

## Mastering your Fellowship

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### Abstract

The series, "Mastering your Fellowship", provides examples of the question format encountered in the FCFP(SA) examination. The series aims to help family medicine registrars and their supervisors prepare for this examination. Model answers are available online.

**Keywords:** FCFP(SA) examination, family medicine registrars

### Introduction

This section in the *South African Family Practice* journal is aimed at helping registrars prepare for the FCFP (SA) Final Part A examination (Fellowship of the College of Family Physicians) and will provide examples of the question formats encountered in the written examination: Multiple Choice Question (MCQ) in the form of Single Best Answer (SBA - Type A) and/or Extended Matching Question (EMQ - Type R); Modified Essay Question (MEQ)/Short Answer Question (SAQ), questions based on the Critical Reading of a journal (evidence-based medicine) and an example of an Objectively Structured Clinical Examination (OSCE) question. Each of these question types is presented based on the College of Family Physicians blueprint and the key learning outcomes of the FCFP programme. The MCQs will be based on the ten clinical domains of family medicine, the MEQs will be aligned with the five national unit standards and the critical reading section will include evidence-based medicine and primary care research methods.

This month's edition is based on unit standard 1 (critically appraising quantitative research), unit standard 2 (evaluate and manage a patient according to the bio-psycho-social approach) and unit standard 4 (facilitate the learning of others). The theme for this edition is Emergency Medicine.

We suggest that you attempt answering the questions (by yourself or with peers/supervisors), before finding the model answers online: <http://www.safpj.co.za/>

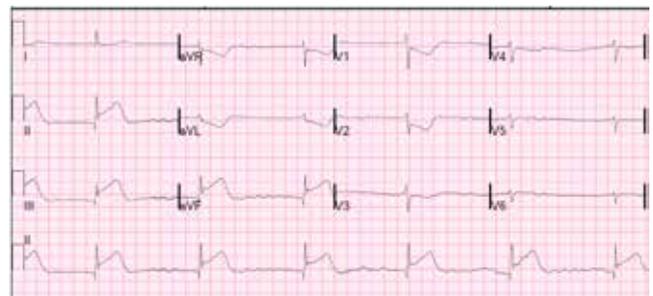
Please visit the Colleges of Medicine website for guidelines on the Fellowship examination:

[https://www.cmsa.co.za/view\\_exam.aspx?QualificationID=9](https://www.cmsa.co.za/view_exam.aspx?QualificationID=9)

We are keen to hear about how this series is assisting registrars and their supervisors in preparing for the FCFP (SA) examination. Please email us your feedback and suggestions.

### 1. MCQ (multiple choice question: single best answer)

A 56-year-old male presents to emergency centre with a history of severe retrosternal chest pain for the last one hour. He is a known patient with hypertension and type 2 diabetes mellitus and smokes 10 cigarettes per day. His electrocardiograph (ECG) is shown below. He still has severe chest pain and his blood pressure = 90/60 mmHg, respiratory rate = 20/minute and pulse oximetry = 97% on room air. The most appropriate next step is to administer:



Calibration = 1cm = 1 mv, Paper speed = 25 mm/sec

- Aspirin and clopidogrel
- Morphine, oxygen, nitrates, aspirin
- Oxygen, aspirin, clopidogrel
- Oxygen, nitrates, aspirin
- Oxygen, nitrates, aspirin, clopidogrel

**Short answer: a**

**Explanation:**

The ECG is diagnostic of a patient with an inferior ST elevation myocardial infarction (STEMI). There is a reciprocal change in the antero-septal leads which may suggest a posterior infarct. A second ECG with a V4R lead would be advised in this patient.

This patient also has a bradycardia of 42 beats/minute and is hypotensive. One would suspect that this patient also has a right ventricular infarct due to the hypotension. The posterior descending branch of the right coronary artery (RCA) supplies the inferior wall of the right ventricle (RV). Other branches of the right coronary artery supply the anterior wall of the right ventricle. Proximal occlusion of the RCA results in larger RV infarcts. Severe RV diastolic dysfunction results in an increase in the right atrial pressure and a drop in the systolic pressure. Dilatation of the right atrium results in the release of atrial natriuretic peptide which is a vasodilator resulting in a further drop in systolic pressures.

When managing the RV dysfunction and hypotension, careful administration of intravenous fluids is needed to improve the blood pressure. Inotropic support may be needed if the patient does not respond to fluid boluses. One needs to be very careful about using nitrates and morphine in this patient as both these agents are venodilators and may further compromise preload in this patient. Oxygen is no longer routinely used in the treatment of STEMI if the patient is able to maintain a peripheral arterial oxygen saturation of greater than 94%. Dual antiplatelet treatment with aspirin and clopidogrel would be the most appropriate next step in conjunction with fluid resuscitation with or without inotropic support. This patient needs emergency reperfusion and a percutaneous intervention is the preferred modality of treatment. However, such interventions are rarely easily available in the public healthcare sector, so thrombolysis is another option if no contraindications exist.

#### Further reading:

1. Levin T, Goldstein JA. Right ventricular myocardial infarction. Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc. <https://www.uptodate.com> (Accessed on 5 April 2019.)
2. Kloeck WJG, editor. A guide to the management of common medical emergencies in adults. 11th ed. Johannesburg: Academy of Advanced Life Support; 2017.

## 2. SAQ (short answer question): The family physician's role as capacity builder, role model, trainer, teacher, supervisor within the domain of emergency medicine

You are the family physician in a busy district hospital. The medical officers approach you to teach them how to obtain intraosseous access for fluid resuscitation. You decide to create a teaching activity to build their competence in intraosseous access.

- 2.1 How would you plan and implement a teaching activity around this skill? Describe your framework? (8)
- 2.2 List two possible learning outcomes for such a teaching activity? (4)
- 2.3 What four principles of adult learning would you seek to embed in your approach to teaching and explain how the principles would be applied in this specific session? (8)

#### Suggested answers:

- 2.1 How would you plan and implement a teaching activity around this skill? Describe your framework:

When planning a teaching activity it is important to think about Why? What? How? and So what? Answers given outnumber the allocated marks. In such situations if the required number of acceptable options are listed, it is accepted.

- i. Why? Decide on the need and the objectives (2)
  - Confirm that the topic is important to address for the health services
  - Clarify the learning needs of the intended participants
- ii. What? The learning outcomes and content (2)
  - Define learning outcomes for the teaching session (knowledge, skills, attitudes)
  - Define the content of the teaching session and identify learning resources
- iii. How? Teaching methods and logistics (2)
  - Plan the teaching methods:

Theory – underlying knowledge/concepts, often in a brief PowerPoint or talk, Modelling – demonstrate yourself or via video or some other means,

Practise with feedback – simulate the skill and provide feedback on performance. Use DOPS.

- Plan the practical logistics – date, venue, equipment needed, invitation sent out, CPD accreditation, attendance register
- iv. So what? Evaluation (2)
  - Obtain feedback from participants using a simple questionnaire
  - Reflect on the feedback to revise future teaching sessions

- 2.2. List two possible learning outcomes for such a teaching activity? (4)

A learning outcome (LO) should specify what the learner should be able to do at the end of the teaching session. The LO can be for knowledge, skills or attitudes and the level of Miller's pyramid/Bloom's taxonomy should be clear from the verb used (e.g. list, describe, demonstrate, etc).

- Possible knowledge LOs may relate to indications, contraindications, anatomy, equipment, drugs, fluids, aftercare (e.g. List the contraindications to the procedure).
- Possible LOs related to skill may refer to the actual procedure (e.g. Demonstrate the procedure).
- Possible LOs related to attitude may relate to communication, caring, consent (e.g. Demonstrate how you would go about obtaining informed consent).

- 2.3 What four principles of adult learning would you seek to embed in your approach to teaching and explain how the principles would be applied in this specific session? (8)

The following are some of the principles. Refer to pages 115–117 in the Essential Handbook for GP training and education where more principles listed.

- i. Create a safe and supported learning environment – be respectful of individuals and their needs
- ii. Promote intellectual freedom and creativity
- iii. See learners as intelligent, experienced peers or colleagues

- iv. Support self-directed learning
- v. Challenge people just beyond their present level of ability
- vi. Actively involve the learner in their learning
- viii. Provide regular feedback

#### Further reading:

1. Chapters 7, 174, 175 and 176. In Mash B, Blitz J (Ed). South African Family Practice Manual. 3<sup>rd</sup> ed. Pretoria: Van Schaik Publishers, 2015.
2. Mehay R. The essential handbook for GP training and education. Mehay R (Ed). London: Radcliffe Publishing, 2012.

### 3. Critical appraisal of quantitative research

Read the accompanying article carefully and then answer the following questions (total 35 marks). As far as possible use your own words. Do not copy out chunks from the article. Be guided by the allocation of marks with respect to the length of your responses.

Hunter LD, Lahri S, Van Hoving DJ. Case mix of patients managed in the resuscitation area of a district-level public hospital in Cape Town. *African Journal of Emergency Medicine*. 2017;7(1):19-23.

Obtainable from: <https://www.sciencedirect.com/science/article/pii/S2211419X16301082>.

- 3.1 Explain the scientific background and rationale for the study reported. (2)
- 3.2 Critically appraise the authors' description of the study setting. (3)
- 3.3 Critically appraise the authors' description of the study period. (2)
- 3.4 Critically appraise the method of sampling study participants. (3)
- 3.5 Discuss the method of collecting the data, as well as the method of ensuring the quality of data collection. (5)
- 3.6 Discuss the ethics of consent with specific reference to the waiver of informed consent. (5)
- 3.7 Critically appraise the authors' decision to present the age variable data in the categories as depicted in Table 1. (5)
- 3.8 Critically review the authors' discussion of the value of using the South African Triage Scale for patients in need of the resuscitation area of the emergency room. Your answer will be evaluated not for being right or wrong, but for the strength of your critique. (5)
- 3.9 Discuss the value of the study findings for your own practice using the READER format. (5)

(Total: 35 marks)

#### Suggested answers:

##### 3.1 Explain the scientific background and rationale for the study reported. (2)

The authors stated that limited data is available of the patient population served by the emergency centres

of district hospitals, an important entry point to the health services. The authors cited previous research from emergency centres at different/higher levels in the health system (community health centres and regional healthcare facilities). They motivated for the scientific need of this study, as this knowledge gap requires to be addressed in order to provide suitable data for adequate planning of health services.

##### 3.2 Critically appraise the authors' description of the study setting. (3)

The authors provided a thick description of the study setting. However, the information provided on the study setting highlights that Khayelitsha Hospital does not meet the criteria of the typical district hospital as described in the introduction section. The authors acknowledged that the "definition of and services offered at a district hospital" varies, but state that district hospitals have less than 200 beds and provide "basic diagnostic and therapeutic services", typically without the availability of specialist services. Khayelitsha Hospital appears to be an anomaly, as it has 240 beds and provides specialised services, such as surgical, medical, psychiatric, paediatric and obstetric inpatient services. Its emergency centre is also 30% larger than that of a standard district-level hospital emergency centre. These discrepancies make one wonder whether Khayelitsha Hospital was a suitable study setting to answer the research question.

##### 3.3 Critically appraise the authors' description of the study period. (2)

The study period is a 6-month period from 1 November 2014 to 30 April 2015. The authors did not specify why they selected this study period but acknowledged the limitation of not including the "traditionally colder months" at the end of the discussion section. As acknowledged by the authors, one might hypothesise that the disease profile may have shifted from being more trauma-orientated to being more medical-orientated.

##### 3.4 Critically appraise the method of sampling study participants. (3)

The authors did not apply a sampling strategy but stated that all adult patients ( $\geq 13$  years) managed in the resuscitation unit during the study period were eligible for inclusion. Potential bias was possible however, as the admission criteria to the resuscitation unit were determined by the South African Triage Scale (SATS) or "at a senior practitioner's discretion". It is not clear if these senior practitioners followed a standardised approach; presumably, this was based on several factors which may introduce potential bias and variability, such as the individual practitioner's previous experience.

##### 3.5 Discuss the method of collecting the data, as well as the method of ensuring the quality of data collection. (5)

The data were collected by means of a tailor-made smartphone application (app). This app was piloted in this study setting and all 18 doctors working in the unit were

required to download the app onto their own smartphones and collect data on the app as an additional step in the clinical note-keeping process of patient management. The authors state that the app proved to be a “powerful prospective data capturing tool with a high data capture rate and enjoyed a positive response from the clinicians”.

The actual capture rate was not specified in the methods or results sections. The authors mentioned a process of crosschecking captured data weekly against the nursing register and the hospital’s electronic administration system (a quality check). Patients not initially captured were retrospectively captured by means of a chart review. It is therefore unclear how “powerful” this capturing tool was as no information on how many entries were captured retrospectively. Furthermore, no data was presented to describe the subjective experience of the 18 doctors. Detail on the method of piloting the instrument is also lacking.

The data captured via the app was immediately coded and stored directly onto a password protected server. It would have been useful if the authors included a screen shot of the app to demonstrate whether checks were in place to prevent capturing errors such as capturing a value outside the range of a variable. A copy of the list of questions would have been a useful supplement.

Another method of checking the data collected, is by performing visual inspection and employing statistical methods to check the dataset for missing data and data capturing errors. The authors stated that they employed Microsoft Excel to provide descriptive statistics. No mention is made of how the dataset was checked to ensure quality.

Additional information (not part of the model answer): The editorial of this issue also assessed the methods section of this paper and the editor stated as follows:

“If you were thinking that this is just a run-of-the-mill paper describing case mixes you would be wrong. Hidden in the methods section is the novel way in which the authors crowd sourced the data using a novel smartphone application, instantly turning every clinician into a point-of-care data collector. With all the hard work done, data were compared with paper registries for completeness and supplemented from the clinical record which is electronically stored. It is important to note that Khayelitsha employs first and foremost a paper-based clerking system. References to electronic record is way overstated as these are simply scanned copies of the clinical records – an improvement indeed, but not so much in terms of interrogating data as can be done through a database.

The methodology used by Hunter, *et al.* empowers the whole clinical team to become part of the research effort. The question is whether such a system can be sustainable in the long run given the huge turn-over of staff in South African emergency centres and large patient loads.”

Available from <https://doi.org/10.1016/j.afjem.2017.02.003>

### 3.6 Discuss the ethics of consent with specific reference to the waiver of informed consent. (5)

Generally, informed consent should be obtained from all study participants before enrolment in a study. Informed consent represents a continuum, during which the individual’s consent to participate is based on relevant information, without any coercion or pressure to participate. The information presented should explain the risks and benefits of participation and should be pitched at the educational level of potential participants. Participants should be able to comprehend the information, as well as have the capacity to make the decision.

The following information was obtained from the website of the Health Research Ethics Committee (HREC) at Stellenbosch University. The model answer will include elements of this information and may be applied to the study, by stating, for example that the research involves no additional risks (routine care) and that the patient data was anonymised/coded and stored on a secure, password-protected server.

“A HREC may waive the requirement to obtain informed consent provided that:

- The research involves no more than minimal risk to the participants;
- The waiver or alteration will not adversely affect the rights and welfare of the participant(s);
- The research could not practicably be carried out without the waiver or alteration; and
- Whenever appropriate, the participants will be provided with additional pertinent information after participation.

Waiver of consent applications should include the following:

- Indication that the above conditions have been met,
- The degree of risk that the research poses to participants to whom the data is linked, as well as the degree of risk posed to participants in the waiving of consent,
- Justification regarding why participant consent cannot be obtained,
- Whether the data will be anonymised (not merely de-identified) at the point of data collection – i.e. no identifying information such as patient file numbers, names or contact details will be recorded, and
- Whether the data will be aggregated and anonymised in the reporting of findings – i.e. no individual cases will be reported on.”

<https://www.sun.ac.za/english/faculty/healthsciences/rdsd/Documents/Undergraduate%20Research/Waiver%20of%20consent%20guidance.pdf>

### 3.7 Critically appraise the authors’ decision to present the age variable data in the categories as depicted in Table 1. (5)

Table 1 shows how the age variable data was categorised in the following groups: 13–18 years (a 6-year period), 19–30 years (a 12-year period), 31–50 years (a 20-year period) and older than 50 years. These age categories were also applied to subsequent figures and tables. No clear rationale was

presented as to why the authors selected these categories. Table 1 also demonstrates the variability in participant numbers in these different age categories.

Categorising continuous data (such as dividing the continuous age variable into groups) is a common method used to present and compare groups of participants. Continuous data may be categorised in quartiles, deciles, age groups and user-defined categories. Age groups should generally be in common groupings (such as teenagers, young adults, adults and elderly) or five/ten-yearly bands. Setting the cut-points for dividing the groups should be explained in the methods section.

The authors in this study did not specify their choice for these different age groups. It would have been helpful to specify whether their choice was based on previous research or other examples/accepted models. In terms of demographics, one may infer that certain age groups are more inclined to suffer certain conditions (as the results are indicating), but this must be clarified a priori in the methods section. If this categorising method was applied at the time of data analyses, it may have introduced some bias or skewing of results.

**3.8 Critically review the authors' discussion of the value of using the South African Triage Scale for patients in need of the resuscitation area of the emergency room. Your answer will be evaluated not for being right or wrong, but for the strength of your critique. (5)**

**Example of a model answer:**

The authors highlighted that almost 30% of patients managed in the resuscitation unit were triaged into lower acuity categories (green and yellow) – see Figure 1. This does not make sense as the red and orange categories signify high acuity and the need for immediate life-saving management. This anomaly implies that the South African Triage Scale (SATS) may have not been applied correctly. The incorrectly applied SATS score was mentioned by the authors. The authors acknowledged that this discrepancy may be multifactorial and may be due to some local service-related factors, such as the use of the resuscitation unit for patients in need of closer monitoring (procedural sedation and fluid management in renal failure patients). This makes one wonder whether the study team should have considered this during the design of the study, as these factors may have been used as exclusion factors for study enrolment. No indication is provided as to what percentage of the patients included in this study was simply managed in the resuscitation unit due to local service agreements. The authors did discuss the issue of prolonged length of stay in a quarter of patients, which may reflect these local service agreements or system factors (such as access block to a high care bed at the referral centre where renal patients may need to be definitely managed, or a day theatre for procedures under sedation). These system factors may be universal to the general district hospital setting.

Reasonable speculation as to the nature of unexpected findings (such as these multifactorial reasons for the SATS

score anomaly) is allowed in general. Such speculations may be based on the authors' own experience but should usually also be supported by citing relevant references or evaluating this through qualitative enquiry.

**3.9 Discuss the value of the study findings for your own practice using the READER format. (5)**

External validity relates to applying the conclusions of a scientific study outside the context of that study. In other words, it is the extent to which the results of a study may be generalised to other situations and to other people. External validity is an important property of any study, as the aim is to facilitate making general conclusions of value to the clinicians and patients in similar contexts.

The model answer here would be constructed around the external validity for the family physician working in the district health system. The study setting is atypical (the authors' description of Khayelitsha Hospital implies that this is not a typical district hospital: bed size, availability of specialists, and urban location). However, the authors highlight the fact that their study described a high burden of trauma and acute medical emergencies managed in the resuscitation unit of this emergency centre.

The **READER** format may be used to answer this question:

- **Relevance** to family medicine and primary care?
- **Education** – does it challenge existing knowledge or thinking?
- **Applicability** – are the results applicable to my practice?
- **Discrimination** – is the study scientifically valid enough?
- **Evaluation** – given the above, how would I score or evaluate the usefulness of this study to my practice?
- **Reaction** – what will I do with the study findings?

The answer may be a subjective response but should be one that demonstrates a critical reflection on the possible implication of the research for the registrar's practice within the South African public healthcare system. It is acceptable for the registrar to suggest how his/her practice might change, within other scenarios after graduation (e.g. general private practice). The reflection on whether all important outcomes were considered is therefore dependant on the registrar's own perspective (is there other information you would have liked to see?).

A model answer may be written from the perspective of the family physician employed in the district health system:

**Relevance** to family medicine and primary care:

This study is relevant to the African primary care context. The emergency centre is a key access point to the health system, and the district hospital represents the key employment setting of family physicians.

**Education** – does it challenge existing knowledge or thinking:

This study highlights the need for primary emergency care physicians to be well-equipped to manage trauma and acute medical emergencies, as these patients often present to the

emergency centre of the district hospital. The disease profile from this study may have to be compared with that of the reader's own context (urban vs. rural). However, this study's disease profile is in keeping with the existing understanding of the quadruple burden of disease experienced by South Africans.

**Applicability** – are the results applicable to my practice:

The intended target audience are planners and policy makers; however, the findings are also applicable to family medicine training programmes and clinical trainers, to ensure that registrars receive adequate exposure and training to be suitably equipped for the district hospital context.

**Discrimination** – is the study scientifically valid:

Some issues around the data collection instrument were highlighted above, as well as the researchers' choice of age categories, which may need to be considered. The findings were merely descriptive in nature and no statistical inferences were made to the target population. This study was conducted at a single centre over a 6-month period.

**Evaluation** – given the above, how would I score or evaluate the usefulness of this study to my practice:

This descriptive study is useful to the district health system and the training of family physicians, although the findings may need to be reframed for the typical district hospital, as well as compared with more robust research conducted across multiple centres with a more transparent analytical framework. This study also describes an innovative use of using smartphone technology for research.

**Reaction** – what will I do with the study findings:

One would have to compare this study to similar research conducted within the South African district health system. The novel use of a smartphone application may be considered when aiming to replicate the study in the emergency centre of a more typical district hospital (or possibly, multiple district hospitals across several provinces with a good mix between urban and rural facilities).

#### Further reading:

- Mash B, Ogunbanjo GA. African primary care research: quantitative analysis and presentation of results. *African Journal of Primary Health Care and Family Medicine*. 2014;6(1):1-5.
- Pather M. Evidence-based family medicine. In Mash B (Ed). *Handbook of Family Medicine* (4th ed). Cape Town: Oxford University Press, 2017:430-453.
- Greenhalgh T. How to read a paper: the basics of evidence-based medicine. John Wiley and Sons; 2014.
- The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. EQUATOR network. Available from URL: <http://www.equator-network.org/reporting-guidelines/strobe/> (last accessed 10 October 2018).
- Centre for Evidence Based Health Care, Stellenbosch University. (2019). EBM toolkit. [online] Available at: <http://www.cebhc.co.za/teaching-resources/> [Accessed 31 January 2019].
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care research (1st ed). Boca Raton, FL: CRC Press, 2019:135-146.

- Joannabriggs.org. (2019). Critical Appraisal Tools - JBI. [online] Available at: <http://joannabriggs.org/research/critical-appraisal-tools.html> [Accessed 31 January 2019].
- The Critical Appraisals Skills Programme (CASP). 2019. CASP checklists. [online] Available at: <https://casp-uk.net/casp-tools-checklists/> [Accessed 31 January 2019].
- HREC SOPs and Ethics Guidelines. 2019. Stellenbosch University. [online] Available at: <http://www.sun.ac.za/english/faculty/healthsciences/rdsd/Pages/Ethics/SOP.aspx> [Accessed 6 April 2019].

## 4. OSCE scenario: Emergency Medicine

### Objective of station:

This station tests the candidate's ability to teach a junior doctor to diagnose and initiate treatment for a patient in diabetic ketoacidosis.

### Type of station

Integrated consultation – acute presentation, teaching

### Equipment list:

1. Role player – young male/female medical student
2. Clinical records and blood results
3. Mannikin in bed, with drip up

### Instructions for candidate

#### History/context

You are conducting a ward round in the emergency centre of the district hospital. The medical officer presents the following patient to you.

Please address the problem presented by the medical officer.

### Instructions for the examiner

**Objectives:** This station tests the candidate's ability to teach a junior doctor to diagnose and initiate treatment for a patient in diabetic ketoacidosis (DKA).

This is an integrated consultation station in which the candidate has 14 minutes.

Familiarise yourself with the assessor guidelines which details the required responses expected from the candidate.

No marks are allocated. In the mark sheet, tick off one of the three responses for each of the competencies listed. Make sure you are clear on what the criteria are for judging a candidates' competence in each area.

Please switch off your cell phone.

Please do not prompt the student.

Please ensure that the station remains tidy and is reset between candidates.

This station is 15 minutes long. The candidate has 14 minutes, then you have 1 minute between candidates to complete the mark sheet and prepare the station.

### Reference:

- Essential Medicine List, Hospital Level (2015). Chapter 8, 8.6.2.

## Marking template for consultation station

Exam number of candidate:			
Competencies (delete what is not applicable)	Candidate's rating		
	Not competent	Competent	Good
<b>1. Establishes and maintains a good senior-junior relationship</b> Comments:			
<b>2. Gathering information</b> Comments:			
<b>3. Clinical reasoning</b> Comments:			
<b>4. Management</b> Comments:			
<b>5. Explaining and planning</b> Comments:			
<b>Overall Comments:</b>			
<b>Examiner's name:</b>		<b>Examiner's signature:</b>	

### Guidance for examiner

**Competency is defined as the desired outcome of that domain, achieved in a manner that is effective and safe.**

- 1. Establishes a good senior-junior relationship:** The competent candidate displays good communication skills, making the junior feel respected and part of the team. The good candidate also reinforces what has been done well, and gently corrects any mistakes.
- 2. Gathering information:** the competent candidate gathers sufficient information (history, examination and lab tests) to make the diagnosis of DKA. The good candidate also explores ongoing risk factors and co-morbidities (WCC, ECG).
- 3. Clinical judgement:** the competent candidate makes a diagnosis of DKA. The good candidate makes a comprehensive 3-stage assessment.
- 4. Management:** the competent candidate develops an evidence-based intervention plan. The good candidate sees the opportunity for enhanced clinical governance in the emergency centre.
- 5. Explaining and planning:** the competent candidate ensures that the junior understands and is able to implement the management plan. The good candidate co-develops the management plan with the junior, using the opportunity to coach and/mentor.

#### Key issues to consider for examiner (see EML for detail):

Diagnosis: clues in role-player presentation – good communication skills needed

- Requested HGT and urine dipsticks, but did not follow up
- Missed information from nursing notes
- Poor communication between nurse and doctor on duty

Intervention:

- Thorough assessment – serum ketones, check for infection (CXR, WCC), do ECG, arterial blood gas, urea and electrolytes (potassium especially), Anion gap
- Correct dehydration: Appropriate fluid resuscitation
  - Run the first litre of crystalloid (Ringers Lactate or Balsol – avoid normal saline in most instances as the associated elevation in chloride worsens the acidosis) IV over an hour. Give Thiamine 100 mg IMI if malnourished.
  - Run the next litre over 3–4 hours. Fluid replacement should be not greater than 3 to 4 litres over the first 24 hours. It is usual for AKI to respond relatively quickly as the intravascular volume is maintained by the increased intravascular osmotic pressure.
  - If the serum sodium rises above 150 mmol/l, or if the plasma glucose falls below 15 mmol/l, then change to 5% or 10% Dextrose water. Run at 100 ml/hr, and monitor glucose hourly. Aim for a urine output of > 0.5 ml/kg/hr (provided renal function is normal).
- Manage hyperglycaemia and potassium:
  - Delay insulin until serum K+ is known to be > 3.5 mmol/l.
  - 10 u regular insulin IV stat, then IO u IV (0.1 u/kg) hourly as a bolus or preferably as a constant IV infusion.
  - Aim to lower the glucose levels by approximately 5 mmol/l per hour.
  - When the blood glucose is controlled (i.e. < 15 mmol/l) but acidosis is still present and anion gap is still increased, 5% or 10% Dextrose water plus KCl together with hourly insulin as above, should be continued until HCO<sub>3</sub> > 15, blood glucose < 15 mmol/l, and pH > 7.3.

### Role play – Instructions for actor

Appearance (theatre clothes) and behaviour (normal). You are handing over patients to the family physician after a busy night on call in the emergency centre.

### Opening statement

“The next patient is a 23-year-old man who presents with severe dehydration secondary to diarrhoea and vomiting for the past two days. He was previously well, and started feeling unwell and nauseous 3 days ago, with the vomiting and diarrhoea getting worse. He came in last night, so he’s been here for about 12 hours now.

We gave him 2L of normal saline overnight, but he still seems not quite right. Remains slightly confused and agitated. BP is now about 100/60 mmHg and his heart rate is 109/minute – he’s had persistent tachycardia and low BP’s since admission.

I took some bloods, and the results should be available any moment now.”

I didn’t have time to review him yet – been too busy with the resus that came in....

This is his first visit to the hospital – no records of him on the IT system either. Brought in by ambulance, no relatives. The ambulance personnel gave the history.

His sugar was a bit high on admission, but this is probably because the paramedics gave him some IV fluids – not sure what fluids, though...

The examination findings are documented in the notes.

You note that you did not have time to follow up on the orders you wrote for the nursing staff.

**If the doctor points out some things that you missed in the nursing notes, act surprised, but not guilty – it was a very busy night.**

### Patient’s notes

- S:** History as per the notes above
- O:** No JACCOL; generally thin with mild temporal wasting  
Vitals as per triage: BP 94/58 mmHg; HR 115/min; temp 35.5 degrees Celsius  
GCS: 15/15, but slightly incoherent speech.  
CNS: Pupils equal, reactive to light. No neck stiffness. No focal neurology.  
Resp: tachyoeic, but good air entry and no abnormal sounds.  
Abdo: mild, vague tenderness. No organomegaly. Not peritonitic.
- A:** Dehydration secondary to gastroenteritis
- P:**
1. Manage dehydration
  2. Check Hb, HGT, urine dipsticks
  3. Bloods: Urea, creatinine and electrolytes, ABG

### Nursing notes:

Date	Time	Item
	23h42	BP check: 98/58 mmHg. IV fluids as ordered.
	00h54	HGT: 24.4 mmol/l
		Urine dipsticks: 4+glucose, 2+ketones
		Doctor informed
	04h00	BP 100/53. 2 <sup>nd</sup> Normal saline commenced
		HGT 25.1 mmol/l

### Blood results:

S-Creatinine	H	135	(59–104) umol/L
S-Urea		5.5	(2.1–7.1) mmol/L
S-Sodium	L	128	(136–146) mmol/L
S-Potassium		4.5	(3.5–6.1) mmol/L

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