The JUNIOR DISEASE DETECTIVES
OPERATION: OUTBREAK
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Foreword

The following story is a work of fiction, but real public health threats and diseases are presented. CDC hopes that this story raises youth awareness of infectious diseases and the public health risks they pose. In addition, CDC hopes that this story helps to encourage youth interest in the many different career paths available in public health at the local, state and federal levels.

Lastly, CDC hopes that this story promotes youth education and interest in science and public health. We at CDC hope that readers are inspired to become the next generation of real life disease detectives and public health superheroes.

This graphic novel is the result of a partnership between the Centers for Disease Control and Prevention (CDC), 4-H, and the U.S. Department of Agriculture (USDA). 4-H is the nation's largest youth development program. 4-H is a public-private partnership with federal, state, local and non-profit support.

Youth and their families access 4-H programs at a community or county level through the cooperative extension division of their land-grant university.

4-H offers a youth development experience for all youth ages 5–19. For more information, please see https://nifa/usda.gov/program/4-h-positive-youth-development.
Oh, I’m playing this cool Centers for Disease Control and Prevention app that lets you solve the source of different outbreaks and I’m stumped on this current outbreak scenario.

Oh... nice, man. Right in time for our three day trip to CDC after the fair for Disease Detective Camp.

Yes, excellent timing! I’m really looking forward to it!

Yay! I can’t wait! So let’s start this 4-H meeting off with a discussion of the CDC camp as well as what we are doing for the county fair.

Emily
President
I have an idea to make things interesting! Let’s each imagine that we are facing a major public health threat and we are the heroes. Eddie, let’s start with you!

Hmm... ok. Well, I’m picturing an outbreak of a new scary disease that has already infected half of the city’s population!

...and I’m Germ Slayer, the germ-fighting superhero who has the cure!

I’m the only hope to deliver it on time!

I remain cloaked to move quickly unnoticed... I can’t risk being stopped or slowed down.

Hospitals and clinics are currently overwhelmed and in some cases people are actually being turned away...
City streets are largely deserted with the exception of locations near medical facilities.

WILL I MAKE IT IN TIME?
And here I am! Just in time to deliver the cure from the CDC!

Fun, Eddie! ...ERR ... I mean Germ Slayer! I like it!

Next, it's your turn, R.J.

I'm a medieval archer and you guys are there with me!

Ok, I've got this!
Hey Guys,
It’s Eddie! Wow... I’m in a suit of Armor. Isn’t this supposed to be Public Health Related, R.J.?

Where are you going with this?

Yeah... whaaaaaat?

Hey guys, It’s Eddie! Wow... I’m in a suit of Armor. Isn’t this supposed to be Public Health Related, R.J.?

Oh R.J., Ha! This is nerdy, but I like my outfit!

Oh, by the way, it’s me Kris. I just got to the meeting... and what timing!

Hang on, guys... I promise this is Public Health Related.
Outside, an army of monster germs is attacking…

YOU SEE, WE REPRESENT THE BODY’S IMMUNE SYSTEM, AND THIS CASTLE HERE IS THE HUMAN BODY.
Your immune cells are constantly on the lookout for invading germs. Every germ is different. To combat this, a special platoon of immune cells will be trained to have defenses specific to each germ invader.

When you get an infection, your body learns everything it can about the germ that causes the disease. Your body's cells will remember what that specific germ looks like.
When germs are spotted and recognized by the immune system, we must leap into action to fight the infection!
I think you actually managed to pull off the Public Health angle!

See, I told you guys it would make sense by the end!

Nice entrance. What's that on your face?

I was practicing baking a cake to enter into the cake competition at the fair, but I got flour all over me!

Hey, at least you made it into my Public Health vision.

Nice, R.J.!

Sorry I'm late to the meeting, I had a baking accident.
SO, I GATHER THIS IS A PUBLIC HEALTH IMAGINATION EXERCISE? CAN I GO NEXT?

OK, GUYS. I'M ON A SPACE STATION...

WOW! AND WE THOUGHT R.J.'S WAS OUT THERE...
"The space station is full of people infected with an alien virus, but I am completely unaware."

"I am just going about my business. Little do I know that the space station is contaminated with the virus. Just by being in the environment, I’m being exposed to the virus!"

"If you are in a contaminated environment and don’t take the proper precautions, you can get sick, too."

"The virus can enter a person’s eyes, nose or mouth to cause infection."

"Oh no! The virus has gotten to me. It’s trying to infect me!"

"However, I know that I’ll be safe because I have been vaccinated. Vaccines work by causing your immune system to recognize and fight against the attacking virus."
OH, WOW! KRIS!
THAT WAS SCARY.
I GUESS BEING
COVERED IN FLOUR
GOT YOU THINKING
ABOUT BEING
COVERED
IN A VIRUS!

HMM,
MY TURN ALREADY?
LET'S SEE...

OK, I'M PICTURING MYSELF AS A DETECTIVE.
I'M GOING TO TRY AND KEEP IT FOCUSED ON
PUBLIC HEALTH FROM THE START... UNLIKE
YOU GUYS!... SO LET'S SAY I'M A DISEASE
DETECTIVE.
“There has been an outbreak of foodborne illness. I have been doing some studying prior to CDC camp, so I know that foodborne illness is caused by consuming contaminated food or beverages and sometimes it can be spread from person to person.”

“I must look for clues and find the evidence that links all the cases!”

“Everyone who has gotten sick ate at this restaurant!”

“Back at the laboratory, I test the sample to see if I can determine the cause of the outbreak… it’s positive for salmonella!”

“I find a sample of food to take back to the lab.”

“Now I need to reach out and see who else may have eaten at this restaurant, and I need to protect people who could be at risk.”
MY BEETLES ARE GOING TO BLOW EVERYONE’S MINDS AT THE FAIR.

THAT WAS FUN, EVERYONE! I’M SURE WE WILL GET A MORE REALISTIC UNDERSTANDING OF WHAT IT’S LIKE TO BE A DISEASE DETECTIVE ONCE WE GO TO CDC FOR THE FIELD TRIP.

I DON’T GET YOUR BUG AND BEETLE FASCINATION, EM... IT’S KIND OF WEIRD.

OK, MR. MEDIEVAL ARCHER GERM ANALOGY GUY.

LATER ON...

NOW, LET’S TALK ABOUT THE COUNTY FAIR. I’LL PRESENT MY BUG COLLECTION. EDDIE WILL BE SHOWING HIS PIG. KRIS IS ENTERED INTO THE CAKE BAKING COMPETITION, AND R.J. WILL BE EXHIBITING HIS CHICKEN. ANY QUESTIONS?

EMILY PRESIDENT
AT THE THOMAS COUNTY FAIR...
C’MON HAMLET, THE JUDGINGS WILL BE STARTING SOON...

CAREFUL ABOUT SUCKING YOUR THUMB BEFORE WASHING YOUR HANDS WHEN AROUND ANIMALS, DEAR. THEY MAY CARRY GERMS.

AND THE BEST IN SHOW GOES TO ROBERT JACKSON AND HIS BEST IN CLASS CHICKEN!

OH YEAH! NOW THAT’S WHAT I’M TALKING ABOUT!

YOU’RE LOOKING AT THE OWNER OF THE BEST CHICKEN IN THOMAS COUNTY!

MY PROJECT IS DEFINITELY WINNING THIS YEAR!
C’MON HAMLET... GO TO THE RIGHT. WHY ARE YOU SO SLUGGISH LATELY?

HI, MOM... HUH?
WELL, MY CAKE DOESN’T LOOK ALL THAT GREAT. BUT IT DOES TASTE GOOD!

FRIDAY NIGHT...

WELL, EDDIE... HOW DID HAMLET DO TODAY?

OK. HE WASN’T 100% BUT I THINK HE DID WELL ENOUGH TO IMPRESS THE JUDGES.

I ASKED THE FAIR VETERINARIAN TO LOOK AT HAMLET, JUST TO MAKE SURE HE WAS OK. WHAT CAN I SAY? I CARE ABOUT THE BIG FELLA.
SAY, WHAT DO YOU THINK ABOUT GRABBING SOME FOOD? I’M FEELING LIKE A BURRITO.

OK, LET’S SEE IF I HAVE ANY MONEY.

AH, HERE WE GO! LET ME GUESS, I’M PAYING FOR YOU, TOO!

WOW, DOUBLING UP ON THE CORN DOGS, HUH?

DOUBLE THE DELICIOUSNESS. YOU KNOW YOU WISH YOU HAD ORDERED A CORN DOG!
I don't know about this, you guys...

Hey, you guys up for the House of Horrors? You're not scared, are you?

N-nothing to worry about... those are just actors... I think...

I don't know about this, you guys...

My asthma is kicking in, it may be the fog machines in here.

Cough! Cough!

Ha!... I can't believe those two are really scared!

Let's go try the bumper cars... okay?

Y-yes... let's...

All right, time for bumper cars!
WHOA… DUDE!

AWESOME! I LOVE BUMPER CARS!

WHOA… DUDE!

BLAM!

WHEEEEEE!!

...WOW, I’M REALLY NOT FEELING WELL YOU GUYS…

BURRITOS AND BUMPER CARS… PROBABLY NOT A GOOD COMBINATION.

HE’LL LIVE. MORE ROOM FOR FUNNEL CAKES, EH MAN?

UGH, EDDIE IS THROWING UP. I THINK IT’S TIME TO CALL IT A NIGHT!

EDDIE … YOU OK?

BLUUUGG!

TRASH
FOR THE LAST TIME... YOU CAN'T GO WITH THIS FEVER!

BUT MOM, I'LL NEVER GET ANOTHER CHANCE TO GO TO THE CDC!
OK EVERYONE, ENTER THE VISITOR CENTER THROUGH THAT DOOR...

PLEASE PICK OUT YOUR NAME TAG AND SIGN NEXT TO YOUR NAME ON THE LIST...

I WISH EDDIE COULDN’T COME. HE WAS REALLY LOOKING FORWARD TO THIS...

YOU THINK HE’S STILL SICK FROM FRIDAY?
I ALONG WITH THE EIS OFFICERS STANDING BESIDE ME, WILL TEACH YOU ABOUT INFECTIOUS DISEASES AND HOW TO BE A DISEASE DETECTIVE. MEET DR. ALISON, ALEX, AND KIM.

I'M DR. LEE. WELCOME TO THE CDC.

I'M DR. ALEX.

AND I'M DR. KIM. WE ARE CDC EIS OFFICERS.

HELLO EVERYONE, I'M DR. ALISON.

...WHICH STANDS FOR EPIDEMIC INTELLIGENCE SERVICE. WHEN DISEASE OUTBREAKS OR OTHER PUBLIC HEALTH THREATS EMERGE, WE ARE ON THE SCENE.

BY THE END OF THIS COURSE, YOU'LL KNOW ABOUT DIFFERENT KINDS OF INFECTIOUS DISEASES AND HOW CDC PROTECTS THE PUBLIC.

HELLO, I'M DR. LEE. WELCOME TO THE CDC.

THIS IS GOING TO BE GREAT! I WISH EDDIE COULD BE HERE TO EXPERIENCE THIS...
WHAT IS PUBLIC HEALTH?

NEXT, I’D LIKE TO TELL YOU HOW WE AT CDC FIGHT DISEASE.

CDC FOCUSES ON PUBLIC HEALTH, PROTECTING THE HEALTH AND SAFETY OF GROUPS OF PEOPLE.

I SURE HOPE EDDIE IS FEELING BETTER.

BACK AT EDDIE’S HOUSE...

I’M TAKING YOU TO THE DOCTOR.
LATER MONDAY AT THE DOCTOR’S OFFICE...

Hi doctor, Eddie became sick Friday night while attending the county fair. He has had a 101° fever, a cough, and muscle aches. He also suffers from asthma.

Okay, just breathe normally for me.

It appears you have an upper respiratory infection, even though we are no longer in cold and flu season.

I don’t know for sure what you have, but I’m going to take a sample for testing...

The results won’t be ready until tomorrow, but since you have asthma and are at high risk of developing complications from respiratory disease, I’m going to prescribe you this medication.

Please call the office if Eddie starts to feel worse.
LATER TUESDAY AT THE LOCAL LABORATORY...

HELLO, DR. WALKER. YOU KNOW THAT SPECIMEN YOU SENT US FROM EDDIE SCHWARTZ? OUR TESTS WERE UNABLE TO IDENTIFY IT. I’M SENDING IT TO THE STATE LABORATORY FOR FURTHER ANALYSIS.

MEANWHILE, AT CDC...

WELCOME TO DAY TWO...

CLASS, TODAY OUR EIS OFFICERS, ALISON, ALEX, AND KIM, WILL WALK YOU THROUGH SOME OUTBREAK INVESTIGATIONS.

FIRST, HOWEVER, THEY WILL TAKE YOU ON A TOUR THROUGH CDC’S DAVID J. SENCER MUSEUM.


ZOONOTIC PATHOGENS CAN INFECT BOTH ANIMALS AND PEOPLE. SOME CAN MAKE PEOPLE REALLY SICK, EVEN IF INFECTED ANIMALS DON’T LOOK SICK.
PEOPLE CAN GET ZOONOTIC DISEASES THROUGH CLOSE CONTACT WITH AN INFECTED ANIMAL, ITS ENVIRONMENT OR OTHER INFECTED PEOPLE.

MANY FOODBORNE DISEASES ARE ALSO ZOONOTIC IN ORIGIN.

DO YOU THINK EDDIE COULD HAVE GOTTEN SICK FROM A FOODBORNE OR ZOONOTIC DISEASE?

HMM... MAYBE.

CDC COLLABORATES WITH OUR STATE PUBLIC HEALTH PARTNERS WHO ARE OFTEN THE FIRST TO IDENTIFY A POTENTIAL PROBLEM.

2009 H1N1 Flu Pandemic

The 2009 H1N1 influenza (flu) pandemic occurred against a backdrop of pandemic response planning at all levels of government including years of developing, refining, and regularly exercising response plans at the international, federal, state, local, and community levels. At the time, public health officials believed that avian influenza (H5N1) viruses posed the greatest pandemic threat. H5N1 viruses were highly pathogenic in poultry in parts of Asia and were infecting people sporadically and often with deadly results. Given reality, pandemic preparedness efforts were largely based on a scenario of severe human illness caused by an avian virus. Despite differences in potential scenarios and the actual 2009 pandemic, many of the systems established through pandemic preparedness were used and useful for pandemic response.

IF THERE IS AN ASSOCIATED ANIMAL OUTBREAK, THE U.S. DEPARTMENT OF AGRICULTURE AND STATE VETERINARIANS ARE ALSO INVOLVED.

WE ALL WORK TOGETHER TO IDENTIFY THE SOURCE OF DISEASE AND FIGURE OUT HOW TO DEAL WITH IT.
EDDIE?
WHAT’S WRONG?!

BACK AT EDDIE’S HOUSE...

MOM, I FEEL WORSE.

WEDNESDAY, EARLY MORNING...

I CAN’T... BREATHE....!

GASP

EMERGENCY
EDDI??
HOW ARE YOU FEELING?

EDDIE!!

NOT RESPONSIVE AND BARELY BREATHING. WE MAY NEED TO INTUBATE HIM.

PULSE IS RAPID AND THREADY. LET'S GET HIM INTO ROOM #2. I'LL START A LINE.
Hey, where's Kris?

Kris and I just received a text from Eddie's mom.

Oh no, guys!

Excuse me, I have to take this...

Sob

Eddie is in serious condition at the hospital!

Later that afternoon...

Hi everyone. I'm going to have to excuse myself to address an urgent issue that just came up.

Alex, Alison and Kim will take it from here.

Dr. Lee, this is Jim Jefferies with the State Health Department.

Our state laboratory has just reported testing a virus that we cannot identify.

The virus was obtained from a 17-year-old boy who got sick Friday night. This boy is currently in serious condition in the ICU. We would like your assistance with testing the virus and performing a case investigation.

You know how she and Eddie are dating?

She felt like she couldn't sit by while Eddie is so sick.

I hope he's going to be OK.

Eddie is in serious condition at the hospital!

Later that afternoon...

...and one day you may return to CDC to take on the responsibilities of a real disease detective as an EIS officer...
WHEN WE GET HOME, LET’S MEET UP WITH KRIS. SHE’S AT THE HOSPITAL WITH EDDIE.

WELL, WE HAVE AN UNIDENTIFIABLE VIRUS WE HAVEN’T SEEN BEFORE…

I’M IN 100 PERCENT!

WHEN WE GET HOME, LET’S MEET UP WITH KRIS. SHE’S AT THE HOSPITAL WITH EDDIE.

WELL, WE HAVE AN UNIDENTIFIABLE VIRUS WE HAVEN’T SEEN BEFORE…

OK, LET’S SUMMARIZE WHAT WE KNOW ABOUT THE SITUATION SO FAR.

LET’S SEE HOW HE IS DOING AND LEND HIM OUR SUPPORT.

YES, AND RIGHT NOW WE ARE DEALING WITH A SINGLE CASE OF SEVERE RESPIRATORY ILLNESS IN A 17-YEAR-OLD MALE WHO GOT SICK FRIDAY NIGHT.

DR. LEE SAID THE PATIENT’S VIRUS SAMPLE HAS BEEN SHIPPED TO CDC. WE’LL KNOW MORE ONCE THE CDC LAB ANALYZES THE VIRUS.

THE KIDS LEAVE CDC DISEASE DETECTIVE CAMP...

THE EIS OFFICERS PREPARE TO LEAVE FOR THOMAS COUNTY...

SHORTLY AFTER...

LET’S DISCUSS THE CASE DURING THE DRIVE. WE WILL DRIVE STRAIGHT TO THOMAS COUNTY.

FROM THERE, WE’LL MEET UP WITH REPRESENTATIVES FROM THE STATE PUBLIC HEALTH DEPARTMENT AND THE STATE VETERINARIAN’S OFFICE TO DISCUSS NEXT STEPS.

OK, LET’S SUMMARIZE WHAT WE KNOW ABOUT THE SITUATION SO FAR.

YES, AND RIGHT NOW WE ARE DEALING WITH A SINGLE CASE OF SEVERE RESPIRATORY ILLNESS IN A 17-YEAR-OLD MALE WHO GOT SICK FRIDAY NIGHT.

DR. LEE SAID THE PATIENT’S VIRUS SAMPLE HAS BEEN SHIPPED TO CDC. WE’LL KNOW MORE ONCE THE CDC LAB ANALYZES THE VIRUS.
WE'RE ALL SO WORRIED ABOUT EDDIE!

THANK YOU, SWEETHEART. EDDIE NEEDS ALL OF OUR LOVE AND SUPPORT RIGHT NOW.

HELLO, MRS. SCHWARTZ. I WOULD LIKE TO SPEAK TO YOU ABOUT EDDIE’S CONDITION, PLEASE COME WITH ME.

LET’S THINK BACK AND SEE IF WE CAN USE WHAT WE LEARNED AT CDC DISEASE DETECTIVE CAMP TO TRY AND SOLVE HOW EDDIE GOT SICK.

YEAH, LET’S DO IT! I THINK WE CAN AT LEAST ATTEMPT TO NARROW DOWN THE SOURCE OF HIS ILLNESS.

LATER AT THE EMERGENCY ROOM WHERE EDDIE IS BEING TREATED…
Likewise, we'll get you unpacked at our office. 

Once inside, let's find out if the Health Department has had a chance to contact local hospitals and doctors’ offices to see if there have been any other unusual respiratory cases in the last few days. If not, we can help them make those calls.

Good to meet you, Jim.

Likewise. We'll get you unpacked at our office.

Ok, while you two get set up at the Health Department, I'll head to the hospital to interview the boy's family, check his medical chart and speak with his physician.
I was thinking back to before the fair.

“I remember we all had eaten together at the snack bar. I had a soda, and you and Eddie got ice cream.”

“So frosty delicious.

“I remember we all had eaten together at the snack bar. I had a soda, and you and Eddie got ice cream.”

Well, I think we can rule out ice cream because I had it too and didn't get sick.”
MEANWHILE, AT THE PUBLIC HEALTH DEPARTMENT...

GOOD PLAN.
I'M GOING TO FINISH GETTING SET UP HERE, AND THEN I'LL CHECK IN WITH ALISON TO SEE IF SHE HAS ANY LEADS TO FOLLOW UP ON.

I'M GOING TO SIT DOWN WITH SOME OF THE EPIDEMIOLOGISTS HERE TO SEE IF THERE HAS BEEN AN INCREASE IN RESPIRATORY ILLNESS REPORTED IN THE AREA.

WE NEED TO ENSURE THIS NEW VIRUS IS NOT SPREADING IN THE COMMUNITY.

KRIS: “Yeah, he was the only one of us to eat a burrito.”

R.J.: “Yeah, I was doubling down on corn dogs, but I didn’t get sick.”
Ok, I have to think like a disease detective!

Hmmm...

Even though Eddie ate a burrito and threw up on the night of the fair, his illness has mainly had respiratory symptoms, like cough, difficulty breathing, and fever.

It sounds like a respiratory virus, which isn’t something that he would have gotten from food.

But where would he have gotten a respiratory illness? We were all hanging out together.

You are right, Em!

What was Eddie exposed to that we weren’t?

Do you guys remember Dr. Lee talking about different pathogens?

I remember Alex talking about zoonotic diseases in the CDC museum.

Now let’s talk about how your immune system fights infection.
OH, Hi! This is quite a coincidence. What brings you here?

Hmmm… you all might be able to help me. In fact, you already have.

I need to speak to Eddie’s mom and doctor first, but after I’m finished, let’s talk.

Hi, Mrs. Schwartz, Dr. Rosenberg.

I’m Dr. Alison Cromwell with CDC in Atlanta. I’d like to ask you a few questions about Eddie’s illness…

Can you tell me about Eddie’s condition and would you mind if I review his medical chart?
MINUTES LATER...

ALEX: WOW! OK, I’ll follow up with our State Public Health colleagues to get a hold of the fair organizer.

HEY ALEX, IT’S ALISON.

I’VE SPoken TO EDDIE’S MOTHER, HIS PHYSICIAN AND HIS FRIENDS HERE AT THE HOSPITAL, WHO COINCIDENTALLY WERE AT THE CDC Disease Detective Camp.

THEY HAVE ALL CONFIRMED THAT EDDIE WAS AT THE THOMAS COUNTY FAIR THE NIGHT HE BECAME SICK.

I’M ABOUT TO SIT DOWN WITH THE KIDS TO FIND OUT MORE...

ALEX: WOW! OK, I’ll follow up with our State Public Health colleagues to get a hold of the fair organizer.

ALISON, WE WERE JUST TALKING ABOUT THIS.

WE ATE AT THE SAME PLACES AS EDDIE, EVEN THOUGH HE HAD A BURRITO AND NO ONE ELSE DID.

I JUST POINTED OUT THAT HIS ILLNESS HAD SYMPTOMS ASSOCIATED WITH RESPIRATORY DISEASE, LIKE HIS COUGH...

VERY ASTUTE, EMILY. WHAT WAS EDDIE DOING AT THE FAIR THAT MAY HAVE EXPOSED HIM TO A RESPIRATORY VIRUS?

HMM... WELL EDDIE’S MAIN ACTIVITY AT THE FAIR WAS SHOWING HIS PIG, HAMLET. EDDIE MENTIONED THAT HAMLET WASN’T 100 PERCENT. HE EVEN ASKED THE FAIR VETERINARIAN TO TAKE A LOOK AT HAMLET.

THIS IS HELPFUL, EMILY. PIGS CAN SPREAD VIRUS EVEN WHEN THEY APPEAR HEALTHY.

I’M GOING TO FOLLOW UP WITH MY FELLOW EIS OFFICER, ALEX.

HI KIDS, LET’S TALK MORE ABOUT EDDIE’S ILLNESS.

CAN YOU TELL ME WHAT YOU DID AT THE FAIR TOGETHER AND IF EDDIE MAY HAVE BEEN INVOLVED WITH ANY ACTIVITIES THAT THE REST OF YOU WEREN’T?
SEVERAL HOURS LATER...

THANKS TO YOU BOTH FOR MEETING WITH ME. DR. TOLANI, I UNDERSTAND THAT YOU ARE THE VETERINARIAN WHO INSPECTED THE ANIMALS AT THE FAIR. CAN YOU TELL ME IF THERE WAS ANY ILLNESS AMONG THE ANIMALS?

INTERESTING... I JUST GOT OFF THE PHONE WITH THE FAIR ORGANIZER. WE'RE SUPPOSED TO MEET AT THE FAIRGROUNDS TO TALK. I'LL SEE IF HE CAN HAVE THE FAIR VETERINARIAN MEET US AS WELL.

ALEX, IT'S ALISON. I JUST TALKED TO EDDIE'S FRIENDS AGAIN. THEY SAID HE SHOWED A PIG AT THE FAIR.
WELL, WE HAD THREE HORSES WITH COLIC AND A FEW CASES OF RINGWORM IN THE COWS.

WHEN I EXAMINED THE PISs, A FEW HAD A MILD FEVER.

I TOOK SAMPLES FROM THEM, WHICH ARE CURRENTLY BEING TESTED AT THE STATE ANIMAL HEALTH LABORATORY.

GREAT WORK! I’M INTERESTED TO KNOW THE RESULTS OF THOSE TESTS.

ANDY, ARE YOU AWARE OF ANY ILLNESS REPORTED AMONG PEOPLE WHO ATTENDED THE FAIR?

NOT SO MUCH DURING THE FAIR ITSELF, BUT I’VE HAD A FEW PEOPLE TELL ME THAT THEY OR SOMEONE IN THEIR FAMILY IS REAL SICK WITH SOME KIND OF RESPIRATORY BUG FOLLOWING THE FAIR.

HMMM... COULD YOU GIVE ME SOME CONTACT NAMES AND NUMBERS SO I CAN FOLLOW UP?

YOU HAVE THE RESULTS?

HMM... I SEE... THANK YOU.

THAT WAS THE STATE ANIMAL HEALTH LABORATORY CALLING WITH THE SWINE TEST RESULTS...

YOU ARE GOING TO WANT TO HEAR THIS...
SOON AFTER, AT CDC’S LABORATORY...

HOURS LATER...

ALEX, ONE OF OUR EIS OFFICERS IN THE FIELD JUST CALLED.

THE BOY FROM THOMAS COUNTY HAD EXPOSURE TO PIGS AT THE AGRICULTURAL FAIR.

RESULTS FROM THE PIGS HAVE COME BACK POSITIVE FOR AN INFLUENZA VIRUS THAT IS CIRCULATING IN SWINE.

OUR PRELIMINARY TEST RESULTS FROM THE BOY INDICATE INFECTION WITH A SIMILAR VIRUS, INDICATING THE BOY MAY HAVE BEEN INFECTED BY HIS PIG.

WE NOW KNOW THAT THIS IS A NEW FLU VIRUS WITH GENES FROM PIGS, BIRDS AND HUMAN FLU VIRUSES...

THE GENERAL PUBLIC WILL NOT HAVE EXISTING IMMUNITY AGAINST THIS VIRUS...

CALL ALEX, ALISON AND KIM. WE NEED TO LET THEM KNOW WHAT WE ARE DEALING WITH HERE. WE WILL NEED TO CALL OUR STATE HEALTH COLLEAGUES AS WELL.

LET’S TALK TO USDA’S LABORATORY TO COMPARE THE GENOMES OF BOTH VIRUSES. THE GENES WILL TELL US WHAT WE ARE DEALING WITH.

IF THIS VIRUS HAS THE ABILITY TO SPREAD EASILY FROM PERSON TO PERSON, IT COULD START A PANDEMIC...

A GLOBAL OUTBREAK OF DISEASE...
I just heard back from Headquarters. CDC’s laboratory in Atlanta and USDA’s laboratory have obtained preliminary test results that indicate a possible match between Eddie’s virus and the virus obtained from his pigs. They are saying this virus has pandemic potential...

For a virus to cause a pandemic, the majority of the world’s population must not have existing immunity against it, and the virus must be capable of spreading easily and sustainably from person to person.

Yes. Let’s hope that this virus isn’t spreading from person to person yet, but that’s what we need to find out. Local hospitals and health care providers are still reporting normal patterns of illness, according to our state public health colleagues.

Yes. We will need to follow up with him and our state public health partners to see if we can learn more about their illness and possibly get those people tested. Let’s go ahead and also coordinate with the state public health department and health care providers. We can ask them to take samples for testing from any patients with flu-like illness that have had recent contact with pigs. We should also set up a phone call with state and federal animal health officials.

The fair manager said some people reported getting sick following the fair, and he also said more pigs have tested positive.

Okay. Looks like our job isn’t over.
Keep fighting, Eddie...

I'm here for you.
MEANWHILE, A SUBCONSCIOUS EDDIE RACES TO FIND A WAY TO ACTIVATE HIS IMMUNE SYSTEM AGAINST THE ATTACKING VIRUSES...

These viruses are right on my tail....

I must find the cure before it’s too late!
ACCESS GRANTED!

I must be close…

This input panel must open access to the room housing the cure!

Click click click!

Access granted!

That did it! I’m in!

There it is!

This will target my immune system against the virus!
NOT A MOMENT TOO SOON!

RAAAWWWRRRRRRRR

GULP
I DID IT! JUST IN TIME...
A WEEK LATER...

HOW ARE YOU FEELING, EDDIE?

OH, I’M DOING BETTER.

AS YOU CAN SEE, HAMLET IS DOING BETTER, TOO.

YOU KNOW, EVEN THOUGH I DIDN’T GET TO GO TO CDC’S DISEASE DETECTIVE CAMP, I LEARNED A LOT FROM THIS EXPERIENCE...

FOR ONE, I LEARNED THAT I COULD CATCH A FLU VIRUS FROM HAMLET, AND NOT ONLY THAT, HAMLET CAN GET INFECTED WITH FLU VIRUSES FROM US AND FROM OTHER PIGS AT THE FAIR, TOO.

I ALSO LEARNED THAT DUE TO HAVING ASTHMA, I AM AT HIGH RISK OF SERIOUS FLU ILLNESS. TRUST ME, I’LL REMEMBER THAT TO TRY AND AVOID ANOTHER TRIP TO THE HOSPITAL.

THAT’S TRUE, EDDIE. ALISON TOLD ME THAT CDC RECOMMENDS FOR HIGH RISK PEOPLE AT AGRICULTURAL FAIRS TO AVOID ENTERING THE SWINE BARN AND TO AVOID PIGS WHILE AT THE FAIR.

REALLY? BUT WHAT ABOUT ME RAISING HAMLET AT HOME?

SO... ALISON SAID THAT IT’S OK FOR PEOPLE AT HIGH RISK TO RAISE PIGS AT HOME. SHE SAID THE PRIMARY CONCERN IS WHEN LARGE NUMBERS OF PIGS AND PEOPLE COME TOGETHER AT AGRICULTURAL EVENTS. THAT’S WHEN THESE VIRUSES ARE MOST LIKELY TO SPREAD BETWEEN PIGS AND PEOPLE.
OH, I SEE.
THAT MAKES SENSE.
BUT HOW DO PEOPLE KNOW IF THEY ARE AT HIGH RISK?

ALISON SAID TO CHECK CDC’S FLU WEBSITE IF WE HAD ANY QUESTIONS.

I REMEMBER HER SAYING THAT IN ADDITION TO PEOPLE WITH ASTHMA, PEOPLE AT HIGH RISK INCLUDED KIDS YOUNGER THAN 5 YEARS OLD, PREGNANT WOMEN, AND PEOPLE WITH OTHER LONG TERM HEALTH CONDITIONS, LIKE DIABETES, TO NAME A FEW.

THAT’S GOOD TO KNOW. SO IS THERE ANYTHING ELSE THEY RECOMMEND DOING TO PREVENT GETTING SICK WITH ONE OF THESE VIRUSES?

WELL, THE EIS OFFICERS SAID THAT PIGS DON’T ALWAYS APPEAR SICK WHEN THEY HAVE THE FLU, SO WASHING YOUR HANDS BEFORE AND AFTER HANDLING THEM IS A GOOD IDEA.

THEY ALSO SAID YOU SHOULDN’T EAT OR PUT ANYTHINGS IN YOUR MOUTH WHEN AROUND PIGS. THIS DOESN’T REALLY APPLY TO ANY OF US, BUT THEY ALSO SAID NOT TO BRING ANY KIDS’ TOYS, PACIFIERS AND STROLLERS INTO ANIMAL AREAS AT FAIRS.

AH! I SEE. DR. TOLANI THE FAIR VETERINARIAN TOLD ME THAT THEY TAKE PRECAUTIONS ON THE ANIMAL HEALTH SIDE, AS WELL.

SHE SAID IT TAKES EVERYONE WORKING TOGETHER TO KEEP ANIMALS AND PEOPLE HEALTHY.

SHE SAID THAT HELPS REDUCE SPREAD OF DISEASE AMONG PIGS AND PEOPLE.

THAT’S WHY THERE ARE SO MANY RULES WE FOLLOW WHEN WE RAISE AND SHOW OUR ANIMALS, SUCH AS NOT KEEPING THE PIGS AT THE FAIR LONGER THAN THREE DAYS.
WHILE EDDIE WAS IN THE HOSPITAL, ALISON TOLD ME A FEW MORE THINGS.

SHE SAID WHEN FLU VIRUSES FROM PIGS INFECT PEOPLE, IT’S CALLED A “VARIANT FLU VIRUS” INFECTION.

SHE SAID VARIANT VIRUS INFECTIONS DON’T HAPPEN OFTEN, BUT SOME OCCUR EVERY YEAR, PARTICULARLY DURING FAIR SEASON.

ALISON ALSO SAID THAT VARIANT VIRUSES ARE DIFFERENT FROM THE FLU VIRUSES THAT NORMALLY MAKE PEOPLE SICK DURING THE FLU SEASON. SINCE PEOPLE AREN’T OFTEN EXPOSED TO VIRUSES FROM PIGS, MOST DON’T HAVE ANTIBODIES THAT PROTECT AGAINST VARIANT VIRUSES.

AS WE LEARNED DURING DISEASE DETECTIVE CAMP, OUR BODIES’ IMMUNE SYSTEM PRODUCES ANTIBODIES TO FIGHT AGAINST INFECTION, AND THE SAFEST WAY TO GET ANTIBODIES IS THROUGH VACCINATION. ALTHOUGH THE FLU VACCINE ISN’T DESIGNED TO PROTECT AGAINST VARIANT FLU, IT IS STILL IMPORTANT TO GET, BECAUSE IT CAN HELP PROTECT US FROM GETTING THE FLU AND SPREADING IT TO OTHERS, INCLUDING HAMLET.

OH WOW! HOW OFTEN DO PEOPLE GET REALLY SICK FROM THESE VIRUSES, LIKE I DID?

NOT TOO OFTEN. ALISON SAID THAT MOST PEOPLE WITH VARIANT FLU JUST HAVE TYPICAL FLU ILLNESS, BUT JUST AS WITH ANY TYPE OF FLU, SOME PEOPLE WILL GET REALLY SICK FROM VARIANT FLU. THIS IS PARTICULARLY IMPORTANT FOR PEOPLE AT HIGH RISK, LIKE YOU.

YEAH, ALISON SAID THAT ANY FLU VIRUS INFECTION CAN BE DANGEROUS, EVEN DEADLY, EVEN FOR OTHERWISE HEALTHY PEOPLE.

SHE SAID CDC WAS INVESTIGATING TO SEE IF THE VIRUS YOU HAD IS SPREADING BETWEEN PEOPLE...
ON THAT POINT, ALISON SAID THAT THEY ALWAYS TRY TO INVESTIGATE VARIANT VIRUS INFECTIONS TO SEE IF THEY ARE SPREADING FROM PERSON-TO-PERSON.

SHE SAID MOST VARIANT VIRUSES SPREAD FROM AN INFECTED PIG TO A PERSON, BUT THESE VIRUSES USUALLY ARE NOT ABLE TO SPREAD EASILY FROM PERSON TO PERSON, LIKE SEASONAL FLU.

OH, YEAH! WHEN A FLU VIRUS FROM ANIMALS GAINS THE ABILITY TO SPREAD EASILY FROM PERSON TO PERSON, THAT’S WHEN A PANDEMIC CAN OCCUR.

IN FACT, THAT’S HOW THE 2009 FLU PANDEMIC OCCURRED. ALEX TOLD ME THE 2009 H1N1 VIRUS HAD A MIX OF GENES FROM NORTH AMERICAN PIGS, PIGS FROM EUROPE AND ASIA, BIRDS, AND EVEN HUMANS.

THAT’S... KIND OF CRAZY!

WOW! YOU GUYS JUST TAUGHT ME A LOT!
I wonder what the EIS officers are up to now?

I saw on TV that more people got sick following the fair, and more disease was found in the pigs as well. The EIS officers were investigating.

Yeah, I wonder if this is the end of it...
ADDENDUM

Please visit the following websites for additional information about health topics and recommendations discussed in The Junior Disease Detectives: Operation Outbreak.

CDC WEBSITE RESOURCES:

**CDC Flu Website:** https://www.cdc.gov/flu/

**CDC Swine/Variant Flu Website:** https://www.cdc.gov/flu/swineflu/index.htm

  *What People Who Raise Pigs Need to Know About Influenza (Flu):*
  https://www.cdc.gov/flu/swineflu/people-raise-pigs-flu.htm

  *Key Facts about Human Infections with Variant Viruses:*
  https://www.cdc.gov/flu/swineflu/keyfacts-variant.htm

  *Key Facts about Swine Influenza in Pigs:*
  https://www.cdc.gov/flu/swineflu/keyfacts_pigs.htm

  *Key Facts for People Exhibiting Pigs at Fairs:*

  *Take Action to Prevent the Spread of Flu Between Pigs and People:*

**CDC Healthy Pets Healthy People Website:** https://www.cdc.gov/healthypets/index.html

**CDC Zoonotic Diseases Website:** https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html

**CDC Pandemic Flu Website:** https://www.cdc.gov/flu/pandemic-resources/index.htm

USDA WEBSITE RESOURCES:

**Zoonotic Influenza and Measures for Prevention at Fairs:**
http://nasphv.org/documentsCompendiaZoonoticInfluenza.html

**Influenza in Swine:** https://www.usda.gov/topics/animals/one-health/influenza-swine

**USDA Surveillance for Influenza A Virus in Swine Update:**