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**Question 1**

Which medicine has been approved by the Food and Drug Administration (FDA) in the United States for the treatment of giardiasis?

- Tinidazole
- Metronidazole
- Furazolidone
- Quinacrine
- Paromomycin
- Albendazole

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**Question 1**

Tinidazole is the only medicine approved by the FDA for the treatment of Giardiasis. It is highly effective (>90%) and can be given as a single dose and is well tolerated.

A very common treatment for giardiasis is metronidazole (Flagyl). It has an efficacy rate of 75% to 100%, but it often causes gastrointestinal side effects, such as nausea and a metallic taste as well as dizziness and headaches.

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**Question 2**

- Where do most lightning deaths occur?
  - Under trees
  - Open fields, on/in water
  - On beaches
  - Working on farm equipment

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**Question 2**

- Open fields/sports parks 54%
- Under trees 23%
- On beaches 12%
- Farm equipment 7%
- Other (open windows) 4%

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**Question 2**



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### Question 3

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- You are leading a hike with young people. A storm approaches and you begin to hear thunder. You are about 30 minutes from where you started your hike. You need to make a decision about what to do with the group.
- Where is the safest place to be?
  - In a crouched position
  - In a tent with no metal poles.
  - Away from water
  - There is no safe place outdoors

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### Question 3

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- **There is no safe place outdoors.** There is little you can do to substantially reduce your risk if you are outside in a thunderstorm. The only completely safe action is to get inside a safe building or vehicle.
- If you absolutely cannot get to safety, you can *slightly* lessen the threat of being struck with the following tips. But don't be deceived--you are NOT safe outside. Know the weather patterns of the area you plan to visit.

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### Question 3

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- Avoid open fields, the top of a hill or a ridge top.
- Crouched positions offer little protection
- Stay away from tall, isolated trees or other tall objects.
- If you are in a forest, stay near a lower stand of trees.
- If you are in a group, spread out to avoid the current traveling between group members.

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### Question 3

- If you are camping in an open area, set up camp in a valley, ravine or other low area.
- Remember, a tent offers NO protection from lightning.
- Stay away from water, wet items, such as ropes, and metal objects, such as fences and poles. Water and metal do not attract lightning but they are excellent conductors of electricity. The current from a lightning flash will easily travel for long distances.

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### Question 4

- What type of lightning kills most people worldwide?
  - Ground current
  - Direct hit
  - Side splash
  - Upward streamer
  - Contact

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### Question 4

- Ground current kills most people worldwide.
 

Ground current	50-55%
Side splash	30-35%
Upward streamer	10-15%
Direct strike	3-5%
Contact	3-5%

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### Question 4

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### Question 4

- When a lightning strike hits the ground, the electricity does not disappear into the earth.
- It spreads out in the ground as a potentially deadly current with voltages decreasing from the point of strike.
- These currents are lightning's biggest danger because they affect large areas in circles, extending out from where lightning reaches the ground, such as at the bottom of a tree.
- Current can travel up one leg, through the body- potentially stopping the heart and breathing- and then down the other leg.

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### Question 5

- Where do the majority of lightning strikes occur in relation to the storm?
  - In the front of the storm
  - During the storm
  - After the storm

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### Question 5

- In front of the storm.
- Some lightning originates in the top of the thunderstorm, the area carrying a large positive charge. Lightning from this area is called positive lightning.
- Positive lightning is particularly dangerous because it frequently strikes away from the rain core, usually ahead of the thunderstorm.
- It can strike as far as 5 or 10 miles (8 or 16 kilometers) from the storm, in areas that most people do not consider to be a lightning-risk area.

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### Question 5

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### Question 6

- Worldwide, where does lightning strike the most?
  - Tropical central Africa
  - Florida and the Gulf Coast in the USA
  - North and South poles
  - Mountains of the Himalaya
  - Pretty even worldwide distribution

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### Question 6

- Thunderbolts rain down with the greatest fervor on **tropical, central Africa,**
- The weather patterns in Africa bring in warm air from the Atlantic Ocean which collides with mountains, producing many thunderstorms and lightning year-round.

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### Question 6

- Another lightning hotspot is the Himalaya, where the mountainous topography forces the convergence of air masses from the Indian Ocean
- The North and South Poles, however, rarely experience thunderstorms and, therefore, have almost no lightning.
- In the United States, the most lightning prone region is Florida, on the Gulf Coast, which has, on average, 12 flashes of lightning per square kilometer per year. But even that is less than central Africa.

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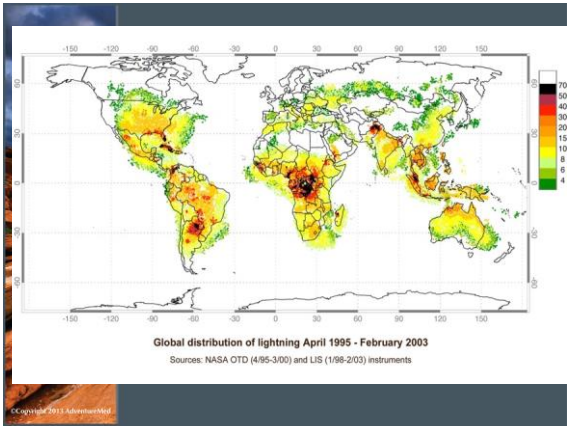
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### Question 7

- What has been approved for use as mosquito repellent by the US Center for Disease Control?
  - DEET, picaridin, oil of lemon eucalyptus
  - DEET, IR3535, picaridin
  - DEET, oil of lemon eucalyptus, citronella

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### Question 7

- **DEET, Picaridin and oil of lemon eucalyptus** are the three repellents that the U.S. Centers for Disease Control recommend as being safe and effective for use in repelling mosquitoes.
- DEET works because mosquitoes don't like the smell of it
- Picaridin works as a receptor blocker, preventing mosquitoes from locating their prey.
- Oil of lemon eucalyptus works by blocking mosquitoes' chemical receptors.

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### Question 7

- IR3535 is marketed as "Skin-So-Soft Bug Guard Plus."
- It has a half-life of 20 min to 6 hours. Overall it is less effective than 12.5% DEET.
- Citronella oil is a natural extract that when rubbed on the skin is effective for approximately 40 minutes. It is much less effective than DEET.

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### Question 8

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- Which pathogen is most difficult for ultra violet radiation to treat?
  - Protozoa/cysts
  - Viruses
  - Cysts




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### Question 8

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- Recent studies show that it is viruses that are the limiting factor of UV treatment, requiring a 10-30 times greater dose of UV light than cysts.
- A concern with UV portable water purification is that some pathogens are hundreds of times less sensitive to UV light than others.
- Protozoan cysts were once believed to be among the least sensitive.
- Cysts such as Cryptosporidium and Giardia are deactivated by low dose UV light.

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### Question 9

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- Which is a risk of water that has been treated with UV irradiation?
  - Reactivation of pathogens
  - No residual treatment
  - Both of these are risks

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### Question 9

- Both of these are long term problems
- Water treated with UV radiation still contains the microbes present in the water, with their means for reproduction having been turned "off".
- If exposed to visible light for any significant period of time, a process known as photo reactivation takes place.
- UV treated water must not be exposed to visible light for any significant period of time.

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### Question 9

- Unlike chlorine, which maintains a presence in the water after the treatment, continuing to disinfect the water, ultraviolet radiation does not stay in the water.
- Any microorganisms that the radiation missed would remain in the water whereas chlorination would destroy them.
- For this reason, a chlorine compound such as chloramine is sometimes added to water already purified by ultraviolet radiation.

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### Question 10

- Which of these forms of malaria Plasmodium is called monkey malaria?
  - P. knowlesi
  - P. ovale
  - P. vivax
  - P. falciparum
  - P. malariae

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### Question 10

- In recent years, sporadic cases of malaria due to *P. knowlesi* have been reported.
- Humans can be infected with this "monkey malaria" parasite while staying in rainforests and/or their fringe areas in south-east Asia.
- The parasite has a cycle of 24 hours and can give rise to daily fever spikes occurring 9–12 days after infection.
- Symptoms may be atypical
- *P. knowlesi* has no persistent liver forms and relapses do not occur.

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### Question 11

- A 30-year-old man is diagnosed and treated for diarrhea caused by campylobacter. After two weeks he is mostly recovered from the diarrhea. However, he then begins to develop weakness in his feet and legs. The weakness progressed to his upper leg muscles. His doctor admitted him into the hospital. He gradually got better over several weeks of therapy.

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### Question 11

- Why did he develop muscle weakness?
  - Antibiotic induced neuropathy
  - Dehydration
  - Guillain-Barre syndrome

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### Question 11

- The patient developed Guillain-Barré Syndrome. This syndrome is known to follow infections from campylobacter.
- After infection from campylobacter, both the innate and the adaptive immune systems are activated. The innate system responds with an acute inflammatory reaction with the creation of granulocytes.
- Since these particular antibodies cross-react with myelin components this can lead to the development of Guillain-Barré syndrome.

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### Question 11

- Evidence of *Campylobacter jejuni* infection has been found in approximately one out of every four cases of Guillain-Barré syndrome
- The risk of developing Guillain-Barré syndrome during the months following a symptomatic episode of *C. jejuni* infection is approximately 100 times higher than the risk in the general population.

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### Question 12

- What is the appropriate technique to remove a tick?
- Using tweezers or forceps, gently grasp the tick as near to the skin as possible, then pull smoothly and directly out.
- Apply tape to the tick, then briskly (or quickly) pull to remove it.
- Cover the tick with Vaseline and wait for it to back its way out.
- Scrape the skin around the tick with a credit card or something similar.

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**Question 12**

- Using tweezers or forceps, gently grasp the tick as near to the skin as possible, then pull smoothly and directly out.
- A tick has no 'head' but rather a proboscis called a hypostome that pokes straight into the skin. So a tick is easily removed in this way. If a small part of the hypostome remains, it is of little or no consequence.

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**Question 12**

- Techniques such as taping or scraping with a credit card on the skin are only suitable to remove larval ticks. Vaseline does not ease, or speed, the removal of ticks.
- Freezing a tick using liquid nitrogen is appropriate

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**Question 12**



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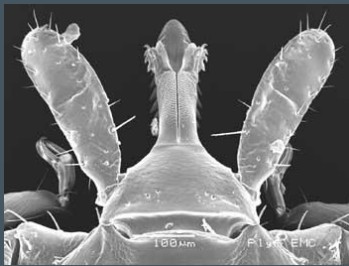
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**Question 12**



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**Question 13**

- Where is Rocky Mountain Spotted Fever most likely to be seen?
- South-Central states and Mid-Atlantic States in the
- The Rocky Mountain Western United States United States
- North America and Europe

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### Question 13

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- As an endemic tick-borne disease, Rocky Mountain Spotted Fever most likely to be seen in **South-Central States and Mid-Atlantic states in the**
- However, due to the ease of interstate and international travel, it really could be seen anywhere in the United States
- Recently this disease has been reported throughout Mexico, Canada, Central America, and South America but it is not endemic in these areas. It is not found in Europe.

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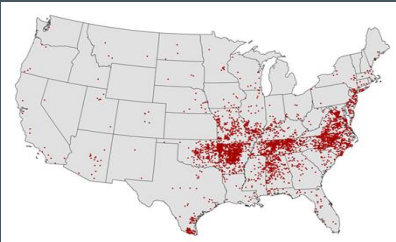
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### Question 13

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### Question 14

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- What is the timeframe to transmit disease from a tick to a human?
  - It depends on the tick and on the disease being transmitted.
  - It's a very short timeframe.
  - It's generally a very long timeframe.

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**Question 14**

- **Depends on the tick and on the disease being transmitted.** For a person to acquire a tick-borne disease, it requires that that individual is bitten by a tick and that that tick feeds for a sufficient period of time. The feeding time required to transmit pathogens differs for different ticks and different pathogens.
- This might be up to several hours

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**Question 15**

- How many diseases are transmitted from tics to humans?
  - 7
  - 17
  - 34
  - 62

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**Question 15**

- About 17 diseases are known to be transmitted from tics to humans.
- Three of these were discovered within the last four years

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**Question 15**

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- Bacteria
  - Lyme disease
  - Relapsing fever
  - Rocky Mountain Spotted Fever
  - Helvetica Spotted fever
  - Ehrlichiosis
  - Bartonella
  - Tularemia

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**Question 15**

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- Viruses
  - Tick-borne meningoencephalitis
  - Colorado tick fever
  - Crimean-Congo hemorrhagic fever
- Protozoa
  - Babesiosis
  - Cyttauxzoonosis
- Toxin
  - Tick paralysis

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**Question 16**

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- A 45-year-old professor from England went to Haiti and the Dominican Republic to conduct research. He lived there for about 6 months. He traveled to multiple islands while conducting his research. Near the end of his work he began to have diarrhea. This persisted off and on for several months. After returning home to England, his symptoms worsened somewhat. He experienced weight loss, anorexia, fatigue, steatorrhea, and weakness.

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**Question 16**

- Which pathogen is likely the cause of his symptoms?
- E. Coli
- Celiac sprue
- Tropical sprue

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**Question 16**

- Tropical sprue is a malabsorptive disorder that causes atrophy of the villus in the small intestines.
- It most often occurs in travelers who have spent more than one month in tropical latitudes within a narrow band, from 30 degrees north latitude to 30 degrees south latitude, though not in all countries.
- Tropical sprue is a disease that causes progressive villus atrophy in the small intestines.

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**Question 16**

- The etiology of tropical sprue is unclear. The current hypothesis is that the disease is caused by an infection that has yet to be identified.
- Patients will often have vitamin B12 and folate deficiencies.
- Antibiotics are the standard treatment for tropical sprue.
- There are no specific blood tests to diagnose tropical sprue

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### Question 17

- A 40-year-old female comes to you after hiking in Germany for 3 days. She ate some beef of questionable quality and now she has bloody diarrhea. She has a fever as well. You want to treat her with an antibiotic before stool cultures return.
- Which should guide your choice?
  - Antibiotics are of uncertain benefit and should be avoided.
  - Fluoroquinolones are first line agents
  - Azithromycin will be effective in preventing post infectious irritable bowel syndrome

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### Question 17

- Antibiotics have not shown to be of clear clinical benefit and those antibiotics that interfere with DNA synthesis, such as fluoroquinolones, have been shown to increase production of shigella like toxins that cause hemolytic uremic syndrome.
- This lady likely has an EHEC infection. Some strains of enterohemorrhagic E. Coli (EHEC) produce a shigella like toxin which is a major cause of foodborne illness.

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### Question 17

- The best known of these strains is **O157:H7**. EHEC's that induce bloody diarrhea lead to HUS in 10% of cases. The clinical manifestations of post-diarrheal HUS include acute renal failure, microangiopathic hemolytic anemia, and thrombocytopenia.
- In Germany in 2011, nearly 4000 people were infected with EHEC with nearly 800 developing HUS. 56 people died.

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### Question 18

- A two-year-old named Emile Ouamouno, who died in December 2013, was "patient zero," or the first person known to have contracted Ebola in the 2014 Ebola outbreak. He lived in a small village called Meliandou, in Guinea. There were about 31 homes in the village, which was surrounded by farmland. Nearby was a tall, hollowed-out tree where the village children loved to play, including Emile. The tree was close to Emile's house, about 165 feet away (50 meters).

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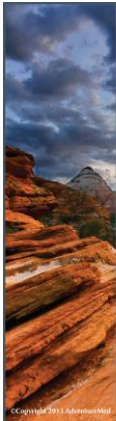
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### Question 18



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### Question 18



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### Question 18

- What animal living in the tree is thought to have passed the Ebola virus to Emile?
  - Monkeys
  - Gorillas
  - Bats
  - Porcupines

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### Question 18

- Researchers found that thousands of bats lived in this tree, and that this toddler likely contracted Ebola from playing there.
- The fruit bat is thought to be the natural host to the Ebola virus. Other bats can carry this disease as well.
- Gorillas, porcupines, and monkeys are potential carries of this disease but are not a natural host.

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### Question 19

- During an outbreak of Ebola in Uganda in the summer of 2015, officials were slow to identify the Ebola disease because victims did not show typical symptoms. Reports indicated that, in some cases, Ebola victims showed no symptoms at all. In the 2014 Ebola virus outbreak in western Africa, at the funeral of a traditional healer, 14 women became infected, but at least 26 other mourners did not. Scientists are unclear why everyone did not get infected.

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**Question 19**

- What are potential reasons for this phenomena?
  - A genetic advantage
  - Eating fruit in the area
  - Previous exposure to someone sick with the virus
  - Eating monkeys and bats
  - All of the above

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**Question 19**

- Any of these reasons could potentially explain why some people did not show symptoms and did not get infected.
- Many studies now show that a certain percentage of the population in Ebola rich areas have antibodies to the disease.
- These people have never been sick with Ebola and many have never seen a victim.

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**Question 19**

- The reasons for this are many but currently it is thought that Ebola could be thousands of years old, imparting genetic immunity to many people.
- In addition, it is felt that people may be “vaccinated” by eating fruit contaminated by bat saliva.
- It is also possible that some get low doses of virus by eating infected monkeys or bats that are undercooked.
- It’s plausible they might be inoculated and develop antibodies.

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### Question 19

- Recent studies in Gabon, a Central African country that had four Ebola outbreaks from 1994 to 2002, found that 15 percent of Gabon's population already had antibodies to Ebola.
- The data varied widely. Near the coast, only three percent had immunity, while in some jungle villages near the Congo border, up to 34 percent had immunity.
- A similar 1999 study conducted by American scientists in the Democratic Republic of Congo found similar results

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### Question 20

- What is the current theory regarding the spread of Ebola through sexual intercourse?
  - Ebola is found in the semen of some men who have recovered.
  - Ebola is found in the semen of all men who have recovered.
  - Ebola is found in vaginal fluids of some women who have recovered.
  - Ebola is found in vaginal fluids of all women who have recovered.

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### Question 20

- Ebola virus has been found in the semen of some men who have recovered from Ebola. It is possible that Ebola could be spread through sex or other contact with semen.
- It is not known how long Ebola might be found in the semen of male Ebola survivors, it is different for each man.

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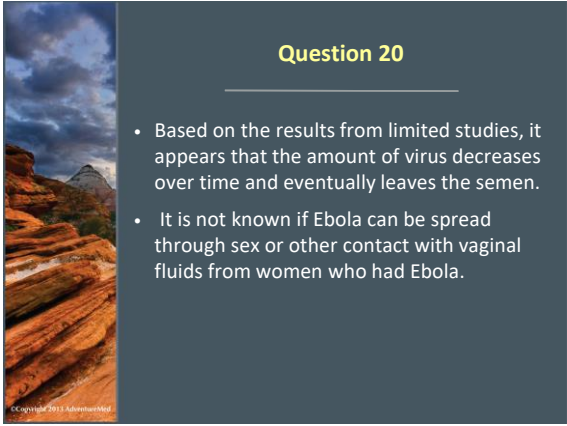
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**Question 20**

- Based on the results from limited studies, it appears that the amount of virus decreases over time and eventually leaves the semen.
- It is not known if Ebola can be spread through sex or other contact with vaginal fluids from women who had Ebola.

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**Questions?**

**Advanced Wilderness Life Support**

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