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ENC(C) Review Questions

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1. You are triaging a patient who complains of fever and headache over the last three days, but is concerned about a newly developing rash on the palms of their hands. Your observation is that it is a maculopapular rash with vesicles and pustules. Which of the following do you suspect is the cause of these symptoms and what type of isolation should you implement?
   A. Smallpox, contact and droplet precautions
   B. Monkeypox, airborne, contact and droplet precautions
   C. Chickenpox, contact and droplet precautions
   D. Cowpox, airborne, contact and droplet precautions

2. Paramedics arrive in your care area with a 19-year-old male patient who has suffered a gunshot wound to the abdomen during a gang-related altercation. The patient is drowsy, but oriented and follows all commands; his vital signs are stable. As you prepare him for a CT of the abdomen, he becomes increasingly anxious and states, "*Please don't tell the police I was shot! I'll be a dead man!*"

   Which of the following statements **most** accurately reflects respective provincial legislation related to the reporting of gunshot wounds?
   A. The gunshot wound must be reported to local police before any treatment is initiated in order to preserve evidence.
   B. The paramedics were first on the scene, thus it is their responsibility to report the gunshot wound to local police.
   C. The receiving healthcare facility is required to report the patient's name and gunshot wound to local police as soon as practicable to do so.
   D. Patient consent is required to report the gunshot wound to local police or the healthcare facility may be subject to legal proceedings.

3. A school bus full of children has collided with a garbage truck on the highway. Your emergency department is expecting 30 children with unknown injuries, plus the bus driver. A Code Orange has been declared. What is a key characteristic of a disaster, such as that described in this scenario?
   A. A situation where demand for support exceeds the normally available resources
   B. A situation where damage exceeds $100,000
   C. A situation where people must evacuate their homes
   D. A situation that emergency medical services (EMS) is not able to manage

4. You have just received a 60-year-old female patient into care in the monitored area. Her husband tells you that she is "getting over a cold" and has been using her "rescue inhaler" more often the last couple of days. She has a history of emphysema. Initial assessment reveals the following:
   - Vital signs: BP 146/84 mmHg; HR 102 bpm; RR 22 breaths/min; Temp 37.4°; SpO_2 89% on room air
   - CV: sinus tachycardia on cardiac monitor; peripheral pulses palpable, 2+; skin cool, dry; peripheral cyanosis present
   - Resp: decreased air entry throughout; coarse crackles on inspiration, expiratory wheeze with cough
   - GI: bowel sounds present x 4 quadrants; soft, non-tender; no distention; denies nausea/vomiting; LBM yesterday, normal; appetite slightly decreased due to shortness of breath
   - GU: denies dysuria, hematuria, frequency, hesitancy; last void 2 hours ago, clear/amber urine

   The emergency physician orders an arterial blood gas (ABG). Which of the following ABG results **best** reflects this patient's history and clinical presentation?
   A. pH 7.33, $PaCO_2$ 58 mmHg, HCO_3^- 30 mEq/L, BE +1 mEq/L, PaO_2 70 mmHg
   B. pH 7.29, $PaCO_2$ 28 mmHg, HCO_3^- 18 mEq/L, BE -6 mEq/L, PaO_2 86 mmHg
   C. pH 7.47, $PaCO_2$ 30 mmHg, HCO_3^- 24 mEq/L, BE +2 mEq/L, PaO_2 94 mmHg
   D. pH 7.38, $PaCO_2$ 43 mmHg, HCO_3^- 25 mEq/L, BE -1 mEq/L, PaO_2 92 mmHg

5. You are caring for a patient who is experiencing an acute ST elevation myocardial infarction (STEMI). Their chest pain started 2 hours ago. Their vital signs are as follows:
   - BP 88/60
   - Pulse 102
   - Resp 24
   - SaO_2 96%

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Which of the following statements is true regarding their management?

A. Unsuccessful IV access attempts (puncture wounds) render the patient ineligible for fibrinolytic therapy
B. Nitroglycerin should be administered within 30 minutes of arrival to reduce cardiac afterload.
C. Oxygen should be administered to maximize coronary perfusion
D. Primary percutaneous coronary intervention (PCI) should be anticipated if the patient is eligible and the facility is capable of the procedure.

6. Which of the following is a hallmark clinical sign of mild hypothermia?
   A. A core body temperature of 33.0°
   B. Loss of consciousness
   C. Shivering
   D. Onset of mental confusion

Correct answers / Rationale

1. Correct answer: B

All of these "pox" viruses present with fever, malaise and a rash. Monkeypox lesions are often present on the palms. Here is a comparison chart of the four viruses presented in the question.

	Smallpox	**Monkeypox**	**Chickenpox**	**Cowpox**
Transmission	Person to person contact, principally respiratory transmission	Zoonotic transmission as well as person to person via infectious respiratory secretions or contact with infectious skin lesions	Contact with fluid in the lesions or the airborne spread from the respiratory tract.	Zoonotic transmission after contact with infected animals
Presentation	Body aches, occasionally vomiting	Headache, lymphadenopathy	Loss of appetite, headache	Headache, lymphadenopathy
Lesions	Centrifugally disseminated rash; lesions often present on palms and soles	Centrifugally disseminated rash; lesions often present on palms and soles	Blister like rash, itchy. Skin lesions on all areas of the body including scalp and mucous membranes. Occur in "crops"	Often localized lesions on the hands, face, and neck due to contact transmission
Isolation requirements	Airborne, contact, droplet. Care should be provided by personnel who have been vaccinated or demonstrate immunity.	Airborne, droplet and contact precautions. Single person room.	Airborne, contact precautions. Care should be provided by personnel who have been vaccinated or demonstrate immunity.	No specific guidance is given but it is prudent to use contact/droplet precutions.

(McCollum, 2022, Government of Canada, 2022, Guarner, 2022, Isaacs, 2022).

2. Correct answer: C

The *Mandatory Gunshot Wounds Reporting Act*, or a version thereof, can be found within most provincial and territorial legislation, specifically their respective *Hospitals Act*. This piece of legislation requires "...health care facilities treating a patient with a gunshot wound to inform the police of the name of the facility, the fact that the facility is treating such a wound, and the name of the patient if known" (Martin, 2017, p. 176). In some jurisdictions, such as Alberta and Saskatchewan, stab wounds are also included in this legislation (Government of Saskatchewan, 2007; Province of Alberta, 2009); therefore, it is imperative that health care providers become familiar with local legislative reporting requirements. It should also be noted the obligation to report lies with the health care facility, not the individual health care provider (Canadian Nurses Protective Society, 2014, para. 2).

The provision of care should never be delayed or withheld pending the reporting of a gunshot wound. Once practicable to do so, the health care facility designate is then required to report (Province of Alberta, 2009, p. 2).

In some jurisdictions, such as Alberta and British Columbia, emergency medical assistants (e.g., paramedic, emergency medical technician) are also required to report a gunshot wound; however, the fact that they were first on the scene does not absolve the health care facility from reporting (Government of British Columbia, 2010, para. 2; Province of Alberta, 2009, pp. 2–3).

Provinces and territories have enacted mandatory gunshot reporting for those being treated for such wounds in the interest of public safety; it allows police to take immediate action in the prevention of further violence or danger to the public

(Government of Ontario, 2005, para. 1). For this reason, patient consent is not required to disclose information to police mandated under the *Act*.

3. Correct answer: A

Disasters can take on many definitions, depending on the community and its elements (e.g., urban verus rural, geographic location, population size) (Jacobson, 2020). They are often unpredictable with varying effects. For example, a multiple casualty incident (MCI) involving five patients may overwhelm an outpost nursing station with limited resources and outside assistance. Therefore, "...disaster is best defined as an incident or event that overwhelms the infrastructure of a community in which it occurred" (De Laby, 2020, p. 164).

In this scenario, an MCI has occurred that will likely stretch the demand for support beyond the hospital's normal available resources (Jacobson, 2020, p. 348). It should be noted that, given the large number of pediatric casualties, the specialized equipment and trained providers required to effectively and safely care for these patients also has the potential to further overwhelm the emergency department and broader hospital and community resources (Jacobson, 2020, p. 353).

A disaster is not classified as such based on the dollar value of damages. "A disaster is different for every community" (Jacobson, 2020, p. 348). Not every disaster requires residents to evacuate their homes. A mass casualty event (MCE), such as a hurricane or wildfire, is a type of disaster more likely to result in evacuation. Although a disaster may overwhelm EMS, other resources, either from the community or outside the community, may be available to bolster, so the definition does not rely on overwhelming a single component of the emergency response.

4. Correct answer: A

Emphysema, a subcategory of chronic obstructive pulmonary disease (COPD), is a progressive and irreversible respiratory condition characterized by "...permanent abnormal enlargement of the respiratory tract distal to the terminal bronchioles and associated destructive changes in the alveolar wall" (Foley & Sweet, 2020, p. 221). Over time, air trapping, hyperinflation, emphysemic changes, increased physiologic dead space, and decreased expiratory flow occur. Subsequent decrease in surface area for alveolar capillary gas exchange leads to abnormal ABG values. As the disease progresses, $PaCO_2$ becomes chronically elevated, often with full metabolic compensation in the setting of normal renal function. In this case, answer "a" best reflects the ABG of a patient with emphysema: partially compensated respiratory acidosis with hypoxemia. The pH is low (acidotic), $PaCO_2$ is increased (respiratory acidosis), and HCO_3^- is increased (renal compensation). The pH is not yet within normal range, thus partial compensation is occurring. Base excess (BE) is also within normal limits (-2 to +2 mEq/L) (Milici, 2018, p. 454; Stacy, 2022, pp. 455-456).

Answer B reflects a metabolic acidosis (e.g., diabetic ketoacidosis, lactic acidosis), thus is incorrect in this case. The pH is low (acidotic), $PaCO_2$ is low (respiratory compensation), HCO_3^- is low (metabolic acidosis), BE is very low (depletion), and oxygenation is normal (Milici, 2018, p. 454; Stacy, 2022, pp. 455-456).

Answer C reflects a respiratory alkalosis, such as in hyperventilation or in response to anxiety or pain. The pH is high (alkalotic), $PaCO_2$ is low (respiratory alkalosis), HCO_3^- is normal (no renal compensation), BE is within normal limits, and oxygenation is normal (Milici, 2018, p. 454; Stacy, 2022, pp. 455-456).

Answer D reflects a normal acid-base status. All parameters are within normal limits and oxygenation is normal (Milici, 2018, p. 454; Stacy, 2022, pp. 455-456).

5. Correct answer: D

Primary PCI is the preferred intervention for patients who are eligible and if the facility has the capability of performing the procedure. The goal times for PCI are first medical contact-to-balloon time of 90 minutes for those transported directly to a PCI capable hospital and 120 minutes or less if initially seen at a facility without PCI capability.

Unsuccessful peripheral venous access attempts are not a contraindication for fibrinolysis (American Heart Association [AHA], 2020). Contraindications for nitroglycerin administration include hypotension which is defined in the Advanced Cardiovascular Life Support (ACLS) guidelines as a systolic BP <90 mmHg or more than 30mmHg below the patient's baseline and hypotension is evident in the scenario. Supplemental oxygen is not required for patients with a SaO_2 greater than 90% (AHA, 2020).

6. Correct answer: C

Mild hypothermia (34° to 36°) is characterized by the onset of shivering (AHA, 2017, p. 392), which becomes severe at core temperatures of 35° (Huether & Rodway, 2019, p. 482). Shivering is a centrally mediated attempt by the hypothalamus to increase body temperature (thermogenesis) via skeletal muscle contraction (Huether & Rodway, 2019). As hypothermia worsens and shivering decreases, eventually disappearing completely, liver glycogen stores become depleted resulting in decreased coordination and confusion (Huether & Rodway, 2019), marking the transition from mild to moderate hypothermia (30° to 34°) (AHA, 2019, p. 392). Once temperatures reach 30° and below (severe hypothermia), a significant decline in cerebral blood flow, cardiac output, and metabolic function occurs leading to diminished vital functions, typically disappearing in the following order:

- Loss of consciousness (at about 27°) and all voluntary movement;
- Loss of pupillary light reflexes;
- Loss of deep tendon reflexes;
- Loss of spontaneous respirations; and
- Loss of organized cardiac rhythm (onset of ventricular fibrillation) (AHA, 2017, p. 392).

Note: If an advanced airway is in situ, an esophageal probe in the lower third of the esophagus is the most accurate method of core temperature measurement. Rectal and bladder measurement may also be considered, but are generally more appropriate for conscious patients with mild to moderate hypothermia (Duong et al., 2022, para. 6).

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