

# Disease Transmission Lab

Name \_\_\_\_\_



## Introduction and Background:

Pathogens are organisms that can cause infectious diseases in humans or other species. There are several means of transmission:

- Direct contact with body fluids – HIV, Ebola, mononucleosis, Herpes
- Indirect contact (e.g. germs on a door handle) – rhinovirus
- Airborne (the pathogen can be inhaled) – influenza, measles, hantavirus
- Foodborne (must be ingested) – *E. coli*, salmonella
- Vector (passed along by a vector host, such as a mosquito) – zika, malaria, bubonic plague

Since most pathogens are invisible, they can also be difficult to avoid. This lab simulates disease transmission via two of the methods listed above.

## PART I: Welcome to the Convention!

You have traveled to a dragon breeder’s convention outside of your hometown, and are staying in a large hotel (part of an international chain). On the first evening of the convention, after checking in and registering with the convention, you attend the “meet and greet” where you can introduce yourself to other dragon breeders (and say hello to ones you have met before).

Unfortunately, one of the attendees has brought a pathogen along with them (unknowingly) . . . a dragonpox virus, which causes a disease similar to the common cold in both humans and dragons. This attendee is not yet showing symptoms, and does not realize they are ill, but is contagious, and therefore able to pass the virus along to others. How many other convention goers will this person be able to infect during the course of the meet and greet?

- Take one of the beakers off of the back lab bench, making note of the number on the side. This represents your body fluids. Now, you will mingle with the other guests, exchanging body fluids with a few of them. (How this happens is up to you . . . the most common way is by taking sips from one another's drinks). **DO NOT ACTUALLY DRINK OUT OF THE BEAKERS** though. ☺

Now, you will interact with up to two different breeders.

- At the start of the evening, while the music is playing you will wander around just talking to your co-conventioners
- When the music stops, whichever person is closest to you will offer you a taste of their drink
- To exchange body fluids, one person will pour the contents of their beaker into the other person's beaker, agitate it to mix, and then pour half the contents back (so each beaker has an equal amount of liquid)
- Make a note in the table below of the person you swapped fluids with.
- While the music plays, once again you will introduce yourself to new people, When the music stops, exchange body fluids with the individual standing closest to you, as described above

Your Name:	Round 1 Partner:	Round 2 Partner:

Word gets out that one of the attendees might be sick, so you decide to visit the health center at the hotel, and be tested for the illness.

- See Professor St. John, who will test you for the illness.
- Using data from the entire class, complete the table below. Together, we will try to discover which conventioner was the source of the initial infection.

	Round 1		Round 2	
	Partner	Infected?	Partner	Infected?
Alex				
Cassandra				
Cody				
Greg				
Jackie				
John				
Kaslin				
Ryan M				
Ryan P				
Veronica				

1. How many conventioners were infected by interacting with just two other people? What proportion of the population does this represent?
2. Who was the original source of the infection?
3. What precaution could have been taken to avoid being infected by this virus?
4. How would the results differ if everyone could choose how many contacts to have, including the option to have no contacts? How does this better resemble real life?
5. How would the results differ if you have only a 20% or 50% chance of contracting the disease after being exposed?

6. Why are sick people sometimes *quarantined*?

**Breakfast Buffet:**

The next morning, you're up bright and early, wanting to have something to eat before the first sessions of the day. The hotel has provided convention attendees with a beautiful breakfast buffet. You can choose what you would like to eat for breakfast. It's an all-you-can-eat buffet, so try as many items as you would like.

- Take an empty cup from the back lab bench
- For each food that you would like to try, fill a pipette full of the liquid in the associated beaker, and transfer it into your own cup. Please do not touch the pipettes to the liquid in your cup – just hold it above the surface and carefully dispense the liquid
- Check off on the chart below which foods you decided to have for breakfast

	Buffet Item
Fresh blackberries	
Fresh strawberries	
Peaches in syrup	
Bacon	
Chicken crepe with sour cream	
Strawberry crepe with whipped cream	
Hardboiled eggs	
Scrambled eggs	
Hashbrown potatoes	
Peach cobbler	

OH NO! You've just heard that some of the people who had breakfast here earlier in the day are not feeling well. To see if you might have contracted a foodborne illness yourself, again, visit Professor St. John. She will perform a test and tell you if you encountered any of the pathogens.

Share the data with the rest of your classmates, to see what they had for breakfast, and which of them ended up with food poisoning. (See chart on the next page)

### Breakfast Buffet

	Food Poisoning?	Blackberries	Strawberries	Peaches	Bacon	Chicken crepe	Strawberry crepe	Scrambled eggs	Hashbrown potatoes	Peach cobbler	Hardboiled eggs
Alex											
Cassandra											
Cody											
Greg											
Jackie											
John											
Kaslin											
Ryan M											
Ryan P											
Veronica											
Contaminated?											

1. Can you determine which food(s) were contaminated?

### **Follow-up Questions:**

1. Think about modes of transmission. How would the spread of a disease differ if the pathogen is airborne, foodborne, waterborne, requires physical contact like a handshake, or intimate contact like sex, or a kiss? Which would be the most deadly mode of transmission if a terrorist was trying to intentionally create an epidemic?
2. Why does international air travel increase the risk of a rapidly spreading pandemic? Why are airports, train and bus stations, schools, restaurants, movie theaters, and shopping malls likely locations for a disease to spread?
3. If a vaccine is in limited supply, why do first responders (police officers, firefighters, paramedics, nurses, doctors) get the first doses? Is this fair?
4. Many diseases, such as the common cold, don't have visible symptoms during their most infectious stage. Why? What would happen if they did?

