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Forward

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.
OPERATION OUTBREAK

PROJECT LEAD: DOUGLAS JORDAN, MA
ART TEAM LEAD: JAMES ARCHER, MSM
WRITTEN BY DOUGLAS JORDAN, MA
& VICTORIA JEISY SCOTT, PHD
PENCILED & INKED BY BOB HOBBS, AS
DIGITAL COLOR BY KRISTEN IMMOOR, BFA
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WHAT ARE YOU DOING, EDDIE?

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!

YEAH! 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.
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.

OK, I've got this!

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

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

Hang on, guys... I promise this is public health related.

Yeah... Whaaaaat?

Oh R.J., HA! Oh, by the way, it’s me Kris. I just got to the meeting... and what timing!
You see, we represent the body's immune system, and this castle here is the human body.

Outside, an army of monster germs is attacking...
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.

Your immune cells are constantly on the lookout for invading germs.
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, R.J.!

Nice entrance. What's that on your face?

Sorry I'm late to the meeting, I had a baking accident.

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.

R.J.
Vice President
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.O.'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.”
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.

My beetles are going to blow everyone’s minds at the fair.

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?

Later on...

I don’t get your bug and beetle fascination, em... it’s kind of weird.

Ok, Mr. medieval archer germ analogy guy.
AT THE THOMAS COUNTY FAIR...
C’MON HAMLET, THE JUDGINGS WILL BE STARTING SOON...

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

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

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

MY PROJECT IS DEFINITELY WINNING THIS YEAR!

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

MOMMY... LOOK AT THE CUTE PIG!

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

C'MON
HAMLET... GO TO THE RIGHT. WHY ARE YOU SO SLUGGISH LATELY?

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

FRIDAY NIGHT...

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.

FRIDAY NIGHT...

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...

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

I don't know about this, you guys…

Nothing to worry about… those are just actors… I think…

EEEEKK!

cough!
cough!

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

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

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

PUFF

All right, time for bumper cars!
AWESOME! I LOVE BUMPER CARS!

WHOA... DUDE!

...WOW, I'M REALLY NOT FEELING WELL YOU GUYS...

AWESOME! I LOVE BUMPER CARS!

BURRITOS AND BUMPER CARS... PROBABLY NOT A GOOD COMBINATION.

WHOA... DUDE!

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?

BLUUGG!

BLUUGG!

BLUUGG!

BLUUGG!

BLUUGG!

BLUUGG!

BLUUGG!
MONDAY MORNING: EDDIE’S HOUSE...

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?
Hello, I’m Dr. Lee. Welcome to the CDC.

I’m Dr. Alex.

Hello everyone, I’m Dr. Alison.

And I’m Dr. Kim. We are CDC EIS officers.

I along with the EIS officers standing beside me, will teach you about infectious diseases and how to be a disease detective. Meet Drs. Alison, Alex, and Kim.

...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.

This is going to be great! I wish Eddie could be here to experience this...
BY THE END OF THIS COURSE, YOU’LL KNOW ABOUT DIFFERENT KINDS OF INFECTIOUS DISEASES AND HOW CDC PROTECTS THE PUBLIC.

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.

WHAT IS PUBLIC HEALTH?

PUBLIC HEALTH WORKERS
- Community Health
- Focus on Preventing Diseases
- Investigate Diseases in Groups of People

CLINICIANS
- Individual Health
- Focus on Treating Diseases
- Diagnose and Treat Disease in One Patient

I SURE HOPE EDDIE IS FEELING BETTER.

BACK AT EDDIE’S HOUSE...

I’M TAKING YOU TO THE DOCTOR.

MOM, I FEEL WORSE.

Mom, I feel worse.

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.

MOM, I FEEL WORSE.
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, testing, and regularly exercising response plans. Pandemic planning also involved local, state, and federal partners at the national, local, and community levels. At the onset, experts believed that swine influenza A (H1N1) viruses posed the greatest pandemic threat. H1N1 influenza is endemic in pigs in parts of the world and can infect people, often with deadly results. Given reality, pandemic preparedness plans were largely based on a scenario where swine influenza A (H1N1) viruses were used and useful for the 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.
BACK AT EDDIE’S HOUSE...

EDDIE? WHAT’S WRONG?!

MOM, I FEEL WORSE.

I CAN’T... BREATHE....!

WEDNESDAY, EARLY MORNING...

GASP
EDDiE?
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.
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.

OH NO, GUYS!

I SEE...

HEEY, WHERE’S KRIS?

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.

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.

...AND ONE DAY YOU MAY RETURN TO CDC TO TAKE ON THE RESPONSIBILITIES OF A REAL DISEASE DETECTIVE AS AN EIS OFFICER...
THE KIDS LEAVE CDC DISEASE DETECTIVE CAMP...

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

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

I’M IN 100 PERCENT!

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.

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

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

WELL, WE HAVE AN UN-IDENTIFIABLE VIRUS WE HAVEN’T SEEN BEFORE...

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.
Later at the emergency room where Eddie is being treated...

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.
AT THE PUBLIC HEALTH DEPARTMENT...

GOOD TO MEET YOU, JIM.

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.

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 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.”
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.”

MEANWHILE, AT THE PUBLIC HEALTH DEPARTMENT...

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.

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.
BACK AT THE EMERGENCY ROOM...

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.

WHAT WAS EDDIE EXPOSED TO THAT WE WEREN’T?

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

You are right, Em!

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.”
AT THE EMERGENCY ROOM...

Hey, Dr. Alison!

Oh, hi! This is quite a coincidence. What brings you here?

We are here to see our friend, Eddie, who is in the ICU.

He got sick at the Thomas County Fair the Friday before our CDC field trip.

We were just using what we learned at CDC to try and figure out how he got sick.

Hmm... 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...

Dr. Rosenberg.

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

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.

Alex: What was Eddie doing at the fair that may have exposed him to a respiratory virus?

Very astute, Emily. What was Eddie doing at the fair that may have exposed him to a respiratory virus?

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...

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?

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.
ALEX, IT'S ALISON. I JUST TALKED TO EDDIE'S FRIENDS AGAIN. THEY SAID HE SHOWED A PIG AT THE FAIR.

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.

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?
WELL, WE HAD
THREE HORSES WITH
COLIC AND A FEW
CASES OF RINGWORM
IN THE COWS.

WHEN I
EXAMINED THE
PIGS, 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...

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.

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

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.

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

A GLOBAL OUTBREAK OF DISEASE...
BACK AT THE PUBLIC HEALTH DEPARTMENT...

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...

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.

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

Yes. Let's 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.

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.
BACK AT THE HOSPITAL...

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!
I must be close…

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

ACCESS GRANTED!

That did it! I’m in!

Whoosh

This will target my immune system against the virus!

There it is!
NOT A MOMENT TOO SOON!

RAAAAWWWWRRRRRRRR

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
THESSE 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 ANYTHING
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.

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.

SHE SAID THAT
HELPS REDUCE SPREAD
OF DISEASE AMONG
PIGS AND PEOPLE.
THEY ALSO SAI'D YOU SHOULDN'T EAT OR PUT ANYTHING IN YOUR MOUTH WHEN AROUND PIGS. THIS DOESN'T REALLY APPLY TO ANY OF US, BUT THEY ALSO SAI'D NOT TO BRING ANY KIDS' TOYS, PACIFIERS AND STROLLERS INTO ANIMAL AREAS AT FAIRS.

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 HINI 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 (Swine Flu) 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: