Supplement 1: Radiation Knowledge Test

Correct answers are in **Bold**

1. A 24-year old male patient is injured in a dirty bomb explosion. He is brought to the Emergency Department by a bystander. He has no air entry over the left side of his chest, has a thready pulse and appears to be lethargic and in severe respiratory distress. His clothes appear covered in dirt and dust from the explosion. Which of the following statements is correct?

* The patient should be surveyed for contamination with radioactive material prior to bringing him into the resuscitation room and inserting a life-saving chest tube
* **The patient should be wrapped in sheets and taken immediately to the resuscitation room for an emergent left chest tube**
* The patient should be rapidly decontaminated with soap and water prior to resuscitation
* Providers can protect themselves from radiation emitted from the patient contaminated body by wearing lead aprons

2. You are evaluating a patient in clinic who inhaled radioactive material at work. Which of the following statements is correct regarding ionizing radiation?

* Absorption of the radionuclide through the alveoli depends on the radioactive properties of the radionuclide
* The biological half-life of the radionuclide is always shorter than its physical half-life
* **The effective half-life of a specific radionuclide is always lesser or equal than the physical or the biological half-life**
* Breastfeeding after internal contamination with a radionuclide is safe

3. A 40-year-old man was located 1 mile downwind from the ground zero of a ground detonation of a 10-KT improvised nuclear device. Which of the following statements is correct?

* Diarrhea within the first hour after detonation can be a sign of a radiation exposure dose to the whole body that is greater than 20 Gy
* Vomiting between 5 and 6 hours after detonation can be a sign of radiation exposure dose to the whole body that is between 5 and 6 Gy
* Serial absolute lymphocyte counts every 2 hours are necessary to estimate the radiation dose received by this patient
* **Geographic location of the patient relative to the detonation, location after the detonation and sheltering are all important determinants of radiation dose received**

4. You are directing hazmat paramedics and firefighters who have responded to the scene of a radioactive dispersal device explosion. No chemical hazards are present. Which of the following statements regarding scene assessment and management is true?

* Level A PPE is necessary to protect from radiological respiratory hazards
* **Level C PPE is necessary to protect from radiological respiratory hazards**
* Decontamination should be deferred to the hospital
* Ionization chamber detectors are ideal to detect surface or patient contamination with radioactive contamination

5. An industrial radiographer is inadvertently exposed to ionizing radiation from an Iridium-192 source at work for a very short period of time. The estimated dose to his whole body is 0.05 Gy (or 50 mSv). Which of the following statements is true about his secondary cancer risk?

* His excess cancer risk over the next 10 years is increased by 5%
* His excess cancer risk over his lifetime is increased by 5%
* **His excess cancer risk calculation is not reliable because his exposure dose was low and current epidemiological data would support the calculation of risk above a dose of 100 mSv**
* He has increased risk of hereditary genetic effects in his future progeny

6. Which of the following statements is true about potassium iodide?

* Seafood allergy is a contraindication to receive potassium iodide
* **Iododerma is a rare complication that can occur from potassium iodide and that is treated by withdrawing the drug, supportive care and possibly steroids**
* Potassium iodide is beneficial up to 12 hours after internal contamination with radioactive iodine
* Repeat dosing of potassium iodide is safe in neonates

7. Which of the following statements is true about colony-stimulating factors or cytokines that are used for Acute Radiation Syndrome?

* **Filgrastim is FDA-approved for the treatment of Hematopoietic Acute Radiation Syndrome at a dose of 10 mcg/Kg per day subcutaneously**
* LUQ abdominal pain that radiates to the left shoulder is a common and benign adverse effect of filgrastim therapy
* Pegylated filgrastim is superior to filgrastim for the treatment of Hematopoietic Acute Radiation Syndrome
* Filgrastim is contraindicated in patients with sickle cell disease

8. Which of the following statements is true about Prussian Blue?

* Insoluble Prussian blue is not efficacious for internal contamination with cesium if started beyond the first 24 hours
* The FDA-approved indication for Prussian blue includes arsenic toxicity
* Prussian blue therapy is contraindicated in pregnant women due to concern for cyanide toxicity
* **Duration of Prussian blue for internal contamination with cesium is guided by urinary and/or fecal bioassays and/or whole body counting**

9. Which of the following statement is true about Calcium and Zinc DTPA?

* Calcium DTPA is safer than Zinc DTPA and is preferred in pregnant women and children
* Manganese and zinc depletion are possible adverse effects of prolonged therapy with Zinc DTPA
* **Zinc depletion is a possible adverse effect of prolonged therapy with Calcium DTPA**
* Zinc DTPA is more efficacious than Calcium DTPA during the first 24 hours after internal contamination with plutonium, americium and curium

10. Which of the following statement is true about uranium isotopes?

* **Uranium toxicity is primarily due to its chemical properties and not radioactive properties**
* Uranium-235 is the most abundant isotope of uranium naturally
* Depleted uranium is a significant radiation hazard
* Uranium in drinking water is regulated by the Environmental Protection Agency at a maximum contaminant level (MCL) of 10 mcg/L