**BIOL 483 - Infection, Immunity, and Evolution of Disease**

**Spring 2022**

**Homework 2**

**Directions:** Use this image and information below to answer the questions on page 2.

Note that the links to web pages with news are for your information only (they are not necessary to answer the questions).

Diagram

Description automatically generated

**Saturday, September 26 (exposure)**: [Rose Garden Event](https://en.wikipedia.org/wiki/White_House_COVID-19_outbreak) with many important figures in attendance, including [President Trump](https://en.wikipedia.org/wiki/Donald_Trump), [First Lady Melania Trump](https://en.wikipedia.org/wiki/Melania_Trump), [Supreme Court Justice Coney Barrett](https://en.wikipedia.org/wiki/Amy_Coney_Barrett_Supreme_Court_nomination), Presidential Aid Hope Hicks, the [Press Secretary Kayleigh McEnany](https://en.wikipedia.org/wiki/Kayleigh_McEnany) and many others. Very few individuals wore masks. This is likely the date of exposure and transmission.

**Tuesday, September 29 (Day 3 post exposure)**: [Presidential debate](https://en.wikipedia.org/wiki/2020_United_States_presidential_debates#September_29_presidential_debate_(Case_Western_Reserve_University)) with Joe Biden. [Hope Hicks shows symptoms of COVID-19.](https://abcnews.go.com/Politics/hope-hicks-president-trumps-closest-advisers-tests-positive/story?id=73377363)

**Thursday, Oct 1 (Day 5 post exposure):** President Trump and First Lady Melania Trump show symptoms of COVID-19 (fatigue, shortness of breath).

**Friday, Oct 2 (Day 6 post exposure):** President Trump and First Lady Melania Trump announce positive PCR test for SARS-CoV-2. [President Trump begins treatment for COVID-19](https://www.reuters.com/article/us-health-coronavirus-trump-timeline/timeline-history-of-trumps-covid-19-illness-idUSKBN26U299) at Walter Reed Military Hospital.

**Monday, Oct 5 (Day 9 post exposure):** [Kayleigh McEnany tests positive](https://www.cnn.com/2020/10/05/politics/kayleigh-mcenany-coronavirus-white-house/index.html) for SARS-CoV-2. She never develops any symptoms.

**Oct. 8 (Day 12 post exposure):** President Trump no longer tests positive for SARS-CoV-2

Justice Coney Barrett [tested positive for SARS-CoV-2 in summer of 2020](https://www.washingtonpost.com/politics/barrett-coronavirus-court-trump/2020/10/02/ecf7c7ce-04cf-11eb-8879-7663b816bfa5_story.html), long before the Rose Garden Event. Following the exposure at the White House event, she did not test positive.

**Questions:**

What day would have been the optimal day to use PCR testing to detect the virus for:

1. Hope Hicks
   1. September 26th – Hope Hicks was already infected with COVID19 and was at the infectious period. This would have been a great time to use PCR testing to detect the virus as he would be at or nearing the peak period. Optimally for safety reasons, he should have been tested before to have known he had the virus already.
2. Melania Trump
   1. September 29th – Melania Trump should have been tested at this point after Hope Hicks shown reports of having symptoms. It would have been the optimal day as it was after the exposure period and three days’ time was already allotted for the virus to have possibly cultivated in the body. In addition, for safety reasons she should have gone to go get tested as she was exposed to someone that was showing symptoms of COVID19.
3. Kayleigh McEnany
   1. September 30th – Kayleigh McEnany should have been tested at this point after Hope Hicks shown reports of having symptoms. It would have been the optimal day as it was after the exposure period and four days’ time was already allotted for the virus to have possibly cultivated in the body. In addition, since she did not show symptoms providing an extra day would have cultivated more of the virus that would have the PCR test to show a positive result. Like Melania Trump, should have gone to go get tested as she was exposed to someone that was showing symptoms of COVID19.

If the exposure date was the same, why is there a difference among these three individuals?

* Hope Hicks could have probably been the source of the infection as he could have been in the infectious stage while showing no symptoms yet. Melania Trump was exposed that day and it took a while for the virus to cultivate enough for her to show symptoms later on. Finally, Kayleigh McEnany could have been exposed to the virus at the same time as Melania Trump, however, due to each person having a different immune system strength as well as McEnany possibly having the vaccine beforehand, could have led to the possibility of her immune system fighting the virus off to the point she showed no symptoms but was still positive. In addition, McEnany could just be a carrier of the virus with it not affecting her. Overall, everyone reacted differently even though they had the same exposure time as factors such as virus cultivation, already infected, or immune system strength could play major roles in this scenario.

Many people were alarmed that Trump could have infected Joe Biden during the Presidential debate. Was that a reasonable concern? Why or why not?

* The people’s concern was reasonable as Trump could have been at the infectious stage during the Presidential debate without him knowing it with him not showing symptoms yet. Joe Biden could have easily been exposed and subject to infection if Trump was at this infectious stage. However, many factors such as cleanliness, distance, and Biden’s immune system could have contributed to if Joe Biden will get sick in the future.

On September 29, when Hope Hicks was sick with COVID-19, would it make sense to test President Trump with an “antibody test” (serology)? (Assume the tests worked perfectly)

* Yes! It would make the perfect sense to test President Trump with an “antibody test” as there is a possibly of him being infected. In addition, with the Presidential debate that day, for safety measures, it would be best to test each individual to see if they have COVID19.

What questions do you have about COVID-19? Please add your anonymous questions [HERE](https://docs.google.com/document/d/1_bTNylXFrqnakk-vn2fvM-bj2Z3ScXDj0DTaGSanD9A/edit)

Questions added.