

The JUNIOR DISEASE DETECTIVES

OPERATION: OUTBREAK



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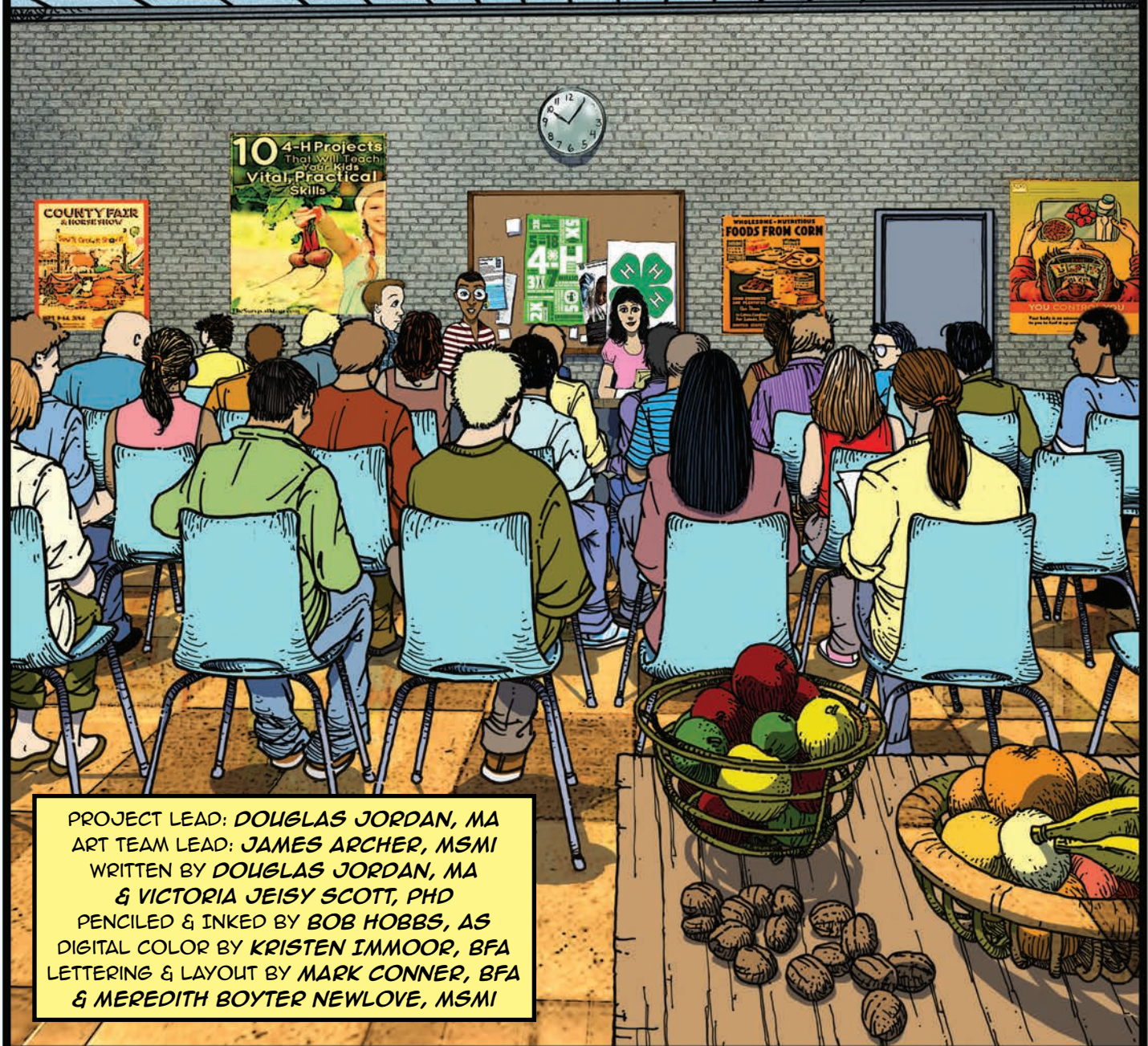
Foreword

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>.

OPERATION OUTBREAK



PROJECT LEAD: DOUGLAS JORDAN, MA

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WRITTEN BY DOUGLAS JORDAN, MA

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PENCILED & INKED BY BOB HOBBS, AS

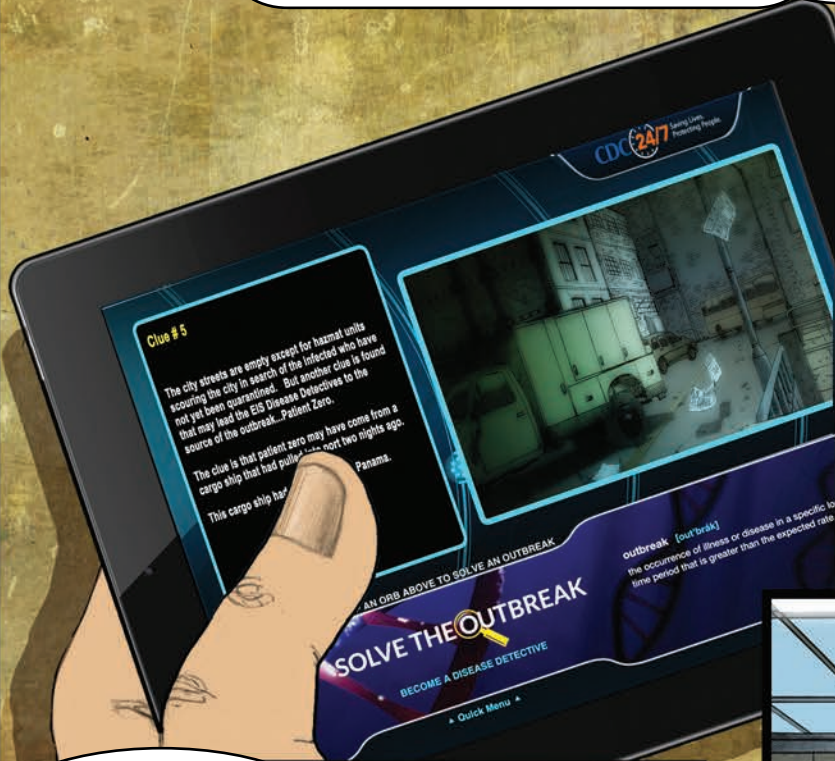
DIGITAL COLOR BY KRISTEN IMMOOR, BFA

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WHAT ARE YOU DOING, EDDIE?

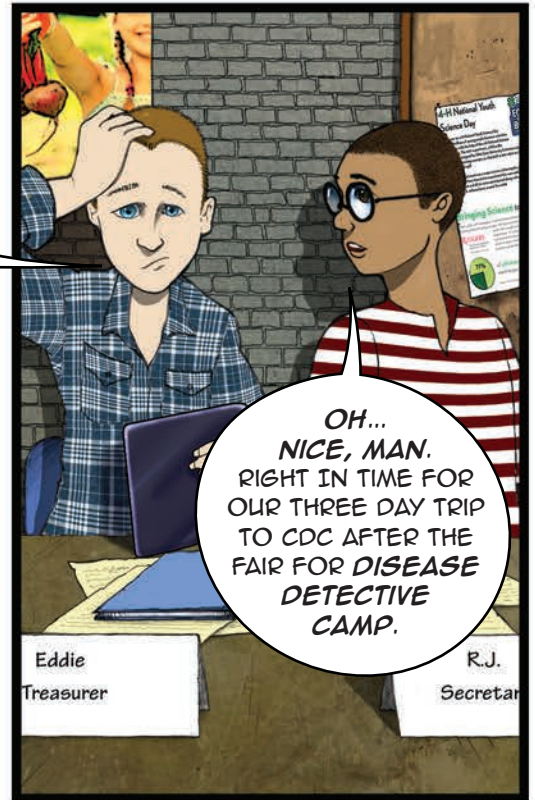
OH, I'M PLAYING THIS COOL **CENTERS FOR DISEASE CONTROL AND PREVENTION** APP THAT LETS YOU SOLVE THE SOURCE OF **DIFFERENT OUTBREAKS** AND I'M STUMPED ON THIS CURRENT **OUTBREAK SCENARIO**.



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



Emily
President



Eddie
Treasurer

R.J.
Secretary

OH... **NICE, MAN.** RIGHT IN TIME FOR OUR THREE DAY TRIP TO CDC AFTER THE FAIR FOR **DISEASE DETECTIVE CAMP**.

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!

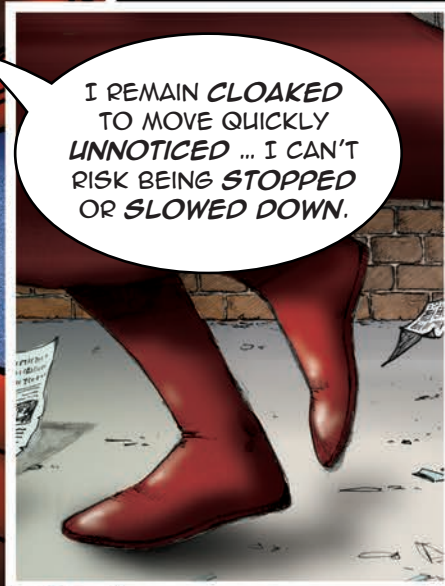
HMM... OK. WELL, I'M PICTURING AN **OUTBREAK** OF A NEW **SCARY DISEASE** THAT HAS ALREADY INFECTED HALF OF THE CITY'S **POPULATION!**



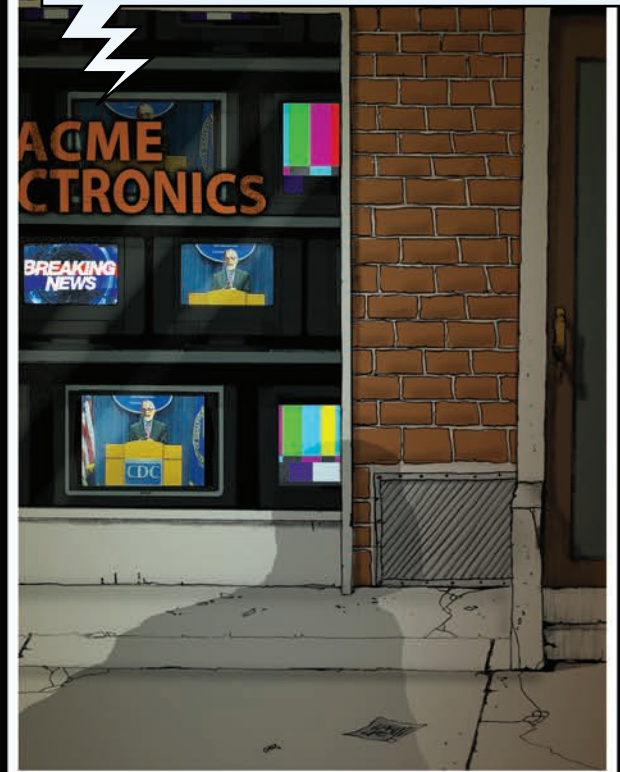
...AND I'M **GERM SLAYER**. THE GERM-FIGHTING **SUPERHERO** WHO HAS THE **CURE!**

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
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?

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

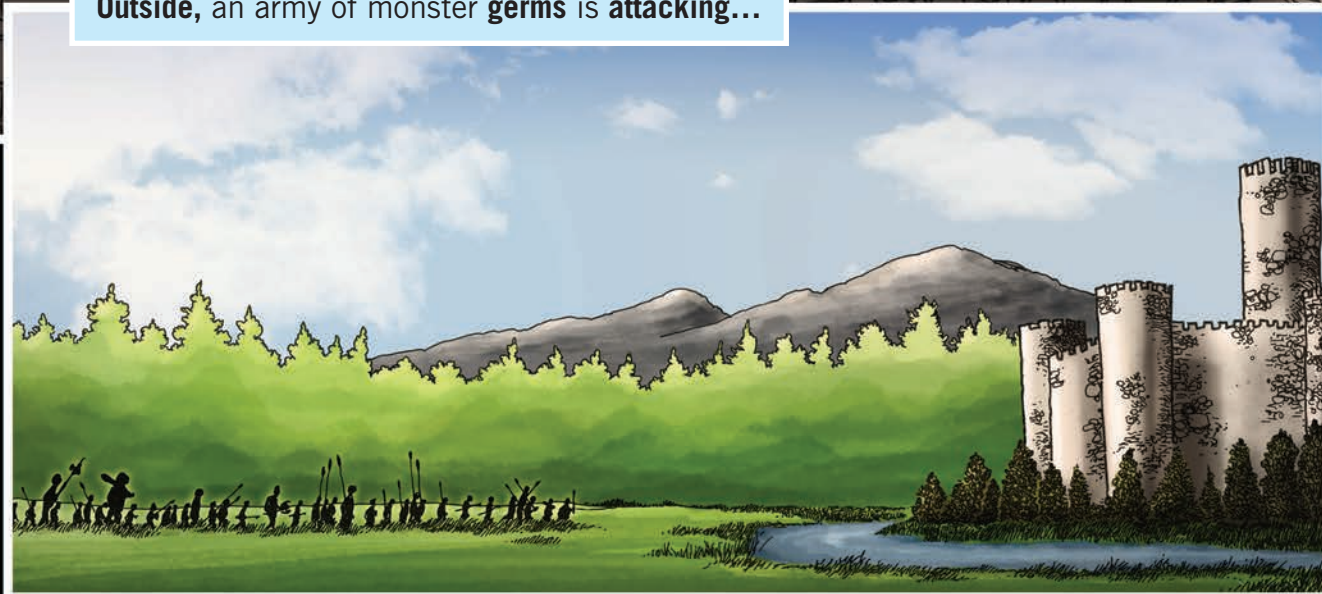
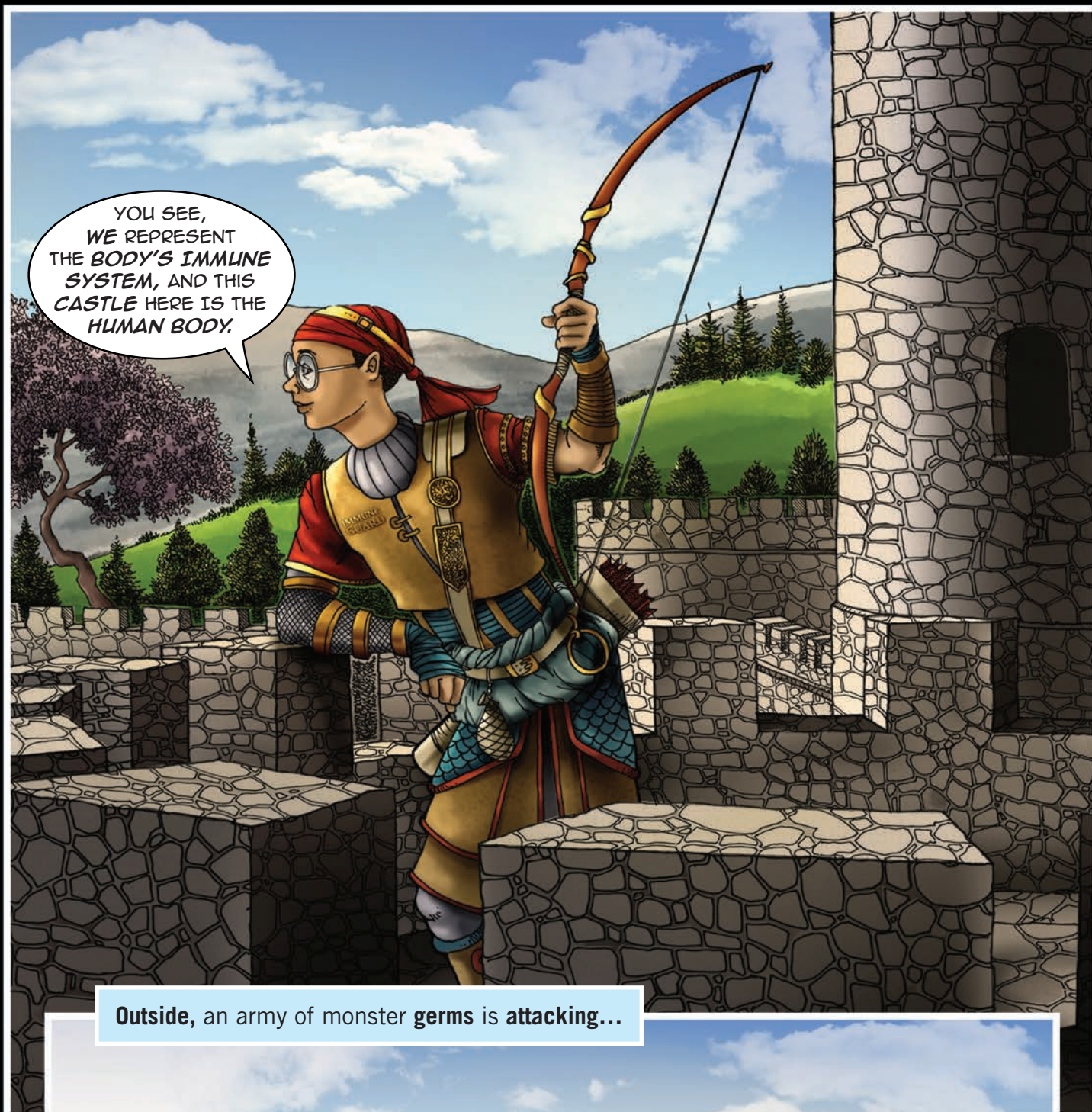


YEAH...
WHAAAAAT?

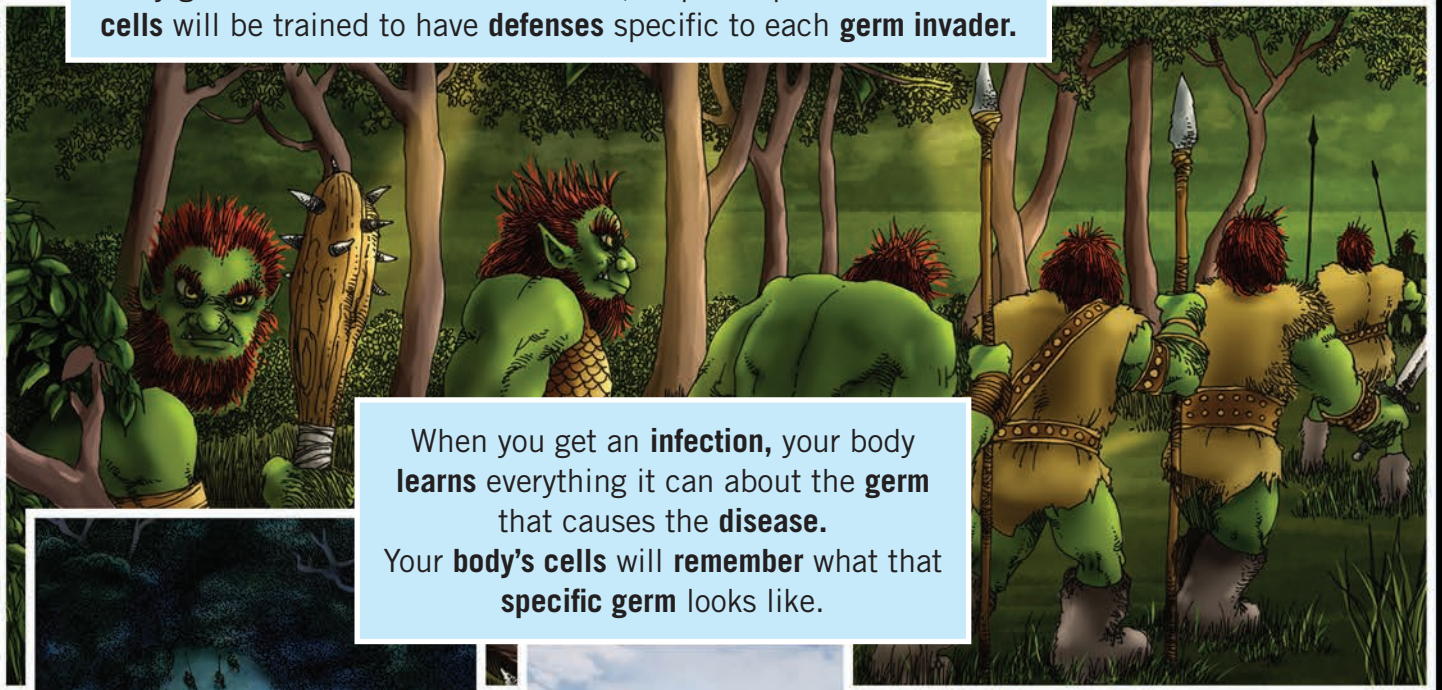


HANG ON,
GUYS...
I PROMISE
THIS IS
PUBLIC HEALTH
RELATED.

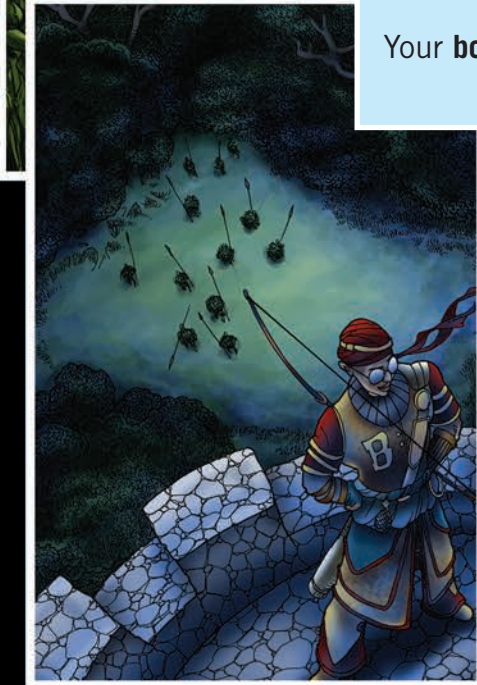
HA! HA!
OH, BY THE WAY,
IT'S ME KRIS.
I JUST GOT
TO THE
MEETING...
AND WHAT
TIMING!



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**.

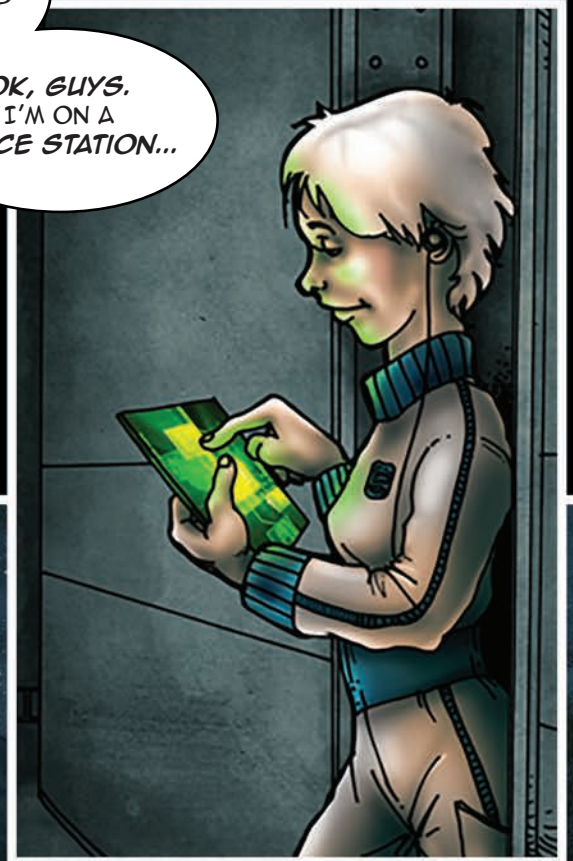
When **germs** are spotted and **recognized** by the **immune system**, we must leap into action to **fight the infection!**





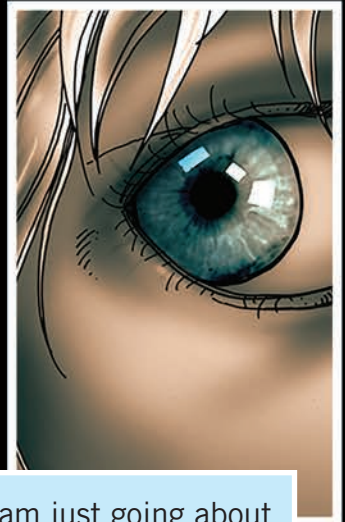


OK, GUYS.
I'M ON A
SPACE STATION...



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!



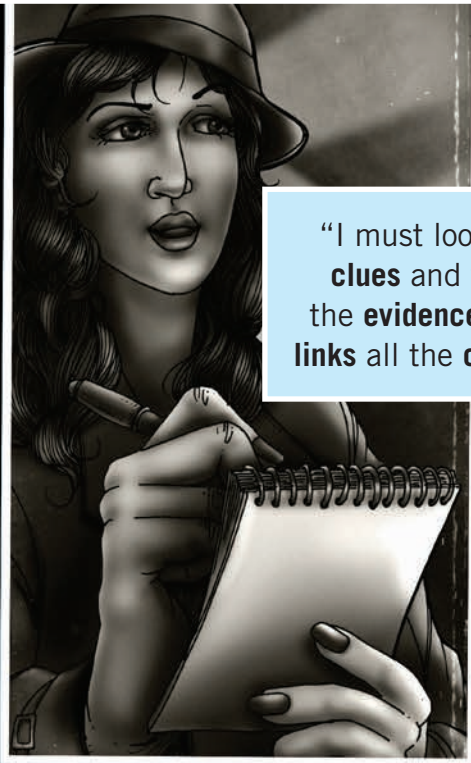
HMM,
MY TURN ALREADY?
LET'S SEE...



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."



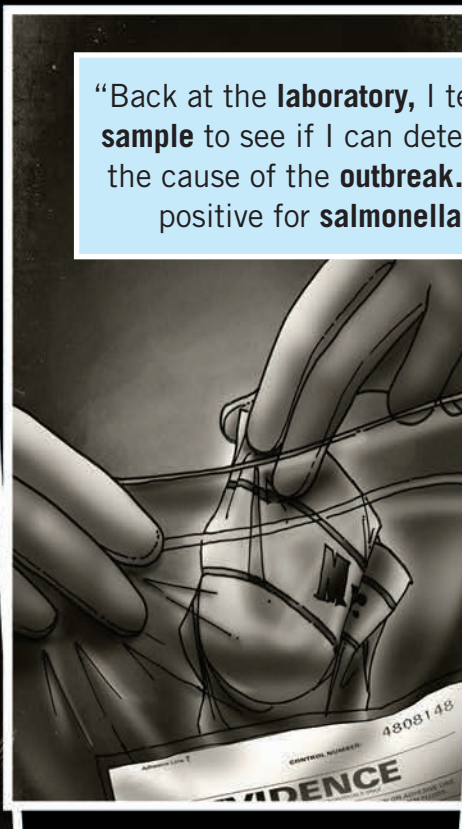
"I must look for **clues** and find the **evidence** that **links** all the **cases**!"



"Everyone who has gotten **sick** ate at this **restaurant**!"



"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**."



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**.

Emily
President

KRIS IS ENTERED
INTO THE **CAKE**
BAKING
COMPETITION,
AND R.J. WILL
BE EXHIBITING
HIS **CHICKEN**.
ANY QUESTIONS?

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

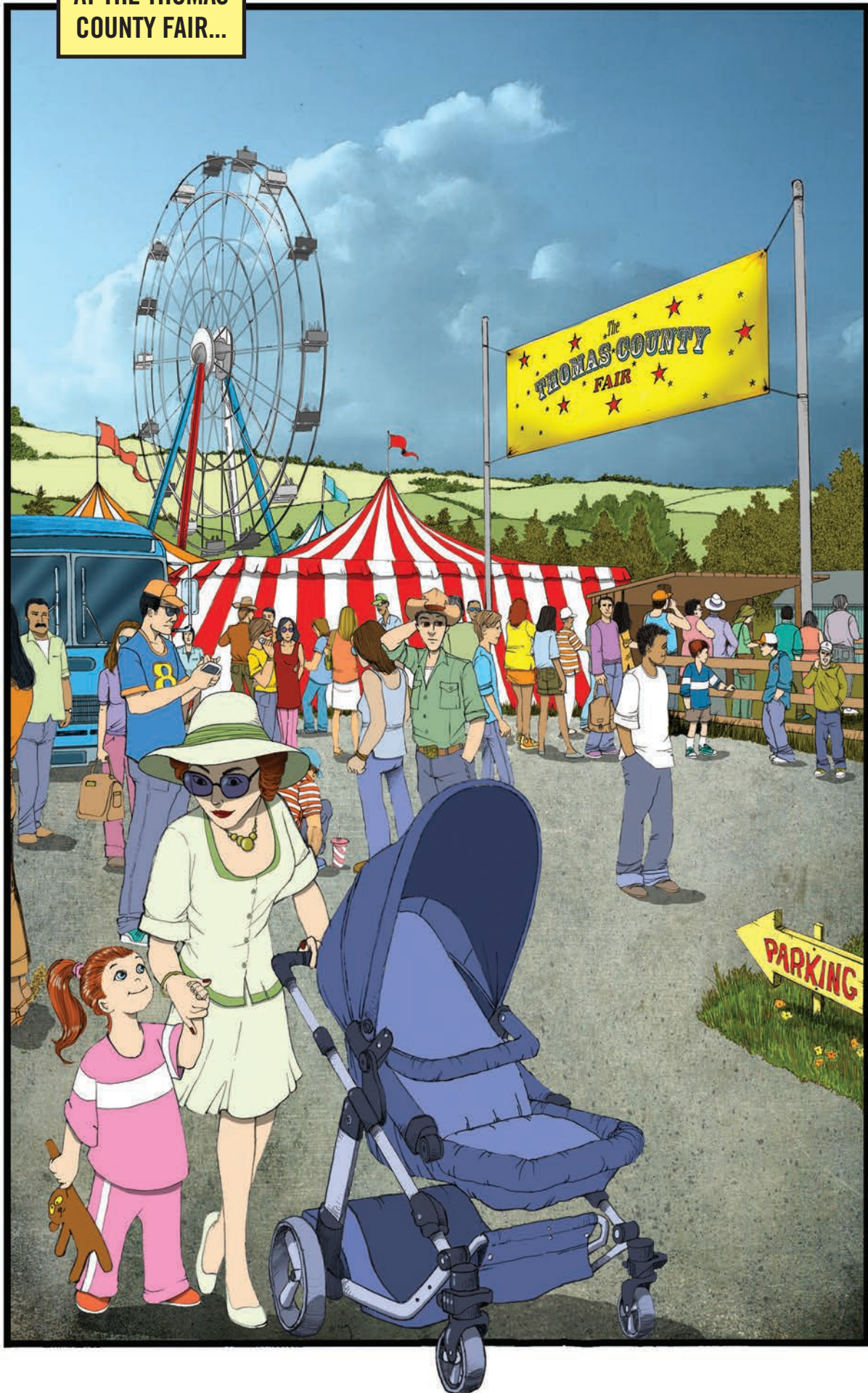
MY **BEETLES**
ARE GOING
TO **BLOW EVERYONE'S**
MINDS AT THE **FAIR**.

LATER ON...



OK, MR.
MEDIEVAL ARCHER
GERM ANALOGY GUY.

AT THE THOMAS
COUNTY FAIR...



C'MON
HAMLET,
THE JUDGING
WILL BE
STARTING
SOON...



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

MOMMY...
LOOK AT THE
CUTE PIG!

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

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

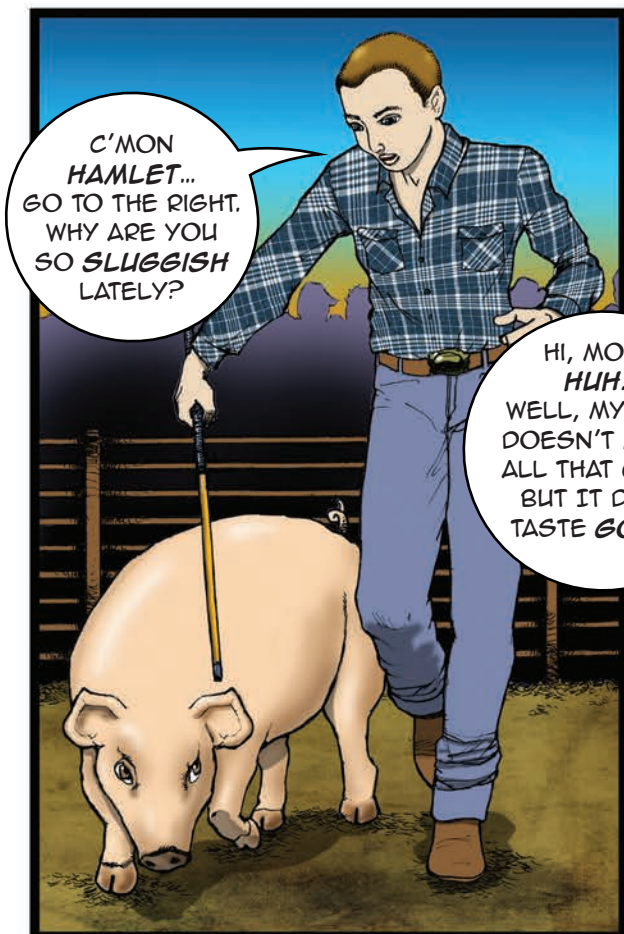


YOU'RE LOOKING
AT THE OWNER
OF THE BEST CHICKEN
IN THOMAS COUNTY!



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!



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?



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



GH
FEK!

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



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!



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

EDDIE ...
YOU OK?



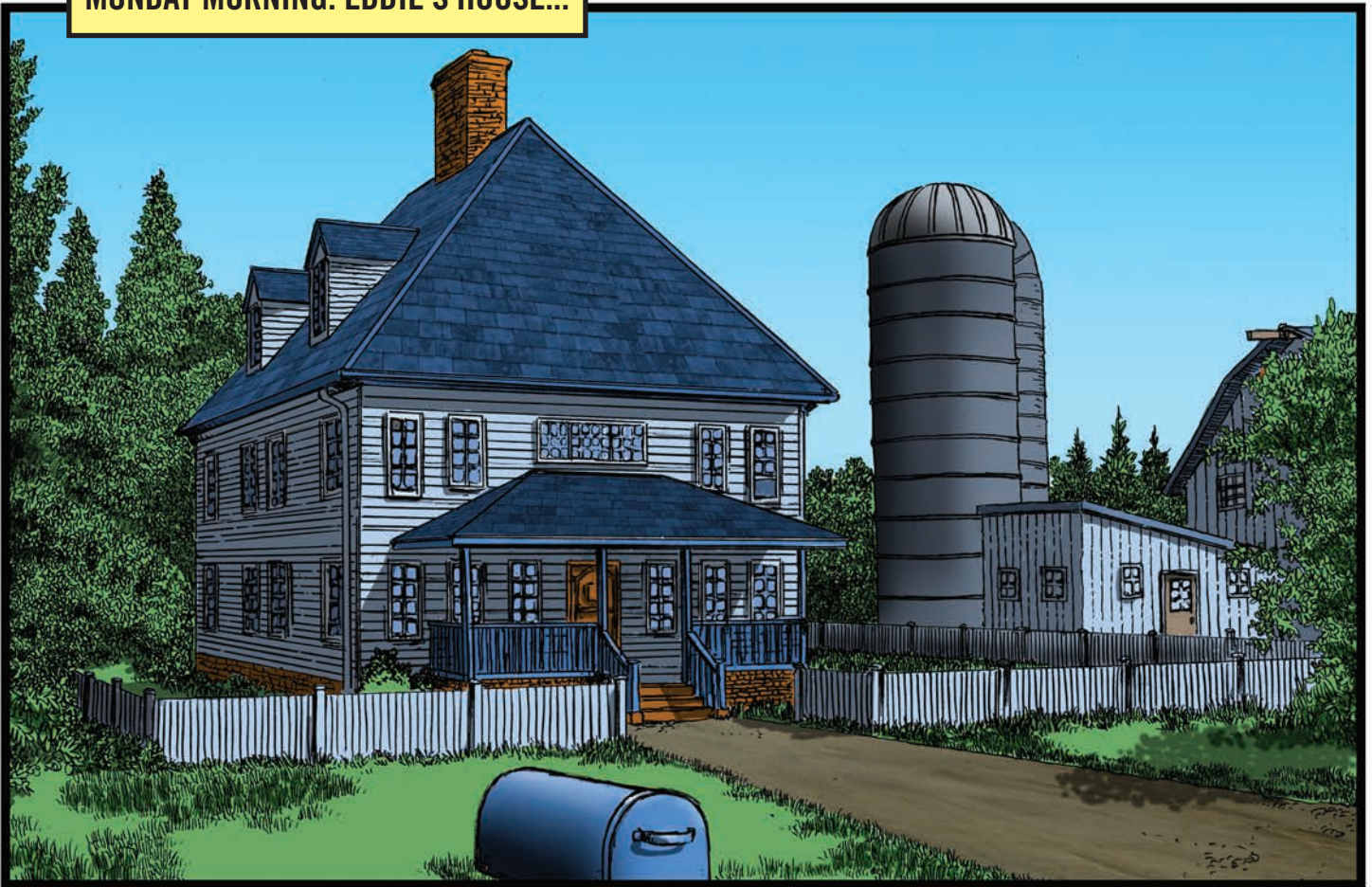
...WOW, I'M REALLY
NOT FEELING WELL
YOU GUYS...

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

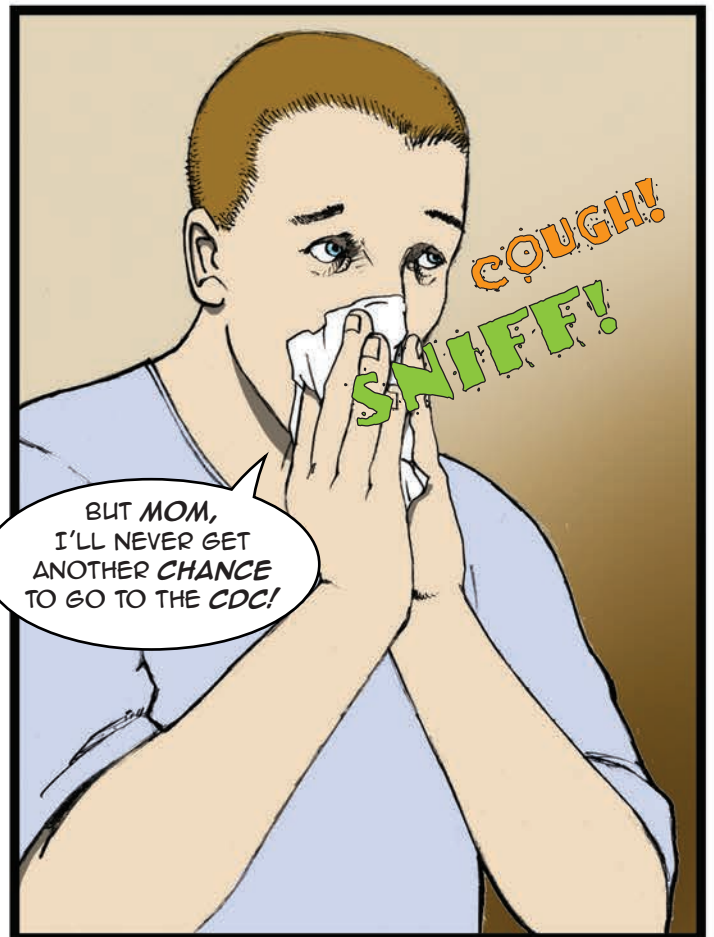
UGH,
EDDIE IS
THROWING UP.
I THINK IT'S TIME
TO CALL IT A
NIGHT!



MONDAY MORNING: EDDIE'S HOUSE...



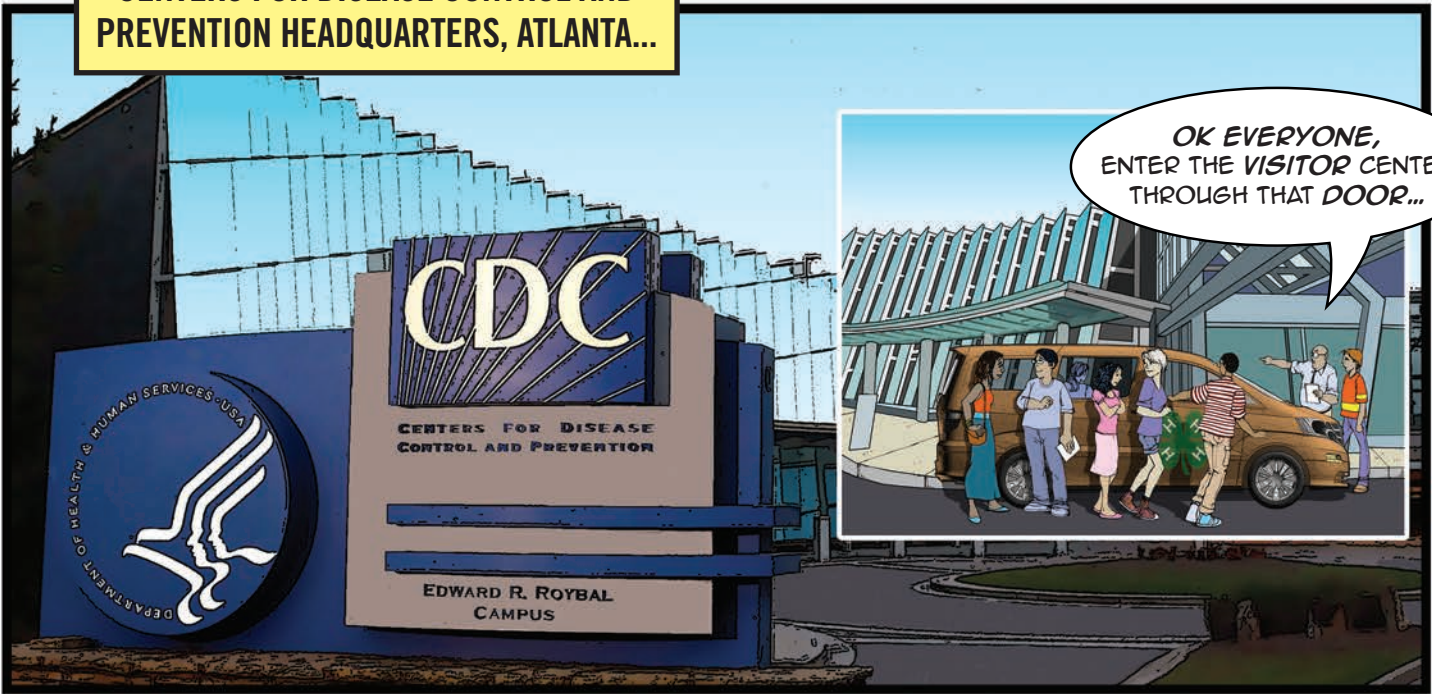
FOR THE
LAST TIME...
YOU CAN'T GO WITH
THIS FEVER!



COUGH!
SNIFF!

BUT MOM,
I'LL NEVER GET
ANOTHER CHANCE
TO GO TO THE CDC!

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



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

HELLO
EVERYONE, I'M
DR. ALISON.

I'M
DR. ALEX.

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...



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.



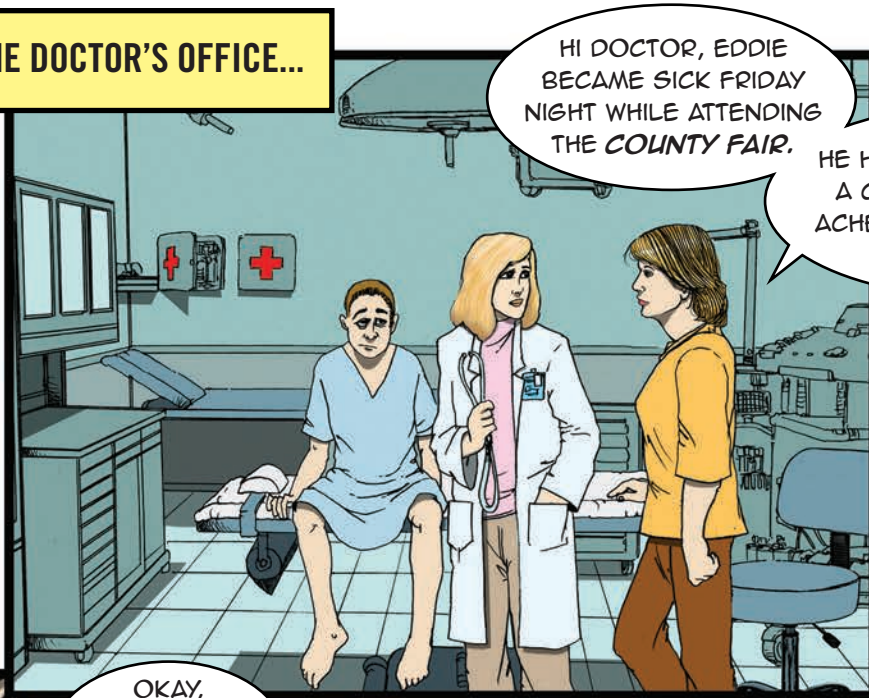
BACK AT EDDIE'S HOUSE...



MOM, I FEEL **WORSE**.

I'M TAKING YOU TO THE **DOCTOR**.

LATER MONDAY AT THE DOCTOR'S OFFICE...

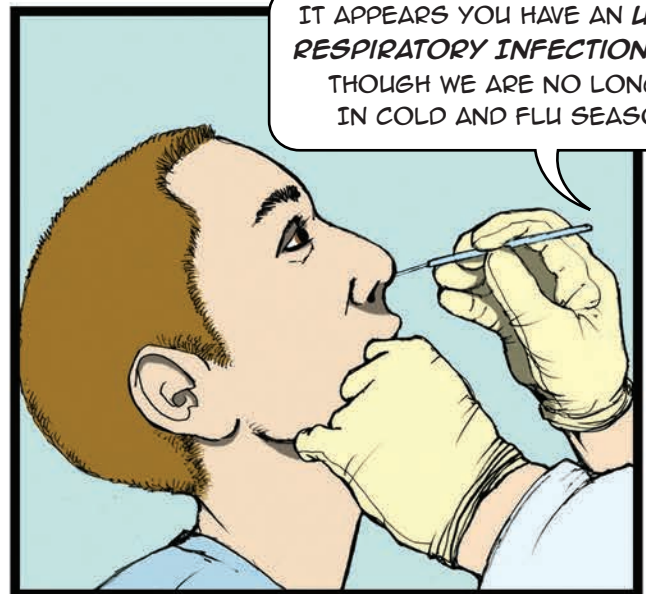


HI DOCTOR, EDDIE BECAME SICK FRIDAY NIGHT WHILE ATTENDING THE **COUNTY FAIR**.

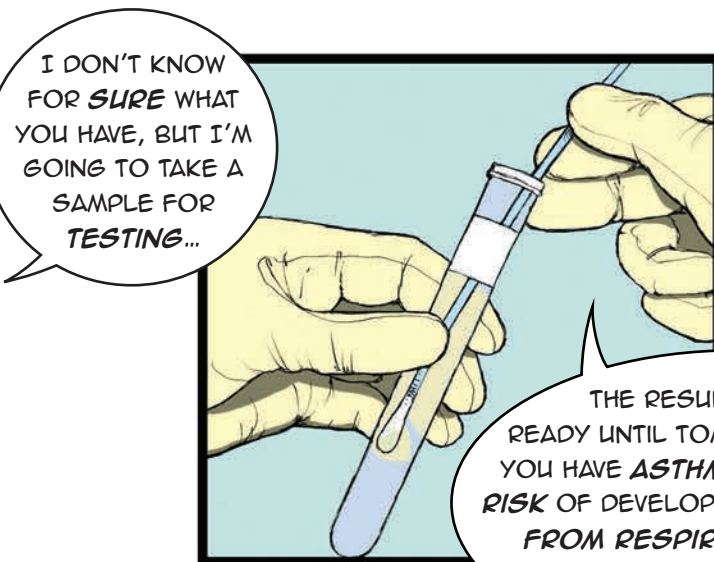
HE HAS HAD A 101° FEVER, A COUGH, AND MUSCLE ACHES. HE ALSO SUFFERS FROM **ASTHMA**.



OKAY, JUST BREATHE NORMALLY FOR ME.

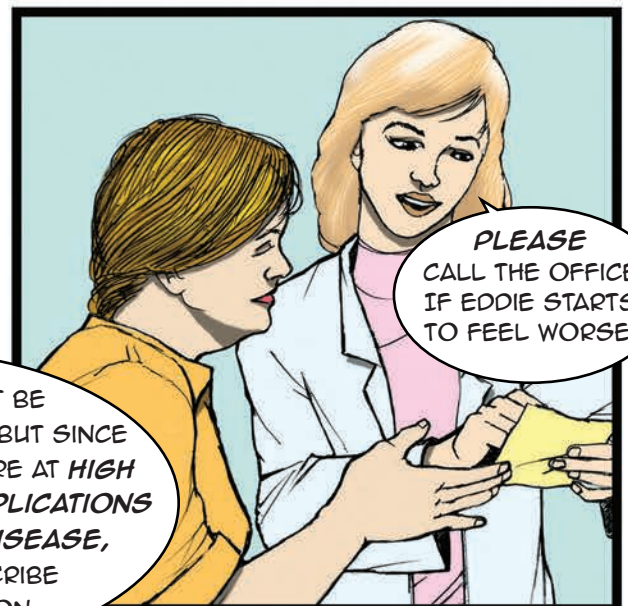


IT APPEARS YOU HAVE AN **UPPER RESPIRATORY INFECTION**, EVEN THOUGH WE ARE NO LONGER IN COLD AND FLU SEASON.



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.



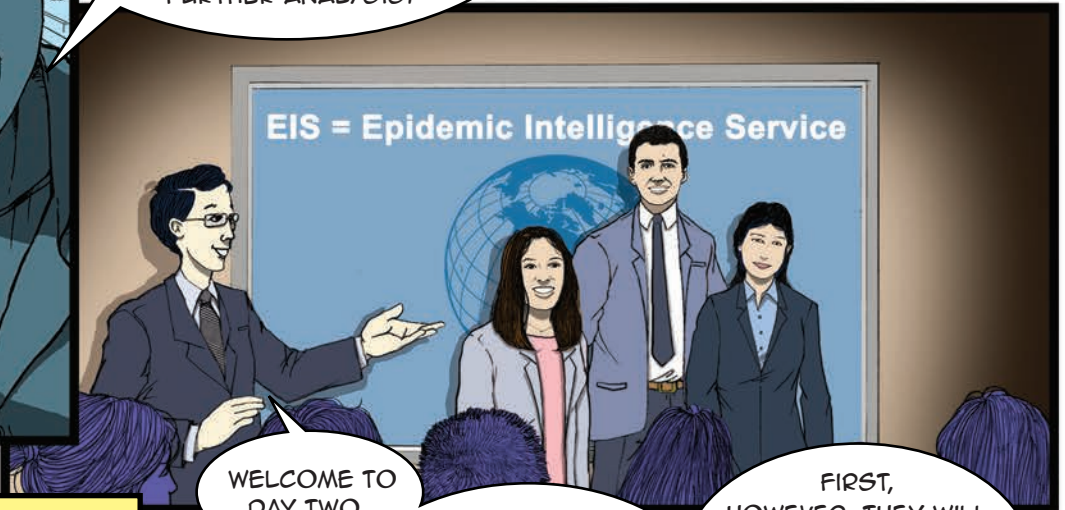
PLEASE CALL THE OFFICE IF EDDIE STARTS TO FEEL WORSE.

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.**



CDC OFTEN INVESTIGATES
VECTOR-BORNE DISEASES,
SUCH AS **MALARIA**, AS WELL AS
ZOO NOTIC DISEASES, SUCH
AS **RABIES, TUBERCULOSIS
AND INFLUENZA,**
A.K.A., **THE FLU.**

ZOO NOTIC 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.

MAKING FOOD SAFER TO EAT

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, experts believed that avian influenza (H5N1) viruses posed the greatest pandemic threat. H5N1 viruses were endemic in poultry in parts of Asia and were infecting people sporadically, often with deadly results. Given the reality, pandemic preparedness plans were largely based on a scenario of severe human illness caused by an avian virus. Despite differences in planning scenarios and the actual 2009 pandemic, many of the systems established through pandemic planning 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?!

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

MOM, I FEEL
WORSE.

GASP

WEDNESDAY, EARLY MORNING...

EMERGENCY





RING
RING

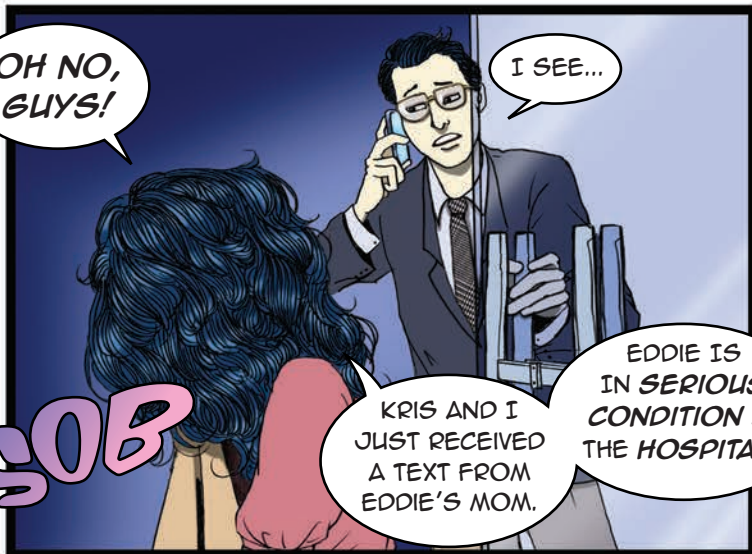
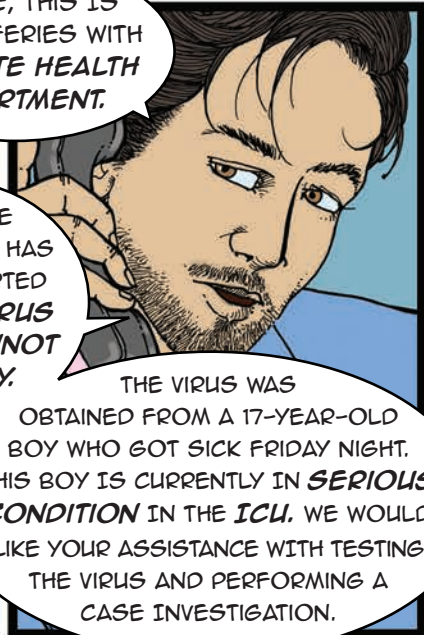
EXCUSE ME,
I HAVE TO TAKE
THIS...



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!

I SEE...

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

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

SOB



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...

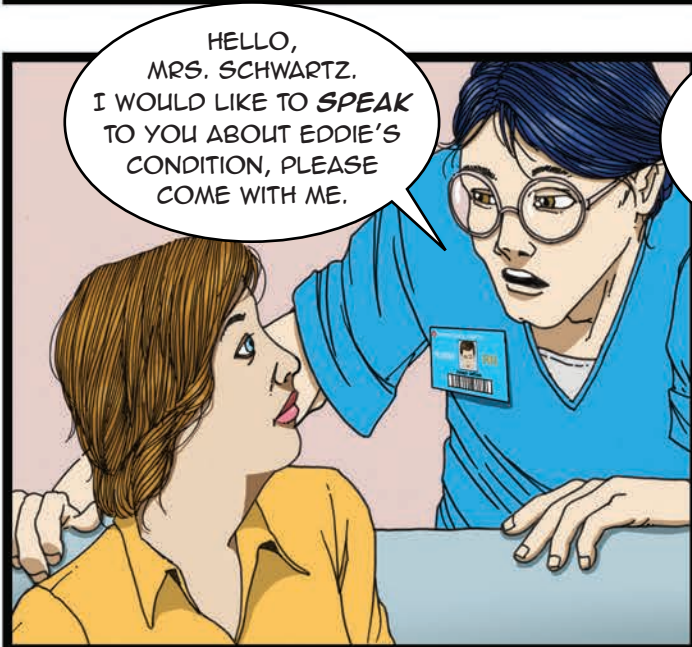
OK, LET'S **SUMMARIZE** WHAT WE KNOW ABOUT THE SITUATION SO FAR.

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

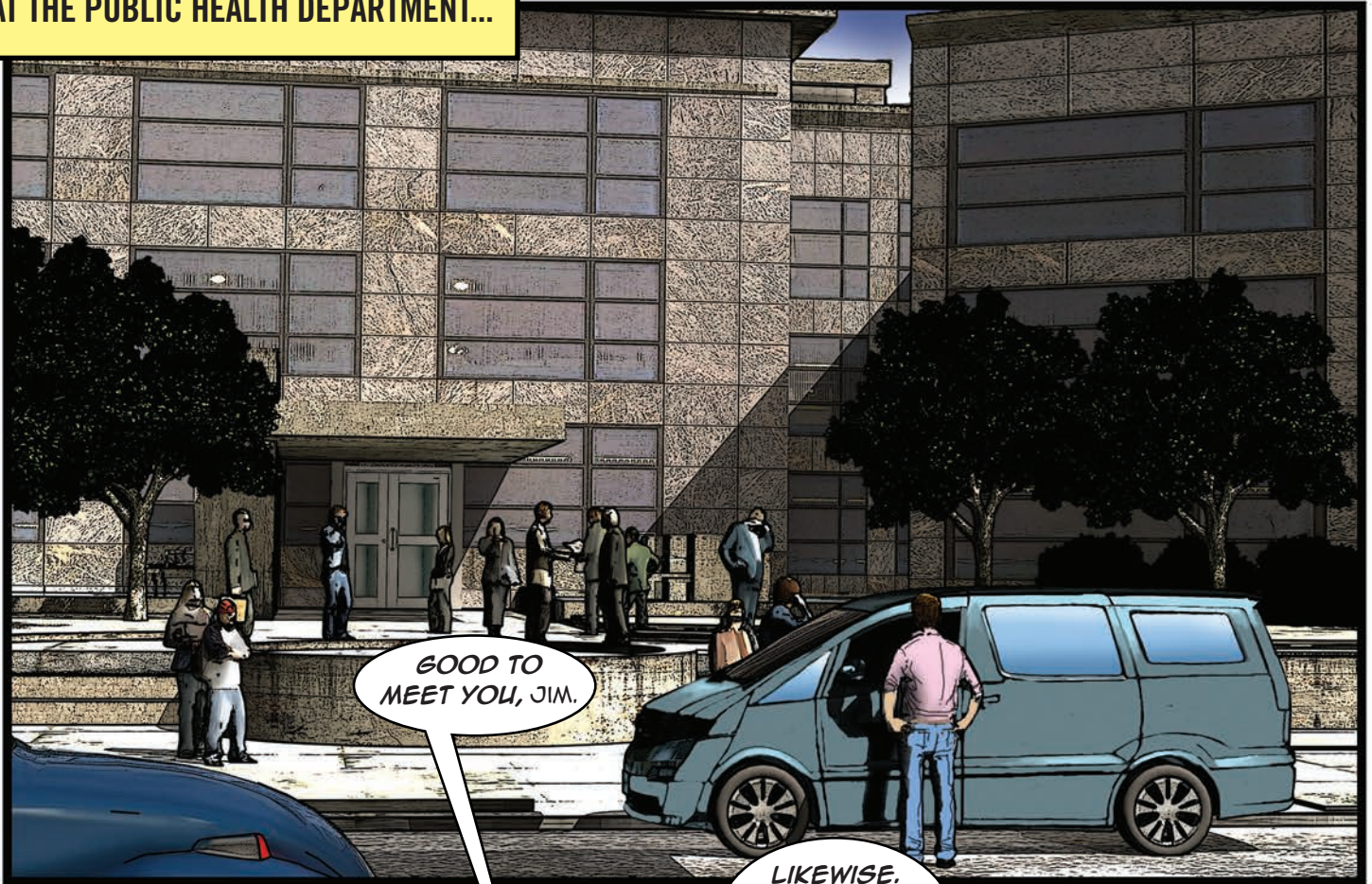
YES, AND RIGHT NOW WE ARE DEALING WITH A SINGLE CASE OF **SEVERE RESPIRATORY ILLNESS** IN A 17-YEAR-OLD MALE WHO GOT SICK FRIDAY NIGHT.

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...



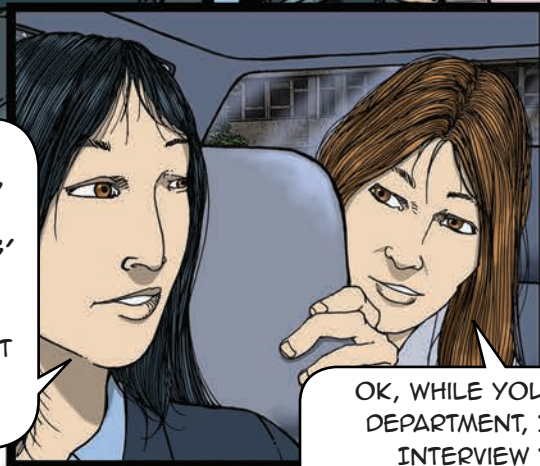
AT THE PUBLIC HEALTH DEPARTMENT...



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.



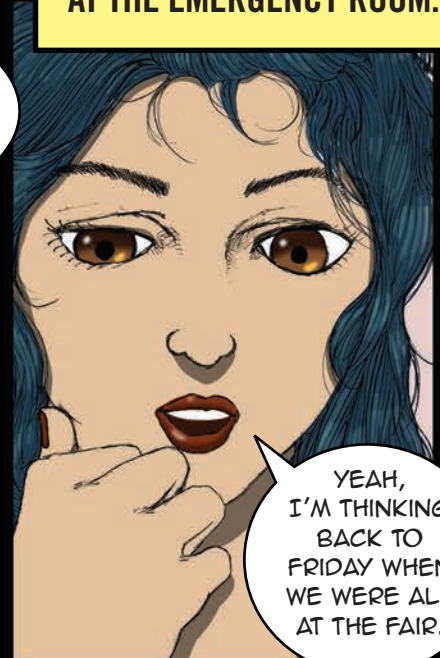
I WAS THINKING BACK TO BEFORE THE FAIR.



"I REMEMBER WALKING WITH EDDIE."

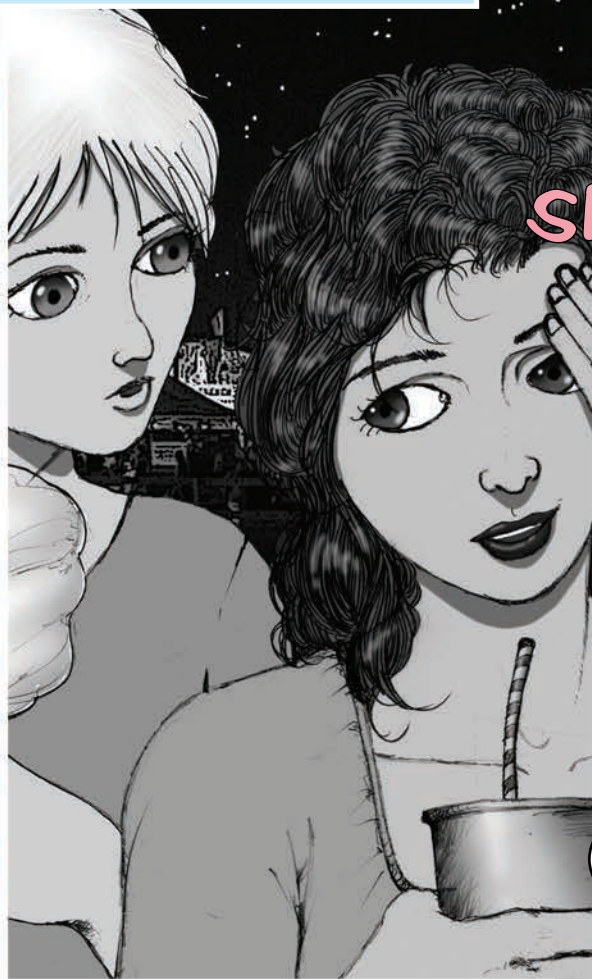
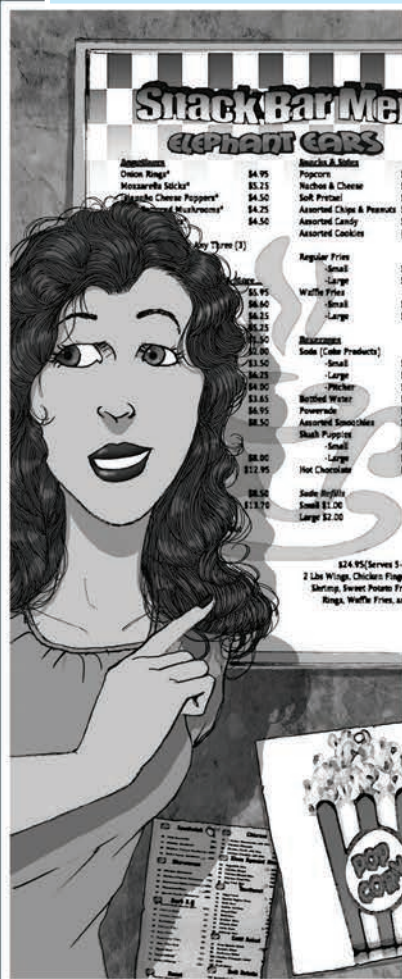
HE WAS TELLING ME ABOUT HIS PLANS TO SHOW HIS PIG, HAMLET. EDDIE SEEMED HEALTHY THEN."

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

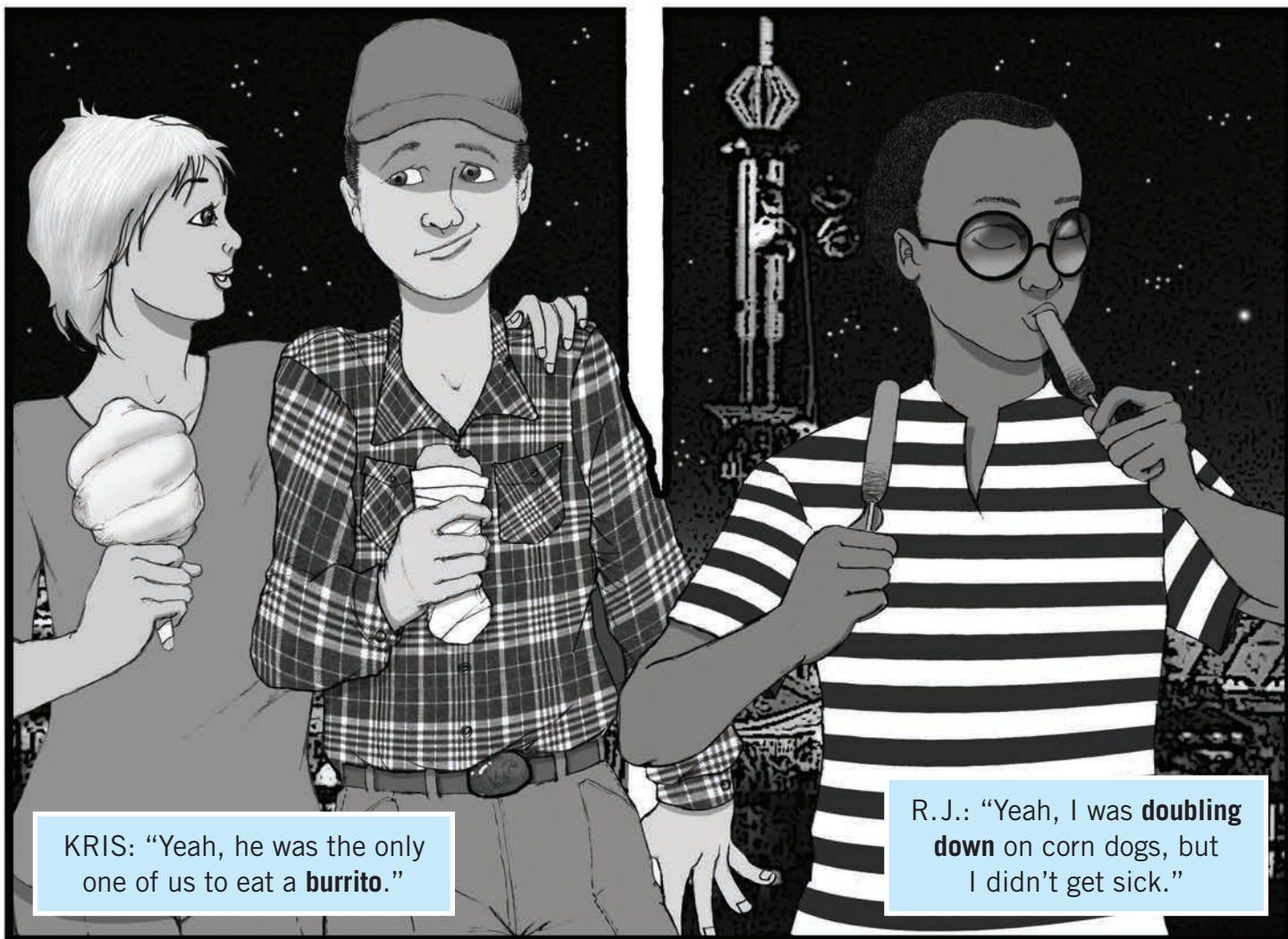
OW!



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**.

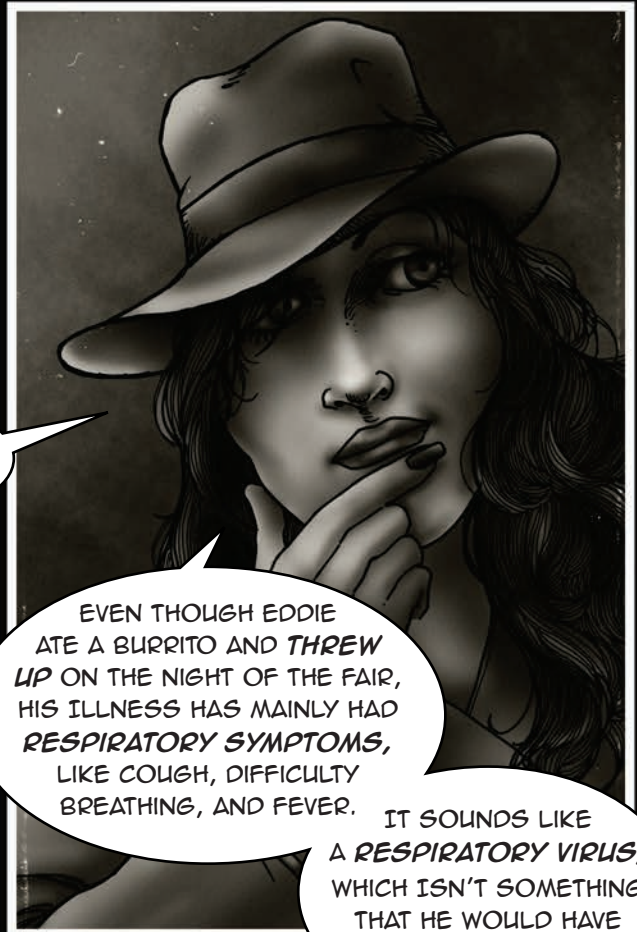
GOOD PLAN.
I'M GOING TO FINISH GETTING SET UP HERE, AND THEN I'LL CHECK IN WITH ALISON TO SEE IF SHE HAS ANY **LEADS** TO FOLLOW UP ON.

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.

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

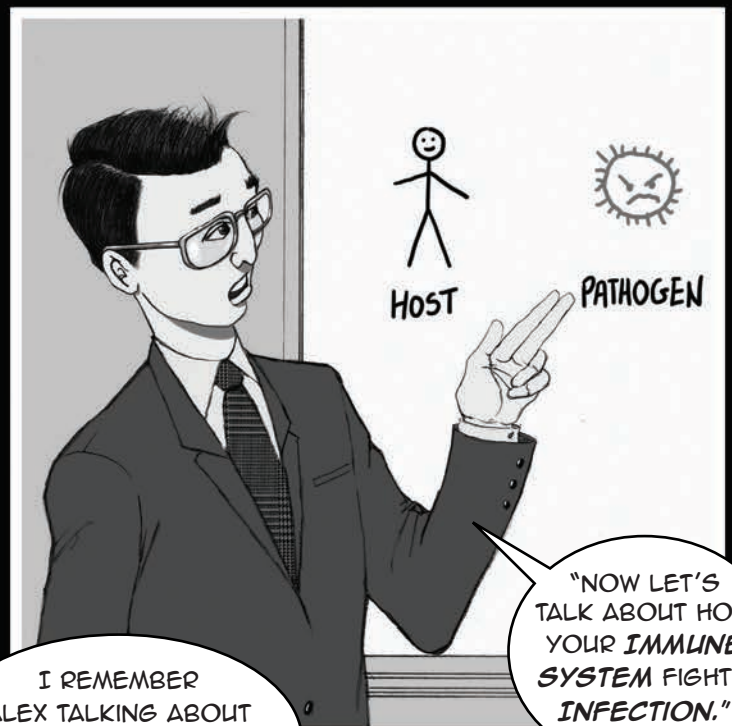
YOU ARE
RIGHT, EM!

WHAT WAS EDDIE
EXPOSED TO THAT
WE *WEREN'T*?



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

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



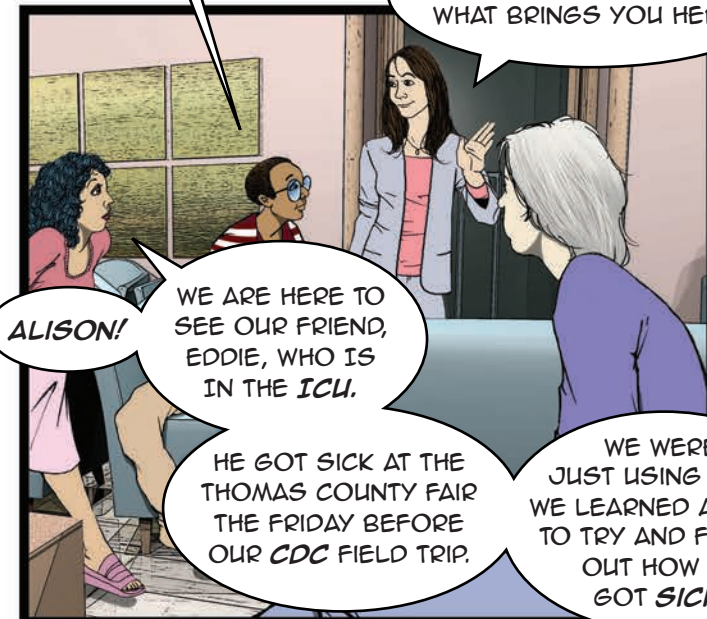
"NOW LET'S
TALK ABOUT HOW
YOUR *IMMUNE*
SYSTEM FIGHTS
INFECTION."

AT THE EMERGENCY ROOM...



HEY,
DR. ALISON!

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

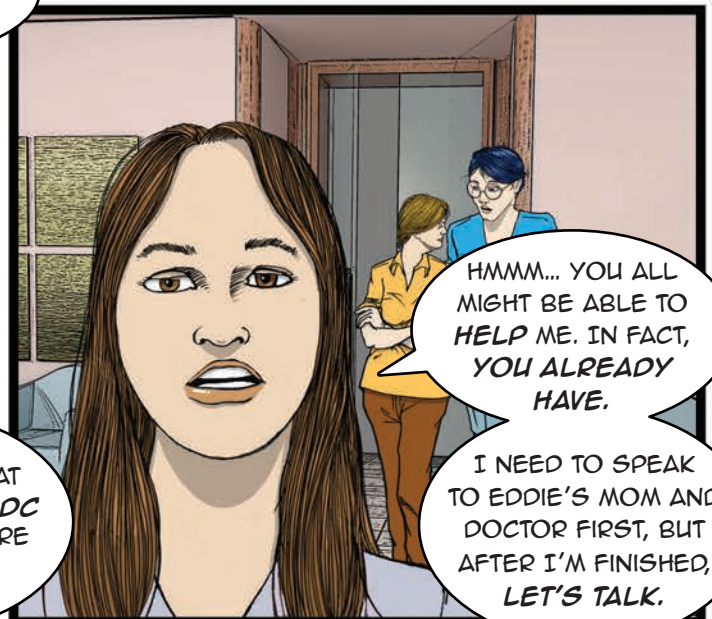


ALISON!

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

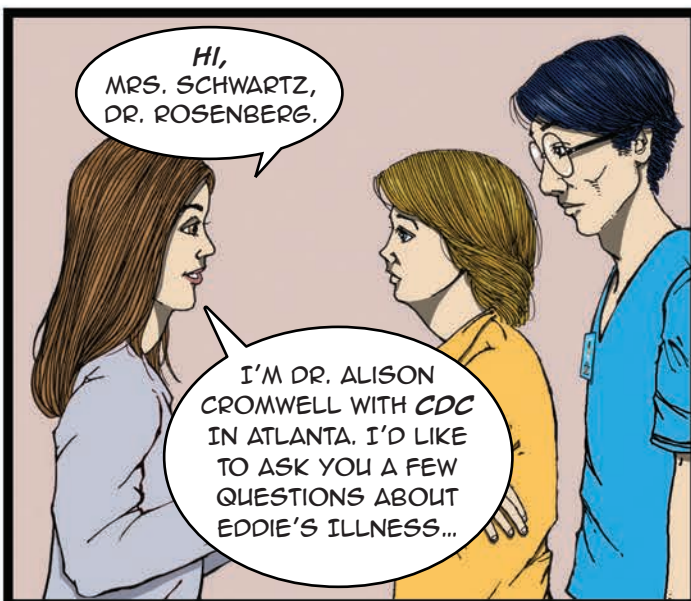
HE GOT SICK AT THE
THOMAS COUNTY FAIR
THE FRIDAY BEFORE
OUR *CDC* FIELD TRIP.

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



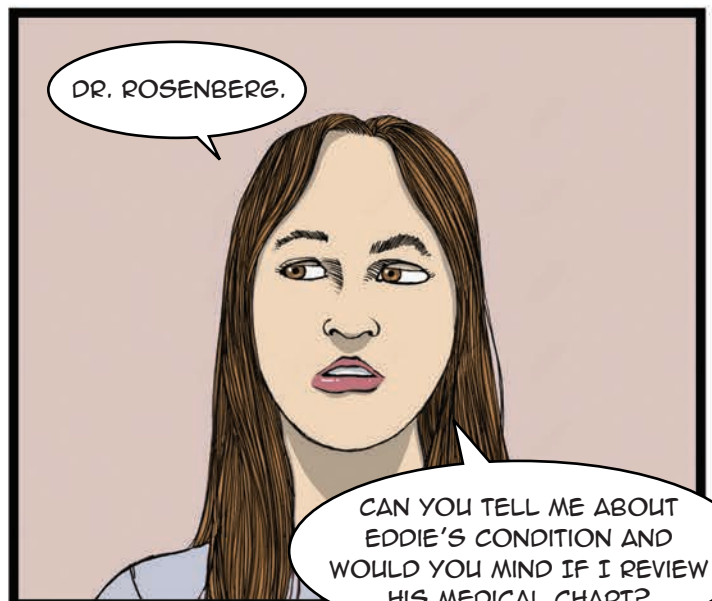
HMMM... YOU ALL
MIGHT BE ABLE TO
HELP ME. IN FACT,
YOU ALREADY
HAVE.

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...

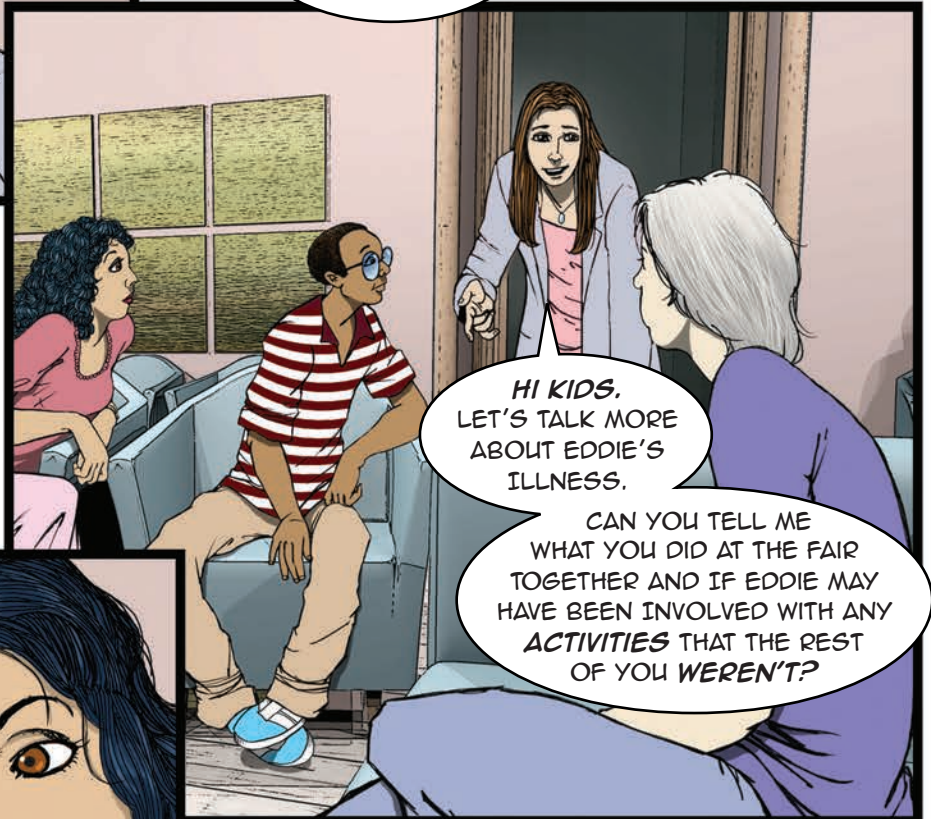
HEY ALEX,
IT'S ALISON.

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...



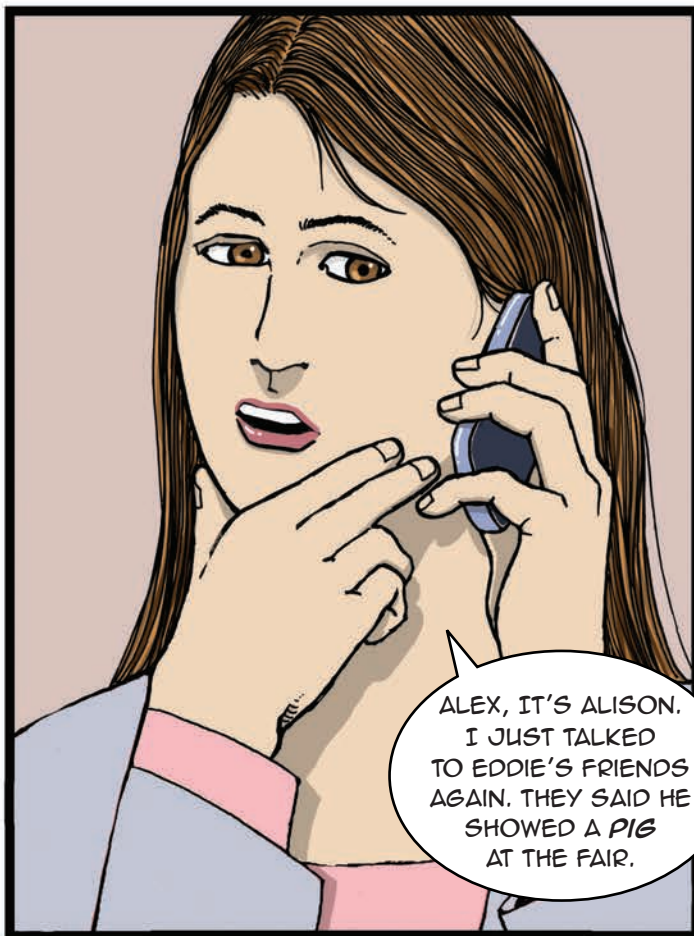
VERY ASTUTE,
EMILY. WHAT WAS
EDDIE DOING AT THE
FAIR THAT MAY HAVE
EXPOSED HIM TO
A *RESPIRATORY
VIRUS*?

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*.

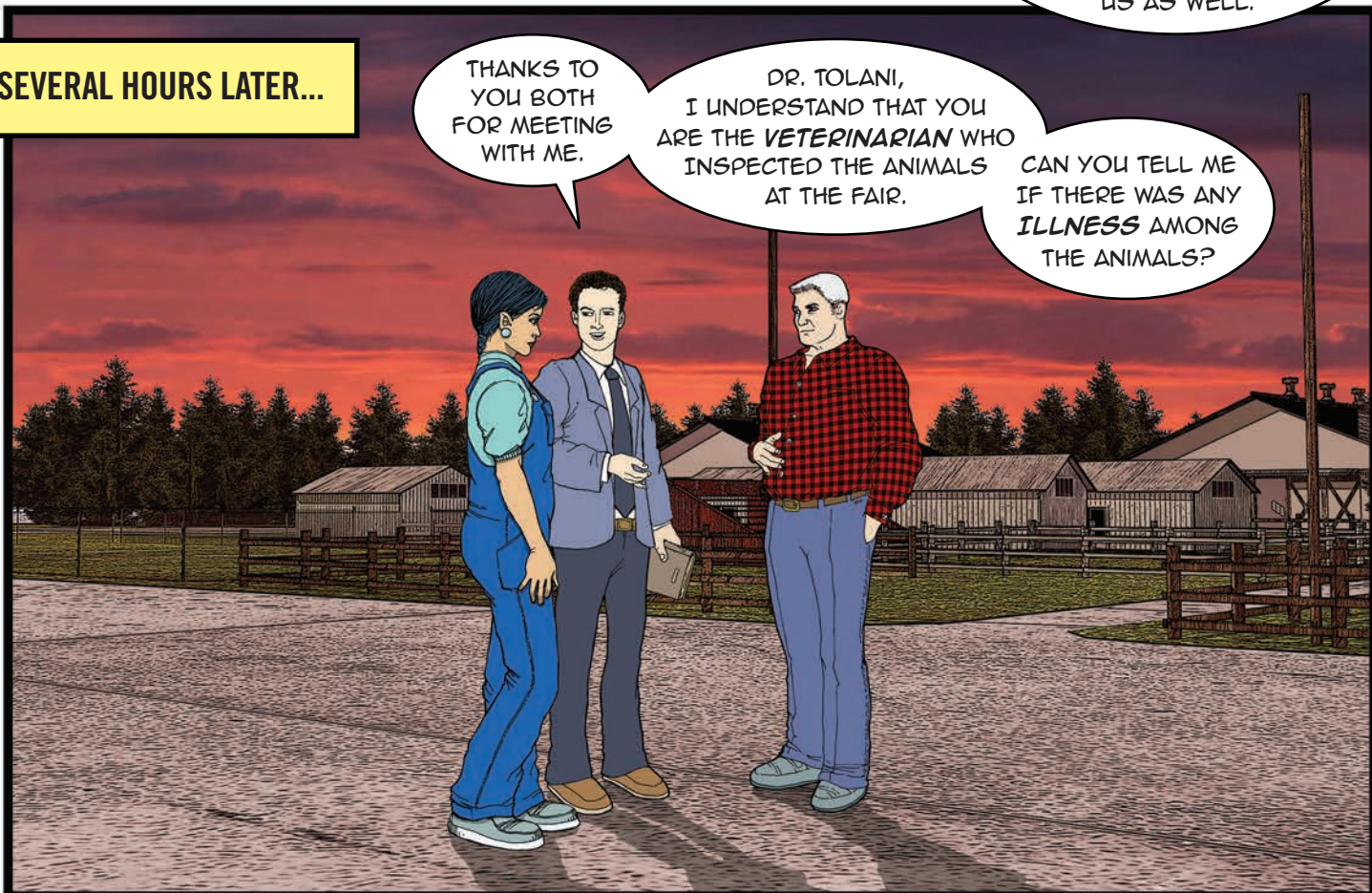


THIS IS
HELPFUL, EMILY.
PIGS CAN **SPREAD
VIRUS** EVEN WHEN
THEY *APPEAR
HEALTHY*.

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



SEVERAL HOURS LATER...





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

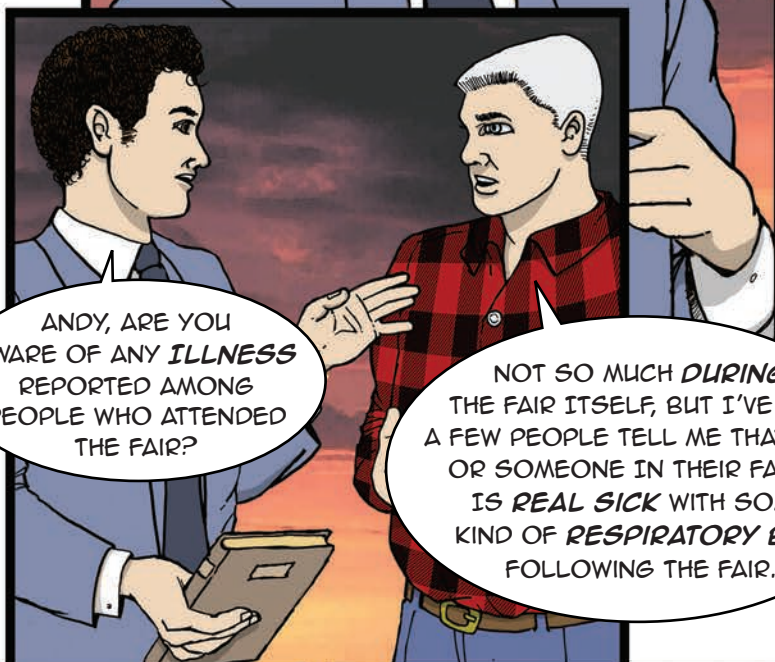
WHEN I EXAMINED THE PIGS, A FEW HAD A MILD FEVER.

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...

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**.

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.

090 21 53 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**.

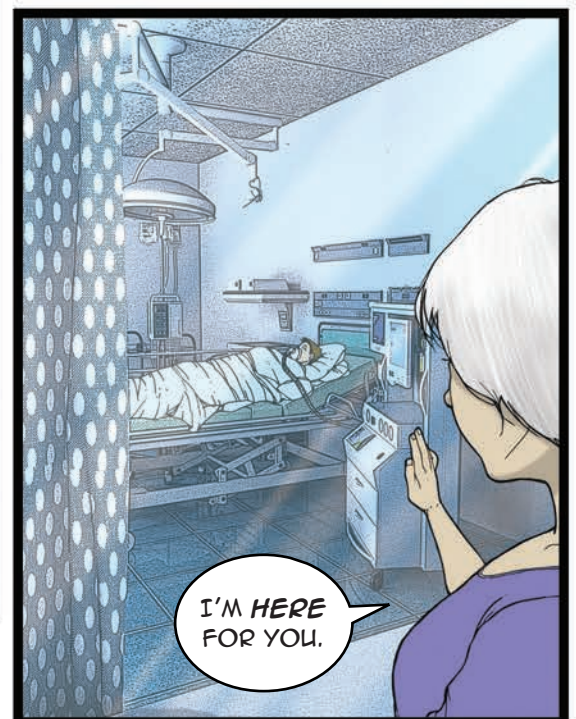
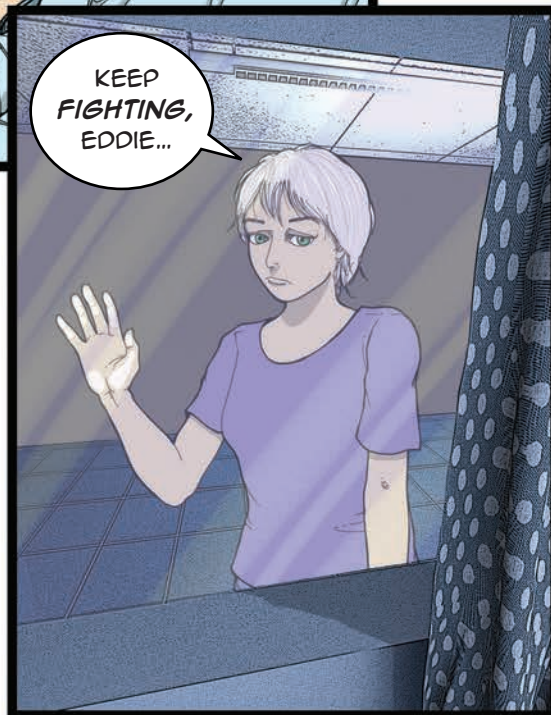
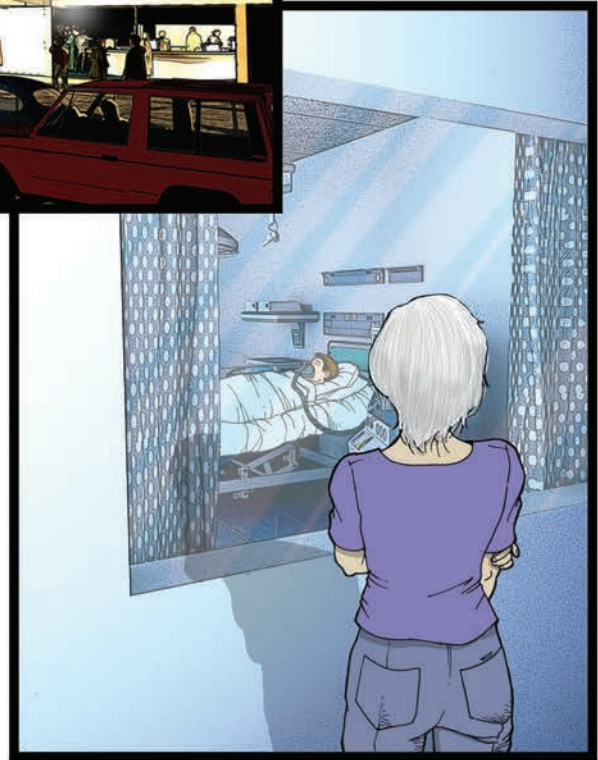
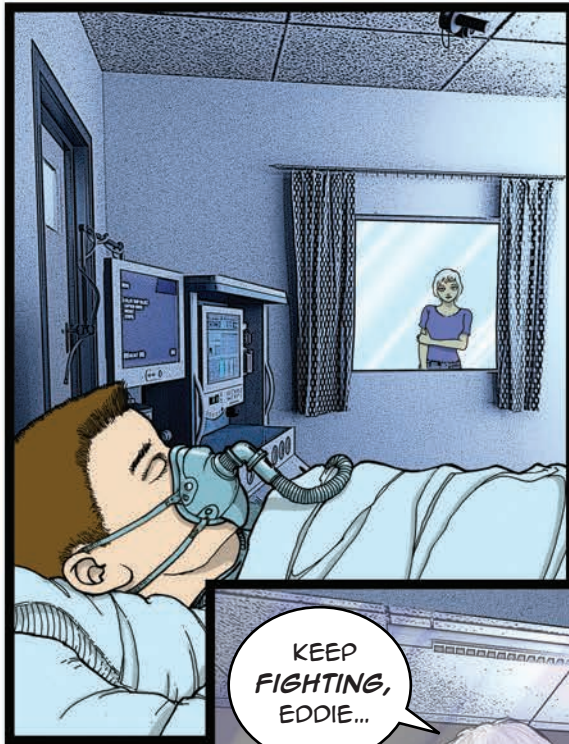
THE **FAIR MANAGER** SAID SOME PEOPLE REPORTED GETTING **SICK** FOLLOWING THE **FAIR**, AND HE ALSO SAID MORE **PIGS** HAVE TESTED **POSITIVE**.

NOPE, WE'RE JUST GETTING STARTED...

OKAY. LOOKS LIKE OUR JOB ISN'T OVER.

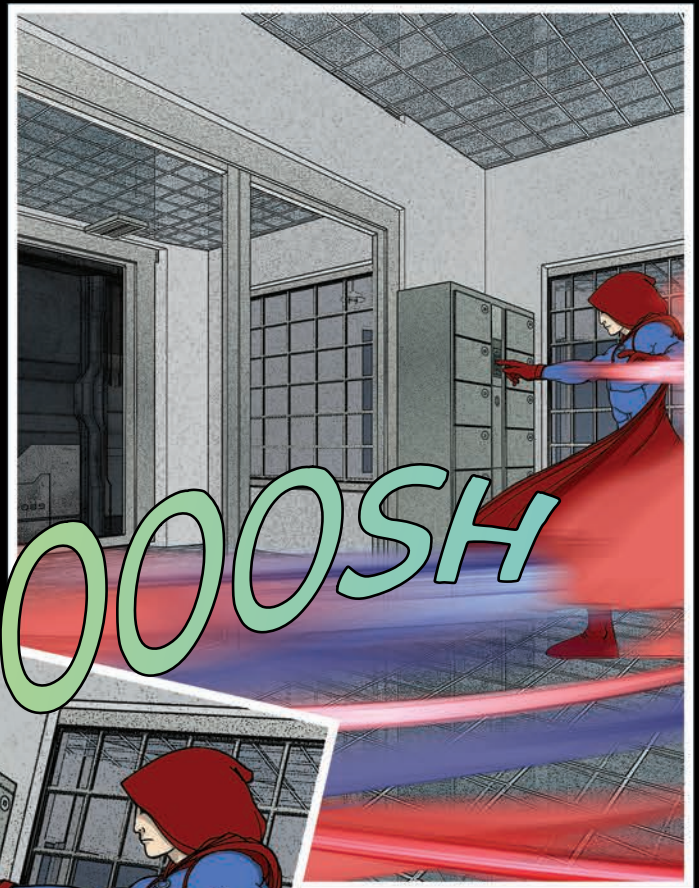
YES. WE WILL NEED TO FOLLOW UP WITH HIM AND OUR **STATE PUBLIC HEALTH PARTNERS** TO SEE IF WE CAN LEARN MORE ABOUT THEIR ILLNESS AND POSSIBLY GET THOSE PEOPLE **TESTED**. LET'S GO AHEAD AND ALSO **COORDINATE** WITH THE **STATE PUBLIC HEALTH DEPARTMENT** AND **HEALTH CARE PROVIDERS**. WE CAN ASK THEM 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...



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

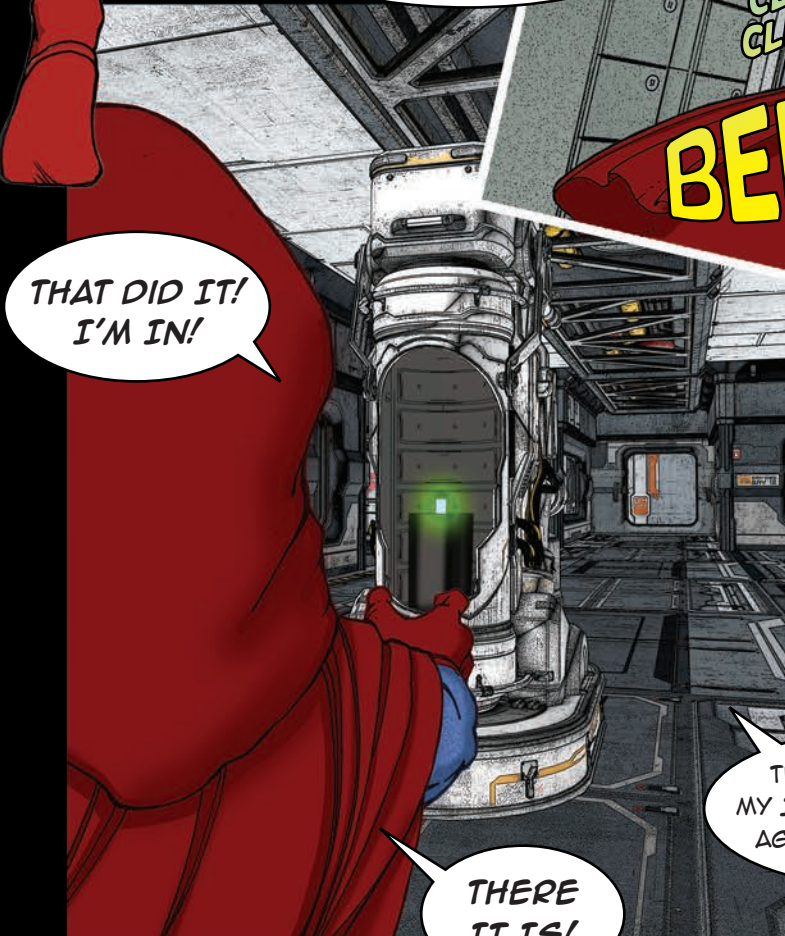




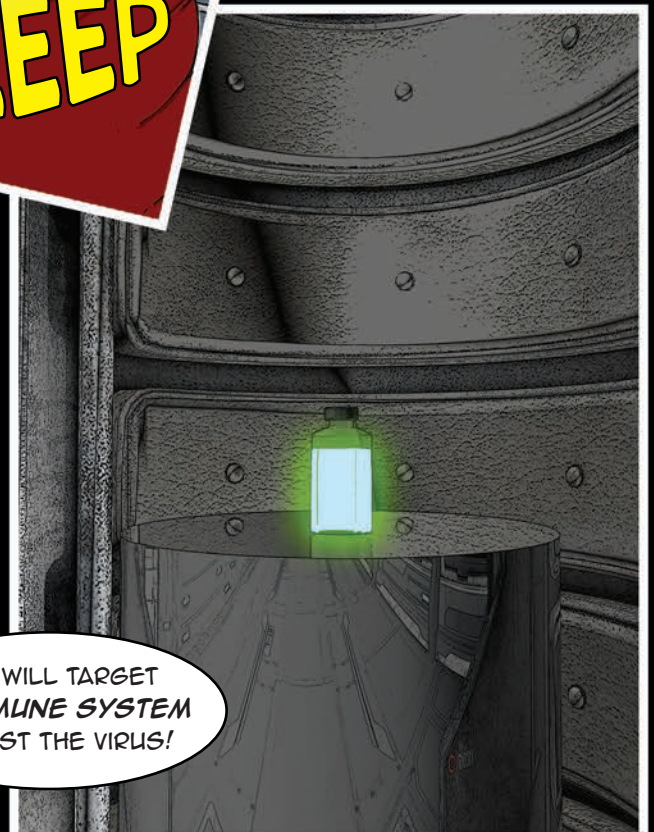
THIS INPUT PANEL MUST OPEN ACCESS TO THE ROOM HOUSING THE CURE!

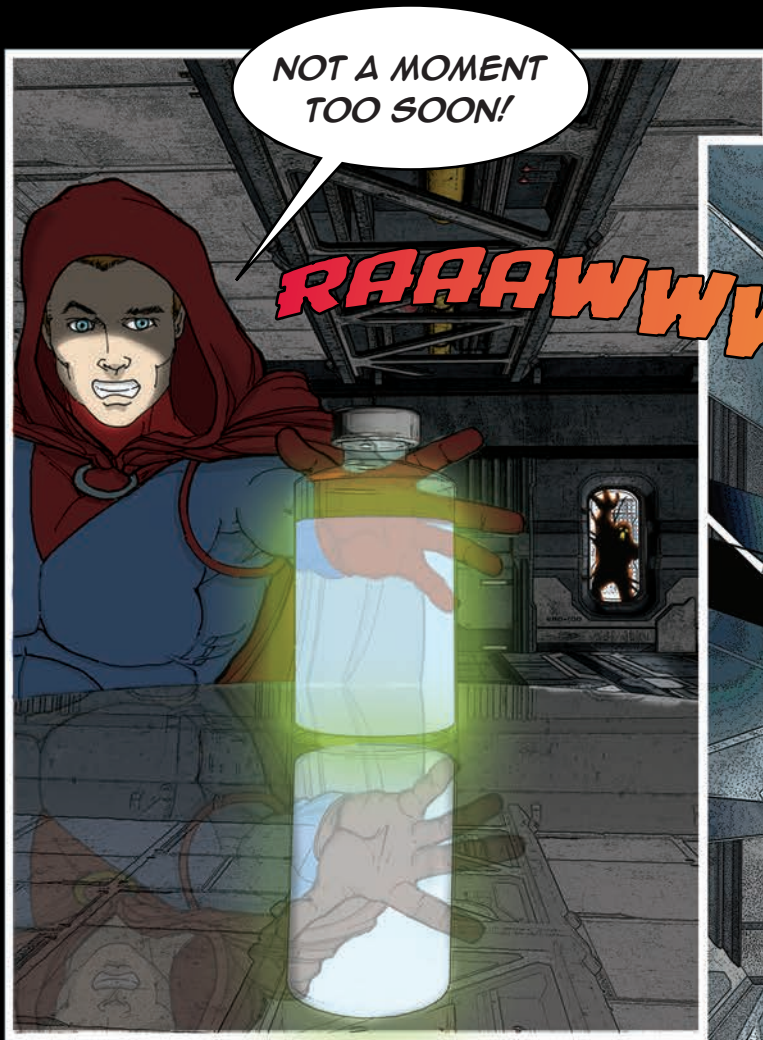
CLICK
CLICK
CLICK
CLICK

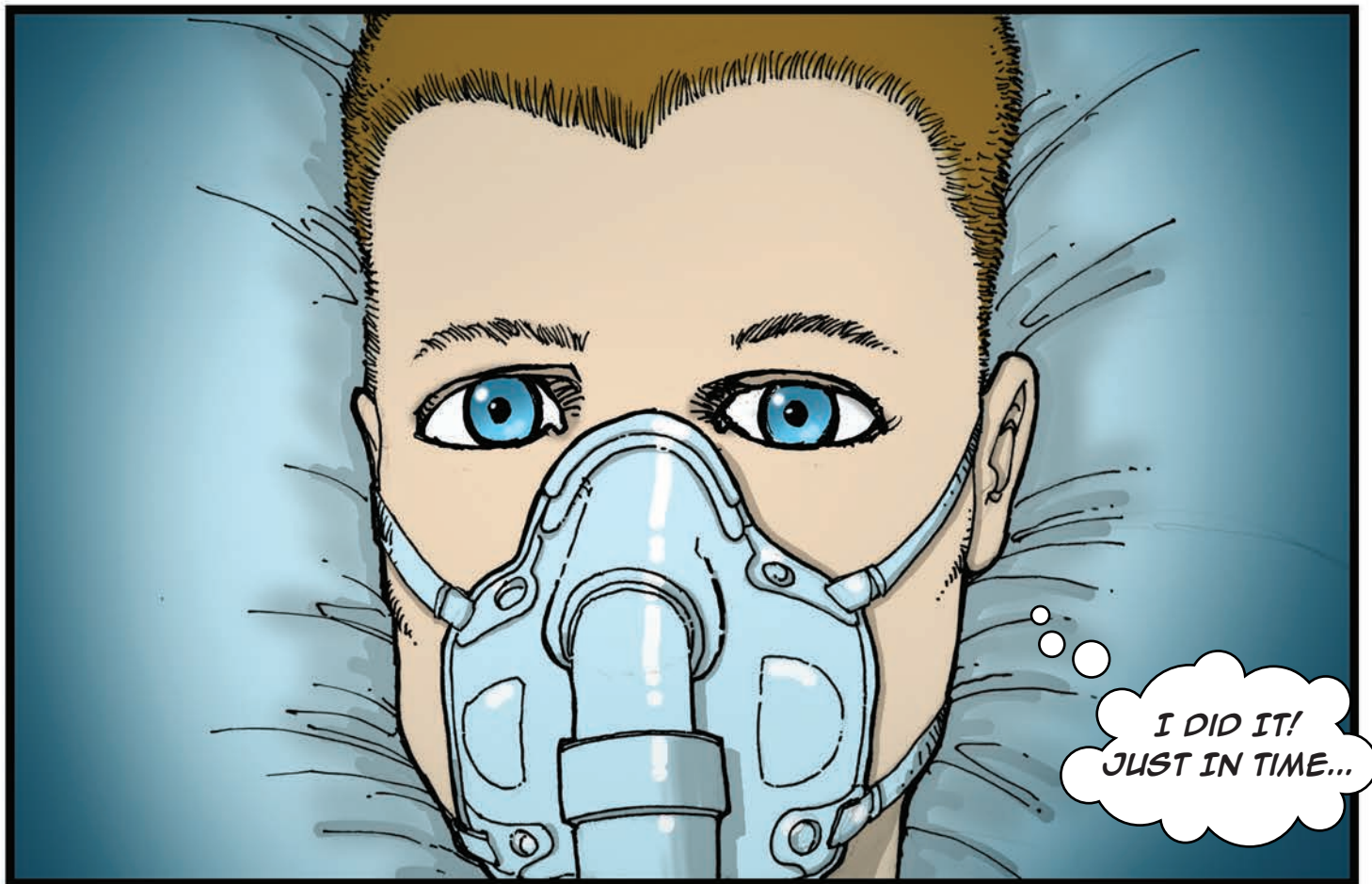
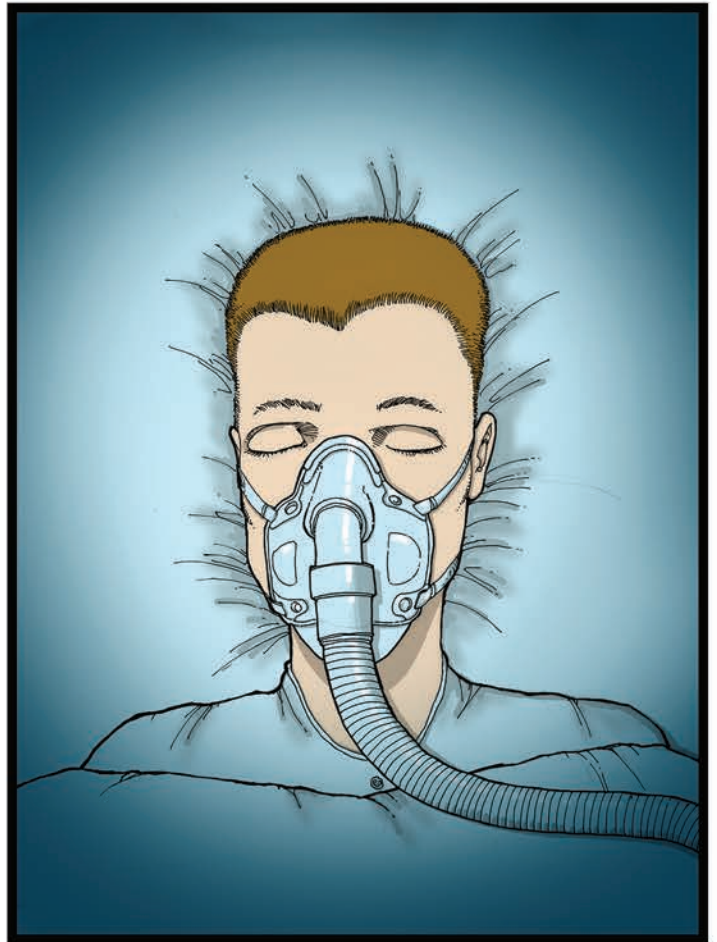
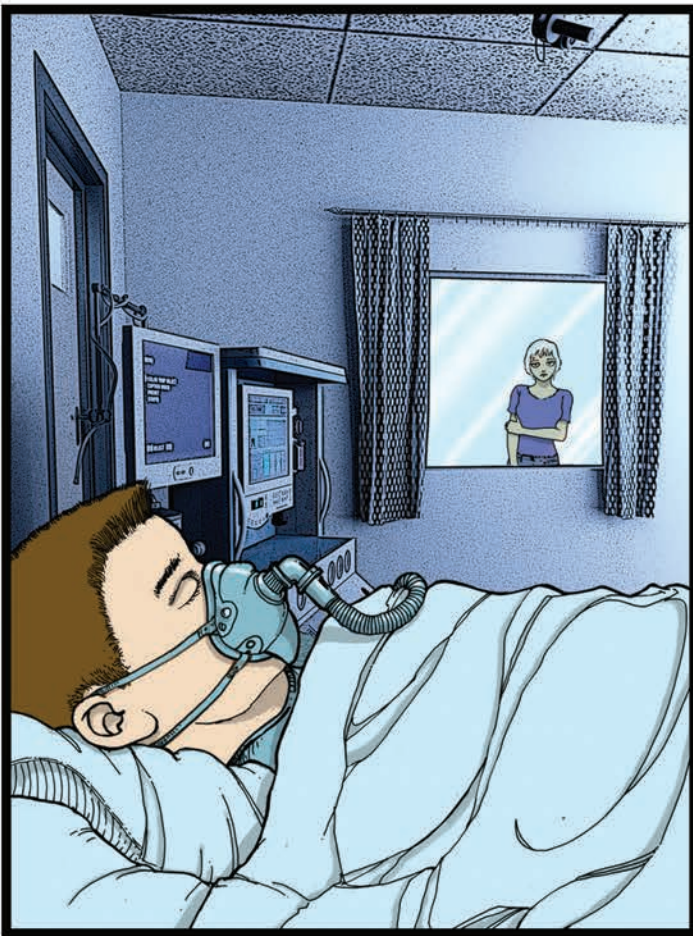
BEEEEEP



THERE IT IS!







A WEEK LATER...

HOW ARE YOU
FEELING, EDDIE?

OH, I'M
DOING
BETTER.

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



OINK!

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 ANYTHING
IN YOUR **MOUSE** 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**.

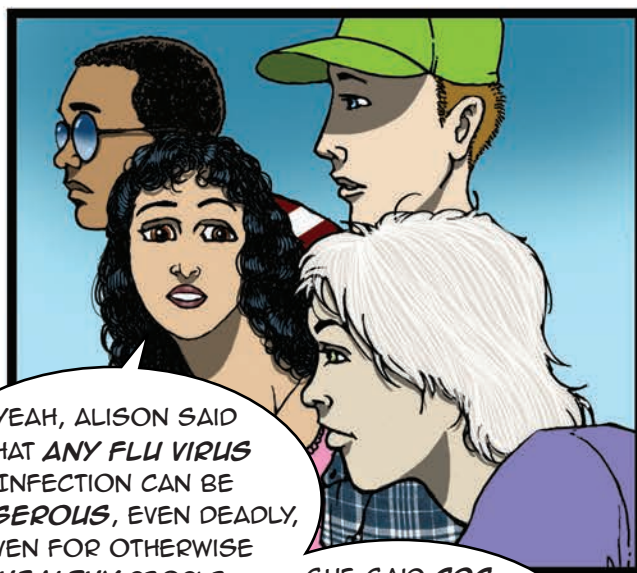
OH WOW! HOW OFTEN DO PEOPLE GET REALLY **SICK** FROM THESE VIRUSES, LIKE I DID?



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**...

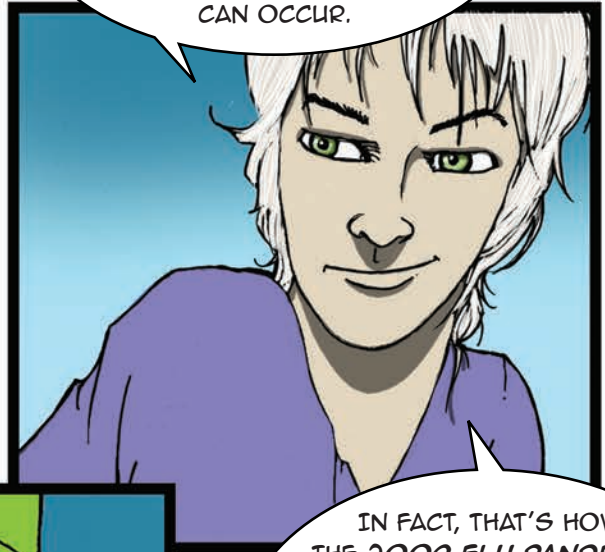


ON THAT POINT,
ALISON SAID THAT THEY
ALWAYS TRY TO INVESTIGATE
VARIANT VIRUS INFECTIONS TO
SEE IF THEY ARE SPREADING
FROM PERSON-TO-PERSON.

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.

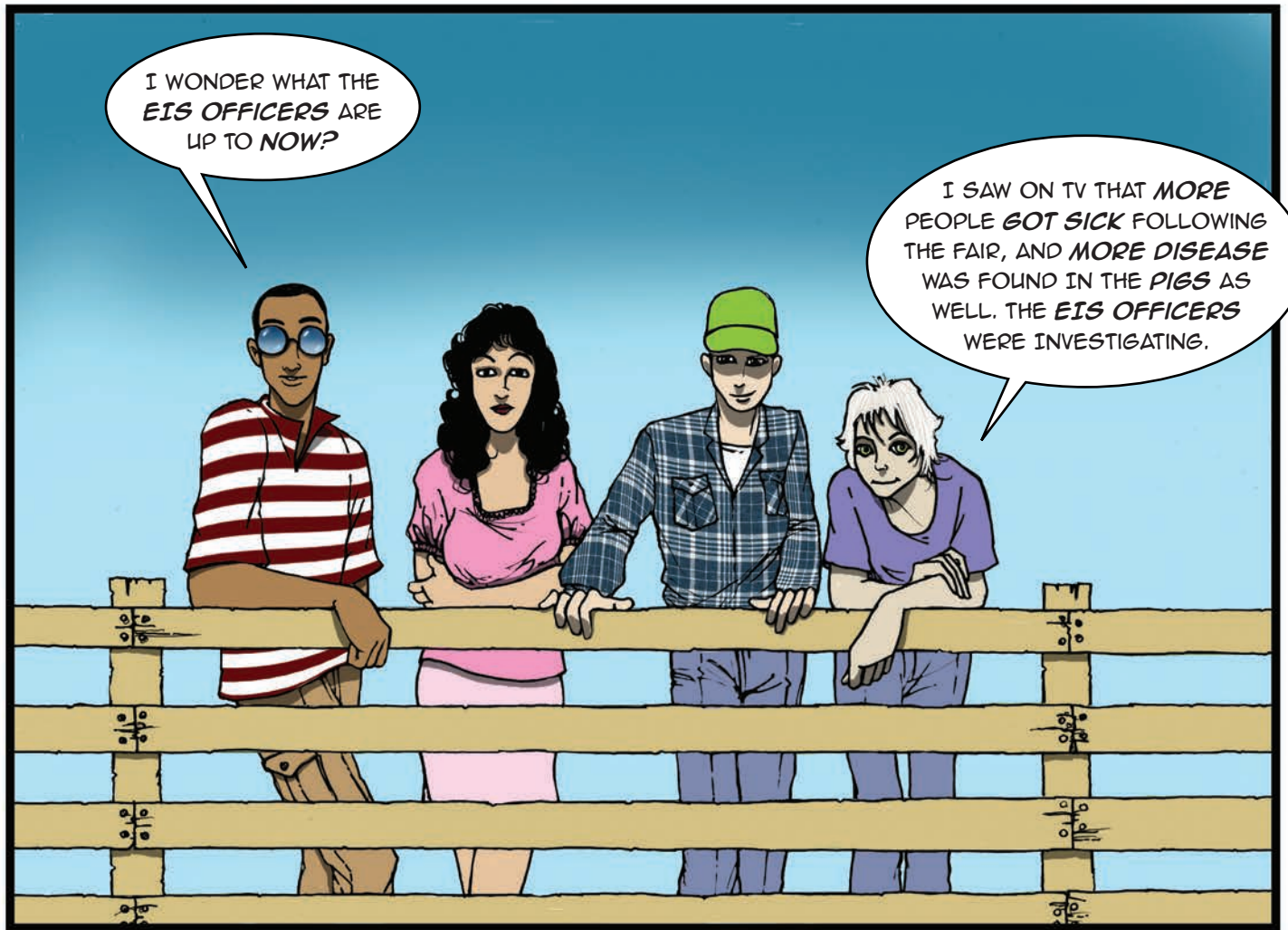


IN FACT, THAT'S HOW
THE **2009 FLU PANDEMIC**
OCCURRED. ALEX TOLD ME
THE 2009 **H1N1 VIRUS** HAD A
MIX OF GENES FROM **NORTH**
AMERICAN PIGS, **PIGS FROM**
EUROPE AND ASIA, **BIRDS**,
AND EVEN **HUMANS**.

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

Key Facts for People Exhibiting Pigs at Fairs:

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/

