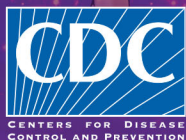


# The JUNIOR DISEASE DETECTIVES

OPERATION: OUTBREAK







## Acknowledgments

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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.

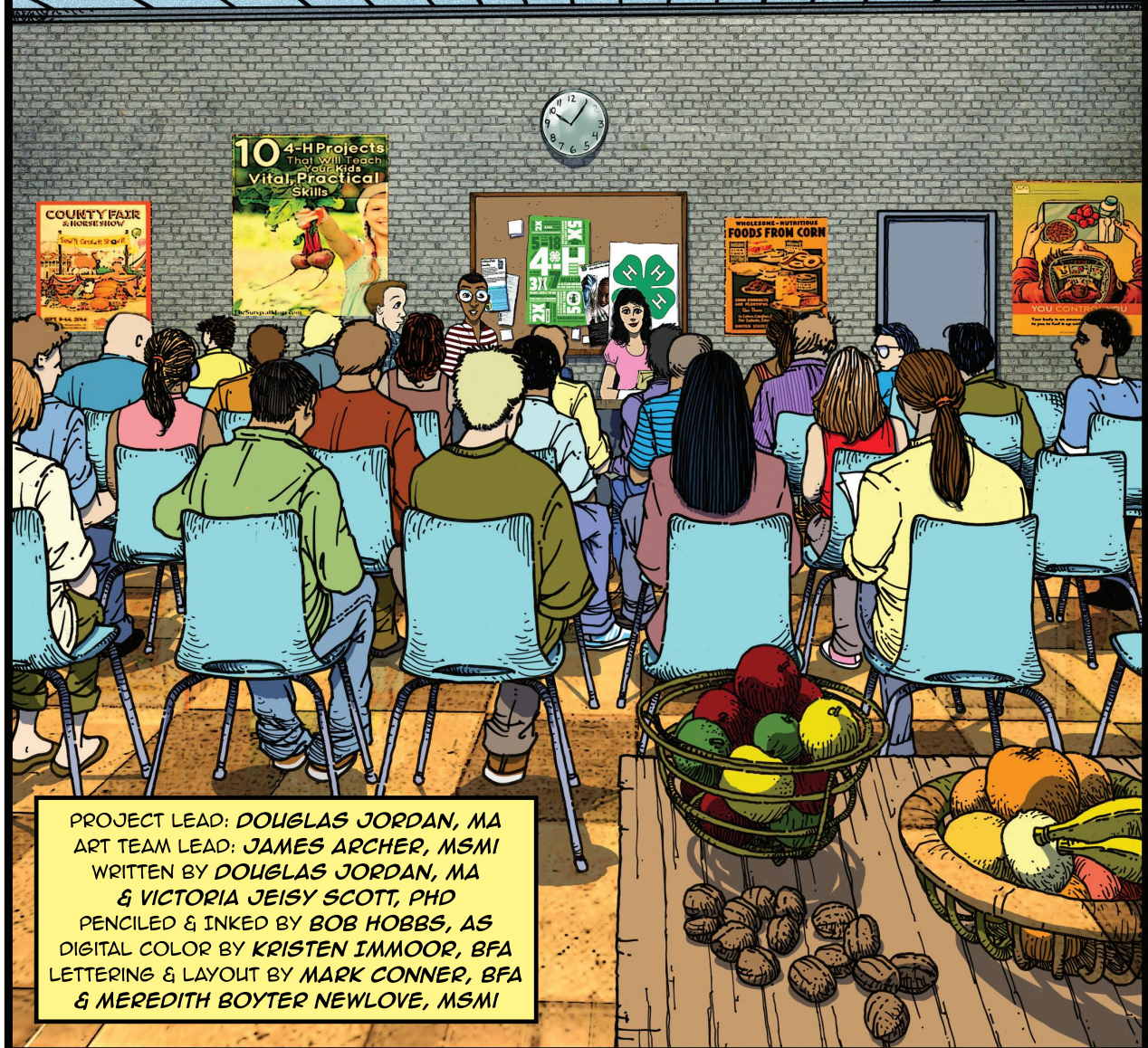
Lastly, CDC hopes that this story promotes youth education and interest in science and public health. We at CDC hope that readers are inspired to become the next generation of real life disease detectives and public health superheroes.

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>.





# OPERATION OUTBREAK



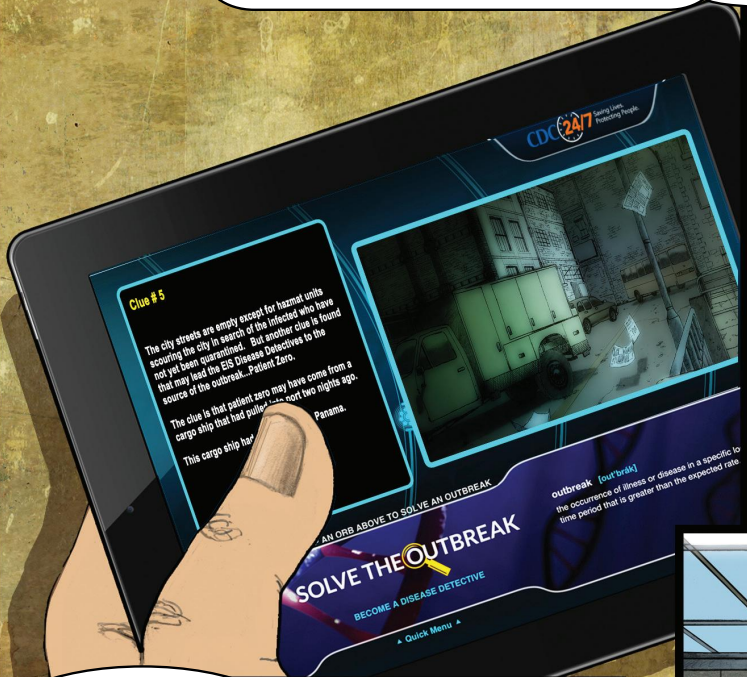
PROJECT LEAD: DOUGLAS JORDAN, MA  
 ART TEAM LEAD: JAMES ARCHER, MSMI  
 WRITTEN BY DOUGLAS JORDAN, MA  
 & VICTORIA JEISY SCOTT, PHD  
 PENCILED & INKED BY BOB HOBBS, AS  
 DIGITAL COLOR BY KRISTEN IMMOOR, BFA  
 LETTERING & LAYOUT BY MARK CONNER, BFA  
 & MEREDITH BOYTER NEWLOVE, MSMI





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.

Eddie  
Treasurer

R.J.  
Secretary

YES, EXCELLENT TIMING! I'M REALLY LOOKING FORWARD TO IT!



Emily  
President

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!**

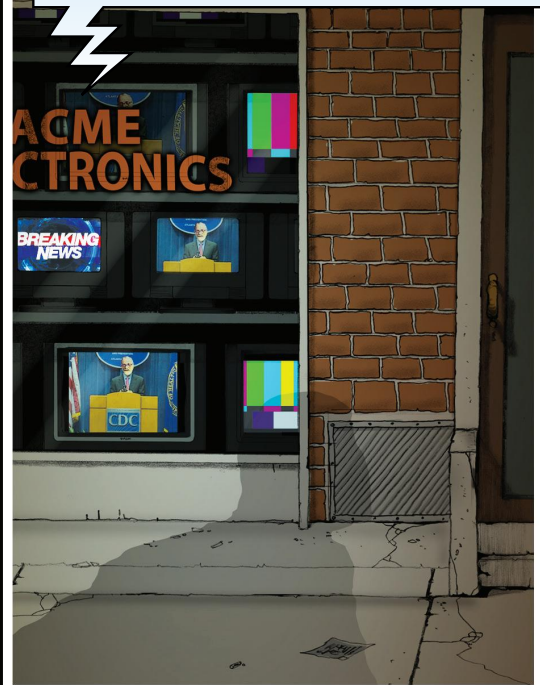


I'M THE **ONLY HOPE** TO **DELIVER IT** ON TIME!

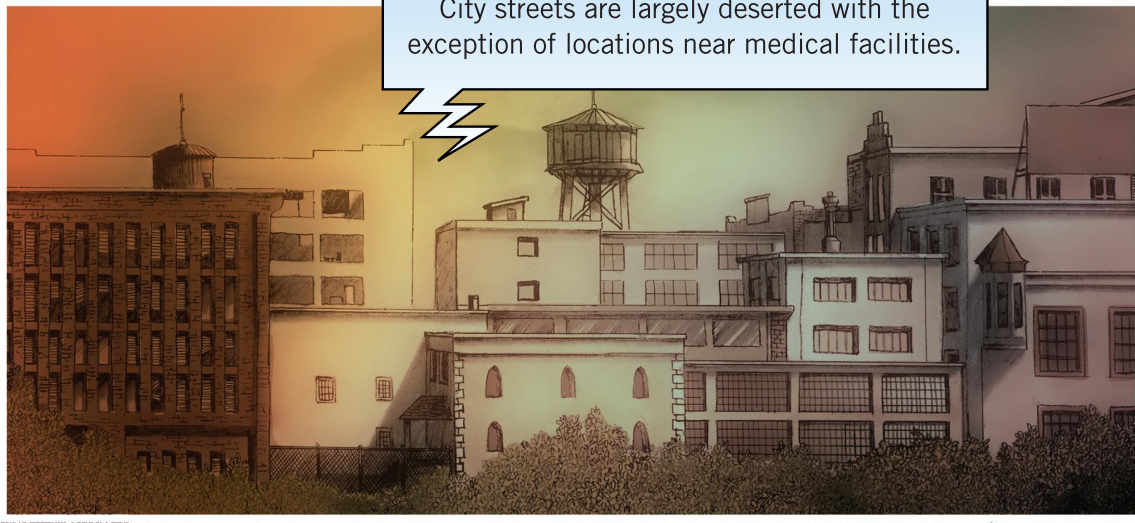
I REMAIN **CLOAKED** TO MOVE **QUICKLY UNNOTICED** ... I CAN'T RISK BEING **STOPPED** OR **SLOWED DOWN**.



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.







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  
MIEVEAL 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?

OH R.J., HA!  
THIS IS NERDY,  
BUT I LIKE  
MY OUTFIT!

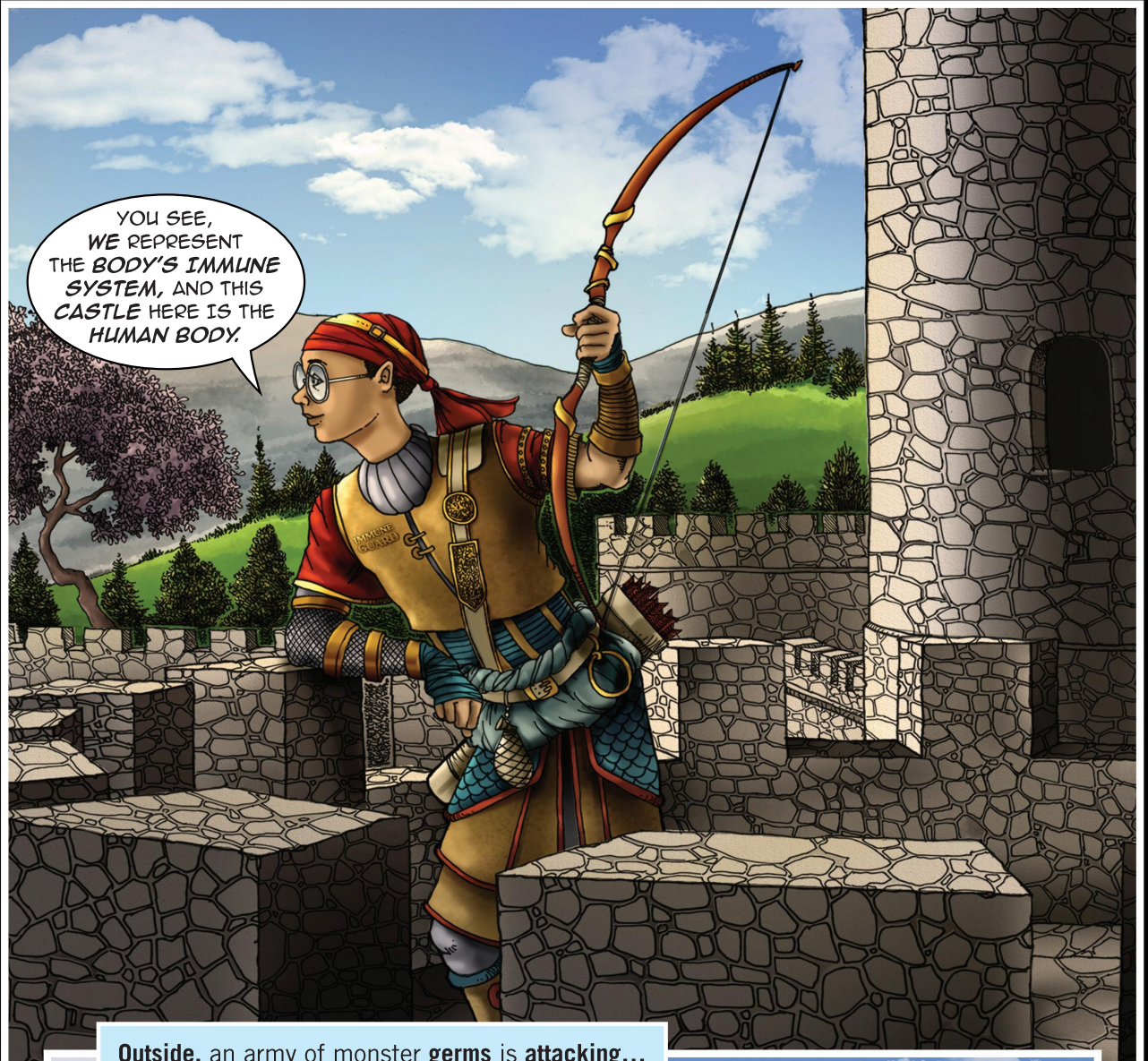


YEAH...  
WHAAAAAT?



HANG ON,  
GUYS...  
I PROMISE  
THIS IS  
PUBLIC HEALTH  
RELATED.

HA! HA!  
OH, BY THE WAY,  
IT'S ME KRIS.  
I JUST GOT  
TO THE  
MEETING...  
AND WHAT  
TIMING!

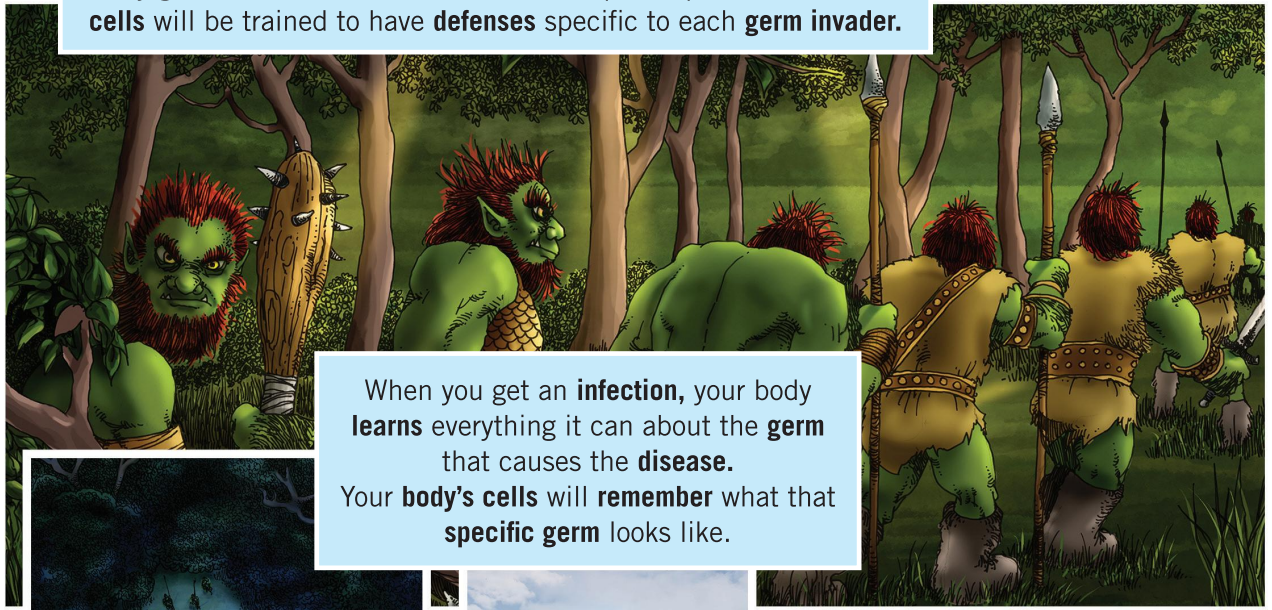


YOU SEE,  
WE REPRESENT  
THE **BODY'S IMMUNE  
SYSTEM**, AND THIS  
CASTLE HERE IS THE  
**HUMAN BODY.**

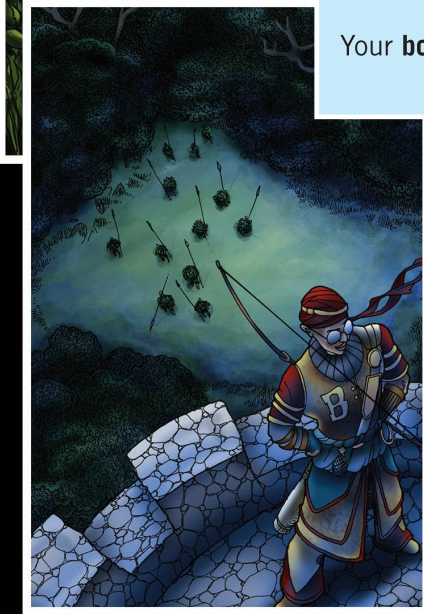
Outside, an army of monster germs is attacking...



Every germ is different. To **combat** this, a special platoon of **immune cells** will be trained to have **defenses** specific to each **germ invader**.



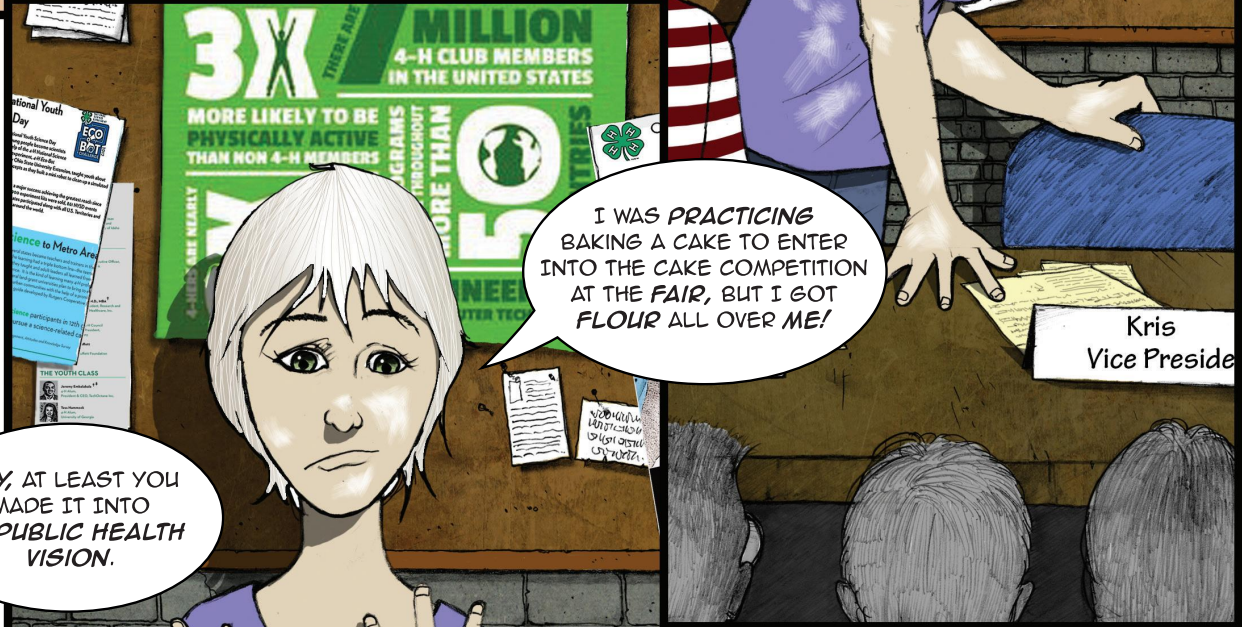
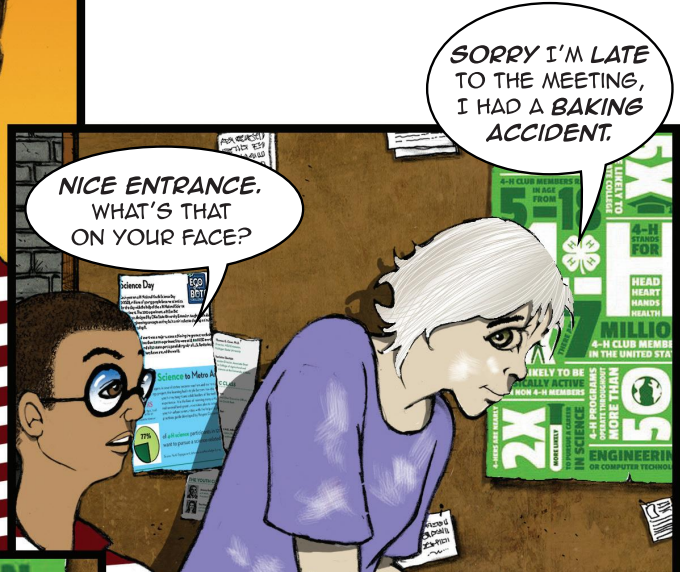
When you get an **infection**, your body **learns** everything it can about the **germ** that causes the **disease**. Your **body's cells** will **remember** what that **specific germ** looks like.



Your **immune cells** are constantly on the lookout for **invading germs**.

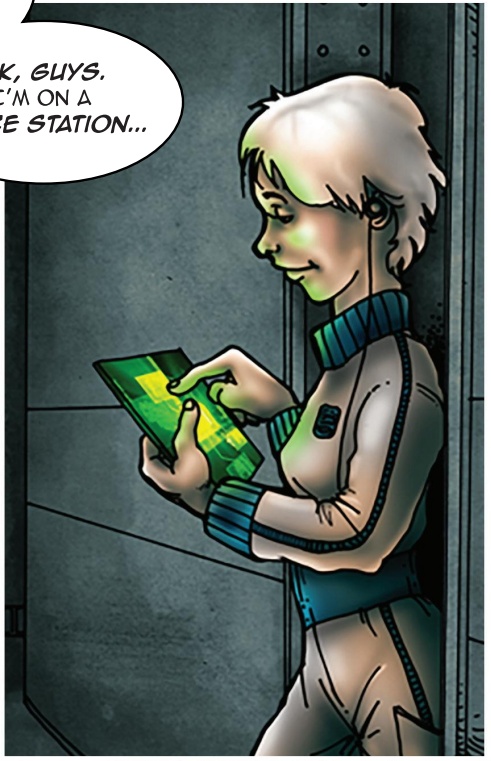
When **germs** are spotted and **recognized** by the **immune system**, we must leap into action to **fight the infection!**







SO, I GATHER THIS IS A **PUBLIC HEALTH** IMAGINATION EXERCISE? CAN I GO NEXT?

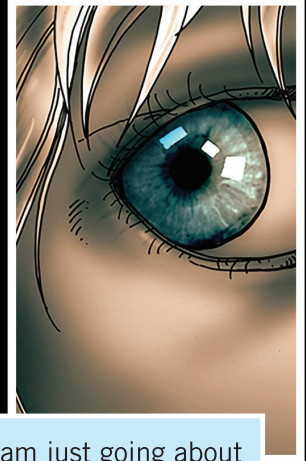


OK, GUYS. I'M ON A **SPACE STATION...**



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!



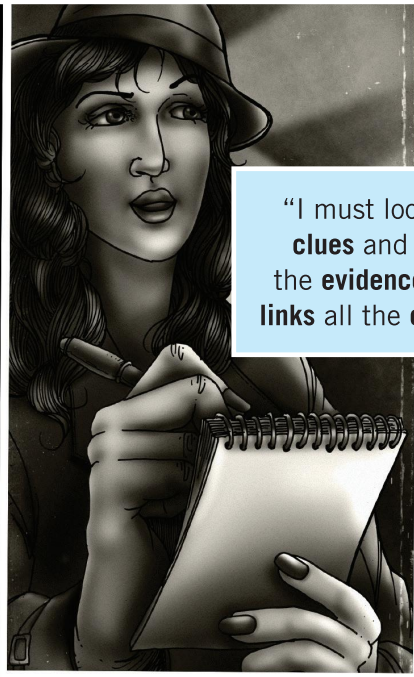
HMM,  
MY TURN ALREADY?  
LET'S SEE...



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!**”

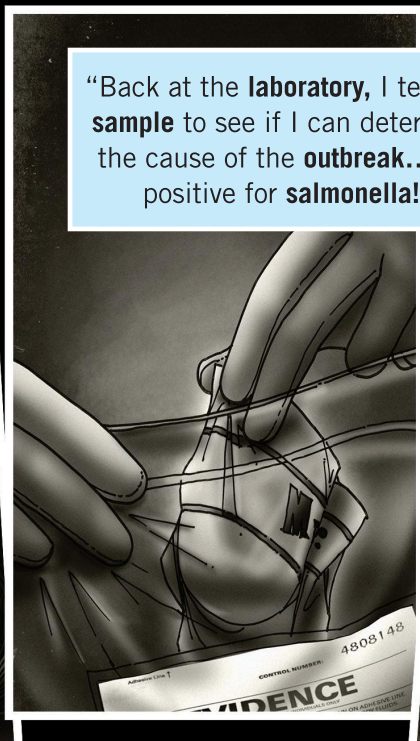


“**Everyone** who has gotten sick ate at this **restaurant!**”



HMM.

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



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



“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.**”



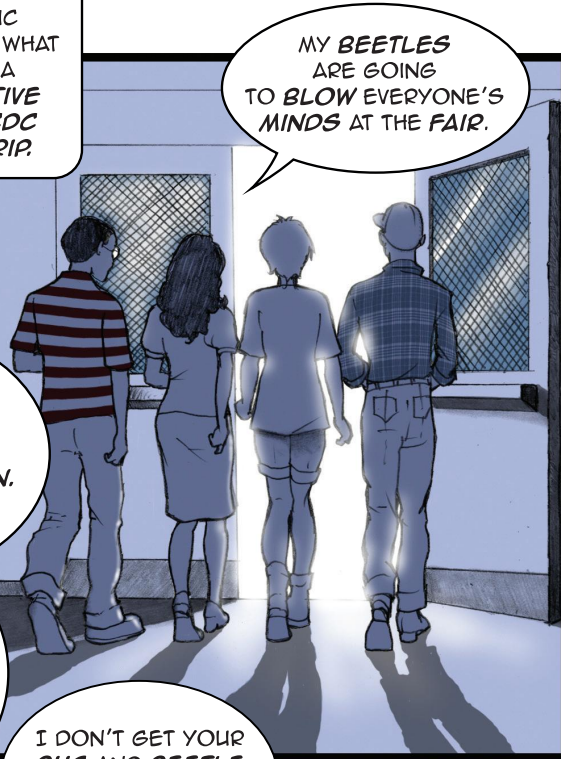
Emily  
President

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*.

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?

MY *BEETLES*  
ARE GOING  
TO *BLOW EVERYONE'S*  
*MINDS* AT THE *FAIR*.



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

LATER ON...



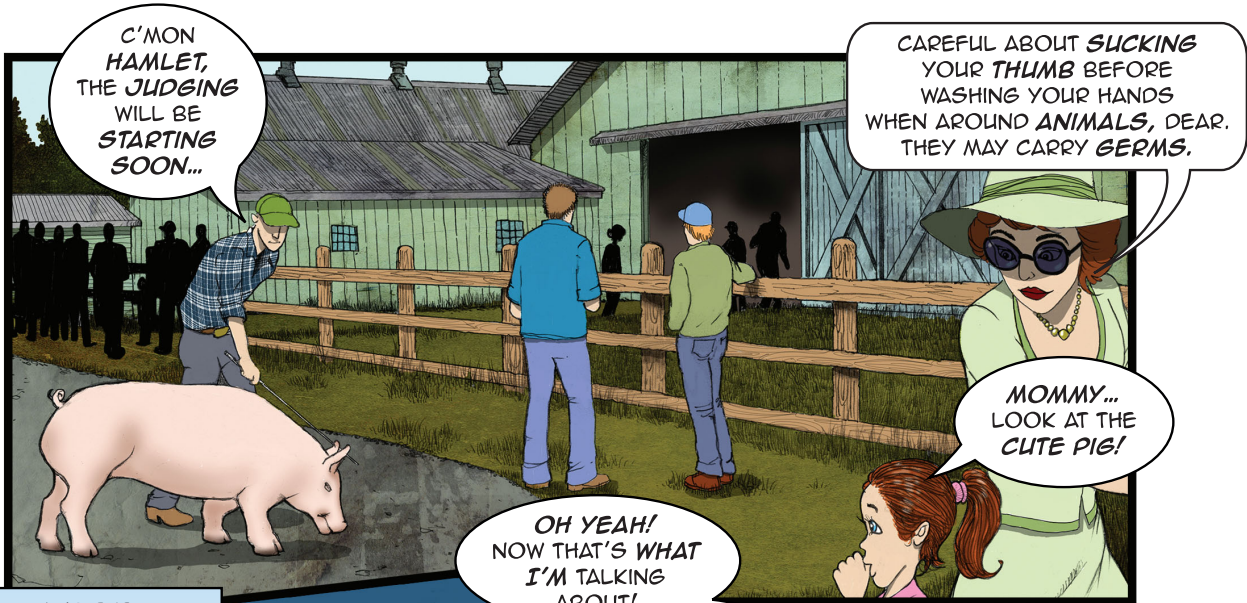
OK, MR.  
*MEDIEVAL ARCHER*  
*GERM ANALOGY GUY*.



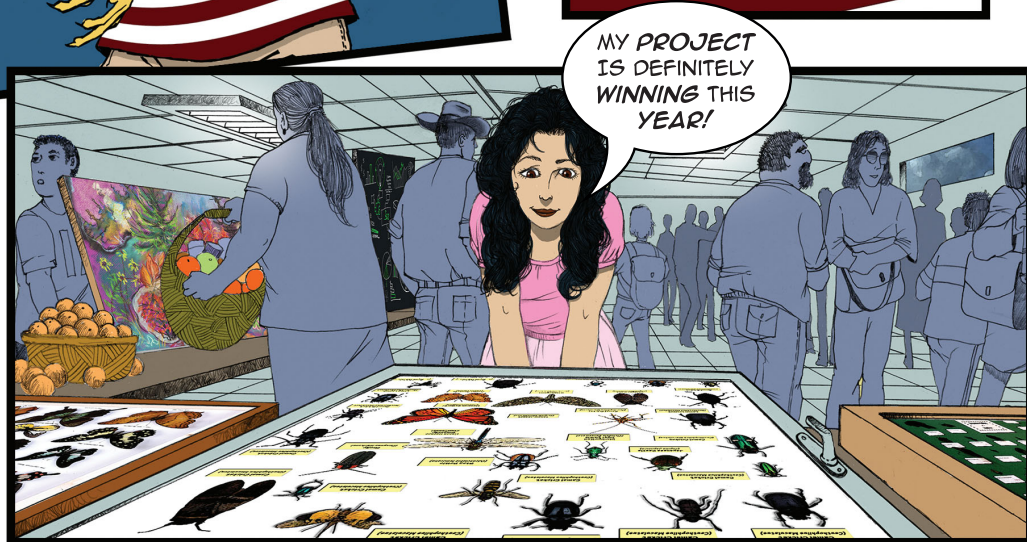
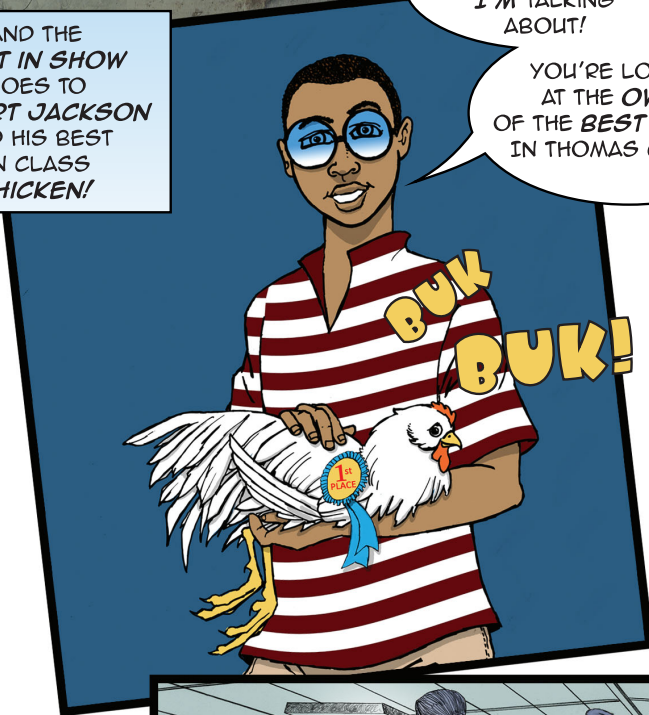


**AT THE THOMAS COUNTY FAIR...**





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



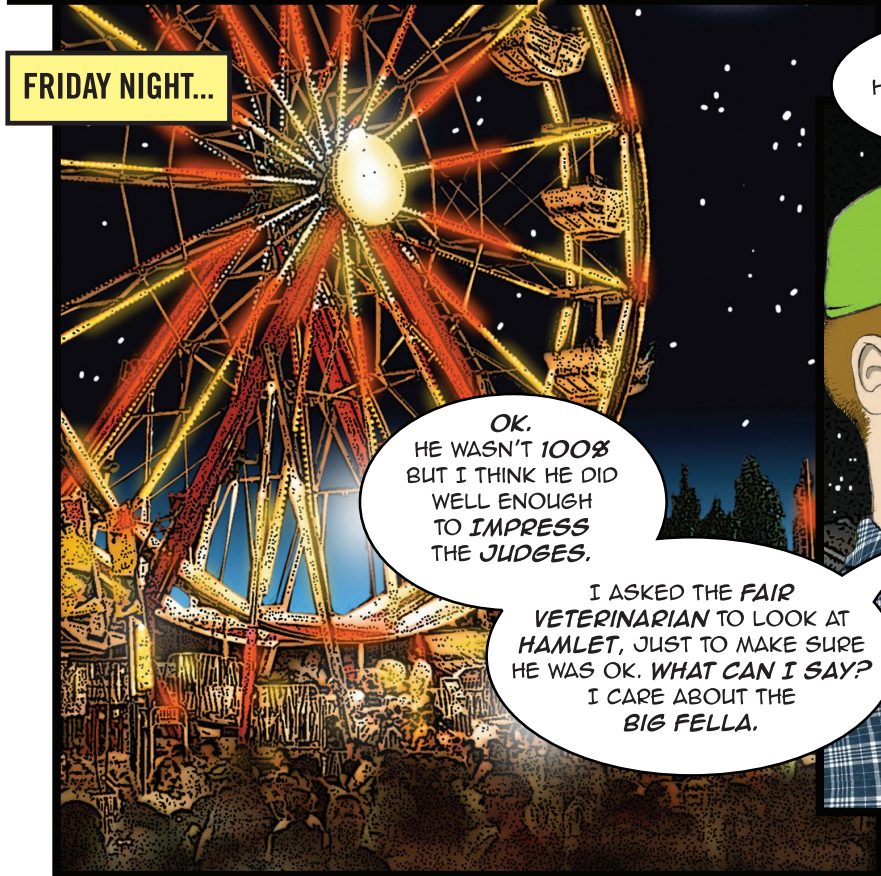


C'MON HAMLET... GO TO THE RIGHT. WHY ARE YOU SO SLUGGISH LATELY?

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



CAKE DECORATING COMPETITION



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.



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







HEY, YOU GUYS UP FOR THE HOUSE OF HORRORS? YOU'RE NOT SCARED, ARE YOU?

I DON'T KNOW ABOUT THIS, YOU GUYS...



N-NOTHING TO WORRY ABOUT... THOSE ARE JUST ACTORS... I THINK...



GEEK



COUGH!  
COUGH!

MY ASTHMA IS KICKING IN, IT MAY BE THE FOG MACHINES IN HERE.



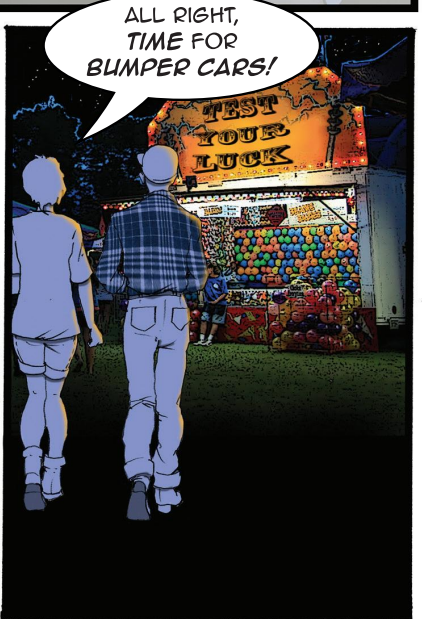
HA!... I CAN'T BELIEVE THOSE TWO ARE REALLY SCARED!

L-LET'S GO TRY THE BUMPER CARS... OKAY?

Y-YES... LET'S...



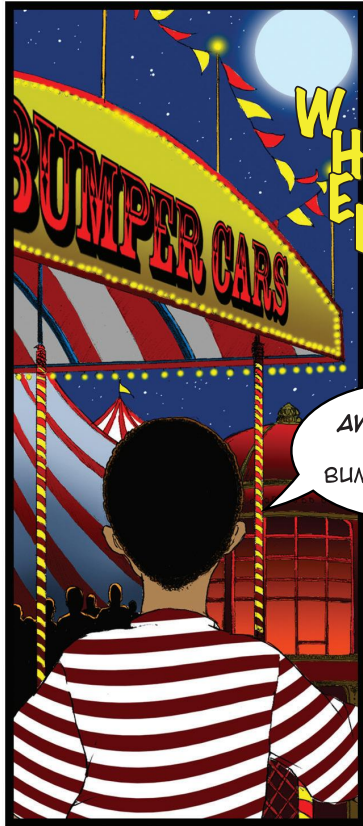
PUFF



ALL RIGHT, TIME FOR BUMPER CARS!







AWESOME!  
I LOVE  
BUMPER CARS!



WHOA... DUDE!

BLAM!

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



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

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



EDDIE ...  
YOU OK?



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

BLUUGG!

TRASH

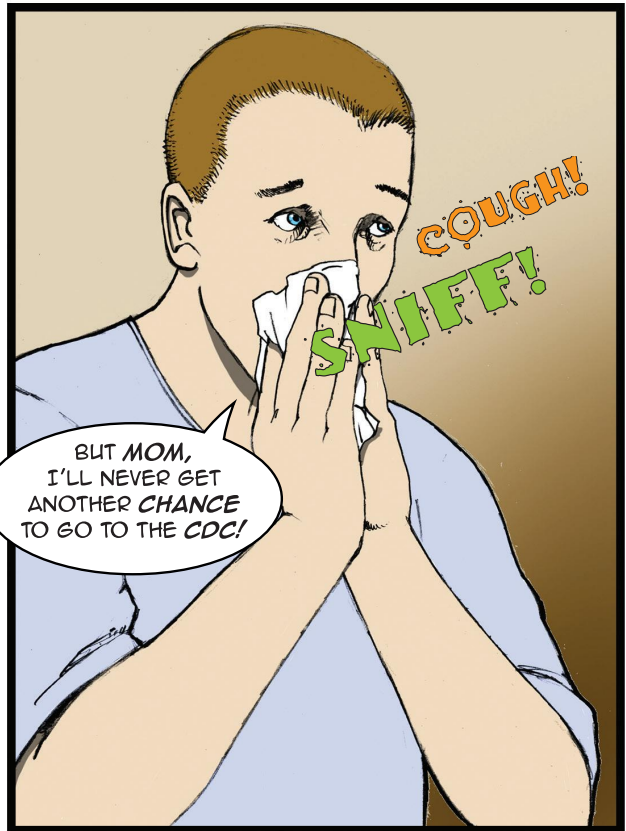
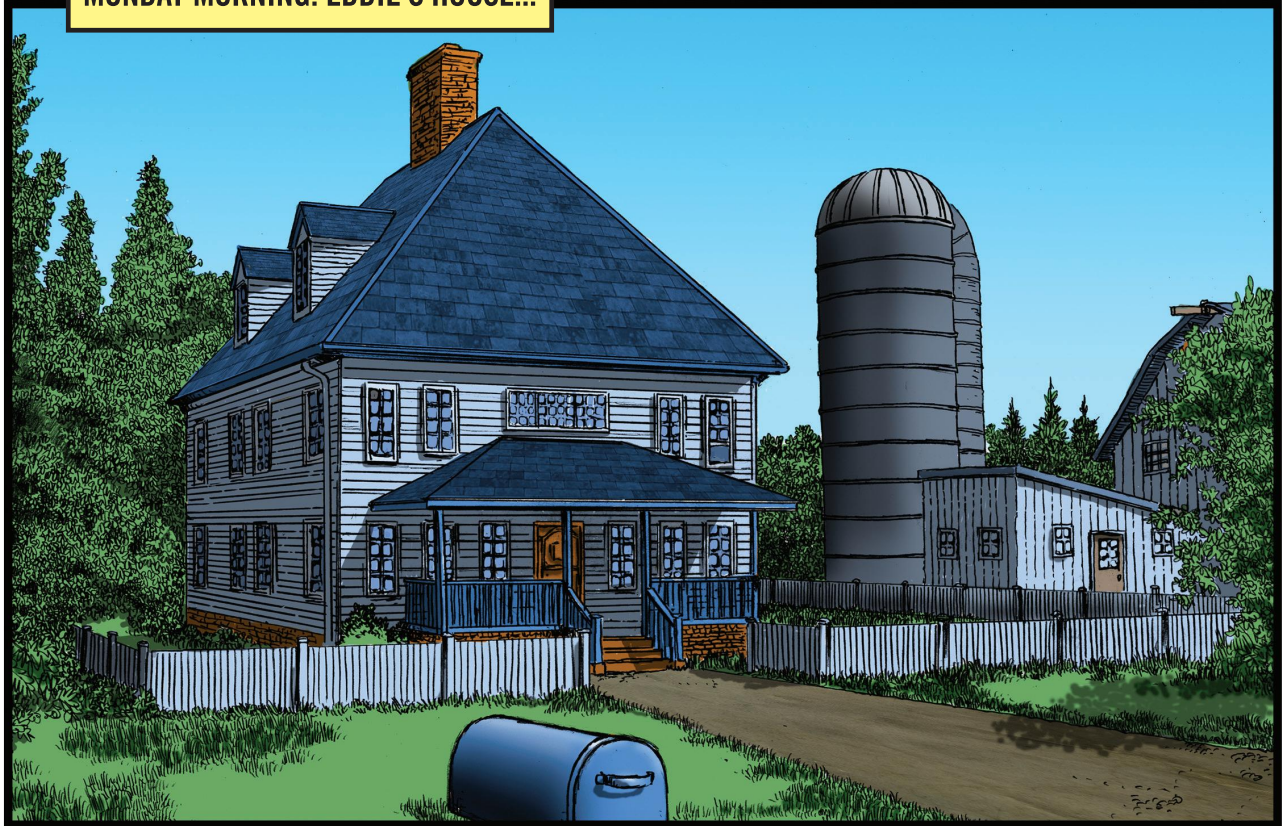


UGH,  
EDDIE IS  
THROWING UP.  
I THINK IT'S TIME  
TO CALL IT A  
NIGHT!



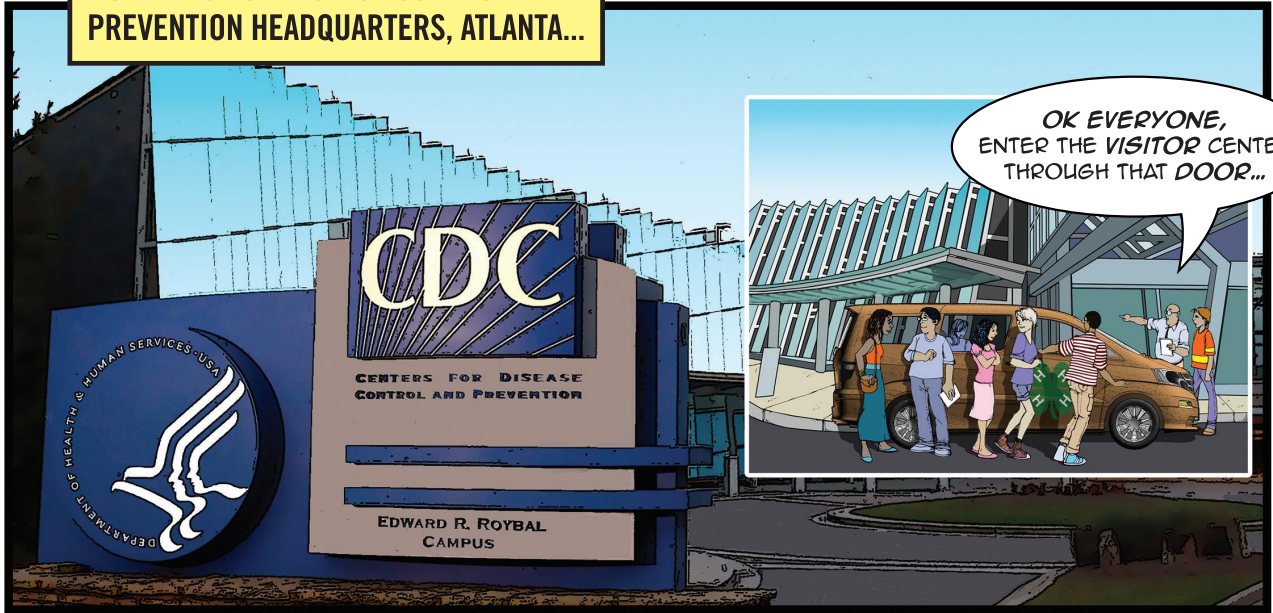


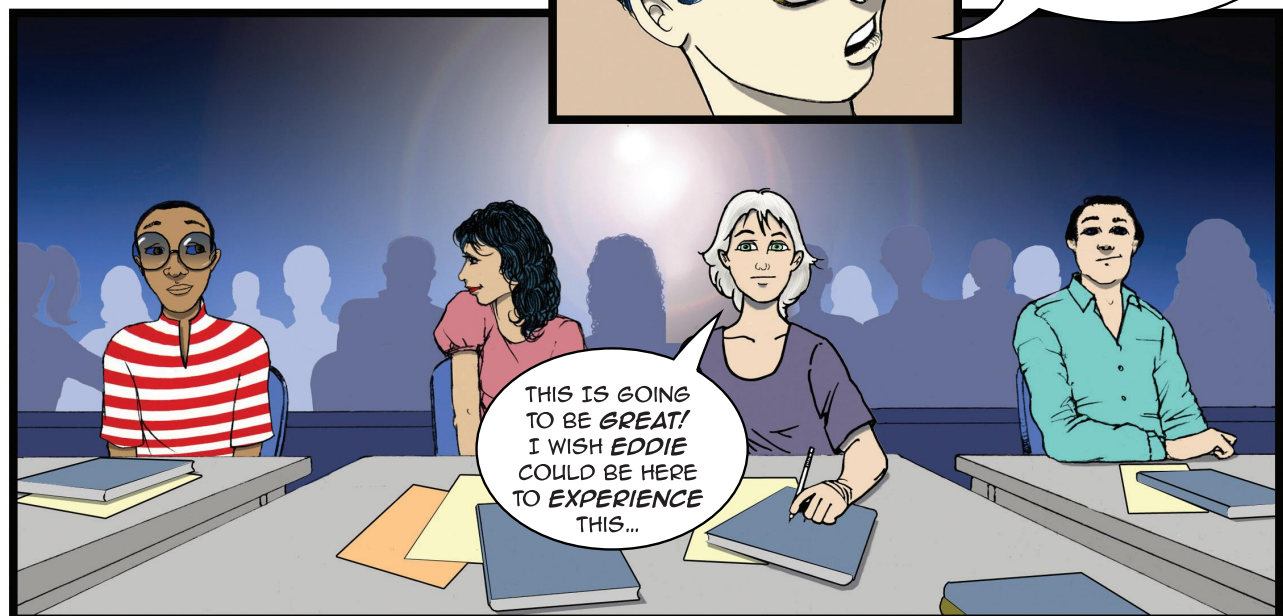
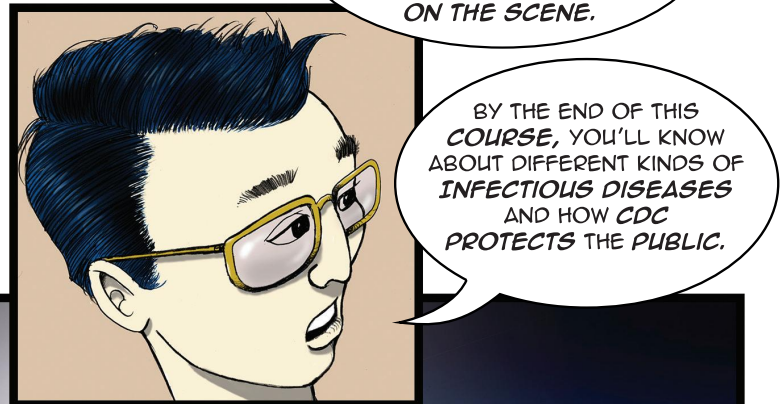
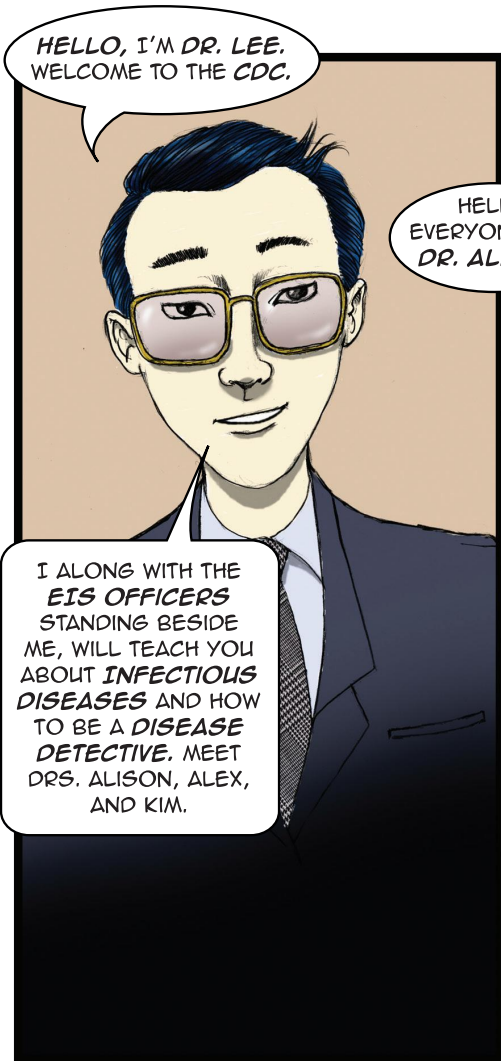
**MONDAY MORNING: EDDIE'S HOUSE...**

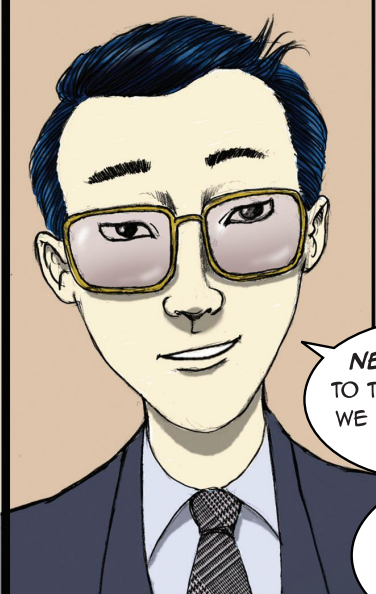




**CENTERS FOR DISEASE CONTROL AND PREVENTION HEADQUARTERS, ATLANTA...**





# 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

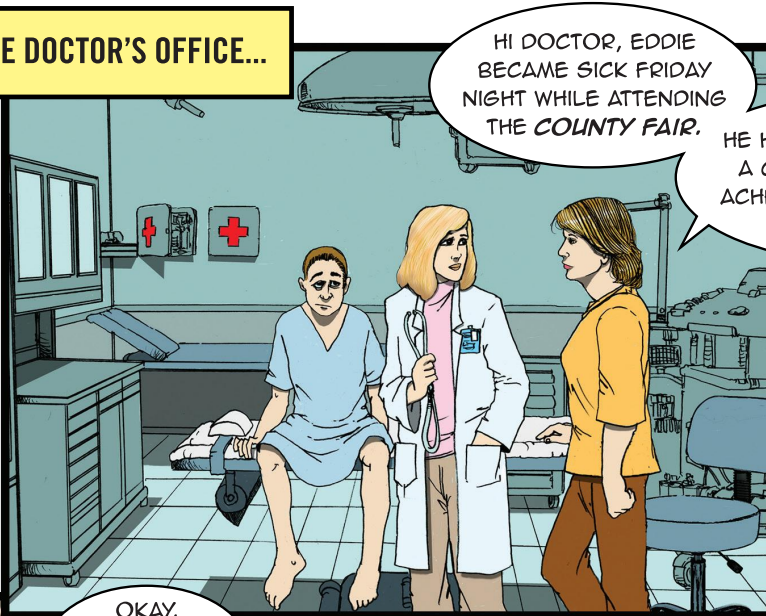
NEXT, I'D LIKE TO TELL YOU HOW WE AT CDC FIGHT DISEASE.

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





LATER MONDAY AT THE DOCTOR'S OFFICE...



HI DOCTOR, EDDIE BECAME SICK FRIDAY NIGHT WHILE ATTENDING THE COUNTY FAIR.

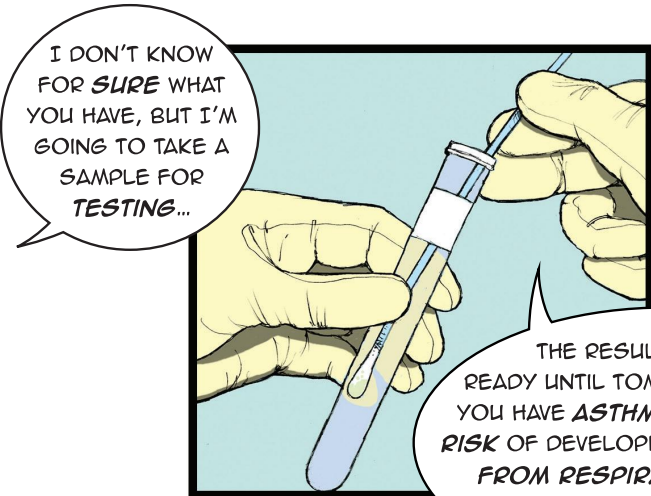
HE HAS HAD A 101° FEVER, A COUGH, AND MUSCLE ACHES. HE ALSO SUFFERS FROM ASTHMA.



OKAY, JUST BREATHE NORMALLY FOR ME.

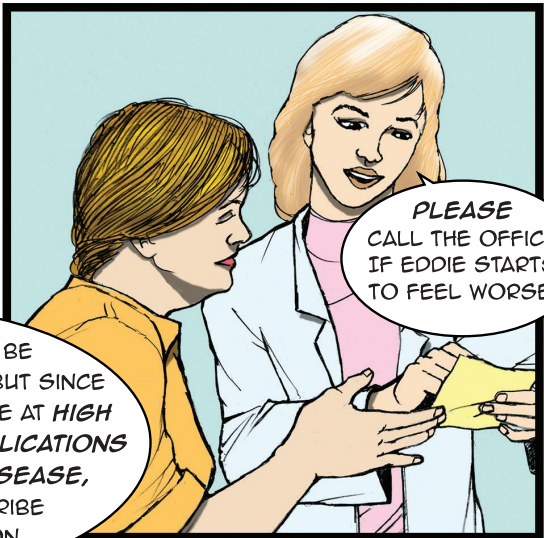


IT APPEARS YOU HAVE AN UPPER RESPIRATORY INFECTION, EVEN THOUGH WE ARE NO LONGER IN COLD AND FLU SEASON.



I DON'T KNOW FOR SURE WHAT YOU HAVE, BUT I'M GOING TO TAKE A SAMPLE FOR TESTING...

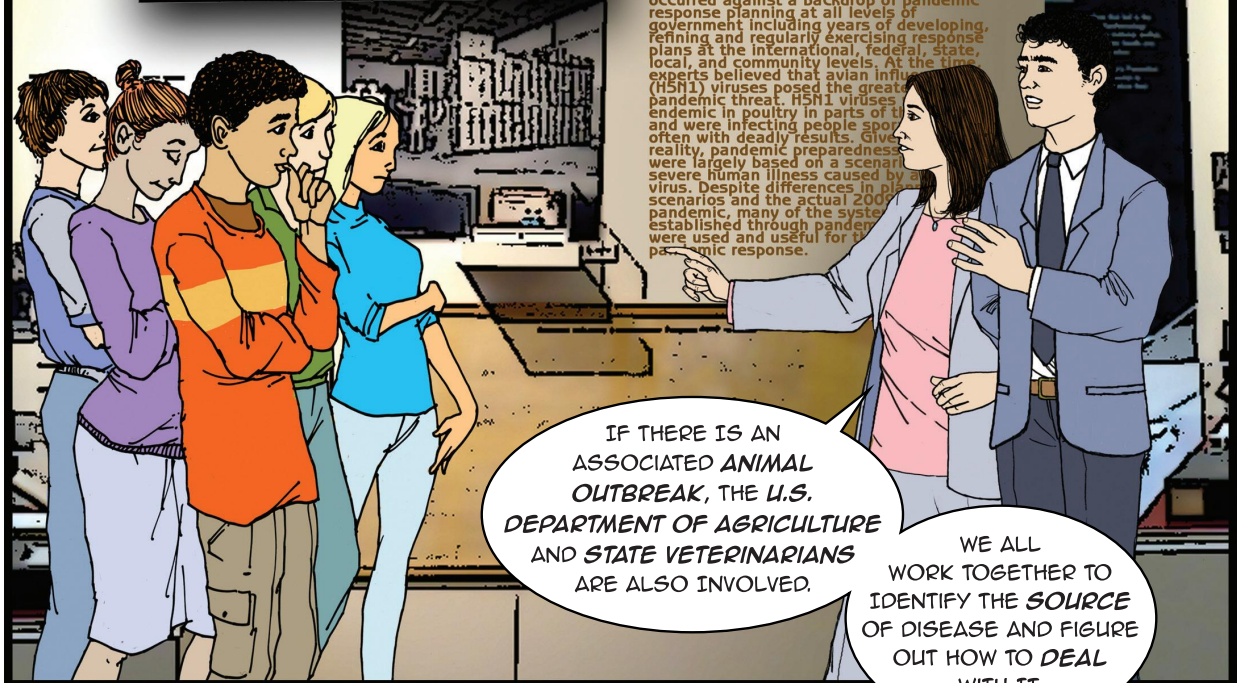
THE RESULTS WON'T BE READY UNTIL TOMORROW, BUT SINCE YOU HAVE ASTHMA AND ARE AT HIGH RISK OF DEVELOPING COMPLICATIONS FROM RESPIRATORY DISEASE, I'M GOING TO PRESCRIBE YOU THIS MEDICATION.



PLEASE CALL THE OFFICE IF EDDIE STARTS TO FEEL WORSE.







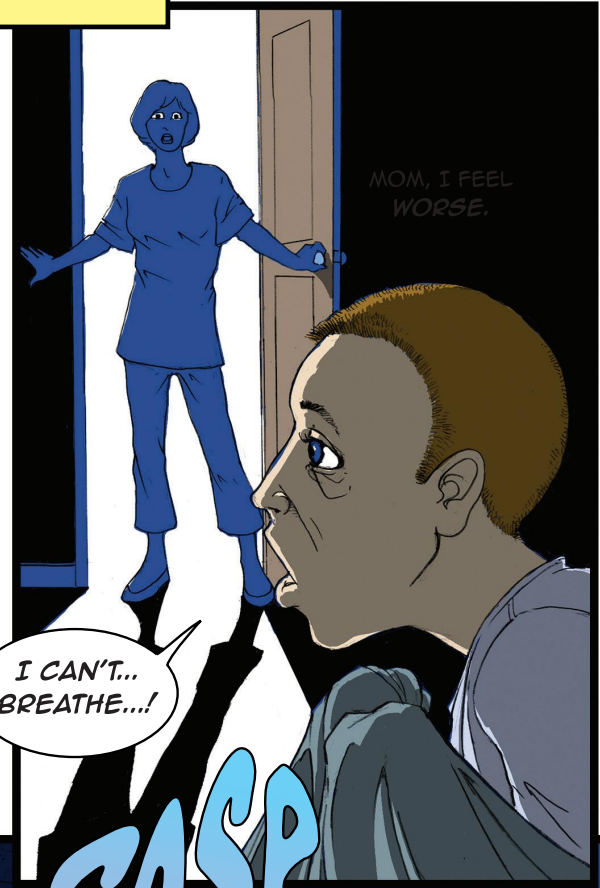




BACK AT EDDIE'S HOUSE...



EDDIE?  
WHAT'S  
WRONG?!



MOM, I FEEL  
WORSE.

I CAN'T...  
BREATHE...!

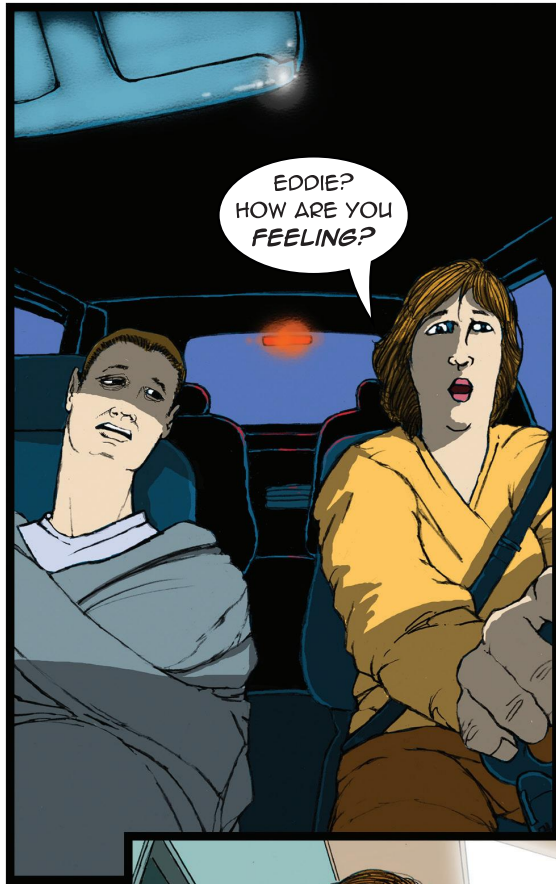
GASP

WEDNESDAY, EARLY MORNING...



EMERGENCY





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.





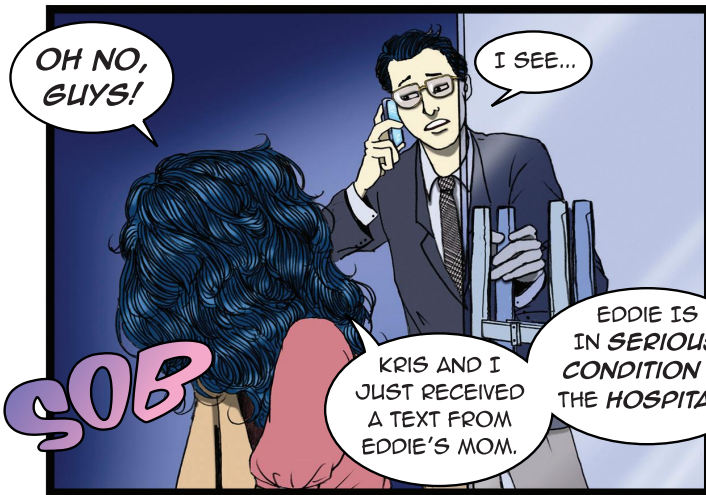
EXCUSE ME, I HAVE TO TAKE THIS...



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!

SOB

I SEE...

KRIS AND I JUST RECEIVED A TEXT FROM EDDIE'S MOM.

EDDIE IS IN **SERIOUS CONDITION** AT THE HOSPITAL!



HEY, WHERE'S KRIS?

YOU KNOW HOW SHE AND EDDIE ARE DATING?

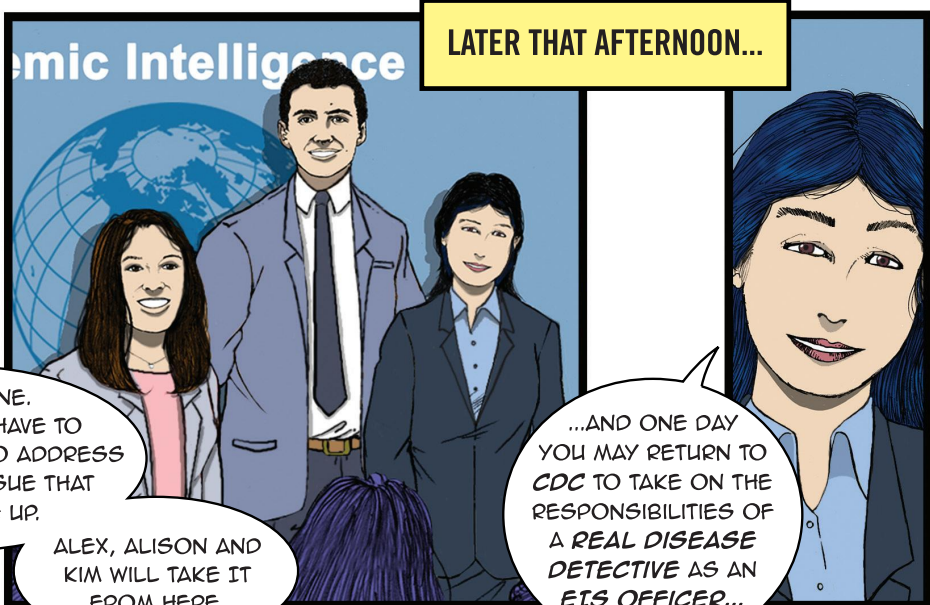
SHE FELT LIKE SHE COULDN'T SIT BY WHILE EDDIE IS **SO SICK**.

I HOPE HE'S GOING TO BE OK.



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.



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**...





**THE KIDS LEAVE CDC DISEASE DETECTIVE CAMP...**



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

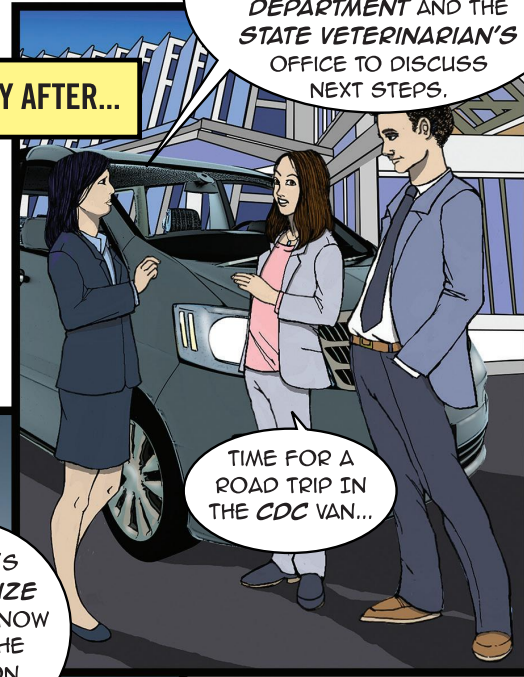
LET'S SEE HOW HE IS DOING AND LEND HIM OUR SUPPORT.

I'M IN 100 PERCENT!

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.

**SHORTLY AFTER...**



TIME FOR A ROAD TRIP IN THE CDC VAN...

**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.





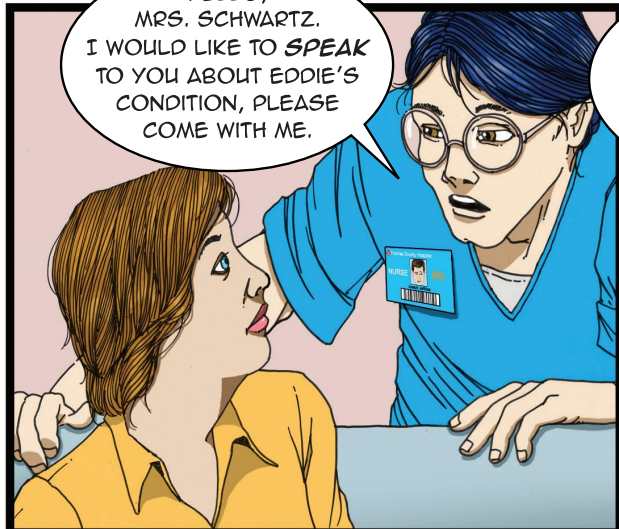
LATER AT THE EMERGENCY ROOM WHERE EDDIE IS BEING TREATED...



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.

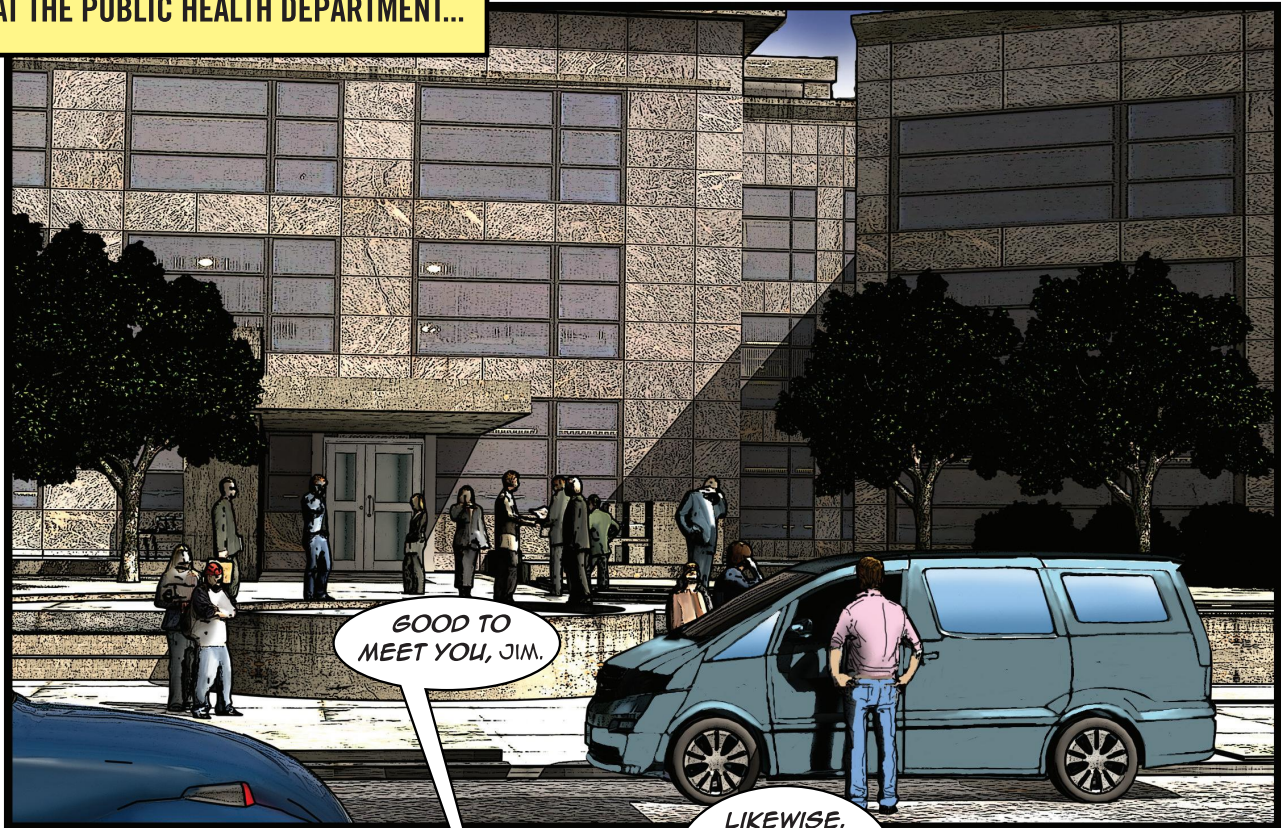


YEAH, LET'S DO IT! I THINK WE CAN AT LEAST ATTEMPT TO NARROW DOWN THE SOURCE OF HIS ILLNESS.





AT THE PUBLIC HEALTH DEPARTMENT...

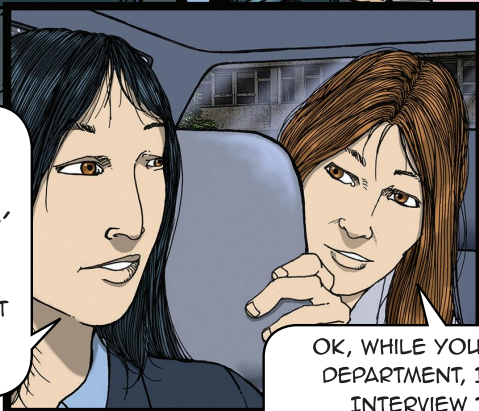


GOOD TO MEET YOU, JIM.

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.

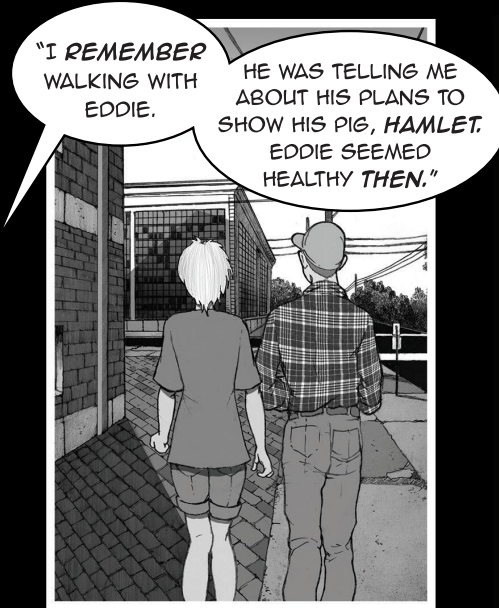


OK, WHILE YOU TWO GET SET UP AT THE HEALTH DEPARTMENT, I'LL HEAD TO THE **HOSPITAL** TO INTERVIEW THE BOY'S FAMILY, CHECK HIS MEDICAL CHART AND SPEAK WITH HIS PHYSICIAN.





I WAS THINKING BACK TO BEFORE THE FAIR.



"I REMEMBER WALKING WITH EDDIE."

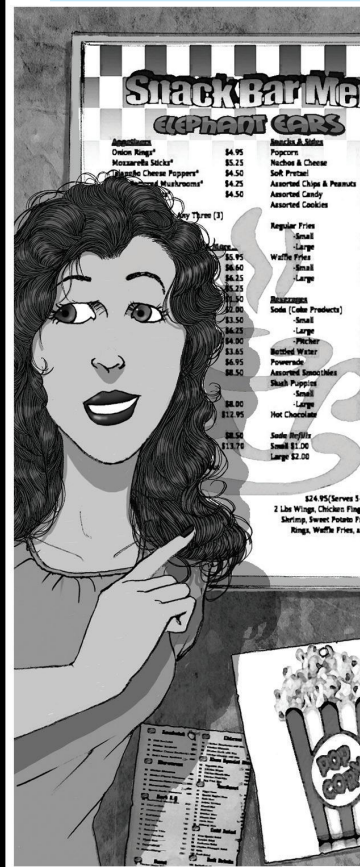
HE WAS TELLING ME ABOUT HIS PLANS TO SHOW HIS PIG, HAMLET. EDDIE SEEMED HEALTHY THEN."



AT THE EMERGENCY ROOM...

YEAH, I'M THINKING BACK TO FRIDAY WHEN WE WERE ALL AT 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.

SLURP

OW!



HANDS OFF!

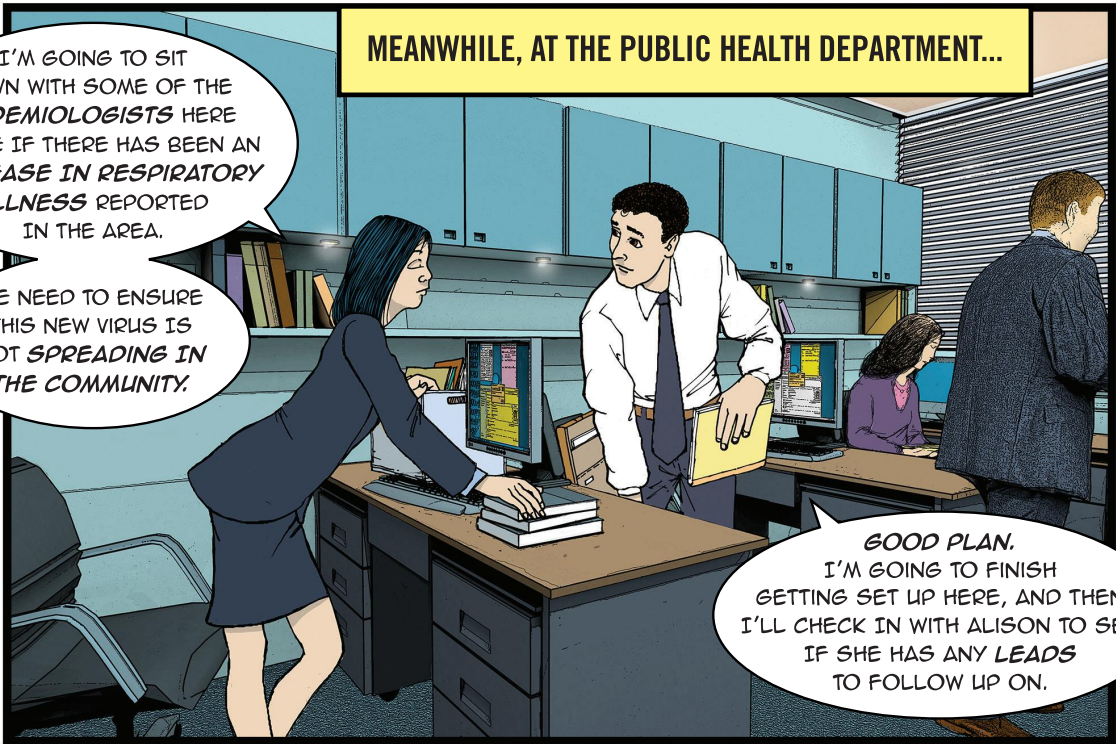
SMACK!

"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.



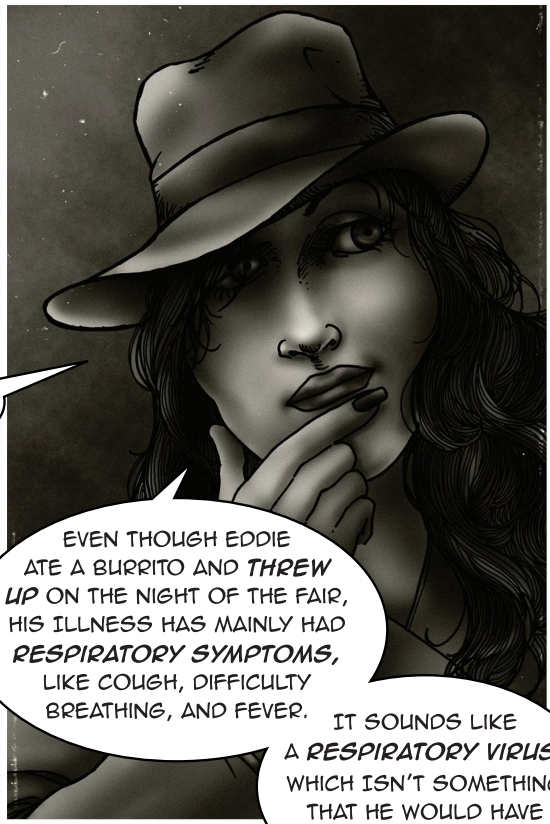


BACK AT THE EMERGENCY ROOM...



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.

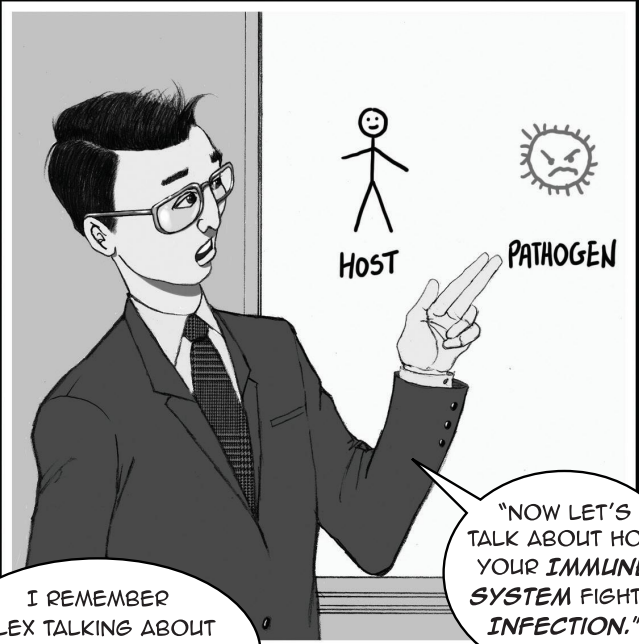
IT SOUNDS LIKE A *RESPIRATORY VIRUS*, WHICH ISN'T SOMETHING THAT HE WOULD HAVE GOTTEN FROM FOOD.



YOU ARE RIGHT, EM!

BUT WHERE WOULD HE HAVE GOTTEN A *RESPIRATORY ILLNESS*? WE WERE ALL HANGING OUT TOGETHER.

DO YOU GUYS REMEMBER DR. LEE TALKING ABOUT DIFFERENT *PATHOGENS*?



I REMEMBER ALEX TALKING ABOUT *ZOOONOTIC DISEASES* IN THE CDC MUSEUM.

"NOW LET'S TALK ABOUT HOW YOUR *IMMUNE SYSTEM* FIGHTS *INFECTION*."

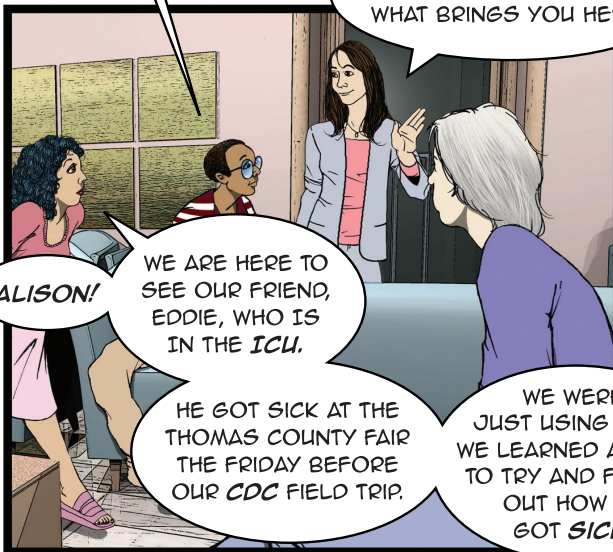


**AT THE EMERGENCY ROOM...**



HEY,  
DR. ALISON!

OH, HI! THIS IS  
QUITE A *COINCIDENCE*.  
WHAT BRINGS YOU HERE?

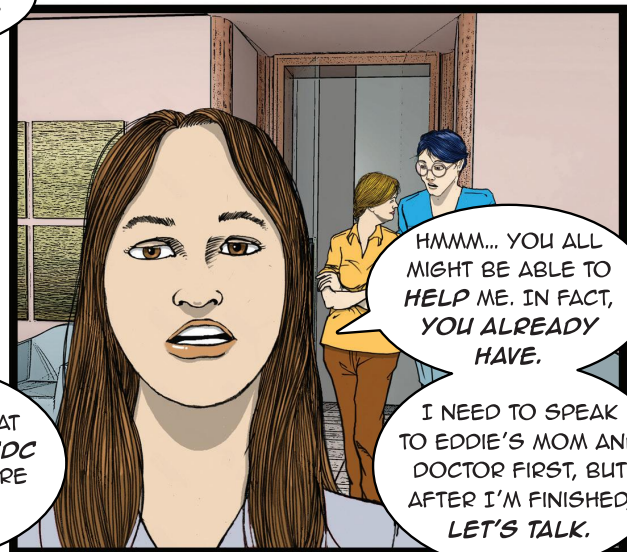


ALISON!

WE ARE HERE TO  
SEE OUR FRIEND,  
EDDIE, WHO IS  
IN THE ICU.

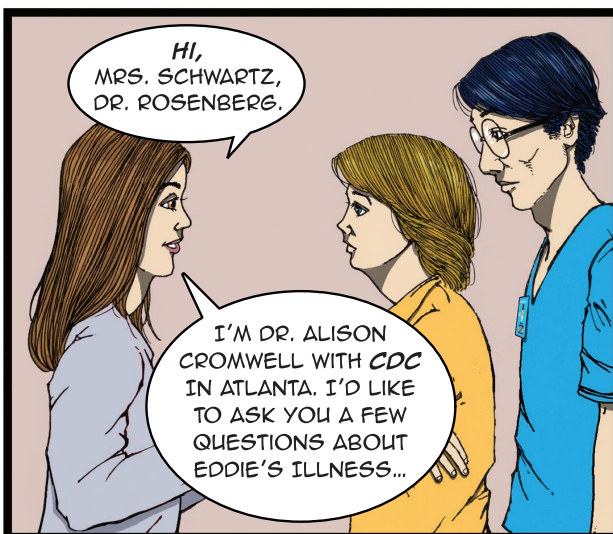
HE GOT SICK AT THE  
THOMAS COUNTY FAIR  
THE FRIDAY BEFORE  
OUR CDC FIELD TRIP.

WE WERE  
JUST USING WHAT  
WE LEARNED AT CDC  
TO TRY AND FIGURE  
OUT HOW HE  
GOT SICK.



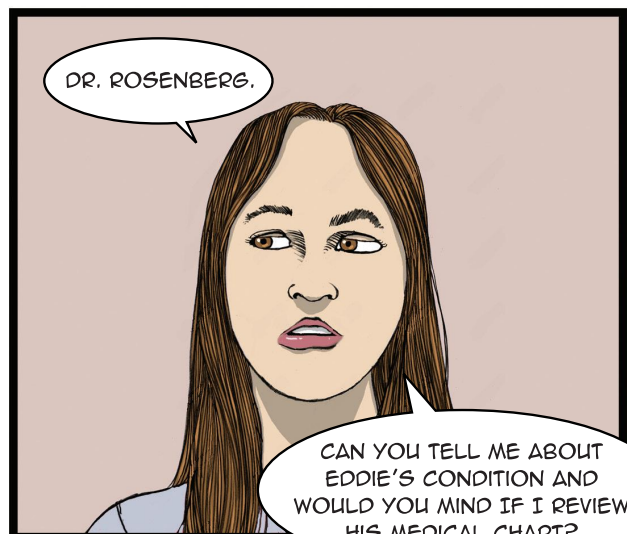
HMMM... YOU ALL  
MIGHT BE ABLE TO  
HELP ME. IN FACT,  
YOU ALREADY  
HAVE.

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...



DR. ROSENBERG.

CAN YOU TELL ME ABOUT  
EDDIE'S CONDITION AND  
WOULD YOU MIND IF I REVIEW  
HIS MEDICAL CHART?





MINUTES LATER...

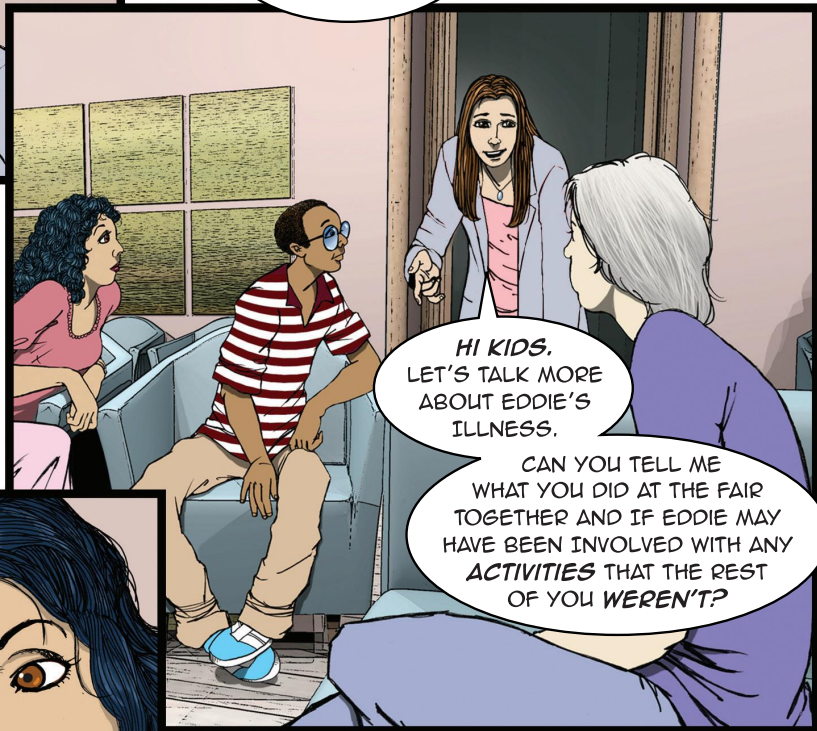
HEY ALEX,  
IT'S ALISON.

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*.



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*?

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...

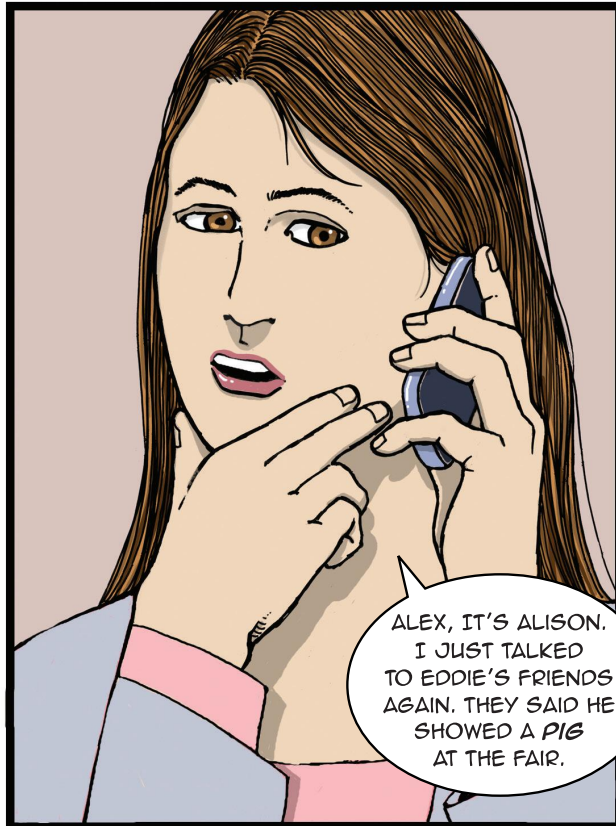
*VERY ASTUTE,*  
EMILY. WHAT WAS  
EDDIE DOING AT THE  
FAIR THAT MAY HAVE  
EXPOSED HIM TO  
A *RESPIRATORY  
VIRUS*?

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.





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.

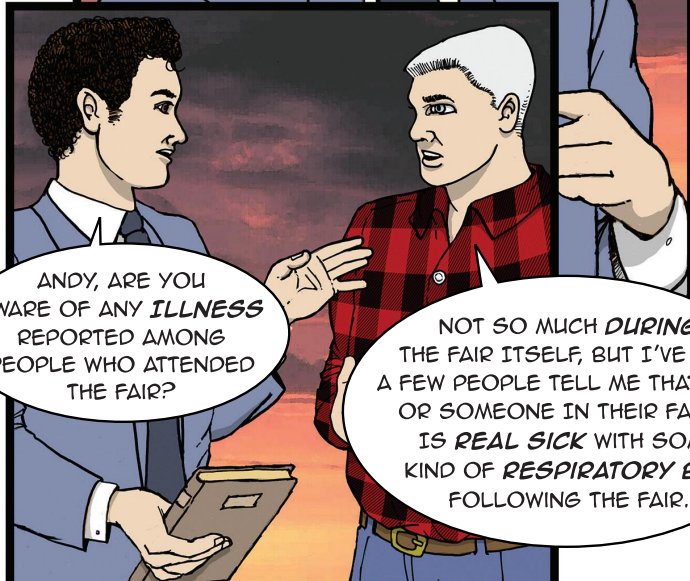
WHEN I EXAMINED THE PIGS, A FEW HAD A MILD FEVER.

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.



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



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.



YOU HAVE THE RESULTS?

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



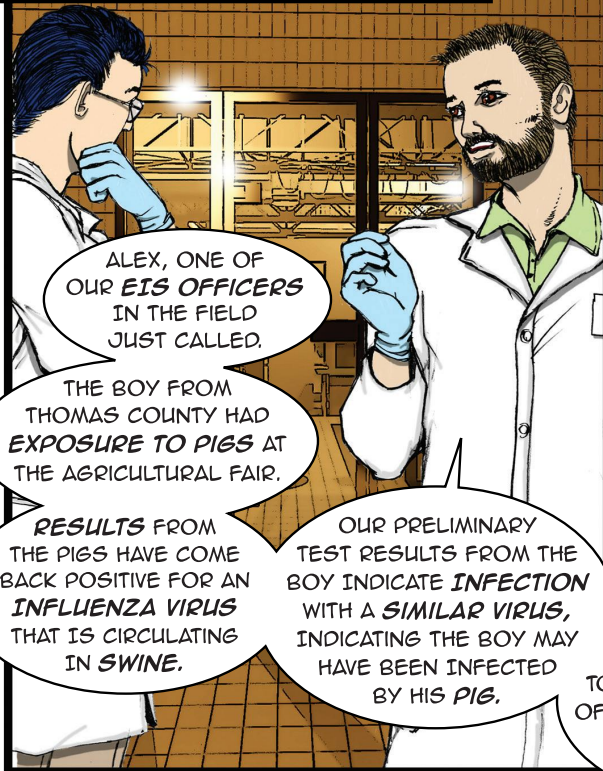
THAT WAS THE STATE ANIMAL HEALTH LABORATORY CALLING WITH THE SWINE TEST RESULTS...

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.

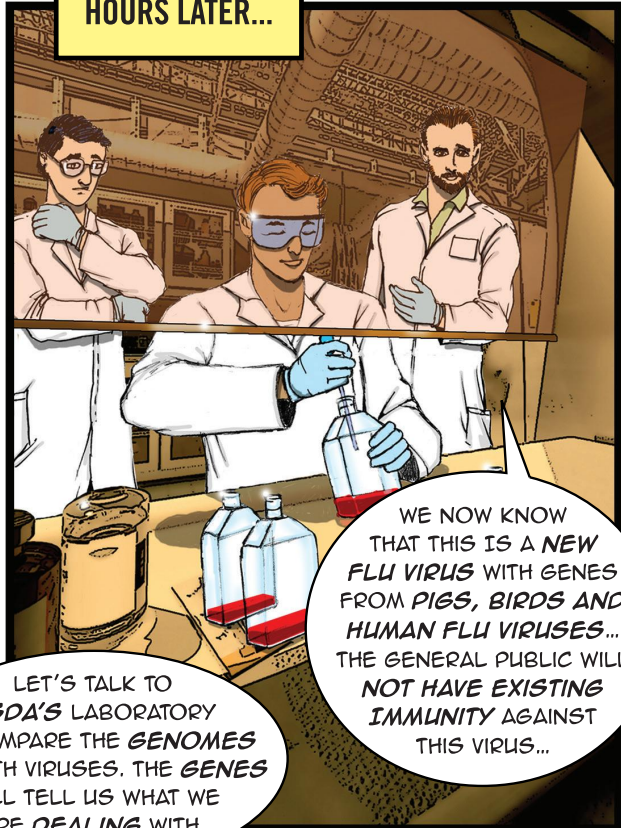
THE BOY FROM THOMAS COUNTY HAD **EXPOSURE TO PIGS** AT THE AGRICULTURAL FAIR.

**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.

**HOURS LATER...**



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.



000 21 51 07  
DAYS HOURS MINUTES SECONDS

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

A **GLOBAL OUTBREAK** OF **DISEASE**...

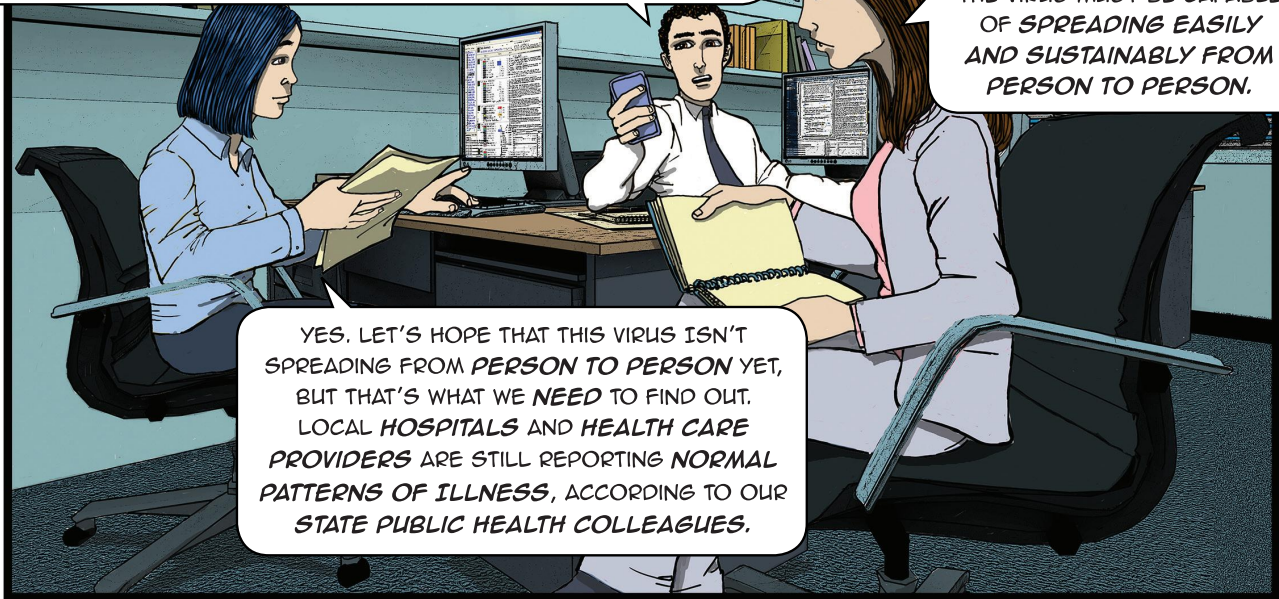




**BACK AT THE PUBLIC HEALTH DEPARTMENT...**

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 *PIG*. 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*.

THE *FAIR MANAGER* SAID SOME PEOPLE REPORTED GETTING *SICK* FOLLOWING THE *FAIR*, AND HE ALSO SAID MORE *PIGS* HAVE TESTED *POSITIVE*.

NOPE, WE'RE JUST GETTING STARTED...



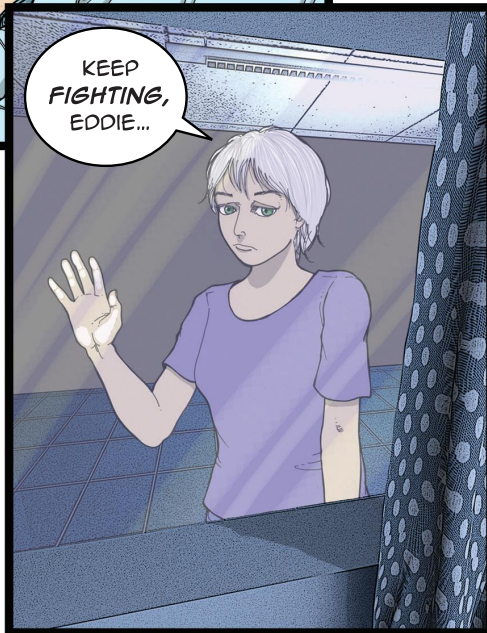
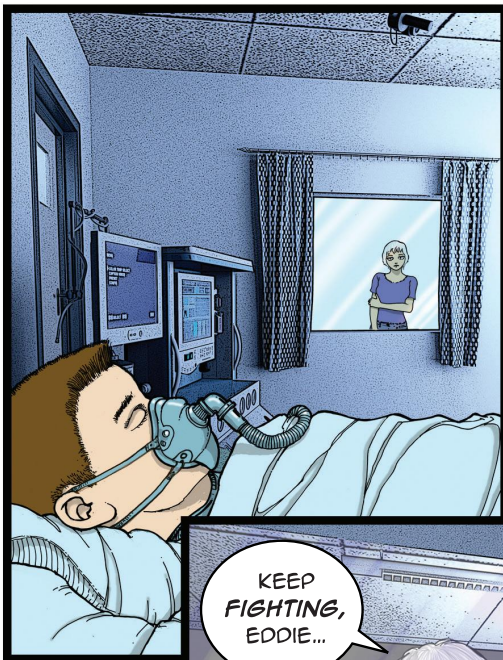
OKAY. LOOKS LIKE OUR JOB ISN'T OVER.

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*.

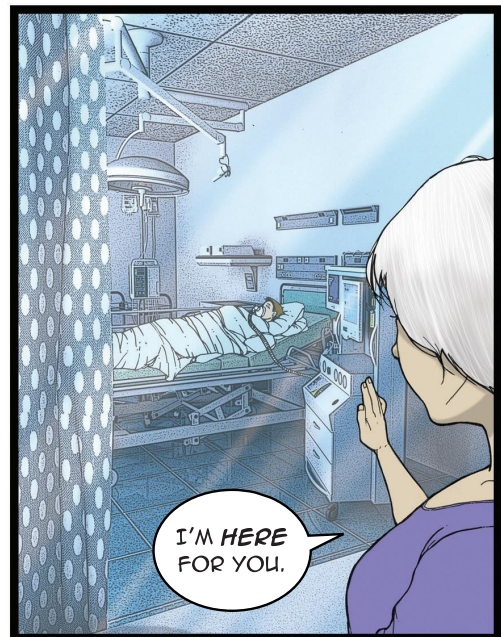




**BACK AT THE HOSPITAL...**



KEEP FIGHTING, EDDIE...



I'M HERE FOR YOU.



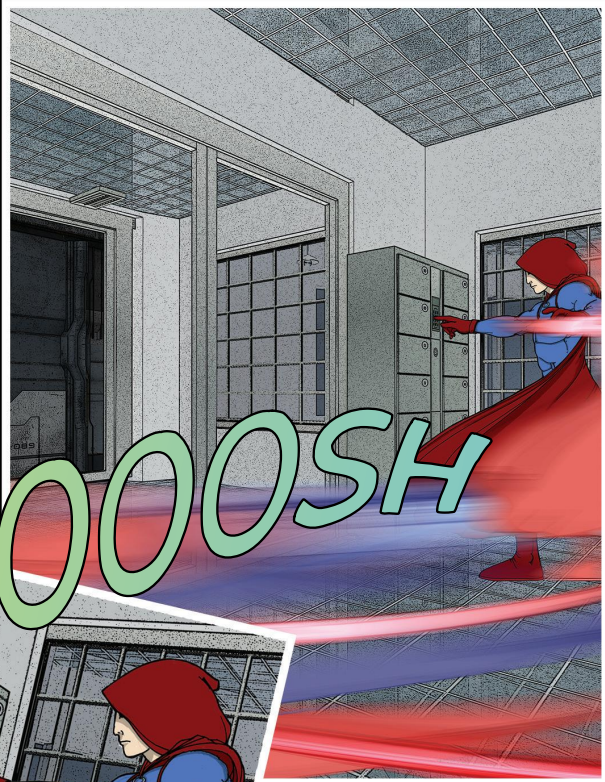


MEANWHILE, A SUBCONSCIOUS EDDIE RACES TO FIND A WAY TO ACTIVATE HIS IMMUNE SYSTEM AGAINST THE ATTACKING VIRUSES...





WHOOSH

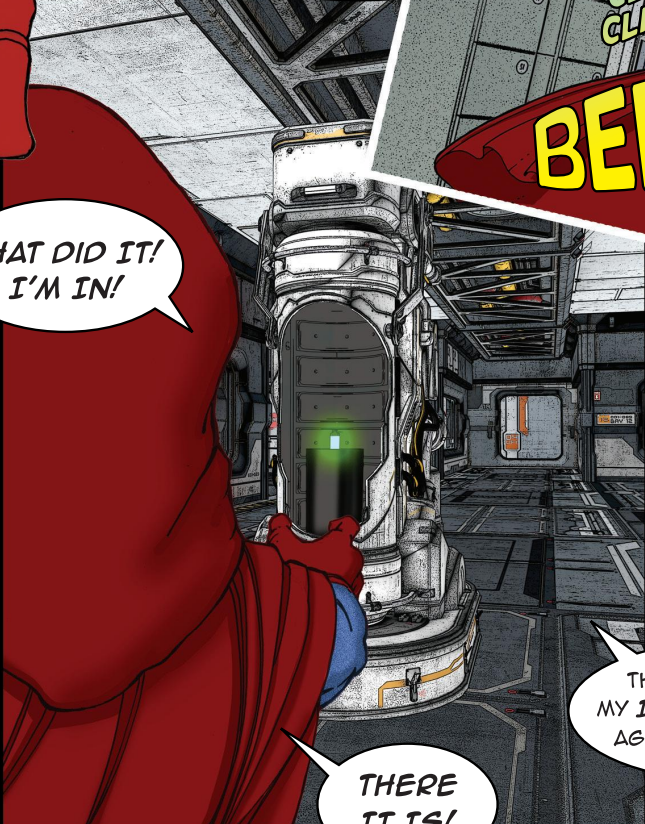


THIS INPUT PANEL MUST OPEN ACCESS TO THE ROOM HOUSING THE CURE!

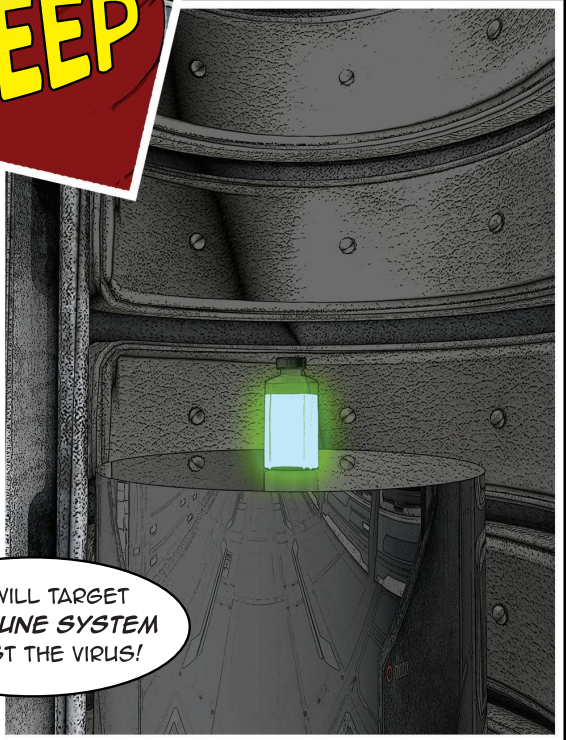


ACCESS GRANTED!

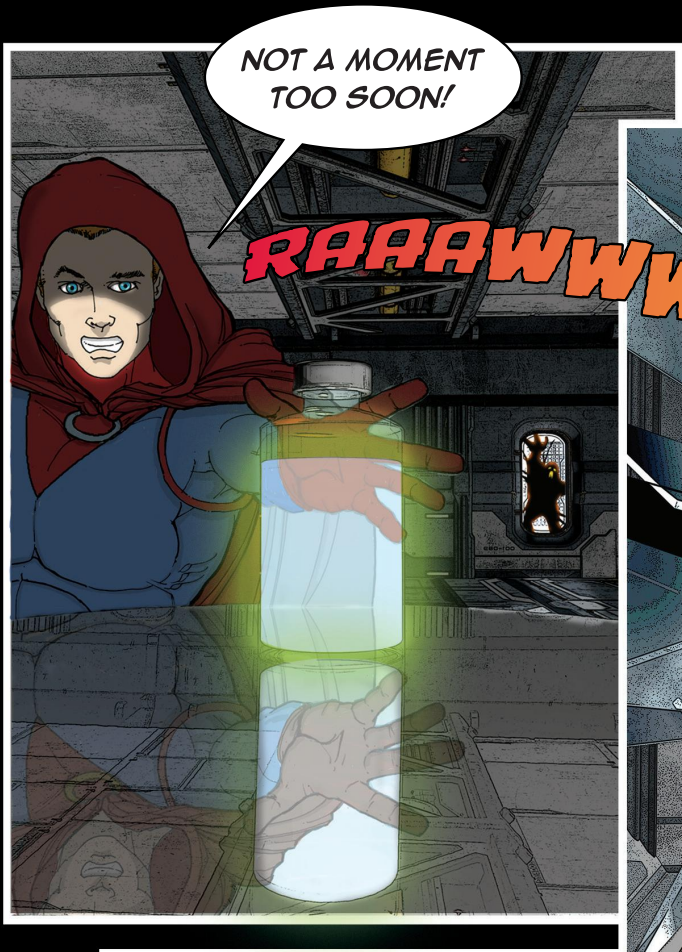
THAT DID IT! I'M IN!



THERE IT IS!

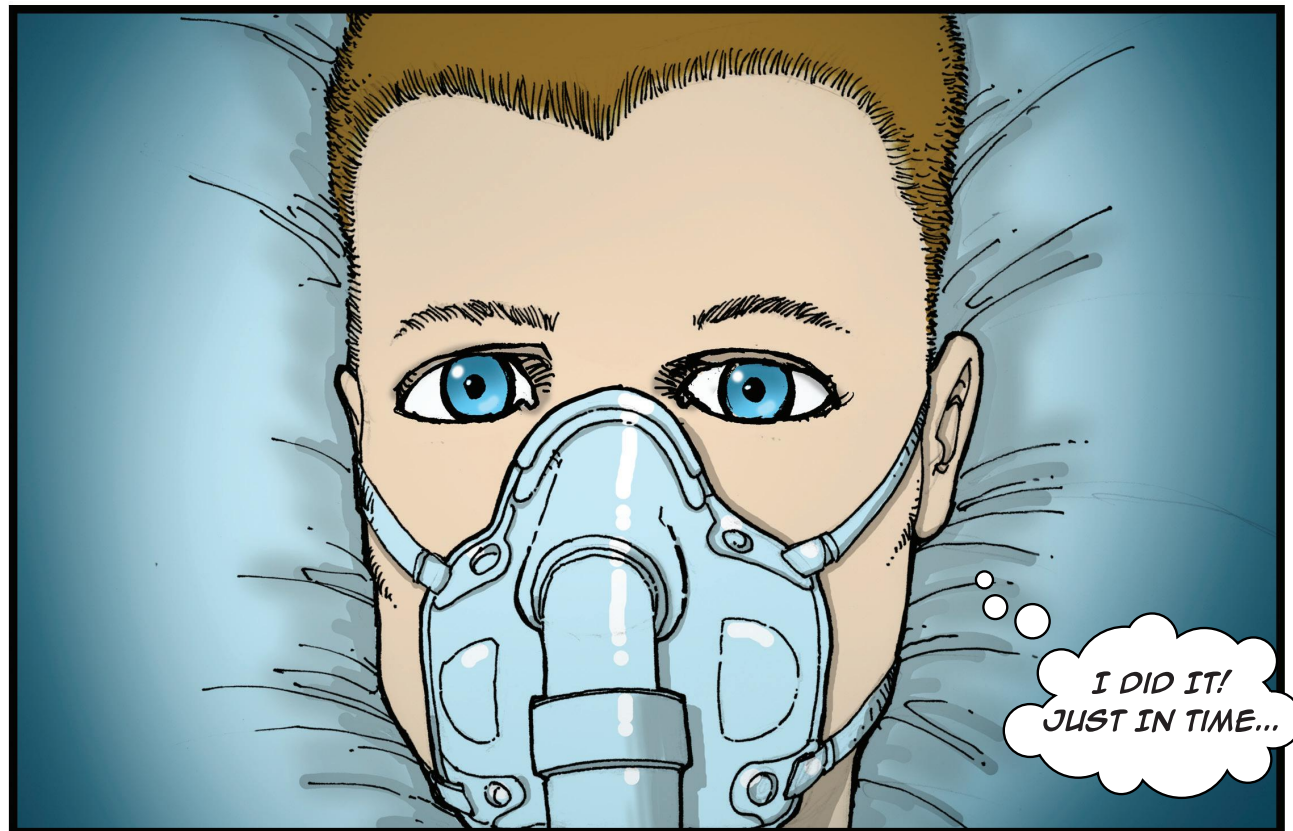
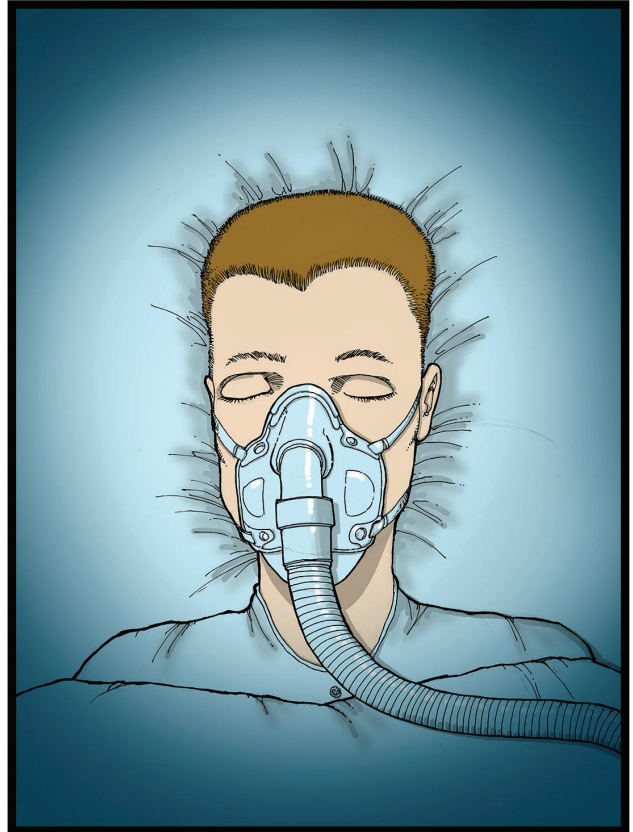
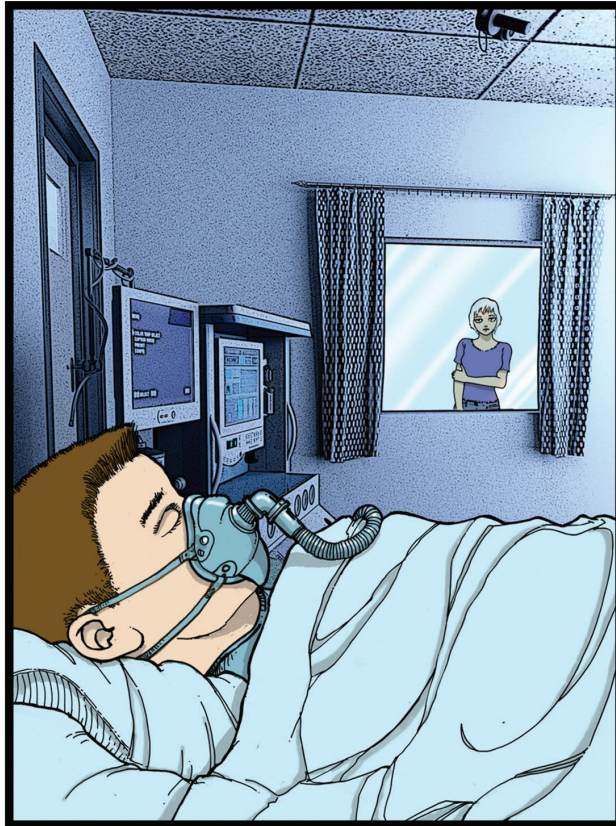


THIS WILL TARGET MY IMMUNE SYSTEM AGAINST THE VIRUS!



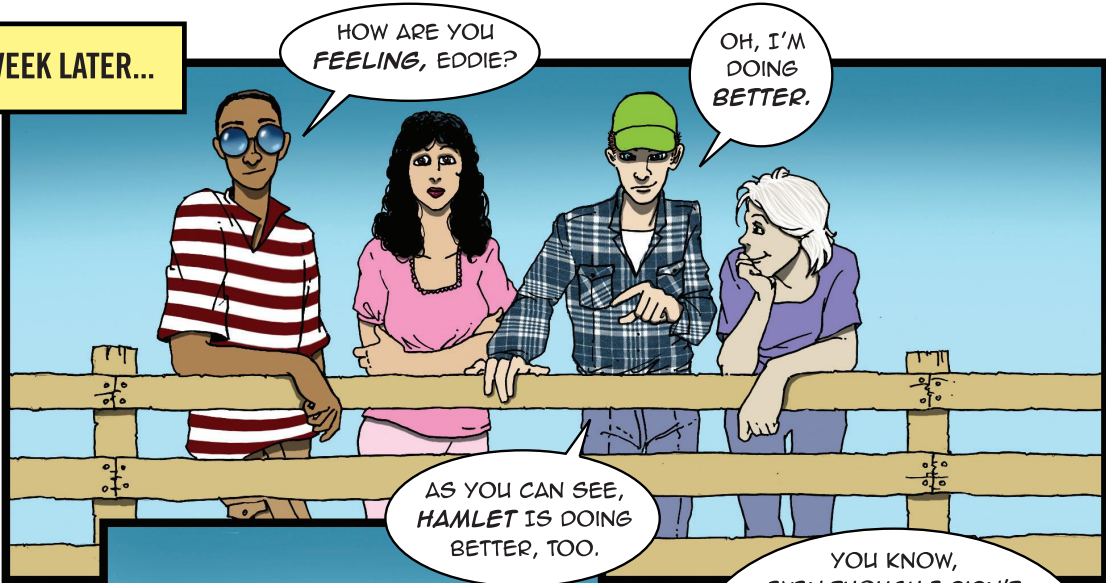
**RRAAWWWRRRRRRR**







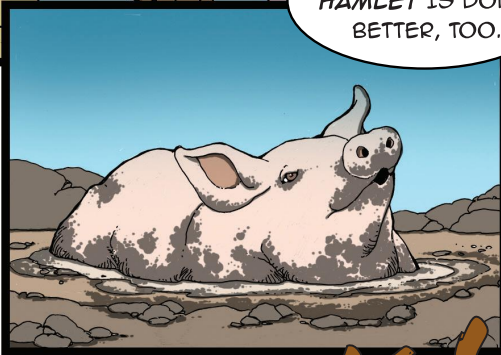
A WEEK LATER...



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...

OINK!



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.



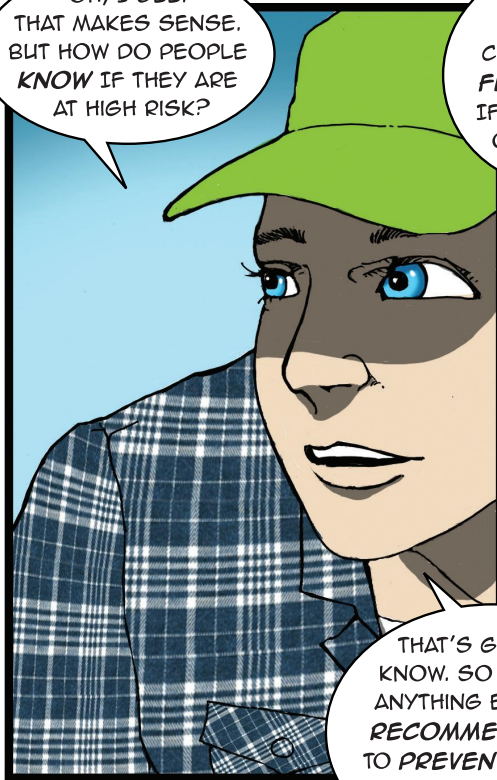
REALLY? BUT WHAT ABOUT ME RAISING HAMLET AT HOME?

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 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.





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*.

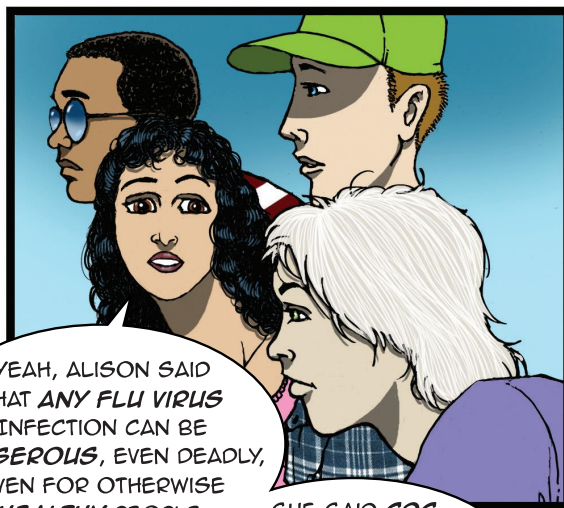
OH WOW! HOW OFTEN DO PEOPLE GET REALLY *SICK* FROM THESE VIRUSES, LIKE I DID?



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...*



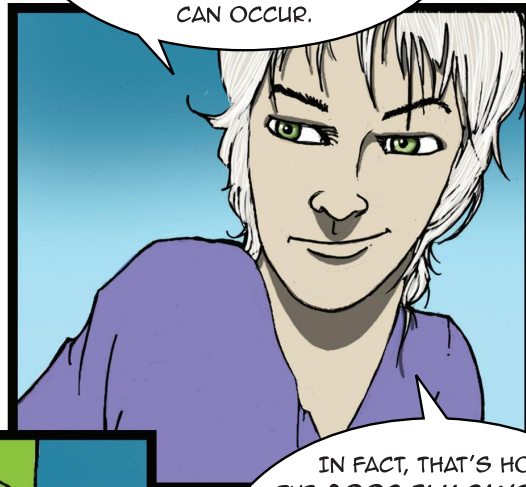


ON THAT POINT, ALISON SAID THAT THEY ALWAYS TRY TO INVESTIGATE VARIANT VIRUS INFECTIONS TO SEE IF THEY ARE SPREADING FROM PERSON-TO-PERSON.

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**.

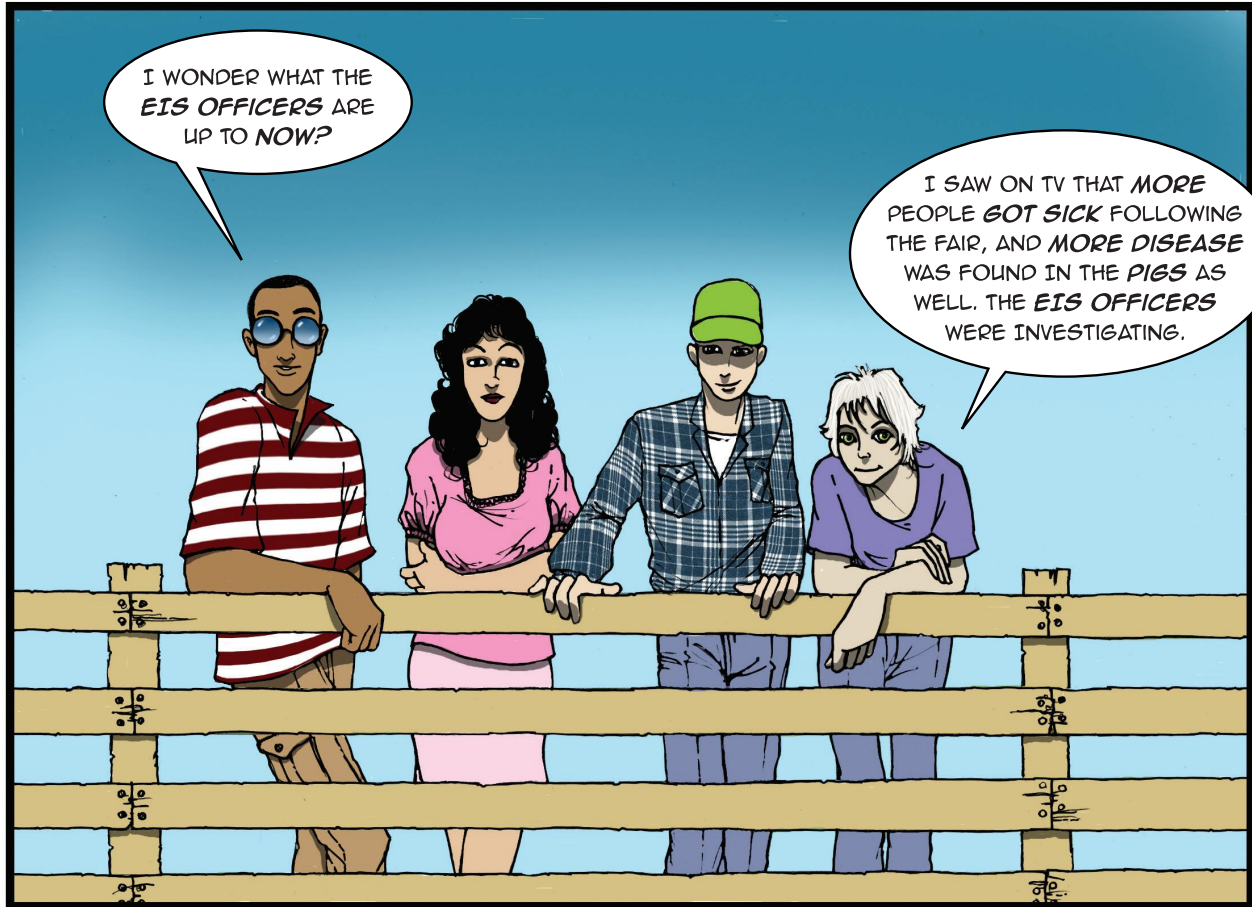
THAT'S... **KIND OF CRAZY!**



**WOW!** YOU GUYS JUST TAUGHT ME A LOT!









## 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](https://www.cdc.gov/flu/swineflu/keyfacts_pigs.htm)

#### **Key Facts for People Exhibiting Pigs at Fairs:**

[https://www.cdc.gov/flu/pdf/swineflu/fair\\_exhibitor\\_factsheet.pdf](https://www.cdc.gov/flu/pdf/swineflu/fair_exhibitor_factsheet.pdf)

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

<https://www.cdc.gov/flu/pdf/swineflu/prevent-spread-flu-pigs-at-fairs.pdf>

**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:**

[https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/sa\\_animal\\_disease\\_information/sa\\_swine\\_health/ct\\_siv\\_surveillance/](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/sa_animal_disease_information/sa_swine_health/ct_siv_surveillance/)







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