COLLEGE OF INTENSIVE CARE MEDICINE
OF AUSTRALIA AND NEW ZEALAND

SECOND PART PAEDIATRIC EXAMINATION

EXAM REPORT

AUGUST / NOVEMBER 2024

This report is prepared to provide candidates, tutors and their Supervisors of Training with information about the way in which the examiners assessed the performance of candidates in the Examination. Candidates should discuss the report with their tutors so that they may prepare appropriately for future examinations.

The written section of the Examination was held in Auckland, Adelaide, Brisbane, Melbourne, Perth and Sydney. The Examination included two 2.5 hour written papers, each composed of 15 ten-minute short answer questions. The pass mark for the written section is derived by the Angoff method and for this sitting was set at **51.84%.** The clinical section of the examination was held in Auckland, New Zealand at Starship Children's Hospital and the vivas were held at Crowne Plaza Hotel, Auckland, New Zealand. The oral component comprised 8 interactive vivas and two clinical hot cases.

The tables below provide an overall summary, as well as information regarding performance in the individual sections. A comparison with the previous five examinations is also provided.

STATISTICAL REPORT

Overall pass rates	**2024**	**2023**	**2022**	**2021**	**2020***	**2019**
Total number presenting (written + carry + SIMG)	13	15	23	11	9	11
Total number invited to the oral section	10	15	16	9	5	4
Total number successful at orals	8	15	15	8	5	4
Overall pass rate	8/13	15/15	15/23	8/11	5/9	4/11
	62%	**100%**	**65%**	**72%**	**56%**	**36%**

**Oral component postponed until 2021 due to COVID.*

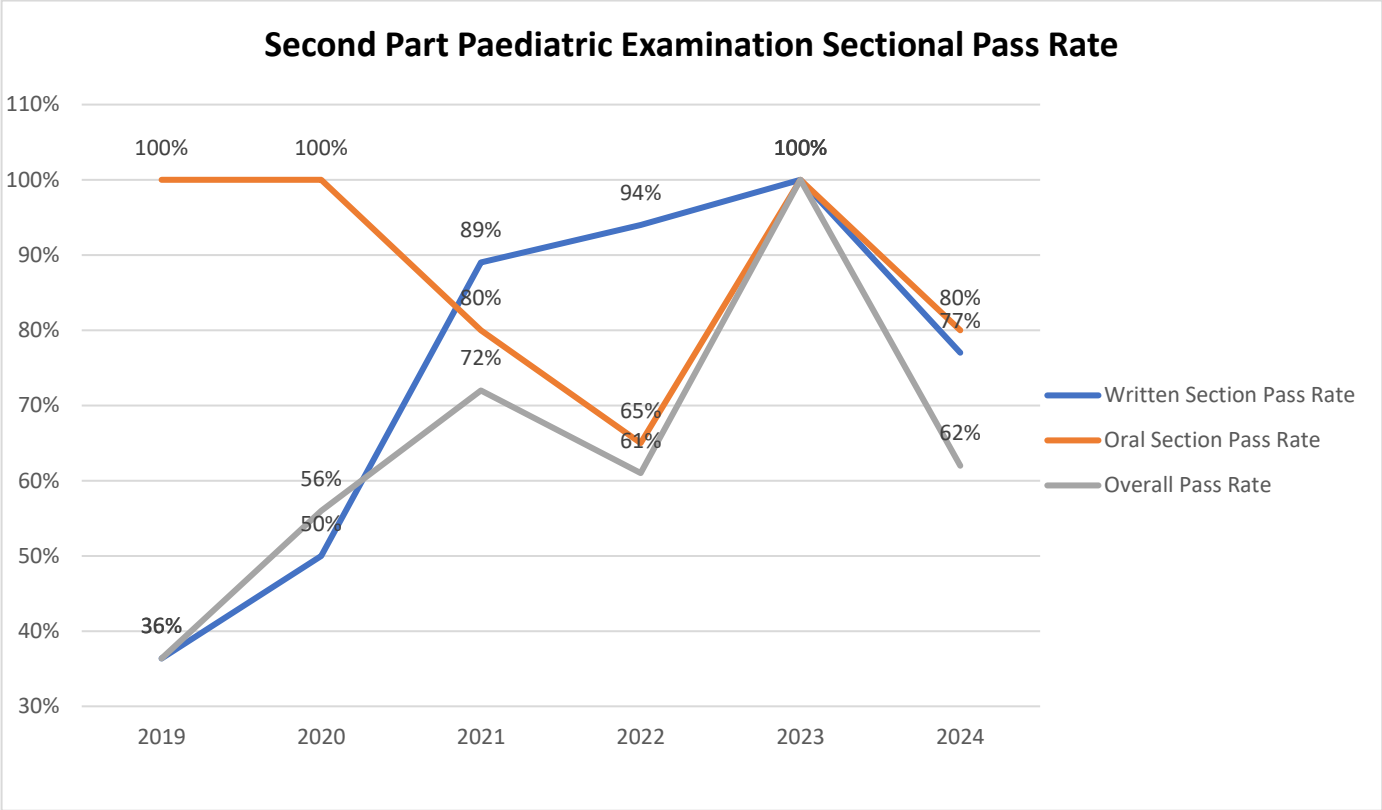
Clinical Pass Rates	2024		2023		2022		2021		2020*		2019	
	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark
Hot Case 1	60%	80%	73%	78%	85%	75%	89%	78%	60%	70%	75%	78%
Hot Case 2	80%	83%	87%	90%	88%	81%	67%	95%	60%	70%	50%	70%
Total number successful in the Hot Case section	7/10		14/15		14/16		6/9		3/5		3/4	
Overall Hot Case pass rate	70%		93%		88%		67%		60%		75%	

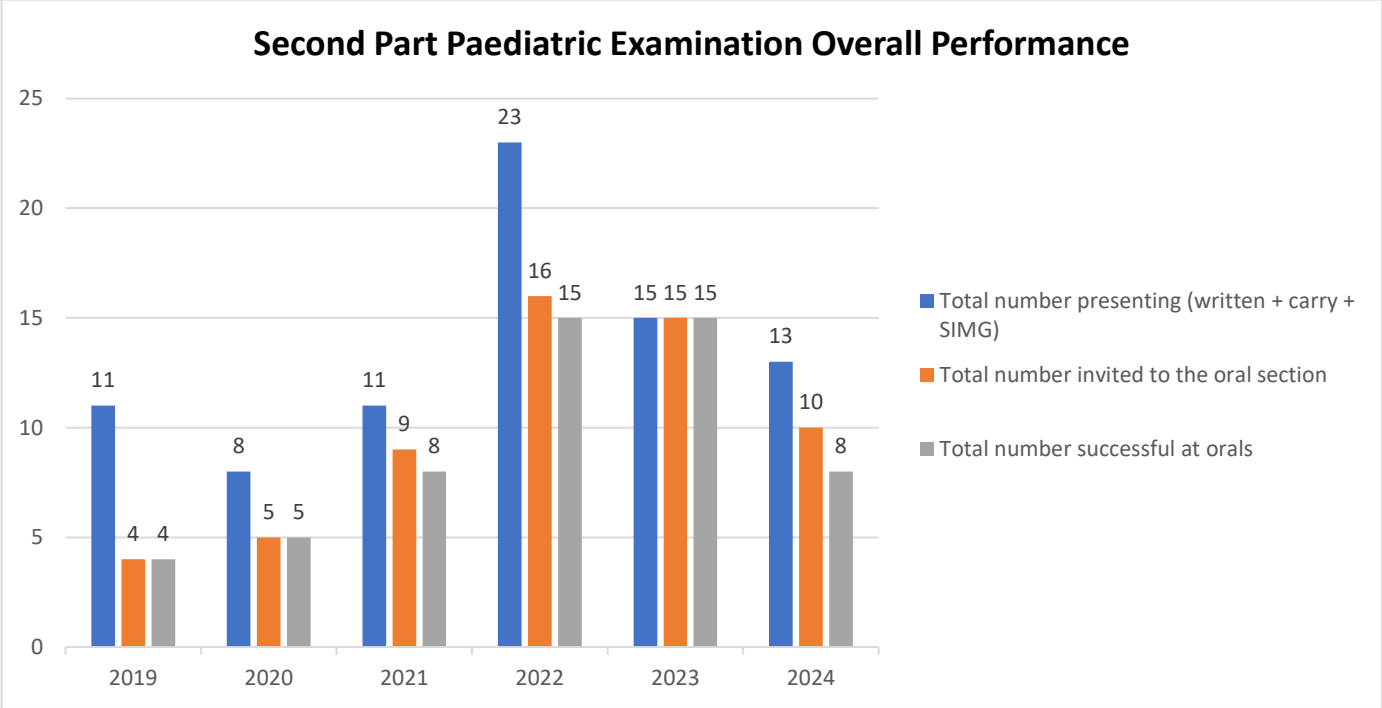
**Oral component postponed until 2021 due to COVID.*

Viva Pass Rates	2024		2023		2022		2021		2020*		2019	
	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark	Pass rate	Highest individual mark
Viva 1	90%	90%	53%	80%	88%	90%	88%	80%	100%	74%	25%	54%
Viva 2	70%	85%	47%	88%	88%	100%	45%	70%	100%	90%	50%	60%
Viva 3	80%	81%	60%	100%	56%	76%	45%	75%	100%	80%	75%	70%
Viva 4	70%	76%	73%	83%	100%	95%	100%	74%	100%	80%	100%	88%
Viva 5	40%	66%	80%	88%	88%	100%	88%	94%	60%	86%	75%	69%
Radiology Viva	60%	73%	73%	72%	44%	72%	67%	60%	80%	71%	100%	65%
Communication Viva	50%	70%	87%	100%	38%	68%	34%	56%	100%	73%	25%	58%
Procedure Viva	90%	83%	80%	83%	56%	85%	78%	70%	80%	60%	75%	88%
Total number successful in the Viva section	8/10		13/15		13/16		8/9		5/5		4/4	
Overall Viva pass rate	80%		87%		81%		89%		100%		100%	

**Oral component postponed until 2021 due to COVID.*

Overall Performance





EXAMINERS' COMMENTS

Written Paper

Eight of the thirty short answer questions had a pass rate of less than 50%. Topics covered by these questions are outlined in the individual SAQ section of this document.

The most common reasons for candidates to fail questions were:

- Insufficient knowledge of the topic
- Insufficient detail or incomplete answer
- Failure to answer the question asked
- Lack of structure or depth

Candidates are reminded to read the questions carefully and thoroughly, and to include in their answer only information that is relevant to the question. The allocation of marks in multipart questions is shown to allow candidates to organise their answers appropriately. The glossary of terms is provided to help candidates to understand the type of information and structure required in the answer.

Hot Cases

Hot cases run for twenty minutes, with an additional two minutes at the start of each case for the candidate to read a written introduction. The written introduction is to allow candidates greater opportunity to plan a focused approach to the case.

The following comments are a guide to the expected standard for performance in the hot cases:

- Candidates should address and answer the question asked in the introduction.
- Candidates should interpret and synthesise information, rather than just describing the clinical findings.
- Candidates need to seek information relevant to the case in question.
- Candidates should be able to provide a sensible differential diagnosis and appropriate management plan. A definitive diagnosis is not always expected, and in some cases, may yet to be determined.
- Candidates should not rely on a template answer or key phrases but answer questions in the specific context of the case in question.
- Candidates must be able to describe, with justification, their own practice for specific management issues.

Candidates who performed well in the hot cases were able to demonstrate the following:

- A professional approach, showing respect and consideration for the patient and family.
- Competent, efficient and structured examination technique and an ability to appropriately adapt the examination to suit the case.
- Pursuit of information relevant to the case.
- An ability to interpret and synthesise their findings appropriately.
- Presentation of conclusions in a concise, targeted and systematic fashion.
- Listing of a differential diagnosis that is relevant to the clinical case.
- Discussion of management issues in a mature fashion, displaying confident and competent decision-making.
- Overall performance at the expected level (competent senior registrar / junior consultant).

Candidates who did not perform at the acceptable standard did so for the following reasons:

- Missing or misinterpreting key clinical signs on examination.
- Incomplete or poor technique for examination of a system.
- Poor synthesis of findings with limited differential diagnosis.
- Poor interpretation of imaging and data or omitting to request important tests.
- Inability to construct an appropriate management plan for the case in question.

- Limited time for discussion as a consequence of taking too long to present the clinical findings or to interpret basic data.
- Inability to convey the impression that he/she could safely take charge of the unit.
- Inability to maintain global overview and answering within a narrow focus.
- Failing to address the question asked.

Some candidates were able to elicit and describe the clinical signs and data but were unable to synthesise all the information and to formulate an appropriate management plan.

Vivas

Candidates should be able to demonstrate a systematic approach to the assessment and management of commonly encountered clinical problems. Candidates should also be prepared to provide a reasonable strategy for management of conditions that they may not be familiar with. Professionalism, manner and empathy are also important components.

WRITTEN EXAMINATION REPORT

Instructions to Candidates

(A) Write your answers in the blue books provided. **Each** question should be answered in a separate booklet. Please ***DO NOT*** write two short answer questions in the same booklet.

(B) Start each answer on a **new booklet** and indicate the **question number**. It is not necessary to rewrite the question in your answer book.

(C) You should aim to answer each question in **ten** minutes.

(D) **All** questions are worth ten marks each in total.

(E) Record your **candidate number** and each **question number** on the cover of each book, page, and hand in all books.

Glossary of Terms

Critically evaluate:	Evaluate the evidence available to support the hypothesis.
Outline:	Provide a summary of the important points.
List:	Provide a list.
Compare and contrast:	Provide a description of similarities and differences (E.g. Table form).
Management:	Generic term that implies overall plan. Where appropriate, may include diagnosis as well as treatment.
Discuss:	Explain the underlying key principles. Where appropriate, this may include controversies and/or pros and cons.

Notes

Where laboratory values are provided, abnormal values are marked with an asterisk (*).

Question 1

Regarding long-segment congenital tracheal stenosis:

a) List four possible associated anomalies.

(2 marks)

b) List the relevant investigations.

(2 marks)

c) Outline the surgical treatment options and important features of post-operative care in the intensive care unit.

(6 marks)

Maximum Score	7.25
Percentage passed	23.1%

Examiners' comments:
Despite this being an often-seen problem in the PICU, knowledge around surgical options and specific post-operative management was poorly formulated. Some candidates' answers focused on placement and post-op management of tracheostomies.

Reference(s):
Hofferberth SC et al. Management of congenital tracheal stenosis. Pediatrics. 2015

Butler CR, et al. Outcomes of slide tracheoplasty in 101 children: a 17-year single-center experience. The Journal of thoracic and cardiovascular surgery. 2014

Hewitt RJ, et al. Congenital tracheobronchial stenosis. In Seminars in pediatric surgery 2016.

Question 2

With regards to acute pancreatitis in children:

a) List five aetiologies.

(2 marks)

b) Outline management in PICU.

(8 marks)

Maximum Score	8.25
Percentage passed	53.8%

Examiners' comments:
Candidates scored marks for listing the aetiology of pancreatitis. Still, answers often lacked a deeper understanding of the management of children with acute pancreatitis in comparison with a generic PICU patient. Some candidates spent too much time on clinical history, list of exams and investigations rather than specifically on management.

Reference(s):
Abu-El-Haija M, et al. Management of Acute Pancreatitis in the Pediatric Population: A Clinical Report From the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition Pancreas Committee. J Pediatr Gastroenterol Nutr. 2018

Mehta, et al. Acute pancreatitis in children: risk factors, management, and outcomes. Current Opinion in Pediatrics 2023.

Question 3

A five-year-old girl with end-stage restrictive cardiomyopathy and near systemic pulmonary pressures is admitted to PICU. She is receiving high flow nasal cannula oxygen therapy and a peripheral venous canula has been inserted. She deteriorates following an episode of syncope and now appears mottled.

Key findings:

- HR 140/min
- BP 60/38 mmHg
- Weak thready pulses with a capillary refill time of 6 seconds
- Peripheral venous lactate 7 mmol/L

a) Outline your steps in immediate resuscitation.

(3 marks)

b) Outline your strategies for optimising cardiac output in children with restrictive cardiomyopathy (excluding ECMO).

(4 marks)

c) Outline the key factors affecting prognosis in this patient.

(3 marks)

Maximum Score	8
Percentage passed	76.9%

Examiners' comments:

Candidates answered the question well overall, especially part a. Answers were marked higher when candidates provided a structured approach to factors affecting cardiac output. Factors affecting prognosis were less known.

Reference(s):

Bogle C, et.al. American Heart Association Young Hearts Pediatric Heart Failure and Transplantation Committee of the Council on Lifelong Congenital Heart Disease and Heart Health in the Young (Young Hearts). Treatment Strategies for Cardiomyopathy in Children: A Scientific Statement From the American Heart Association. Circulation. 2023

Question 4

Adrenaline (epinephrine) is one of the most commonly used medications in paediatric cardiac arrest.

a) Discuss the mechanism of action of epinephrine in cardiac arrest.

(2 marks)

b) Critically evaluate the use of epinephrine for paediatric cardiac arrest.

(8 marks)

Maximum Score	6.25
Percentage passed	30.8%

Examiners' comments:
The question was poorly answered. The answers demonstrated a lack of knowledge of Adrenaline, the most commonly administered drug for cardiac arrest in Intensive Care Medicine, and the evidence supporting its utilisation.

Reference(s):
Hansen M et al, Resuscitation outcomes consortium Investigators. Time to epinephrine administration and survival from non shockable out of hospital cardiac arrest among children and adults Circulation 2018.

Finn J et al. Adrenaline and vasopressin for cardiac arrest. Cochrane databae of Syst Rev 2019.

Raymond TT. Association of hospital rate of delayed epinephrine administration with survival to discharge for Pediatric Nonshockable in hospital cardiac arrest. PCCM 2019.

Andersen LW. Time to epinephrine and survival after pediatric in hospital cardiac arrest JAMA 2015.

Perkins GD et al. A randomised trial for epinephrine in out of hospital cardiac arrest. NEJM 2018.

Kienzle MF et al. The effect of epinephrine dosing intervals on outcomes from pediatric in hospital cardiac arrest. American Journal of Respiratory and Critical care Medicine 2021.

Ohshimo S . Pediatric timing of epinephrine doses: A systematic review. Resuscitation. 2021

Question 5

A 10-year-old (40 kg) is admitted with Diabetic Ketoacidosis (DKA). They initially had dry mucous membranes, decreased skin turgor, feeble pulses, and poor capillary refill. Vital signs were:

- GCS 13 (E3V4M6)
- Heart Rate 150/min
- Blood Pressure 90/50 mmHg
- Respiratory Rate 40/min
- Saturation 99% in 0.21 FiO_2

Their initial arterial blood gas is outlined below:

Parameter	Patient Value	Normal Range
pH	6.8*	7.35 – 7.45
$PaCO_2$	25 mmHg* (3.33 Kpa)	35-45 (4.7 – 6.0)
PaO_2	90 mmHg (11.99 Kpa)	70 -100 (9.3-13.3)
HCO_3	3.2 mmol/L*	25-27
Base excess	- 25 mmol/L*	-2 to +2
Potassium	5.5 mmol/L*	3.5 – 4.5
Sodium	160 mmol/L*	135 – 145
Chloride	120 mmol/L*	97 – 106
Glucose	30 mmol/L*	3.6 – 5.4
Lactate	8.1 mmol/L*	< 2.0
Betahydroxybutyrate	6.0 mmol/L*	< 0.3

The child was given an initial 10 ml/kg fluid bolus, which corrected the circulatory shock.

a) Calculate the fluid volume prescription for the patient for the first 48 hours.

(2 marks)

b) Calculate corrected Sodium. Describe the physiological rationale for measuring corrected Sodium and how do you utilize it in your patient management of DKA.

(2 marks)

c) Outline your management of this patient in the first 24 hours, including how you will monitor the child's response to therapy.

(6 marks)

Maximum Score	7.875
Percentage passed	46.2%

Examiners' comments:
Very few candidates were able to calculate fluid requirement over 48 hours and demonstrate an understanding of the physiological principles behind corrected sodium or its utility in managing DKA patients during the acute corrective phase. Candidates who did well had thorough answers for DKA management focused on fluid, insulin, electrolytes, BSL, and monitoring and treatment of complications.

Reference(s):
Karen E Gripp, et al. Current recommendations for management of paediatric diabetic ketoacidosis, Paediatrics & Child Health 2023.

Question 6

Regarding delirium in critically ill children, outline the following:

a) Diagnosis

(2 marks)

b) Risk factors

(2 marks)

c) Management

(2 marks)

d) Potential differential diagnoses

(2 marks)

e) Associated adverse outcomes

(2 marks)

Maximum Score	9.125
Percentage passed	76.9%

Examiners' comments:
Candidates answered the question well overall. Stronger candidates thoroughly described diagnosis, risk factors and adverse outcomes. The management component was well answered especially non-pharmacological interventions. A step-wise approach to delirium management that included avoiding withdrawal and maintaining safety with potential pharmacological intervention scored well.

Reference(s):
Ista E, et al. Factors associated with delirium in children. A systematic review and meta-analysis. PCCM 2023.

Egbuta C, et al. Current State of Analgesia and Sedation in Pediatric Intensive Care Unit. J Clin Med 2021.

Question 7

With respect to Bordetella Pertussis infection, outline the following:

a) Pathophysiology

(2 marks)

b) Risk factors associated with increased mortality.

(1 marks)

c) Your approach to investigations and PICU management of an infant intubated for severe respiratory failure due to Pertussis.

(7 marks)

Maximum Score	8.75
Percentage passed	69.2%

Examiners' comments:

Overall, the question had a broad marking range. Strong candidates understood pathophysiology, recognised high mortality rate in this age group, and could discuss the complexity of ECMO, leukodepletion, and balancing lung-protective ventilation with PHT Mx. Poor answers had a non-specific A/B/C approach to the clinical scenario presented.

Reference(s):

Decker et al. (2021) JID, 2021.

Esposito et al. Frontiers in immunology, July 2019.

Straney et al. Burden and Outcomes of Severe Pertussis Infection in Critically Ill Infants*. Pediatric Critical Care Medicine 2016.

Question 8

With regards to Cerebral Venous Sinus Thrombosis:

a) List five risk factors.

(2 marks)

b) Compare and contrast CT venography and MRI venography imaging for diagnostic evaluation.

(2 marks)

c) Outline your management of a patient who presents with a Cerebral Sinus Thrombosis secondary to a local infection.

(6 marks)

Maximum Score	8.125
Percentage passed	61.5%

Examiners' comments:
The majority of candidates demonstrated knowledge of risk factors for CVT and could discuss MRI v CT venography well. Management answers differentiated candidates' level of expertise; weaker candidates talked in general terms, providing little detail. Stronger candidates gave specifics about the multidisciplinary approach to source control and anticoagulation, weighing the risks of anticoagulation in the context of potential surgical intervention.

Reference(s):
NA

Question 9

With respect to Haemophagocytic lymphohistiocytosis (HLH), outline:

a) Pathophysiology

(2 marks)

b) List four clinical and/or laboratory diagnostic findings.

(2 marks)

c) Specific treatments and the indicators of poor prognosis in HLH.

(6 marks)

Maximum Score	9.25
Percentage passed	76.9%

Examiners' comments:
Those who scored well demonstrated a high knowledge of the underlying pathophysiology and therapy goals, including second-tier immunological and biologic treatment. A discussion of general principles of managing inflammatory disease scored less highly. Markers of poor prognosis were not well known by many.

Reference(s):
Shakoory et al. Points to consider at the early stages of diagnosis and management of suspected haemophagocytic lymphohistiocytosis /macrophage activation syndrome (HLH/MAS) Ann Rheum 2023.

Canna & Marsh. Pediatric hemophagocytic lymphohistiocytosis. Blood 2020.

Question 10

Outline two examples of ethical issues in paediatric ECMO for each of the following:

a) Consent

(2.5 marks)

b) Initiation

(2.5 marks)

c) Discontinuation

(2.5 marks)

d) Resource allocation and equity to access

(2.5 marks)

Maximum Score	8.125
Percentage passed	69.2%

Examiners' comments:
Candidates scored well if they demonstrated a broad understanding of the ethical issues and gave specific clinical examples describing the clinical dilemmas. Candidates failed if answers focused on one or two issues and repeated them for each part of the question.

Reference(s):
Moynihan KM, et al. Decision-Making, Ethics, and End-of-Life Care in Pediatric Extracorporeal Membrane Oxygenation: A Comprehensive Narrative Review. Pediatr Crit Care Med. 2021

Question 11

A 6-month-old boy with pulmonary atresia, who had a modified Blalock-Taussig shunt as a newborn, is admitted from theatre following a bidirectional cavopulmonary shunt.

The anaesthesia and operation were uncomplicated, but there have been problems with hypoxia since separation from cardiopulmonary bypass.

Current observations are:
- Temperature: 37.5ºC
- SpO_2 66%
- Heart rate: 130 beats/minute
- Blood pressure: 89/43 mmHg (mean 61 mmHg)
- SVC pressure: 16 mmHg

He is on infusions of dobutamine (5 micrograms/kg/min) and morphine (20 micrograms/kg/hr).

Current ventilator settings are:
- Pressure-Control Ventilation
- FiO_2 0.7
- Respiratory rate: 18 breaths/minute
- Pressures: 18/5 cmH_2O
- Inspiratory time: 1 second

Results for an arterial blood gas analysis are shown below:

Parameter	Patient Value	Normal Range
pH	7.45	7.35 – 7.45
$PaCO_2$	31 mmHg (4.13 kPa)	31 – 42 (4.13 – 5.60)
PaO_2	40 mmHg (5.33 kPa) *	80 – 105 (10.67 – 14.00)
HCO_3	18 mmol/L*	22 – 26
Base Excess	-2 mmol/L	-2 to +2
Lactate	2.0 mmol/L*	1.0 – 1.8

a) Outline the potential causes for hypoxia in this patient.

(6 marks)

b) Outline your management over the next 12 hours.

(4 marks)

Maximum Score	10
Percentage passed	92.3%

Examiners' comments:
All candidates answered the question well. The causes of hypoxia in children with Glenn physiology were well answered. The answers that scored higher highlighted the need to exclude anatomical and cardiac output issues before progressing the child to spontaneous ventilation, defined titration targets and provided a rationale for their decisions (e.g. allowing PaCO2 to rise to increase CBF).

Reference(s):
Nichols D., et al. Critical Heart Disease in Infants and Children.

Question 12

Question 12 a)

4-year-old boy presents with central cyanosis. His SpO_2 is 85% on high flow nasal prong oxygen in 100% FiO_2. He takes regular medications for autoimmune bullous dermatosis.

His arterial blood gas analysis is as follows:

Parameter	Patient value	Normal range
pH	7.34	7.30 – 7.40
$PaCO_2$	41 mmHg (5.4 kPa)	35-45 (4.7 – 6.0)
PaO_2	200 mmHg* (26.6 kPa)	70 -100 (9.3-13.3)
HCO_3^-	23 mmol/L	22 – 26
Base excess	-1 mmol/L	-2 to +2
Lactate	1.0 mmol/L	<2
Haemoglobin	113 g/L	110-145
Methaemoglobin	20.3%*	0.2-1.5%

i. Explain the difference between SpO_2 and PaO_2 readings in this child.

(2 marks)

ii. What is the likely diagnosis and the pathophysiology?

(2 marks)

iii. Name one agent that can cause this.

(0.5 marks)

iv. What ***specific*** emergency treatment would you give?

(0.5 marks)

Question 12 b)

A previously well 18-month-old girl presents unconscious and tachypnoeic. Her mother has been applying Bonjela to sore teething gums.

Her arterial blood gas analysis is as follows:

Parameter	Patient value	Normal range
pH	7.48*	7.30 – 7.40
PCO_2	16.5 mmHg* (2.2 kPa)	35-45 (4.7 – 6.0)
PO_2	114mmHg* (15.2 kPa)	70 -100 (9.3-13.3)
HCO_3^-	17 mmol/L*	22 – 26
Base excess	-10 mmol/L*	-2 to +2
Lactate	1.5 mmol/L	<2
Anion gap	20 mmol/L*	10-16

i. Explain the blood gas abnormality and likely cause.

(2 marks)

ii. List 4 indications for initiating emergency treatment in this child.

(2 marks)

iii. What ***specific*** emergency treatments would you give to this child?

(1 mark)

Maximum Score	8.125
Percentage passed	76.9%

Examiners' comments:
The understanding of pulse oximetry and how it is affected by haemoglobinopathy was variably demonstrated. Many candidates assumed the incorrect diagnosis from the clinical stem (lignocaine toxicity rather than salicylate toxicity), carrying the mistake through the rest of the question.

Reference(s):
Methaemoglobinaemia – www.uptodate.com

Salicylate toxicity – LITFL (Salicylate toxicity • LITFL • Toxicology Library Toxicant).

Question 13

a) Define pulmonary arterial hypertension in children based on data obtained at cardiac catheterization.

(1 mark)

b) List four congenital cardiac lesions associated with "post-capillary" pulmonary hypertension.

(2 marks)

c) In table form, list sildenafil, bosentan and epoprostenol by class; mechanism of action; dosing; and adverse effects.

(7 marks)

Maximum Score	7.66
Percentage passed	69.2%

Examiners' comments:
A significant knowledge deficit is seen with this question. Very few candidates could provide the correct definition of Pulmonary Hypertension based on cardiac catheter data. Most candidates could answer part 2, but some offered left to right shunt lesions (no marks) or non-cardiac causes (no marks). Generally, knowledge of the three commonly used medications for pulmonary hypertension could be improved.

Reference(s):
Avitabile CM, et al. Drug treatment of pulmonary hypertension in children. Pediatric Drugs. 2020

Humbert M, et al. 2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension. European Heart Journal. 2022

Question 14

With regard to patient-ventilator dyssynchrony;

a) Provide a definition.

(1 mark)

b) List four consequences in critically unwell patients.

(2 marks)

c) For each of two types below, provide a description, likely causes and management:

i. Ineffective triggering

(4 marks)

ii. Auto triggering

(3 marks)

Maximum Score	9.25
Percentage passed	76.9%

Examiners' comments:

Most candidates answered the question well, although the definition of patient-ventilator dyssynchrony was sometimes superficial or absent. Candidates failed the question if the description of ineffective triggering and/or auto triggering was superficial and troubleshooting interventions were limited.

Reference(s):

De Oliveira B, et al. Patient–Ventilator Dyssynchrony in Critically Ill Patients. Journal of Clinical Medicine. 2021

Gilstrap D, et al. Patient-ventilator interactions. Implications for clinical management. Am J Respir Crit Care Med. 2013

Question 15

a) List four patient cohorts for whom chemoprophylaxis against Pneumocystis Jirovecii (PJP) might be recommended.

(2 marks)

b) Discuss your management plan for a 10-year-old patient treated for Hodgkin lymphoma (in remission), admitted to PICU with severe Pneumocystis Jirovecii (PJP) ARDS. Assume the child is already intubated/ventilated.

(8 marks)

Maximum Score	8.25
Percentage passed	69.2%

Examiners' comments:
The majority of candidates were able to answer the question well, listing patients who require PJP prophylaxis and discussing principles of ARDS and specific PJP management. Candidates who scored poorly often provided superficial knowledge about the management of children with PJP ARDS.

Reference(s):
Ibrahim A, et al Pneumocystis jiroveci Pneumonia: A Review of Management in Human Immunodeficiency Virus (HIV) and Non-HIV Immunocompromised Patients. Avicenna J Med. 2023

Question 16

An 8-year-old girl is admitted with 50% burns and an inhalation injury. On day 3, she remains intubated and ventilated, with improving gas exchange. She is enterally fed and has had debridement of her burns.

Her current analgesia and sedation consist of regular intravenous paracetamol, morphine (80 micrograms/kg/hour) and dexmedetomidine (1.2 micrograms/kg/hour).

The nurse reports episodes of waking and agitation and thinks she is in pain.

a) Outline your approach to assess the efficacy of her current pain management.

(3 marks)

b) Outline your approach to her pain management.

(7 marks)

Maximum Score	9.25
Percentage passed	76.9%

Examiners' comments:
A structured pain ladder approach to pharmacological management of pain, including adjuncts, scored highly. Assessment was generally done well and considered assessment tools, trends, feedback from staff & family, differential diagnosis and communicating with the child.

Reference(s):
Smith, Heidi A. B. MD, et al. 2022 Society of Critical Care Medicine Clinical Practice Guidelines on Prevention and Management of Pain, Agitation, Neuromuscular Blockade, and Delirium in Critically Ill Pediatric Patients With Consideration of the ICU Environment and Early Mobility. Pediatric Critical Care Medicine 2022.

Question 17

Discuss the Phoenix Sepsis Score.

Include in your answer the definition, population target, advantages, and limitations.

(10 marks)

Maximum Score	8.25
Percentage passed	92.3%

Examiners' comments:
Most candidates were able to describe the score. Good answers demonstrated insight into the differences between old and new sepsis definitions and addressed the four specific requested parts. An overall understanding of the utility of the score in standardising the definition of sepsis was missing.

Reference(s):
LN Sanchez-Pinto et al. Development and Validation of the Phoenix Criteria for Pediatric Sepsis and Septic Shock. JAMA 2024.

EF Carlton, et al. Context and Implications of the New Pediatric Sepsis Criteria. JAMA 2024.

Question 18

With regards to refeeding syndrome, outline the following:

1. Definition, risk factors, laboratory indicators, and clinical signs.

(4 marks)

2. Pathophysiology

(3 marks)

3. Management of a patient with refeeding syndrome in PICU.

(3 marks)

Maximum Score	8.625
Percentage passed	46.2%

Examiners' comments:

The question demonstrated some lack of understanding of the refeeding syndrome from the candidates. Good answers described this condition well, its pathophysiology, and a clear and safe management plan. Candidates who failed often had vague, superficial answers, regarding pathophysiology.

References:

Corsello A, et al. Refeeding syndrome in Pediatric Age, an unknown disease; A narrative review. Journal of *Pediatric* Gastroenterology and Nutrition (JPGN) 2023.

Question 19

a) Define the following terms used in DDD mode cardiac pacing:

i. Ventricular sensitivity
ii. Post-ventricular atrial refractory period (PVARP)
iii. AV delay

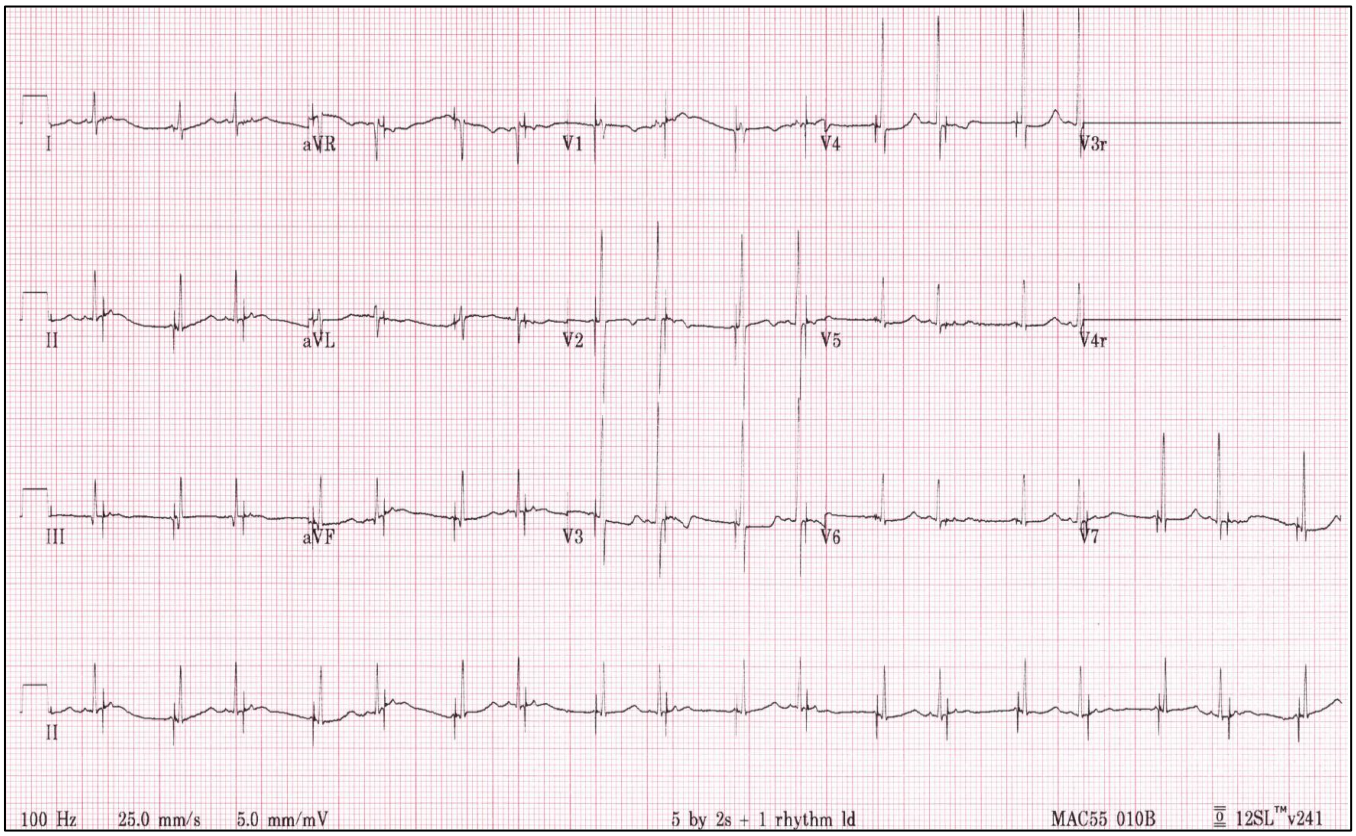
(3 marks)

b) The following ECGs have all been taken in patients on temporary cardiac pacing because the heart rate has been noted to be irregular.

In each case, briefly describe:
i. the pacemaker-related problem
ii. the solution

ECG 1
2-month-old boy day 2 following hypoplastic aortic arch repair. Pacing AAI 110 per minute.

(2 marks)

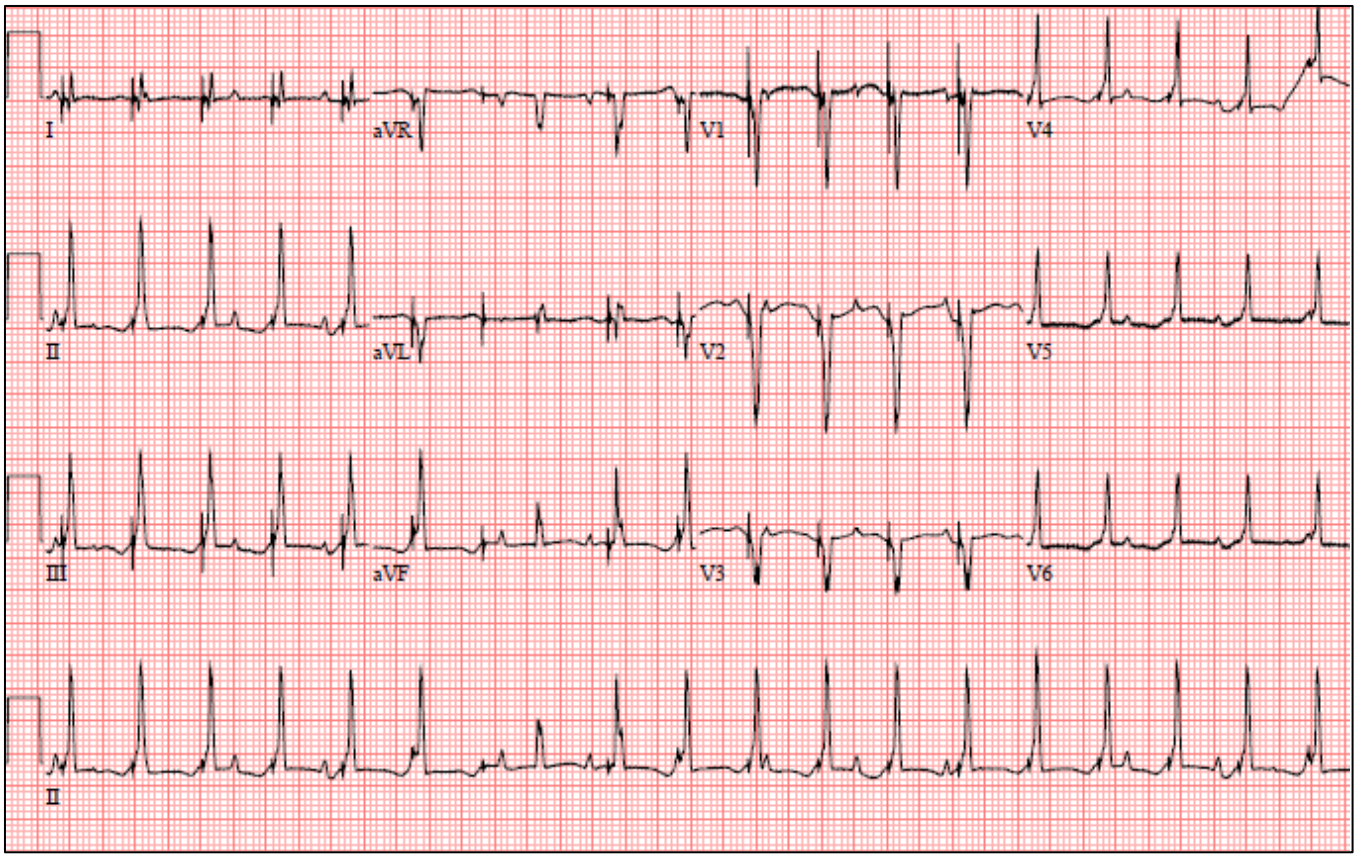


Question 19 Continued on Next Page

Question 19 Continued

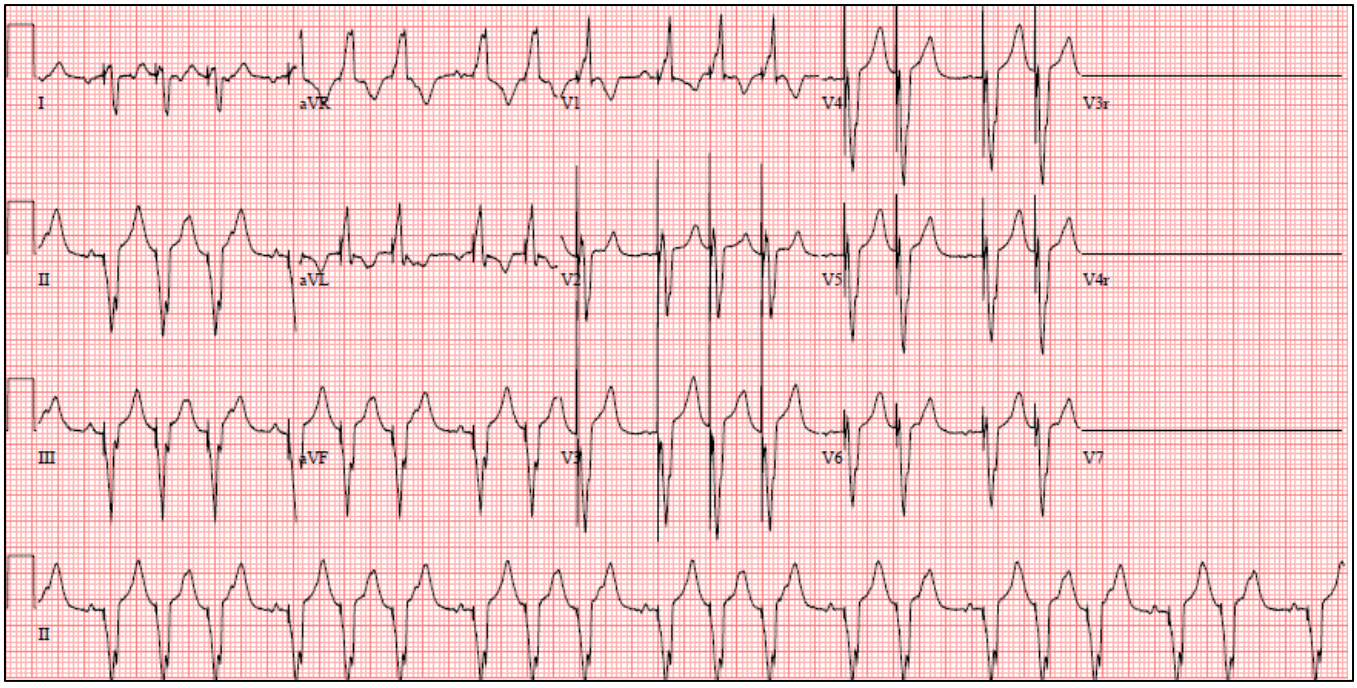
ECG 2
3-day-old with bradycardia, first degree heart block and long QT interval. Pacing VVI 135 per minute

(3 marks)



ECG 3
2-year-old with single ventricle, day 2 post AV valve repair. Pacing DDD 110 per minute

(2 marks)



Maximum Score	8.5
Percentage passed	69.2%

Examiners' comments:
The majority of answers provided vague definitions of ventricular sensitivity, PVARP and AV delay. Candidates who scored highly defined terms accurately. Most candidates did not identify pacemaker Wenckebach phenomenon, and the ones who failed generally interpreted the ECGs incorrectly.

Reference(s):
Fuhrman and Zimmerman. Paediatric Critical Care.

Question 20

For the following 3 blood gases, describe and explain the abnormalities.

a) 5-year-old, 3 days of upper respiratory tract symptoms, transferred to PICU with reduced GCS.

(3 marks)

Parameter	Patient Value	Normal range
pH	6.89*	7.35 – 7.45
$PaCO_2$	12 mmHg (1.59 kPa) *	35 – 45 (4.7 – 6.0)
$PaO2_2$	105 mmHg (13.9 kPa) *	80 – 105 (10.7 – 14.0)
O_2 saturation	98 %	96 – 100%
Sodium	133 mmol/L *	135 – 145
Potassium	4.3 mmol/L	3.5 – 4.5
Chloride	117 mmol/L *	97 – 106
HCO_3	2 mmol/L *	25 - 27
Base excess	-30 mmol *	-2 to +2
Lactate	1.7 mmol/L	< 2.0
Glucose	44 mmol/L *	3.6 – 5.4
Urea	12.5 mmol/L *	5.5 – 10.5

b) 6 months old, ex 23 weeks premature infant with RSV infection, intubated and ventilated with mean airway pressure of 20 cmH_2O in FiO_2 0.6.

(3 marks)

Parameter	Patient Value	Normal range
pH	7.30*	7.35 – 7.45
$PaCO_2$	72 mmHg (9.59 kPa) *	35 – 45 (4.7 – 6.0)
PaO_2	60 mmHg (7.99 kPa) *	80 – 105 (10.7 – 14.0)
O_2 saturation	89 %*	96 – 100 %
Sodium	140 mmol/L	135 – 145
Potassium	3.8 mmol/L	3.5 – 4.5
Chloride	84 mmol/L*	97 – 106
HCO_3	38 mmol/L*	25 - 27
Base excess	+ 15 mmol *	-2 to +2
Lactate	1.8 mmol/L	< 2.0

Question 20 Continued on Next Page

Question 20 Continued

Question 20 c)

i. 4-year-old girl presenting with 3 days fever, lethargy, sore throat, some vomiting and diarrhoea for the last 24 hours. She is intubated and ventilated in PICU on multiple inotropes.

(3 marks)

ii. List three potential causes of hyperkalemia in this case.

(1 mark)

Parameter	Patient Value	Normal range
pH	6.91*	7.35 – 7.45
$PaCO_2$	59 mmHg (7.86 kPa) *	35 – 45 (4.7 – 6.0)
PaO_2	79 mmHg (10.5 kPa) *	80 – 105 (10.7 – 14.0)
O_2 saturation	89 %*	96 – 100 %
Sodium	130 mmol/L *	135 – 145
Potassium	7.0 mmol/L *	3.5 – 4.5
Chloride	99 mmol/L	97 – 106
Hb	113 g/L	110-140
HCO_3	4 mmol/L*	25 - 27
Base excess	- 21 mmol *	-2 to +2
Glucose	11 mmol/L *	3.6-5.4
Lactate	10.2 mmol/L*	< 2.0

Maximum Score	7.625
Percentage passed	53.8%

Examiners' comments:
The question aimed to assess comprehensive knowledge of blood gas analysis. Most candidates provided superficial and limited information. Candidates who performed detailed analyses using the correct formulae scored well.

Reference(s):
Fuhrman and Zimmerman. Pediatric Critical Care.

Online resources on https://www.anaesthesiamcq.com/AcidBaseBook

Question 21

With regards to chylothorax after cardiac surgery in children:

a) List the diagnostic criteria.

(2 marks)

b) Outline the management of patients with chylothorax, including investigations and therapies.

(5 marks)

c) List the pharmacodynamic effects and side effects of Octreotide.

(3 marks)

Maximum Score	8.25
Percentage passed	76.9%

Examiners' comments:
Candidates demonstrated good knowledge of a common complication post cardiac surgery. Overall, the candidates outlined robust management plans. Candidates scored less when answers listed possible interventions without providing a reasoned plan or context surrounding them.

Reference(s):
Nichols et al. Critical Heart Disease in Infants and Children.

Samanidis, G., et al. Postoperative Chylothorax in Neonates and Infants after Congenital Heart Disease Surgery—Current Aspects in Diagnosis and Treatment. Nutrients 2022.

Bhatnagar M, et al. Chylothorax: pathophysiology, diagnosis, and management-a comprehensive review. J Thorac Dis. 2024

Question 22

a) List four factors that are associated with poor outcome after paediatric traumatic brain injury for each of the following time points:

i. At the scene.

(2 marks)

ii. On presentation to hospital.

(2 marks)

iii. At 72 hours from PICU admission.

(2 marks)

b) Outline how prognostication in traumatic brain injury differs from prognostication after cardiac arrest in children.

(4 marks)

Maximum Score	7
Percentage passed	61.5%

Examiners' comments:

This question was poorly answered, especially in part B. Candidates who listed a barrage of tests without providing context about when they would be deployed or how they would be interpreted failed to demonstrate command of the subject, gaining fewer marks. A small number of candidates provided in-depth answers on this core topic.

Reference(s):

Steyerberg EW, et al. Predicting outcome after traumatic brain injury: development and international validation of prognostic scores based on admission characteristics. PLoS Med. 2008

A.A.Topjian, et al, Pediatric Post–Cardiac Arrest Care: A Scientific Statement From the American Heart Association, Circulation. 2019

Question 23

In relation to **plasma exchange** and **exchange transfusion** in critically unwell neonates and children.

a) Outline the pathophysiological principles involved.

(2 marks)

b) List two indications for each and provide supporting evidence.

(6 marks)

c) List four complications of these procedures.

(2 marks)

Maximum Score	8
Percentage passed	76.9%

Examiners' comments:
Few candidates demonstrated precise and detailed knowledge of plasma exchange and exchange transfusion but, overall, were able to prove that they would apply it appropriately and safely. Several answers highlighted a knowledge gap in the mechanics of either technique, the differences between them, or the significant complications; however, candidates were able to provide indications and evidence sufficient to pass.

Reference(s):
Rogers. Pediatric Intensive Care.

Management of Hyperbilirubinaemia in the Newborn Infant 35 or More Weeks of Gestation. American Academy of Paediatrics, Clinical Practice Guideline. Paediatrics 2004.

Emre U, et al. Effect of transfusion in acute chest syndrome of sickle cell disease. J Pediatr 1995.

Ipe TS, et al. Therapeutic Plasma Exchange in Myasthenia Gravis: A Systematic Literature Review and Meta-Analysis of Comparative Evidence. Front Neurol 2021.

Question 24

a) What is a systematic review?

(1 mark)

b) What is a meta-analysis?

(1 mark)

c) Outline the advantages and disadvantages of these two methods.

(8 marks)

Maximum Score	6.25
Percentage passed	61.5%

Examiners' comments:
The question was poorly answered. While candidates commonly needed more specific knowledge of each methodology, few could articulate the key differences between them or the respective advantages/disadvantages of each technique.

Reference(s):
Ankita Agarwal et al. 21st Century Evidence: Randomized Controlled Trials Versus Systematic Reviews and Meta-Analyses. Crit Care Medicine. 2021

Question 25

Discuss the use of prone positioning ventilation in ARDS with respect to:

a) Pathophysiological principles.

(5 marks)

b) Practical considerations, including complications and contraindications.

(3 marks)

c) Evidence for benefit.

(2 marks)

Maximum Score	7.175
Percentage passed	53.8%

Examiners' comments:

The answers demonstrated an overall knowledge gap in the pathophysiology behind the deployment of the prone position in patients with ARDS and the mechanism leading to improved oxygenation. Many candidates failed to comment on potential complications and contraindications in depth.

Reference(s):

Guerin et al. Prone Positioning in ARDS patients; Why, When, How and for Whom. Intensive Care Med. 2020

Guerin et al. Prone positioning. Intensive Care Medicine 2024.

Question 26

You are phoned for advice regarding a 6-hour-old, 3.5kg term baby with a congenital diaphragmatic hernia (CDH) in NICU.

- Current Ventilation: High-Frequency Oscillatory Ventilation (HFOV)
  Settings: MAP 18 cmH_2O, amplitude 30, Hz 10, FiO_2 1.0, iNO 20ppm
- Oxygen Saturations: pre ductal 79%, post ductal 62%
- HR 175/min, BP 59/33 (41), capillary refill time 2-3 seconds
- On dopamine at 5 micrograms/kg/minute.

Arterial blood gas (taken from the umbilical arterial catheter (UAC))

Parameter	Result	Normal Range
pH	7.2 *	7.35 -7.45
pCO_2	61 mmHg (8.2 kPa) *	35-45 (4.7-6.0)
pO_2	32 mmHg (4.3 kPa) *	70 -100 (9.3-13.3)
Lactate	1.9 mmol/L	< 2

The neonatologist has calculated the Oxygenation Index (OI) as 68 and wonders if this baby would benefit from ECMO.

a) How is the Oxygenation Index calculated and what is the significance of this OI value in this child?

(2 marks)

b) Outline the advice you would give the neonatologist to help them optimise the baby's oxygenation.

(6 marks)

c) What is the role of ECMO in the management of CDH?

(2 marks)

Maximum Score	5.85
Percentage passed	38.5%

Examiners' comments:
Most candidates failed to comment on the role of OI calculated with post-ductal arterial blood. The majority of answers were superficial, failing to comment/guide on the use of inotropes/alprostadil or on the need for an Echo. The controversies of early ECMO and the difficulties in assessing physiological reserve were poorly addressed.

Reference(s):
Peter T. Yu, et al. The role of ECMO in the management of congenital diaphragmatic hernia Seminars in Perinatology, 2020.

Shazia Bhombal, et al. Diagnosis & management of pulmonary hypertension in congenital diaphragmatic hernia. Semin Fetal Neonatal Med 2022.

Question 27

In response to the College of Intensive Care Medicine requirement for trainee competency in "*Focused cardiac ultrasound*", your director asks you to draft a plan for the implementation of a program in your unit.

Outline what you would consider in the development and implementation of a program.

(10 marks)

Maximum Score	7.75
Percentage passed	84.6%

Examiners' comments:
Most candidates could provide a reasonable outline for the design of an ECHO teaching program. However, very few were able to outline governance for the teaching program or comment on escalation mechanisms for abnormal findings. None of the candidates mentioned PICU nursing colleagues as part of their stakeholder engagement.

Reference(s):
CICM Policy (2018) - Levels of training in adult crit care ECHO.

CICM Statement (2016) – The role of ECHO in ICU.

CICM Trainee resource – Focused cardiac ultrasound in Intensive Care.

CICM (2020) - Focused Cardiac Ultrasound in Intensive Care Training Competency.

Question 28

With regards to the Syndrome of Inappropriate Antidiuretic Hormone (SIADH) and Cerebral Salt Wasting syndrome (CSW):

Compare and contrast

a) Pathophysiology

(2 marks)

b) Expected clinical and biochemical findings

(3 marks)

c) Management

(5 marks)

Maximum Score	5.375
Percentage passed	15.4%

Examiners' comments:
Most candidates could explain the pathophysiology, clinical findings and management of SIADH. However, knowledge of CSW was poor, with several candidates confusing CSW with Diabetes Insipidus. Answers needed more depth in the section on management of these common intensive care conditions (5 marks allocation).

Reference(s):
Ji Young Oh, et al. Syndrome of inappropriate antidiuretic hormone secretion and cerebral/renal salt wasting syndrome: similarities and differences. Frontiers in Pediatrics 2015.

Question 29

A 6-month-old boy, corrected age 7 weeks, is admitted to your PICU with severe RSV bronchiolitis. He was ventilated in NICU for 16 weeks and requires ongoing home oxygen (0.5 L/min) and oral Sildenafil for pulmonary hypertension.

He is tachypneic to 110/min with increased respiratory effort and desaturation episodes to 83% on a CPAP of 5 cmH_2O.

a) Outline your approach to intubation and ventilation for this patient.

(5 marks)

b) What are the echocardiographic findings of pulmonary hypertension and how is pulmonary artery pressure estimated by echo.

(3 marks)

c) Outline your management plan to support this patient's Right Ventricle.

(2 marks)

Maximum Score	7.17
Percentage passed	38.5%

Examiners' comments:

Most candidates failed to show the challenges in the management of this case, balancing pulmonary hypertension with ARDS management in a patient with chronic lung disease. Candidates also failed to address part a of the question, which asked to address intubation and ventilation with the majority of the candidates giving a good intubation plan but little to no detail on ventilation management. The ECHO knowledge demonstrated was very superficial.

Reference(s):

Emeriaud, Guillaume, et al. Executive summary of the second international guidelines for the diagnosis and management of pediatric acute respiratory distress syndrome (PALICC-2). Pediatric Critical Care Medicine 2023.

Kaestner M, et al. Pulmonary hypertension in the intensive care unit. Expert consensus statement on the diagnosis and treatment of paediatric pulmonary hypertension. The European Paediatric Pulmonary Vascular Disease Network, endorsed by ISHLT and DGPK. Heart. 2016.

Question 30

A 3-day-old, 3.8 Kg baby with hyperammonaemia is referred to your PICU from a level 3 NICU 100 Km away (90 minutes road trip). The referring hospital cannot transport the patient but your transport team is in-house.

The referring neonatal registrar describes the baby as tachypnoeic and lethargic, although still breastfeeding. Last ammonia level, taken 30 minutes before the call, was 500 micromol/l (reference range <50 micromol/l).

In order to get the patient to your unit and initiate renal replacement therapy as quickly as possible, outline:

a) The advice that you will give to the referring doctor.

(4.5 marks)

b) The principles that will guide this transport and transport team.

(3 marks)

c) The preparatory steps that you will take at your hospital.

(2.5 marks)

Maximum Score	8.125
Percentage passed	38.5%

Examiners' comments:

Most candidates gave well-structured answers and approach to part a with advice to the referring centre. Part b. on transport principles was poorly answered with a limited understanding of transport principles. Most answers regarding preparation failed to consider other teams involved in the care of these critically ill newborns.

Reference(s):

Savy N, et al. Acute pediatric hyperammonemia: current diagnosis and management strategies. Hepat Med. 2018

Summar ML, et al. Inborn Errors of Metabolism with Hyperammonemia: Urea Cycle Defects and Related Disorders. Pediatr Clin North Am. 2018

ORAL SECTION

The Clinical Section

The Clinical Section (2 clinical cases – 20 minutes per case) was conducted in the Paediatric Intensive Care Unit at Starship Children's Hospital, Auckland, New Zealand.

Candidates who approach the clinical examination of the patient and presentation of findings in an organized manner will impress the examiners. 30% of the overall marks are allocated to the two clinical cases. Candidates should bear this in mind when preparing for the examination.

Candidates were given a written introduction to the hot cases, which they studied for 2 minutes prior to commencement. This allowed candidates time to think about how best to approach the case, what information to seek and how to structure the examination. These two minutes are in addition to the 20 minutes taken to perform the hot case.

Cases are usually presented as problem-solving exercises. For maximum marks, candidates should demonstrate a systematic approach to examination, clinical signs should be demonstrated, and a reasonable discussion regarding their findings should follow.

Some candidates waste valuable time at the start of the case by spending more than a couple of minutes around the bedside before actually examining the patient. Exposing the patient should be limited to those areas that are necessary for that component of the examination. Candidates must show appropriate courtesy and respect to patients and their families if present during the examination.

The twenty minutes available for each case provides ample opportunity to discuss investigations and plans of management. Candidates are reminded that a large proportion of the marks are allocated to coherent presentation and synthesis, discussion and reasoning. Candidates should approach the case discussion in a consultant-like manner.

Cases encountered in the clinical component of the examination included:

- An 8 weeks corrected-age boy (born at 27 weeks), with pulmonary hypertension, extensive NEC with short gut syndrome and 15 days post tracheostomy still dependent on positive pressure ventilation.
- A 22-month-old boy, day 3 post-AVSD repair and postoperative JET managed with targeted therapeutic hypothermia, amiodarone infusion and overdrive pacing.
- A 7-year-old with necrotising pneumonia on VV-ECMO and antiphospholipid syndrome with left-hand ischemic changes.

Viva Section

There are 8 stations of ten minutes each for structured vivas. Two minutes are provided to read an introductory scenario (which includes the initial question) outside each viva room. This same information is also provided inside the viva room.

The following are the introductory scenarios and questions provided to the candidates:

Viva 1

A 4-month infant was admitted to your PICU 6 hours ago following Tetralogy of Fallot repair with a transannular patch. The right ventricle (RV) was noted to be hypertrophic at operation with low residual gradient across the RV outflow tract at the end of the case and no residual VSD.

The patient has a central and arterial line in situ as well as pacing wires and chest drains; he was extubated in the operating theatre and is self-ventilating in 40% oxygen via high-flow nasal canulae at 2L/Kg/min.

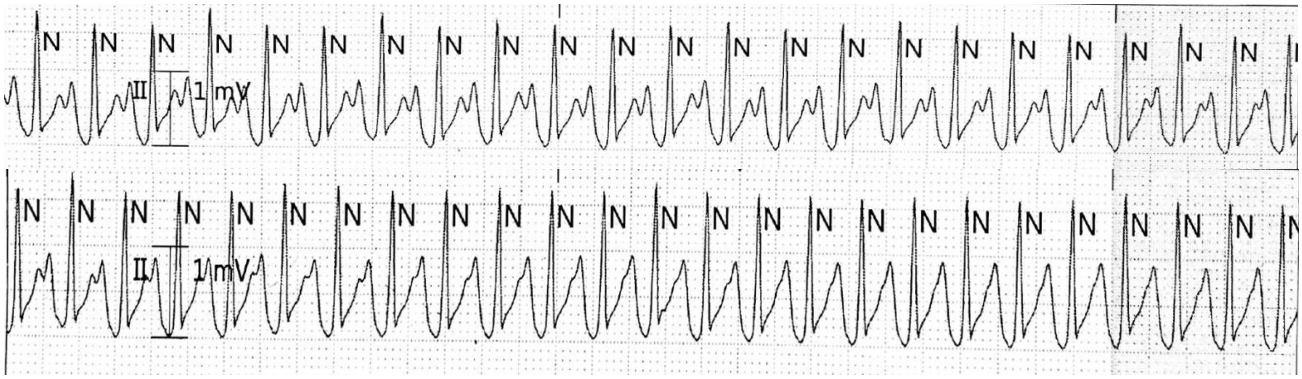
The current vital signs include:

- HR 195bpm
- BP 55/30mmHg (MBP 38 mmHg)
- CVP 14mmHg
- SpO2 96%
- Arterial Lactate 3.7 mmol/L (Normal <2.0)
- SvO2 47%
- Temperature 37.8°C

Current infusions include:

- milrinone 0.75 micrograms/kg/min;
- adrenaline increased from 0.05 to 0.25 micrograms/kg/min since admission;
- morphine 20 micrograms/kg/hr.

The rhythm strip from the bedside monitor looks like this:



Outline your clinical concerns for this patient.

Maximum Score	9
Percentage Passed	90%

Candidates did well if they:
Candidates did well if they demonstrated a good understanding of Junctional Ectopic Tachycardia and asked for an atrial ECG in addition to a 12 lead ECG. Good candidates demonstrated a systematic approach to management of low cardiac output state in a post operative patient with good understanding of Tetralogy of Fallot physiology.

Candidates achieved less marks if they:
Candidates did poorly if their answers were disorganised or required frequent prompting. Candidates who failed this question did not identify low cardiac output state and could not create a list of differential diagnoses. Poor answers did not demonstrate an understanding of the relevant physiology and could not give a good management plan.

Viva 2

A 14-year-old boy presents with a 6-day history of vomiting, jaundice and abdominal pain.

On examination he is confused with GCS of 9 (E1, V3, M5) and brisk deep tendon reflexes.

Observations:

- Heart rate 80/minute,
- Blood pressure 130/70mmHg,
- Pupils 3 and reactive bilaterally.

What differential diagnoses would you consider for this child and how would you investigate them?

Maximum Score	8.5
Percentage Passed	70%

Candidates did well if they:
Good Candidates could identify acute liver failure with encephalopathy and give a comprehensive list of aetiology and could describe complications. Investigations were comprehensive and include general plus specific investigations with discussions such as imaging and biopsy. Good management answers discussed specific strategies as well as supportive care.

Candidates achieved less marks if they:
Candidates did poorly if they did not recognise acute liver failure with encephalopathy and could only provide generic investigations with little consideration of the underlying aetiology.

Viva 3

A 4-year-old girl, 2 years after liver transplant, is in ED with a first episode of Generalised Tonic-Clonic seizure (TCS), lasting for 20 minutes despite 3 doses of intramuscular (IM) Midazolam.

She has a 4 day history of lethargy, vomiting and headache.

Her current observations are:

HR 170/min
BP 165/90mmHg
Sats O2 84% in 15 Lt/min O2 via non-rebreather mask
PUPILS 5 mm bilaterally, not responding, ongoing tonic clonic seizures
Temperature 37.1 C

Regular medications:

Amlodipine 1.5 mg BD
Aspirin 100 mg OD
Azathioprine 30mg OD
Prednisolone 5mg OD
Tacrolimus 2 mg BD
Trimethoprim-sulfamethoxazole 0.5 tablet 3 times/week
Valganciclovir 300 mg OD
Vitamin A 5000 iu OD

What are your immediate management priorities?

Maximum Score	8.125
Percentage Passed	80%

Candidates did well if they:
Candidates did well if they presented an organised structure and clear plan. Good answers started with a broad differential diagnosis and candidates were able to escalate management of the patient as the scenario progressed. Most candidates recognised Posterior reversible encephalopathy syndrome (PRES) as part of the differential diagnosis and recognised the MRI images as being consistent with the diagnosis of PRES.

Candidates achieved less marks if they:
Candidates achieved less mark if they provided superficial answers e.g. talking about sepsis or an infective cause but not mentioning antibiotics. Candidates did poorly if they did not answer the question that was asked. Very few candidates talked about obtaining an EEG for either PRES or status epilepticus management. Poor answers did not include clear goals for their suggested management e.g. neuroprotection.

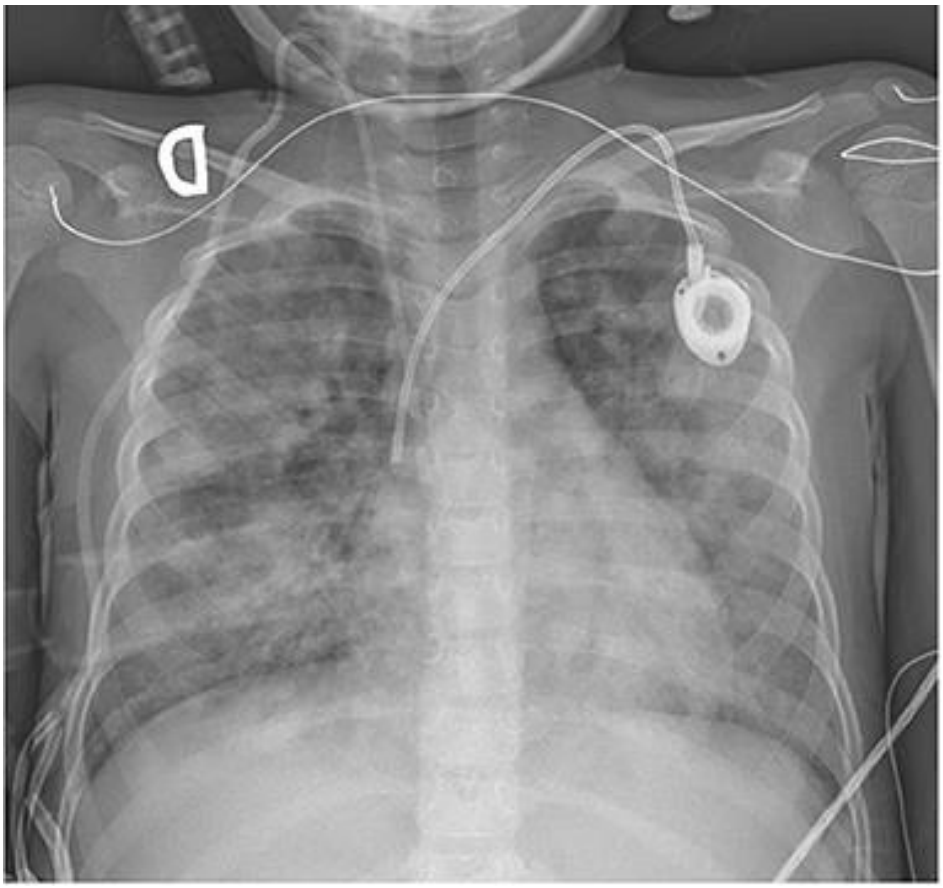
Viva 4

You are asked to review 6-year-old Claire on the oncology ward for hypotension despite receiving 30mls/kg of normal saline. She is 29 days post allogenic bone marrow transplantation for Acute Lymphoblastic Leukemia.

Current Assessment:

- Drowsy
- HR 150 bpm
- BP 70/50 mmHg
- RR 30/min with moderate work of breathing.
- $SatO_2$ 92% with 2L low flow nasal O_2
- Temp 38.0 °C
- Central capillary refill time 3-4 seconds.

Chest x-ray:



Outline your initial plan of management for this patient, including differential diagnosis and investigations.

Maximum Score	7.625
Percentage Passed	70%

Candidates did well if they:
Candidates who performed well maintained an overview, stated their major concerns, listed relevant differential diagnoses with pertinent investigations and communicated their intentions about patient management and disposition. All candidates placed sepsis at the top of their list. Good candidates demonstrated their mastery of sepsis management including their choice of antimicrobials, source control and shock management. Candidates scored well if they were able to provide corrective strategies for inadequate ventilation including appropriate ventilator adjustments, fluid removal, pronation and inhaled nitric oxide.

Candidates achieved less marks if they:
Candidates who launched into detailed aspects of immediate resuscitation tended to lose their way, requiring redirection. Some candidates omitted common complications of BMT, chemotherapy and immunotherapy. Every candidate had to be prompted to describe any physical signs they would seek on examination which was surprising. Candidates who needed a lot of prompting scored fewer marks. Statements without explanation also scored poorly eg mentioning lung protective ventilation but unable to explain what that meant.

Viva 5

You are the PICU consultant on call for retrieval.

You are contacted for advice by a small regional hospital, 300km from your tertiary children's hospital to arrange retrieval for a 3 year old boy with coryzal symptoms, respiratory distress and agitation who has just presented to their hospital.

Observations:

Saturations 89% on 6L O2 via Hudson mask,

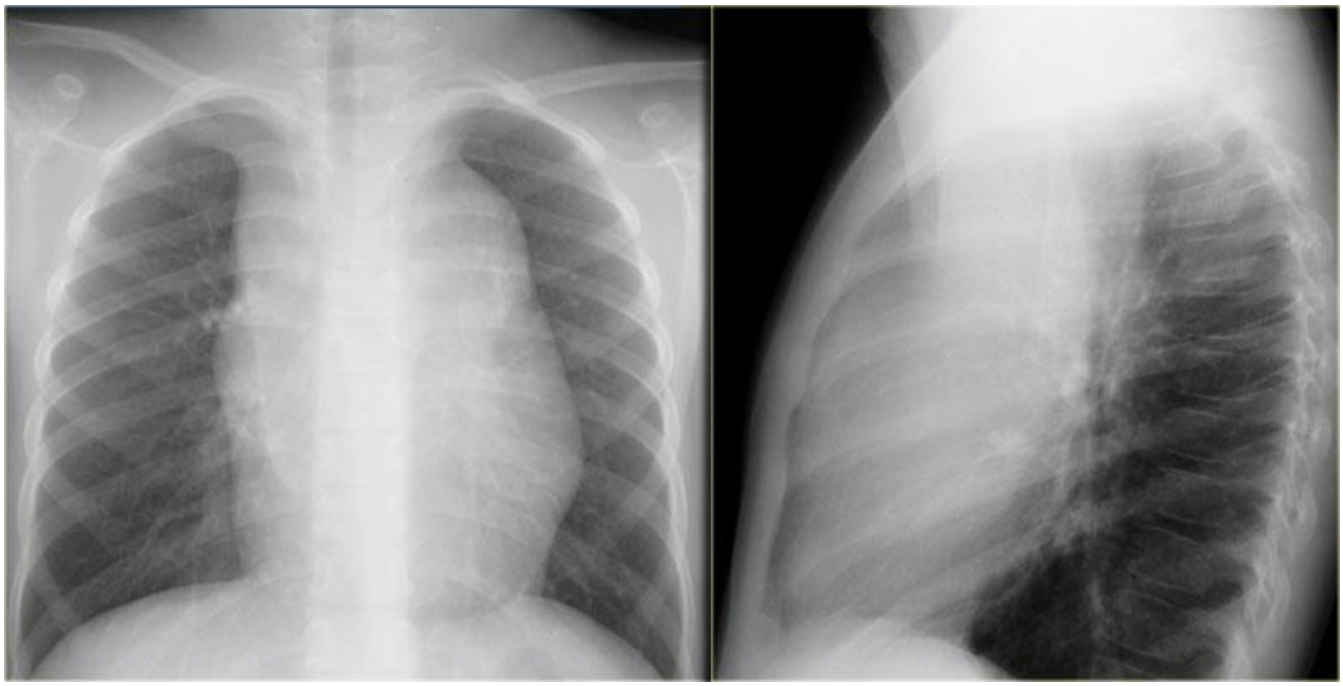
Respiratory Rate 30 breaths/min, mild-moderate work of breathing

Heart Rate: 144 bpm

Blood Pressure: 90/55mmHg

Afebrile

Chest x-ray:



What are the salient features on chest x-ray?

What is the most likely diagnosis?

Maximum Score	6.625
Percentage Passed	40%

Candidates did well if they:
Candidates did well if they had a structure and approach to the problem and could identify that there were multiple issues to address including clinical issues as well as the complexity of transport.

Candidates achieved less marks if they:
Candidates did poorly if they did not demonstrate an understanding of the complexity of transport and their answer did not show the challenges of managing a complex clinical scenario.

Viva 6 – Radiology Viva

Candidates were shown a series of radiological investigations and asked to describe the important findings in each.

Maximum Score	7.25
Percentage Passed	60%

Candidates did well if they:
Candidates performed strongly when demonstrating a systematic and methodical approach to radiological investigations. Successful candidates were expected to identify and discuss the major radiological findings that are frequently encountered in patients admitted to the Paediatric Intensive Care Unit (PICU).

Candidates achieved less marks if they:
Candidates received low scores when their approach to radiological imaging was superficial and lacked organization. Furthermore, lower marks were given when candidates failed to accurately identify and articulate the main abnormal findings in the images.

Viva 7 – Procedure Viva

You have just retrieved a 1yr old, 10 kg child with pneumococcal haemolytic uraemic syndrome (HUS) who is anuric. They have received adequate fluid resuscitation. The child is currently intubated and ventilated, sedated, and receiving adrenaline 0.05mcg/kg/min and noradrenaline 0.15mcg/kg/min for hypotension.

Current vital signs:

HR 130/min
BP 90/42 (Mean 58 mmHg,)
Saturations 100%

The most recent blood results are:

Chemistry	**Normal Range**
Na 132	135-145 mmol/L
K 7.5	3.5 - 5 mmol/L
Urea 35	1.8 - 5.2 mmol/L
Cr 170	< 40 umol/L
Alb 32	32-48 g/L
PO4 1.9	1.1-2.2 mmol/L
ALT 34	0-45 U/L
ALP 202	80-450 U/L
Lactate 4	< 2mmol/L

Full blood count	**Normal Range**
Hb 70	105-140 g/L
Platelets 22	150-500 E+9/L
WCC 35	5-14 E+9/L

Basic Haemostasis Screen	**Normal Range**
APTT 65	25-38 seconds
PR 1.2	0.8-1.2
Fibrinogen 2.1	1.5-4 g/L

You have decided to start renal replacement therapy. Describe your approach to initiating this in this patient.

Maximum Score	8.25
Percentage Passed	90%

Candidates did well if they:
Candidates had a good understanding of the components of a CVVH prescription and how to adapt them to initiate treatment. Candidates with a structured approach were able to answer the trouble shooting questions well.

Candidates achieved less marks if they:
Candidates that did poorly did not have a structured approach to troubleshooting and required a lot of prompting to get through the questions. They lacked specific knowledge about manipulating the prescription/machine and tended to focus on cannula and patient issues. Candidates also achieved less marks if they did not discuss the logistics of how to put a haemodynamically unstable patient onto CVVH or demonstrate that they were aware that this might precipitate haemodynamic instability and required some additional thought/consideration.

Viva 8 – Communication Viva

You are a junior consultant working with a new registrar, Grace. She is post adult ICU Fellowship.

You observe an interaction between Grace and one of the unit's outreach nurses that concerns you:

- Nurse approaches Grace to discuss a patient on the ward.
- Nurse concerned that the patient is at risk of deterioration and the inpatient team doesn't seem concerned.
- The nurse asked if Grace could come to the ward and review the patient with her.
- Grace appeared to roll their eyes and dismiss the concerns.
- Grace stated that this was not an ICU issue, and that the nurse should discuss their concerns with the inpatient team.
- Grace turned and walked away from the nurse and returned to the computer.

You are concerned that this behaviour does not align with unit culture and has the potential to adversely impact patient safety in the organisation. You believe in timely feedback.

It is 5 minutes after the event, and there is an opportunity to engage in a private feedback conversation with Grace. The conversation should include the observed interaction, its potential impact and plan going forward.

Maximum Score	7
Percentage Passed	50%

Candidates did well if they:
The aim of this scenario was to deliver supportive feedback on performance during a working day which is an important skill for all consultants. Candidates who performed well checked in with the trainee, spent some time developing rapport and made the trainee feel safe. They were able to raise concerns without making it personal and were specific about the perceived issues. They worked collaboratively with the trainee to make a plan to move forward with nursing staff and future referrals.

Candidates achieved less marks if they:
Candidates did poorly if they asked closed questions, rushed the conversation to deliver their message and presenting information in a way that was unclear to the actor. Candidates also did poorly if the actor reported that they were made to feel anxious or unsafe in the conversation.