

**Lesson 20 Study Guide:  
Medical Biotechnology Pandemic Flu & Emergent Disease**

**1. The film Contagion:**

- (A) entirely depicts a situation that could never possibly happen in the US based on and H8N14 outbreak**
- (B) is entirely science fiction and depicts only a Hollywood version of pandemic**
- (C) is a theoretical depiction based on what might happen in a global pandemic**
- (D) is based on the alien invasion of a virus that takes over the planet that could actually happen (HxNv)**
- (E) is a documentary based on the 1957-58 pandemic of the Hong Kong flue (H3N5)**

**2. An influenza pandemic is a global outbreak of disease that occurs when a new influenza A virus appears or “emerges” in the human population, causes serious illness, and then spreads:**

- (A) from plants to animals**
- (B) easily from person to person worldwide**
- (C) from birds to humans in Southeast Asia**
- (D) from birds to pigs**
- (E) out from a research laboratory**

**3. An influenza pandemic is a global outbreak of disease that occurs when a new influenza A virus appears or “emerges” in the human population, causes serious illness, and then spreads easily from person to person worldwide. An influenza pandemic:**

- (A) is a theoretical concern of the WHO and the CDC**
- (B) has not occurred in the US since the famous 1918-19 Spanish Flu**
- (C) has occurred several times in the last 100 years with devastating consequences**
- (D) will not likely occur in the next fifty years but is a significant concern to the USDA**
- (E) none of these answers is correct**

**4. Flu outbreaks are the result of human to human transmission of a an influenza A virus. Many of these vruses have their origin in other animals.**

**Pandemics:**

- (A) are different from seasonal outbreaks or “epidemics” of influenza**
- (B) are outbreaks that are caused by new influenza subtypes**
- (C) are outbreaks that are caused by influenza subtypes that have never circulated among people or by subtypes that have not circulated among people for a long time**
- (D) in the past have led to high levels of illness, death, social disruption, and economic loss on a global scale**
- (E) all of these answers is correct**

**5. Pandemics can spread rapidly. In our now global society how will the next global pandemic likely move most effectively?**

- (A) cargo ships from southeast Asia which inadvertently may carry infected fruit bats**
- (B) infected military personnel returning from service in the Middle East**
- (C) contaminated food sources from Mexico**
- (D) human to human transmission facilitated by air travel**
- (E) as a computer virus transmitted through social media**

**6. There are many different subtypes of Influenza A or “flu” viruses. The subtypes differ based upon certain proteins on the surface of the virus are used to classify the subtypes are designated:**

- (A) only for avian flu subtypes**
- (B) as HN based on the hemagglutinin or “HA” protein and the neuraminidase or the “NA” protein**
- (C) specifically by the WHO for seasonal flu vaccine production**
- (D) by their animal host reservoir whether they are avian (AV), pigs (PG), or bats (BT)**
- (E) when they reach Phase 3 pandemic level as HuHu3**

**7. Tracking viruses related to influenza can now be accomplished very effectively. PCR is a method useful for use in plant genetics, pharmacogenomics, evolutionary studies, pandemic flu, and analysis of bioweapons.**

- (A) false**
- (B) true**
- (C) only when a plant geneticist thinks his collaborator stole his work**
- (D) only when forensic analysis involves bioweapons from an anthrax attack**
- (E) this is true for everything except its use on pandemic flu**

**8. Pandemic viruses emerge as a result of a process called “antigenic shift,” which causes an abrupt or sudden, major change in influenza A viruses. These changes are caused by:**

- (A) people who do not practice good personal hygiene**
- (B) molecular biologists that study viral transmission**
- (C) an overuse of antibiotics**
- (D) new combinations of the HA and/or NA proteins on the surface of the virus during viral evolution**
- (E) alternative medical therapies in Southeast Asia**

**9. Changes in the viral genome result in a new influenza A virus subtype. The appearance of a new influenza A virus subtype is the first step toward a pandemic; however, to cause a pandemic, the new virus subtype also must:**

- (A) escape detection by viral researchers and the CDC**
- (B) be transmissible through agricultural crops, such as is now feared through genetically modified corn**
- (C) be able to use bats as its animal host**
- (D) have the capacity to spread easily from person to person**
- (E) be based on the genomic sequence that is the same as the 1918 Spanish flu virus**

**10. Who is monitoring global emergence of influenza viruses?**

- (A) The US Department of Agriculture (USDA) and the Food and Drug Administration (FDA) in the United States**
- (B) The U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO)**
- (C) The Environmental Protection Agency (EPA) in the United States**
- (D) The Republican Party (GOP) related to the Personal Health Care Act issues**
- (E) The Academy Awards Committee (AAC) for accuracy of the film Contagion**

**11. No Question Listed – put E**

**12. The Stages of a Pandemic, characterized by the World Health Organization recognizes a Phase 6 Pandemic when:**

- (A) an emergent influenza virus is recognized in an animal host species**
- (B) human infection(s) with a new subtype have occurred, but there is no human-to-human spread**
- (C) small cluster(s) with limited human-to-human transmission but spread is highly localized**
- (D) increased human-to-human transmission occurs and sustained transmission in general population**
- (E) the virus has become sexually transmissible**

**13. Vaccines can be made to protect against pandemic influenza viruses, but:**

- (A) it would be too costly to be effective and therefore not manufactured by major pharmaceutical companies**
- (B) a vaccine probably would not be available in the early stages of a pandemic**
- (C) requires 12 years and would cost over \$1.5 billion from bench to bedside**
- (D) can only be produced using the attenuated vaccine approach in chicken eggs**
- (E) could never be over 50% effective so would not interrupt a full blown pandemic**

**14. Antiviral medications have been made and tested to prevent and treat influenza:**

- (A) of the seasonal subtypes only, and will be of little use in a pandemic**
- (B) including four different influenza antiviral medications (amantadine, rimantadine, oseltamivir, and zanamivir)**
- (C) but are not yet approved by the U.S. Food and Drug Administration (FDA) for the treatment and/or prevention of influenza**
- (D) but will only be available for underdeveloped countries provided by the UN and the WHO to prevent the pandemic spread to developed countries**
- (E) but cannot be commercialized because of perceived controversies about the manufacture and possible side-effects**

**15. The emergence of several new influenza A virus subtypes have caused pandemics during the 20th century; one important clue about their origins is that:**

- (A) the viruses contain a combination of human genes and/or animal host species**
- (B) they all occurred in large urban areas in Western Europe**
- (C) they are not transmissible from human-to-human**
- (D) they were all genetically engineered**
- (E) they appeared with the onset of antibiotic use in Southeast Asia**

**16. The Dual Use Dilemma refers to:**

- (A) the complicated situation of a train platform and whether to sacrifice one life to save five**
- (B) the basic research on viral genetics and transmissibility that could be used to combat pandemics and the use of that knowledge for the creation of bioweapons**
- (C) the use of one antibiotic to treat two separate pandemic subtypes**
- (D) the use of basic scientific research for profit**
- (E) the use of theoretical dilemmas when real lives are at high risk through pandemics**

**17. Many scientists believe it is only a matter of time until the next lethal influenza pandemic occurs. The severity of the next pandemic cannot be predicted, but modeling studies suggest that the impact of a pandemic on the United States could be substantial. In the absence of any control measures (vaccination or drugs), it has been estimated that in the United States a “medium–level” pandemic could cause:**

- (A) 9,000 to 7,000 deaths, 4,000 and 5,000 hospitalizations**
- (B) 589,000 to 1207,000 deaths, 3,814,000 and 9,734,000 hospitalizations**
- (C) 89,000 to 207,000 deaths, 314,000 and 734,000 hospitalizations**
- (D) over 10,000 hours of missed work time**
- (E) a cancelation of the Academy award ceremonies**