

FEx Net 2022 Collated SAQs: Environmental Questions

1. Altitude
2. Cold
3. Collapse
4. Diving
5. Diving
6. Diving
7. Drowning
8. Drowning
9. Electrocution
10. Heat
11. Heat
12. Heat
13. Jellyfish
14. Lightning
15. Octopus
16. Snake
17. Snake
18. Snake

Question 1 (15 marks)

You have agreed to be the expedition doctor for a trek to the Everest base camp. (altitude 5300m)

- i. Outline the proposed pathophysiology of:

Acute Mountain Sickness (AMS)/High Altitude Cerebral Oedema (2 marks)

High Altitude Pulmonary Oedema (2 marks)

ii. List 2 risk factors for the development of High Altitude Pulmonary Oedema at any given altitude (2 marks)

iii. List 5 clinical features of AMS (5 marks)

iv. For severe High Altitude Pulmonary Oedema, list 4 treatment options (4 marks)

Question 2 (15 marks)

An elderly lady is brought to your ED by ambulance. She was found by a neighbour in her back yard.

Vital signs: GCS 9 (E3V3M3)
BP 90/50 mmHg
HR 45 bpm
SaO2 90% (8L/min Hudson)
Temp 27 deg celsius (oral and rectal)

- i. List possible complications of her hypothermia on four organ systems (4 marks)

- ii. After one hour, the patient remains GCS 9 and temp 29 degrees despite initial treatment. You decide to perform a CT brain. List 3 pros and 3 cons of intubating prior to CT (6 marks)

- iii. The patient develops ventricular fibrillation. List five ways in which your approach to this resuscitation differs from standard ALS principles (5 marks)

Question 3 (26 marks)

You are the ED consultant on call at a major tertiary centre. You receive a call from a rural district hospital 200km away requesting advice. The locum GP has inadvertently injected 350mg of Bupivacaine as intravenous regional anaesthesia instead of Prilocaine into a 60yr old woman with a Colle's fracture. The cuff is currently inflated, and the fracture reduced. The patient is 50kg, asymptomatic and has normal vital signs.

Questions:

1. List (3) serious complications which may arise from this event.

(3 marks)

2. List the (4) main priorities of managing this situation?

(4 marks)

3. List (2) retrieval options for this patient, with (2) advantages and (2) disadvantages of each.

(10 marks)

Retrieval Method	Advantage	Disadvantage
1-		

2-		
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4. List (5) steps you will take to prepare your tertiary ED to receive this patient .
(5 marks)

5. List (4) medico---legal issues should be addressed in this case? (4 marks)

Question 4 (19 marks)

A 30 year old male is brought by ambulance to your urban district ED from a local beach following a SCUBA dive. His dive buddy reports that the patient appeared to be behaving abnormally and possibly had brief seizure---type movements during their dive at a depth of 35 metres.

- i. List 3 diving---related causes of confusion or behaviour change at depth (3 marks)

Because of the problem at 35 metres, the buddy forced a rapid ascent and omitted a decompression stop at 10 metres. On the dive boat, the patient began to vomit and was very unsteady on his feet.

- ii. List 3 differential diagnoses for this presentation and outline historical or examination features that would support each differential (9 marks)

Differential Diagnosis	Supporting Findings

- iii. Complete the following table of changes in bubble size with change (altitude or depth) from sea level (4 marks)

Altitude	10,000 feet	
	2,000 feet	
	Sea Level	10 ml
Depth	10 metres	
	20 metres	

- iv. List 3 relative contraindications to helicopter retrieval in this patient (3 marks)

Question 5 (12 marks)

A 39 year old SCUBA diver presents to your Emergency Department with a rash to his torso after ascending from a dive on the Great Barrier Reef two hours ago.

See image in Props book.

a) State the two (2) most likely differential causes for the rash. **(2 marks)**

1.

2.

b) List six (6) risk factors for a SCUBA diver developing decompression illness. **(6 marks)**

1.

2.

3.

4.

5.

6.

The patient develops weakness in his legs and urinary retention. There are concerns that he has Spinal Decompression Illness and the decision is made to retrieve him to the nearest hyperbaric chamber, 300km away.

- c) State two (2) advantages and two (2) disadvantages for using an Aeromedical Helicopter to retrieve this patient. **(4 marks)**

Advantage 1.

Advantage 2.

Disadvantage 1.

Disadvantage 2.

Question 6 (22 Marks)

You are working as the doctor on a helicopter retrieval service that is dispatched to retrieve a patient that has collapsed on a dive boat on a nearby reef.

Questions:

1. List 8 key features in the history that you would need to assess this patient's risk of decompression illness.

(8 marks)

2. List 5 body systems that may be affected by decompression illness and give one example for each.

(10 marks)

Body system	Example

3. Outline 4 key considerations in transporting this patient by helicopter.

Question 7 (11 MARKS)

You are the in-charge consultant at an urban district hospital. You receive a batcall about a 2-year-old who has been dragged unconscious from a backyard pool. It is the middle of winter.

His vital signs en route are:

HR	70	GCS	Unresponsive
BP	70/40	Temp	30 degrees
O2 sats	90% (bag valve mask FiO2 1.0)		

1. List 4 predictors of poor outcome in drowning. (4 marks)

(1) _____

(2) _____

(3) _____

(4) _____

You intubate this child on arrival.

*See his initial CXR below

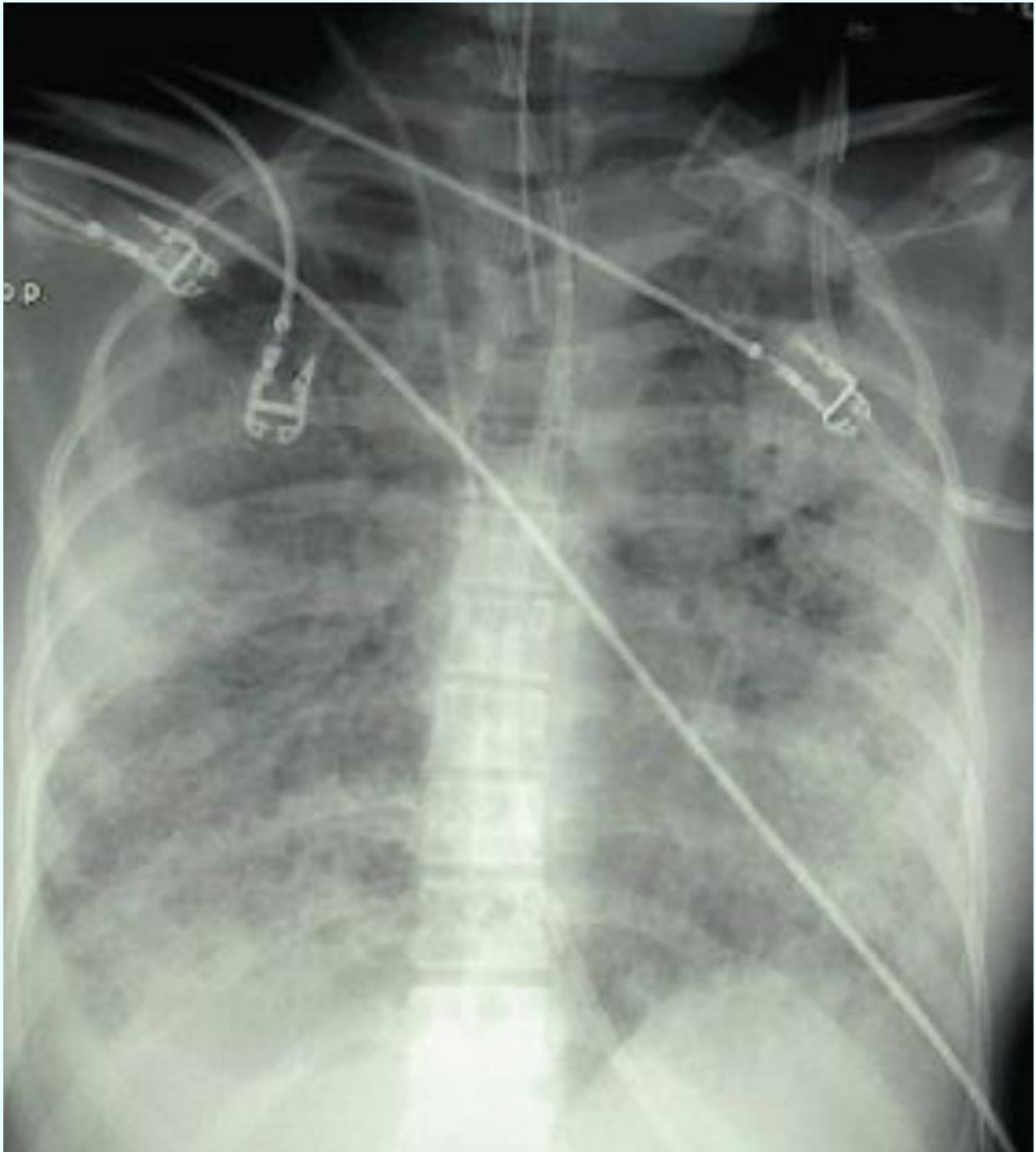
2. List 2 relevant features at this stage of the patient's management. (2 marks)

(1) _____

(2) _____

3. What ventilation strategies would you use? (2 marks)

4. What are your other initial management priorities? (3 marks)



Question 8 (18 marks)

You are on duty in a small urban district hospital. You attend to an 8 year-old boy who was rescued from the bottom of a saltwater backyard pool, unconscious. He was resuscitated by pre-hospital personnel and presents with the following vital signs:

HR 72 bpm, regular

BP 90/60 mmHg

RR 24 bpm

SaO₂ 100 % on high flow oxygen

- i. Outline 5 key features in your examination of this child (5 marks)

- ii. List 5 factors which determine this child's prognosis (5 marks)

- iii. The child's GCS improves to 14. Despite high flow "non-rebreather" mask oxygen, he shows signs of respiratory distress from aspiration pneumonitis. Complete the table outlining 3 escalating modalities that could be used to improve his oxygenation. Describe initial settings and sizes as appropriate (6 marks)

Treatment/modality	Settings

- iv. List 4 potential disadvantages of the use of non-invasive mask ventilation (CPAP or BiPAP) for this child in the aero-medical retrieval context (4 marks)

Question 9 (15 marks)

A 27 year old man climbed over an electricity sub-station fence and sustained an electrical injury while grabbing a metal pole with his right hand. He arrives 30 minutes later complaining of tingling in his right arm and a numb left foot.

A CLINICAL PHOTOGRAPH IS SHOWN Below

- i. Describe the wound seen on the foot (1 mark)

Question continues next page

- ii. Complete the table outlining factors that determine the severity of an electrical injury (8 marks)

Category	Explanation
Voltage	
Current	
Resistance	
Type of current	

- iii. For each of the three categories below, what specific injuries or problems may occur in the patient described in the stem? For each, describe the patho-physiological process (6 marks)

	Injury	Pathophysiology
Cardiac		
Nervous system		
Limb/soft tissue		



Question 10 (24 marks)

There has been a 3-day heat wave involving the south-eastern region (parts of NSW, Victoria and South Australia) with daytime temperatures 38-40 degrees Celsius and overnight minimum temperatures of 28-30 degrees Celsius.

- i. List 4 groups who are particularly at risk of developing non-exertional heat-related illness and include your reasoning (8 marks)

At-risk group	Explanation

- ii. What is the classic definition of heatstroke? (1 mark)

- iii. Provide 3 differential diagnoses of heatstroke in each of the 2 listed categories (6 marks)

Drug intoxication:

Infections:

- iv. Complete the table listing 3 cooling methods and 2 advantages and 2 disadvantages of each (9 marks)

Cooling method	Advantages	Disadvantages

Question 11 (21 marks)

A 20 year old male is brought to your ED with confusion and hyperthermia following a marathon. You think he has exertion related heat stroke.

- i. What are the management priorities in this situation (5 marks)

- ii. What investigations would you perform and why (4 marks)

Heat illness affects some groups more than others and non-exertional heat stroke is more common during heat waves.

- iii. Define heat wave (2 marks)

- iv. List 4 risk factors for classic non-exertional heat stroke (4 marks)

- v. List three drugs/medications from different classes that increase the risk of heat stroke and explain the pharmacological reason(s) for the effect for each (6 marks)

Medication	Explanation

Question 12 (19 Marks)

A 2 year old boy presents to your ED with fever and drowsiness after being left unattended for 30mins in a locked vehicle.

Her vitals signs are:

HR 150
BP 70/35
Temp 41 C
RR 48
Sats 95%

1. List 5 possible differential diagnoses. (5 marks)

2. List and justify 6 investigations you would perform in ED in this patient. (6 marks)

3. Outline your approach for cooling this patient in the ED.

(8 marks)

Question 13 (11 marks)

You are working in a rural hospital in North Queensland and the ambulance bring in a 19 year old man with a suspected jellyfish envenomation.

What 2 jellyfish have life-threatening envenomation? (2 marks)

1: _____

2: _____

Compare and contrast them in terms of their clinical features (4 marks)

	1: _____	2: _____
Timing of pain		
Location of pain		
Skin changes		
Cardiac arrest?		

He has been stung by this jellyfish



What is the name of this jellyfish? (1 mark)

Discuss the components of management relevant to this envenomation (4 marks)

Question 14 (10 Marks)

A 55 year old man is brought to ED by ambulance after being found collapsed on a golf course. He received bystander CPR for 5-10 minutes at the scene. On arrival to ED, he is haemodynamically stable, spontaneously ventilating and alert but slightly confused.

Vital signs:

HR 120/min

BP 190/100mmHg

GCS 14

E4, V4, M6

RR 26/min

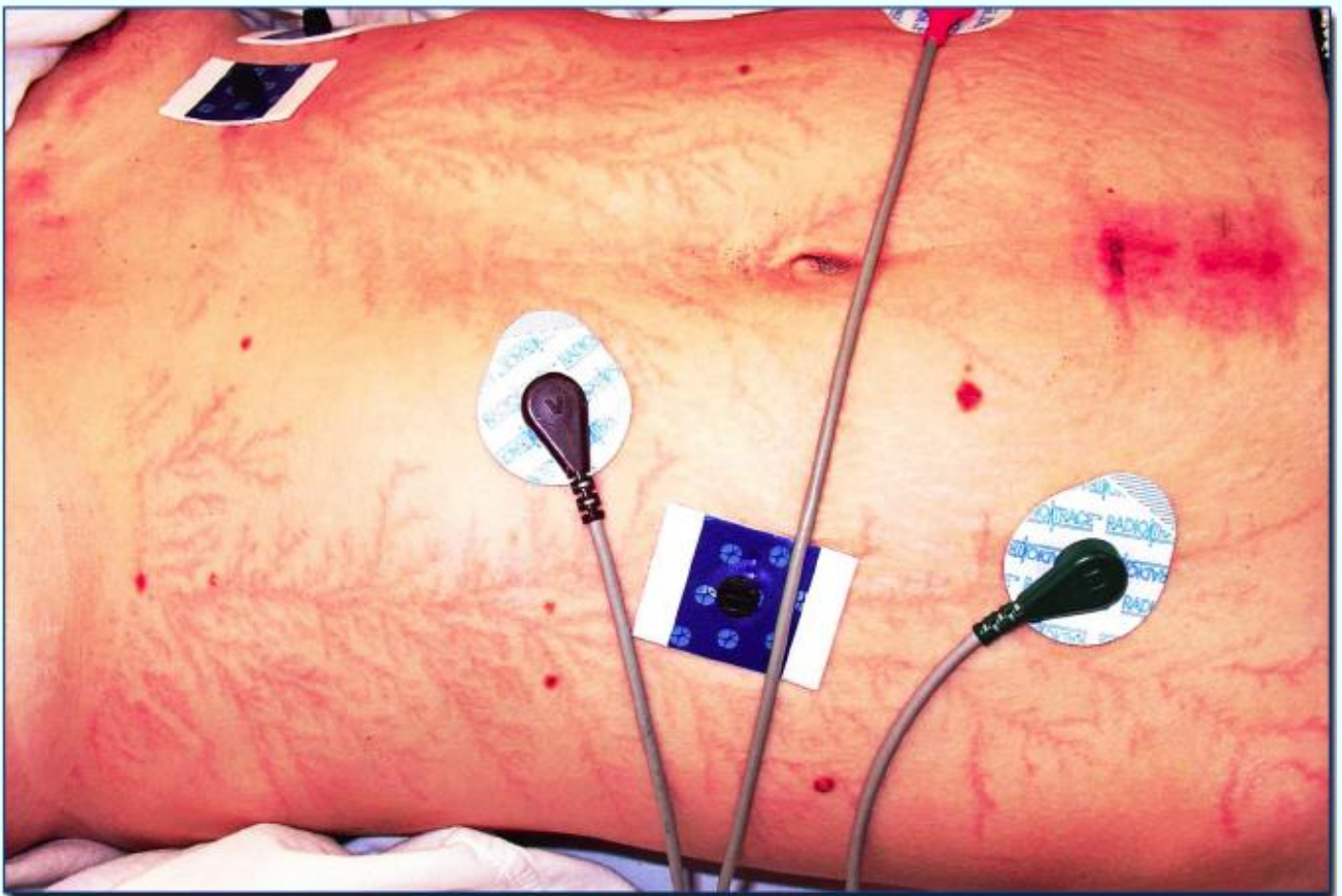


Figure 1: Image reproduced from Dunn's Emergency Medicine Manual (6th edition)

1. What is the most likely diagnosis? List **2** features from the photograph that support this diagnosis (2 marks).

Diagnosis: _____

Clinical Features:

i. _____

ii. _____

2. List **4** immediate complications that you would assess for (4 marks).

i. _____

ii. _____

iii. _____

iv. _____

3. List **1** important delayed complication requiring specialty follow-up (1 mark).

4. List and justify **3** investigations for this patient (3 marks).

	Investigation	Justification
1.		
2.		
3.		

Question 15 (11 marks)

A 10 year old boy collapses on the beach in Queensland after playing in a small rock pool. He had been handling a small sea creature. He is brought to your rural ED by paramedics who identified the creature as a blue ring octopus.

- i. Identify the type of toxin and its mechanism of action (2 marks)

- ii. Describe the clinical features you would expect this child to exhibit in early and late stages of the toxidrome (4 marks)

Stage of toxidrome	Clinical signs
Early signs – list 2	
Late signs – list 2	

- iii. Identify the definitive management step for the toxidrome from the blue ring octopus (1 mark)

- iv. List 2 other marine creatures which may cause collapse on an Australian beach and identify the mechanism of the collapse (4 marks)

Marine Creature	Mechanism of collapse

Question 16 (11 Marks)

You are working in an ED in North Queensland.

A nine year old child has been brought to the ED by her mother after being bitten by a snake in her backyard.

The patient has normal vital signs on arrival.

1. List **four specific features** of your examination. (4 marks)

(1) _____

(2) _____

(3) _____

(4) _____

2. List the **two most relevant** laboratory investigations you will perform. (2 marks)

(1) _____

(2) _____

Initial assessment demonstrates **no evidence of envenomation**.

3. List your **discharge criteria** for this girl.

(5 marks)

- (1) _____

- (2) _____

- (3) _____

- (4) _____

- (5) _____

Question 17 (12 Marks)

You are working in the afternoon at 'fast track' at a large referral centre in rural coastal Queensland.

The triage nurse asks you to see an 8 year old child is brought in by his mother with a bruise to his right foot. Reportedly, the child came into the house crying 20 minutes previously complaining of feeling nauseous and having a 'bit of a sore foot'.

You take a look the child's foot - a clinical photograph is available **(see props booklet, question 28)**.

- i. List five (5) steps you would perform as part of your immediate management. (5 marks)

1.

2.

3.

4.

5.

You are concerned this young girl has sustained a snake bite. An hour later, while awaiting the results of the blood tests, her nurse approaches you with concerns the child appears to be quite sleepy.

You review the patient and notice the she seems to have a bilateral ptosis **(see below)**

- ii. Based on the clinical information provided, what snake is most likely responsible for the envenomation in this case. Briefly justify this answer. (2 points)

Snake: _____

Justification: _____

- iii. With regards to the clinical features of Australian snake envenomation, complete the following table: (5 marks)

Snake	Coagulopathy	Neurotoxicity	Rhabdomyolysis	Other effects
Brown				
Tiger				
Black				
Death Adder				
Taipan				





Question 18 (13 marks)

A 28 year old, 32 week pregnant, woman presents to your regional hospital 20 minutes after being bitten by a snake on her foot. She is very anxious about the safety of her baby.

- a. State four (4) clinical syndromes associated with envenomation indicating an Australian snake which causes each (8 marks)

Clinical Syndrome (4 marks)	Causative Snake (4 marks)

- b. State how the indication AND dose of antivenom are affected by this patient's pregnant status with explanation (2 marks)

You explain to the patient that you are going to organise transfer to a major hospital so she can continue to be managed. Upon hearing this she is quite distressed and requests that she stays at this small regional hospital.

- c. List the medical criteria that necessitate her transfer to the major hospital (3 marks)
