognise the nature of 'consensus' limits to promote standardisation

When was the last adjustment experiment performed? Candidates may be asked as to how to perform an adjustment experiment. Do they know what their local adjustment formula is?

A graph could be was plotted in calcium (y axis) vs albumin (x axis). Linear regression was performed, giving the equation:

The ACB document recommends an equation of the form:

$$\text{Adjusted [Ca]} = \text{Total [Ca]} - (\text{slope} \cdot [\text{albumin}]) + (\text{mean total [Ca]} - \text{intercept [Ca]})$$