The JUNIOR DISEASE DETECTIVES

OPERATION: OUTBREAK

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

USDA

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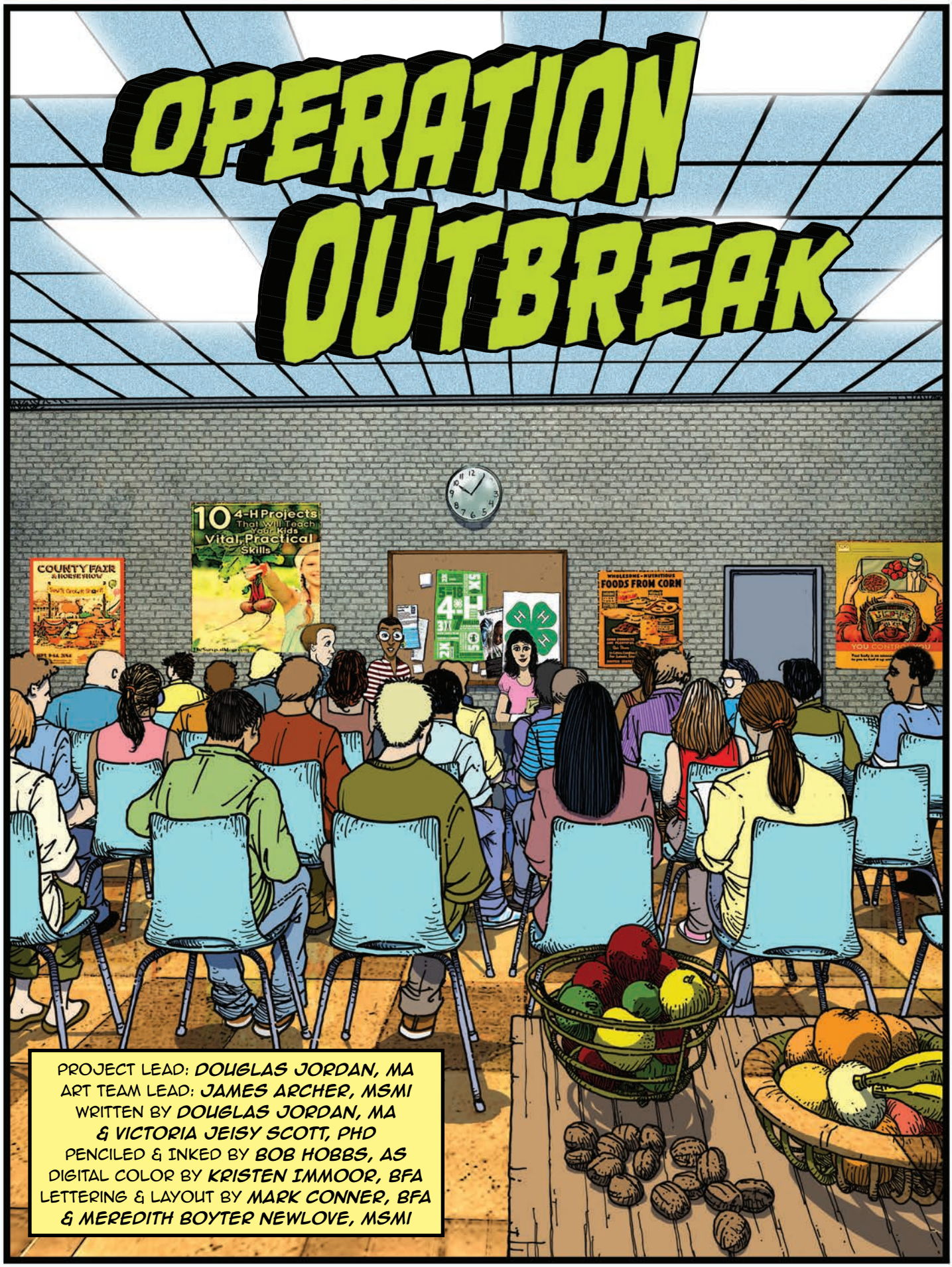
Foreword

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
COUNTY FAIR & HORSE SHOW
10 4-H Projects That Will Teach Your Kids Vital, Practical Skills
FOODS FROM CORN
PROJECT LEAD: DOUGLAS JORDAN, MA
ART TEAM LEAD: JAMES ARCHER, MSMI
WRITTEN BY DOUGLAS JORDAN, MA & VICTORIA JEISY SCOTT, PHD
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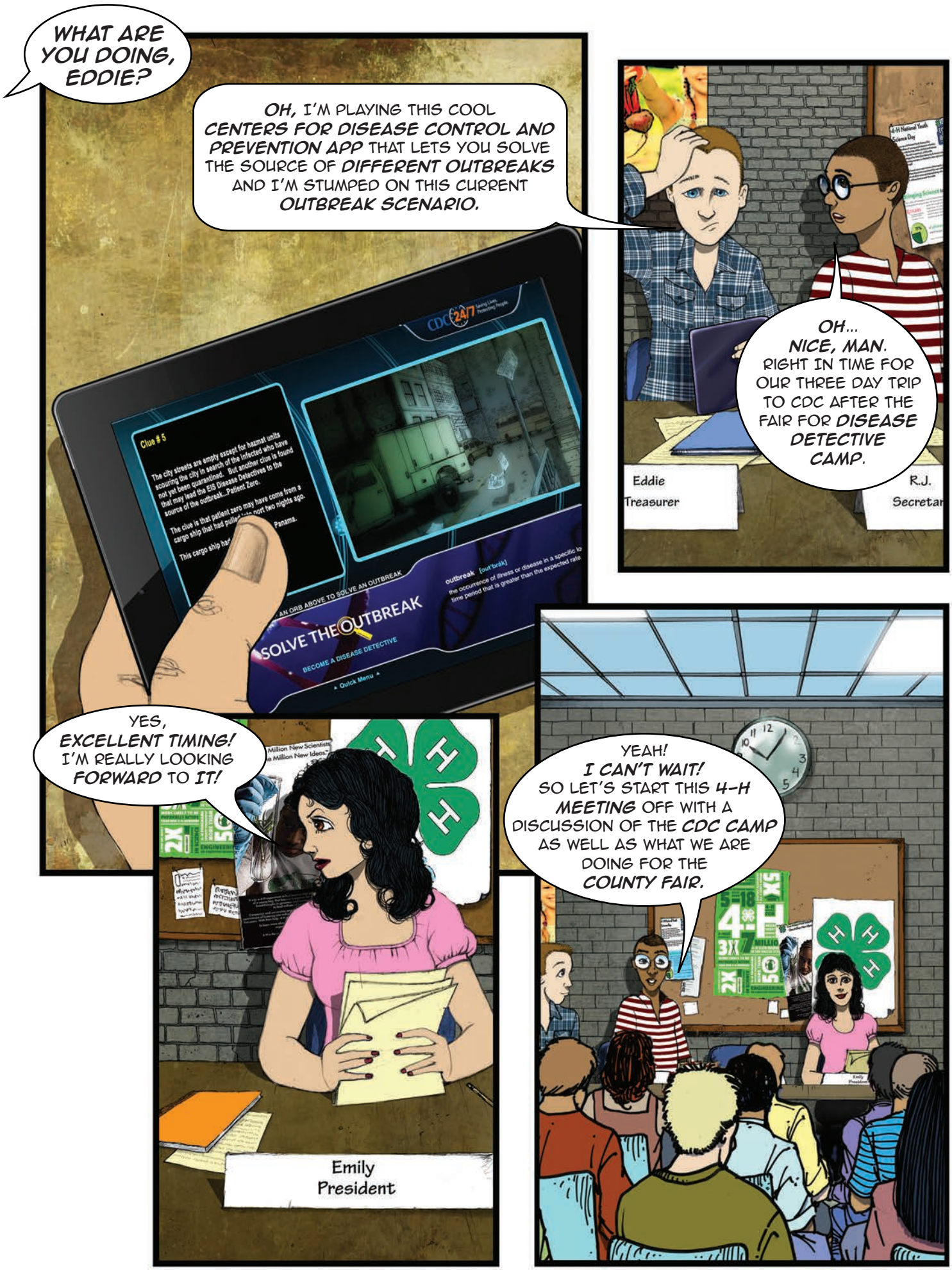

WHAT ARE YOU DOING, EDDIE?
OH, I'M PLAYING THIS COOL CENTERS FOR DISEASE CONTROL AND PREVENTION APP THAT LETS YOU SOLVE THE SOURCE OF DIFFERENT OUTBREAKS AND I'M STUMPED ON THIS CURRENT OUTBREAK SCENARIO.
Clue # 5
SOLVE THE OUTBREAK
BECOME A DISEASE DETECTIVE
OH... NICE, MAN. RIGHT IN TIME FOR OUR THREE DAY TRIP TO CDC AFTER THE FAIR FOR DISEASE DETECTIVE CAMP.
Eddie
Treasurer
R.J.
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...
ACME CTRONICS
BREAKING NEWS
CDC

City streets are largely deserted with the exception of locations near medical facilities.
SWOOOSSSSS
!HHHSS
WILL I MAKE IT IN TIME?

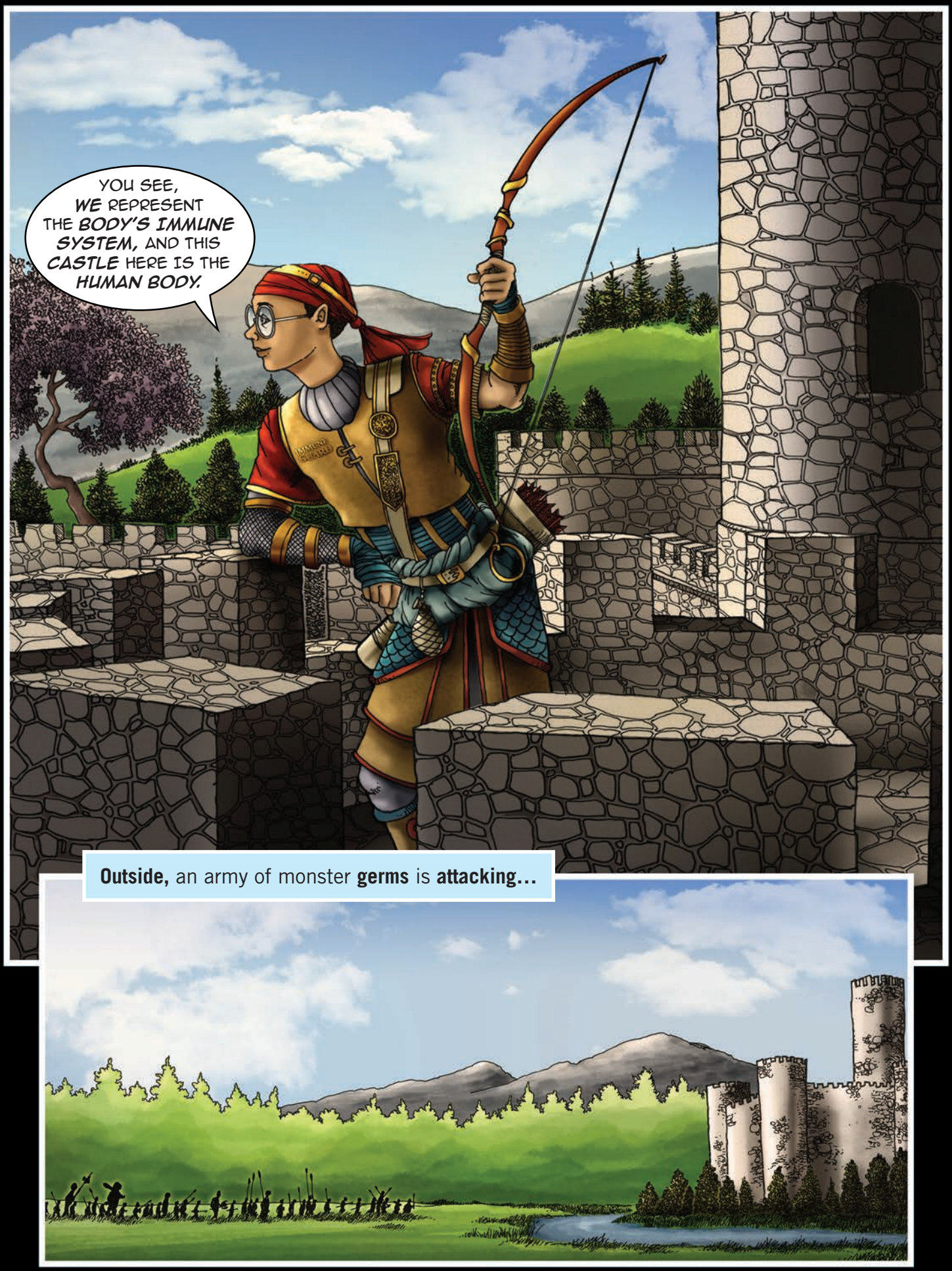
AND HERE I AM! JUST IN TIME TO DELIVER THE CURE FROM THE CDC!

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?
YEAH... WHAAAAAT?
OH R.J., HA! THIS IS NERDY, BUT I LIKE MY OUTFIT!
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!
IMMUNE GUARD


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.
INFLUENZA
MALARIA
TUBERCULOSIS
SALMONELLA
Your **immune cells** are constantly on the lookout for **invading germs.**

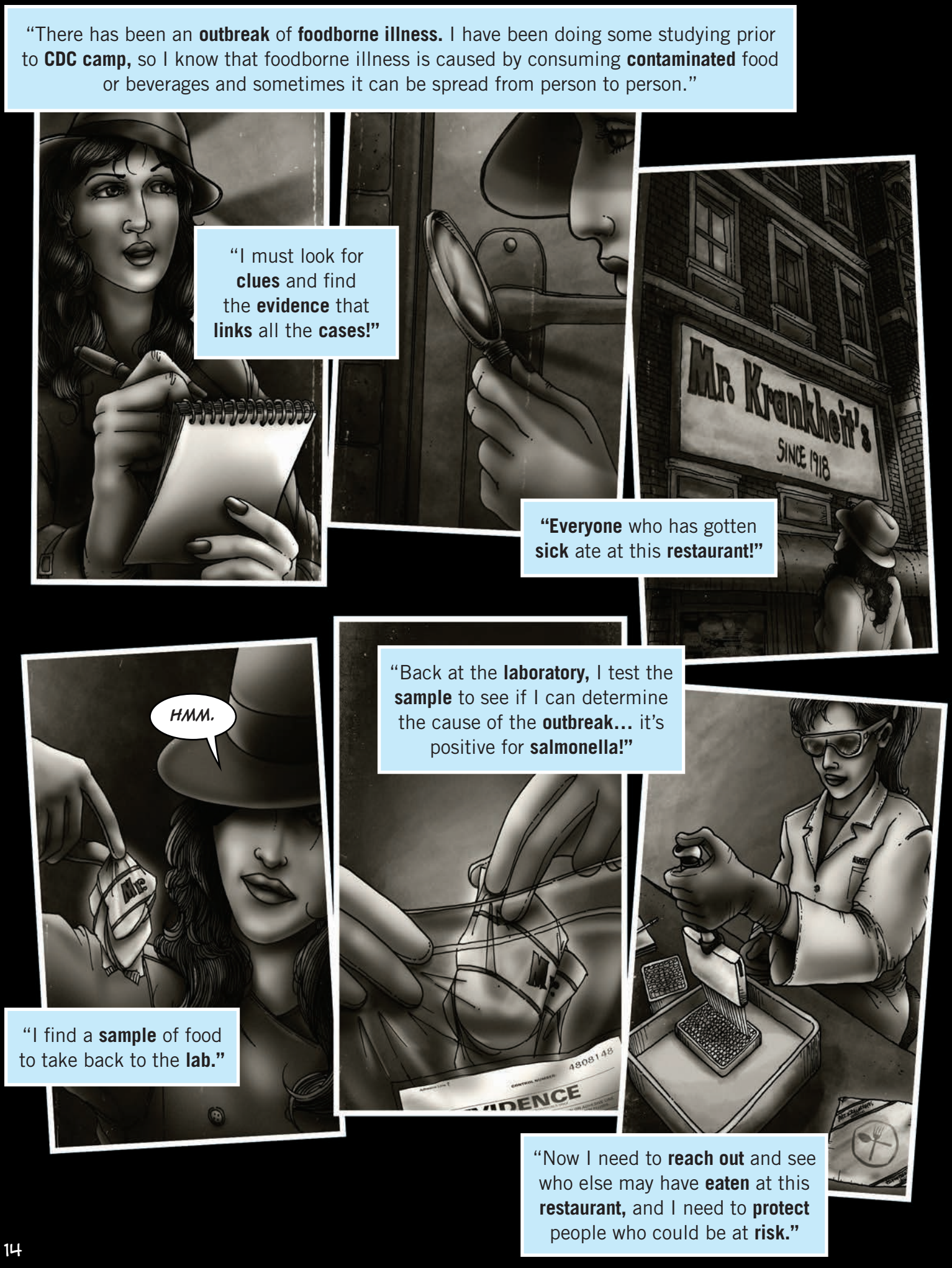
When **germs** are spotted and **recognized** by the **immune system,** we must leap into action to **fight** the **infection!**

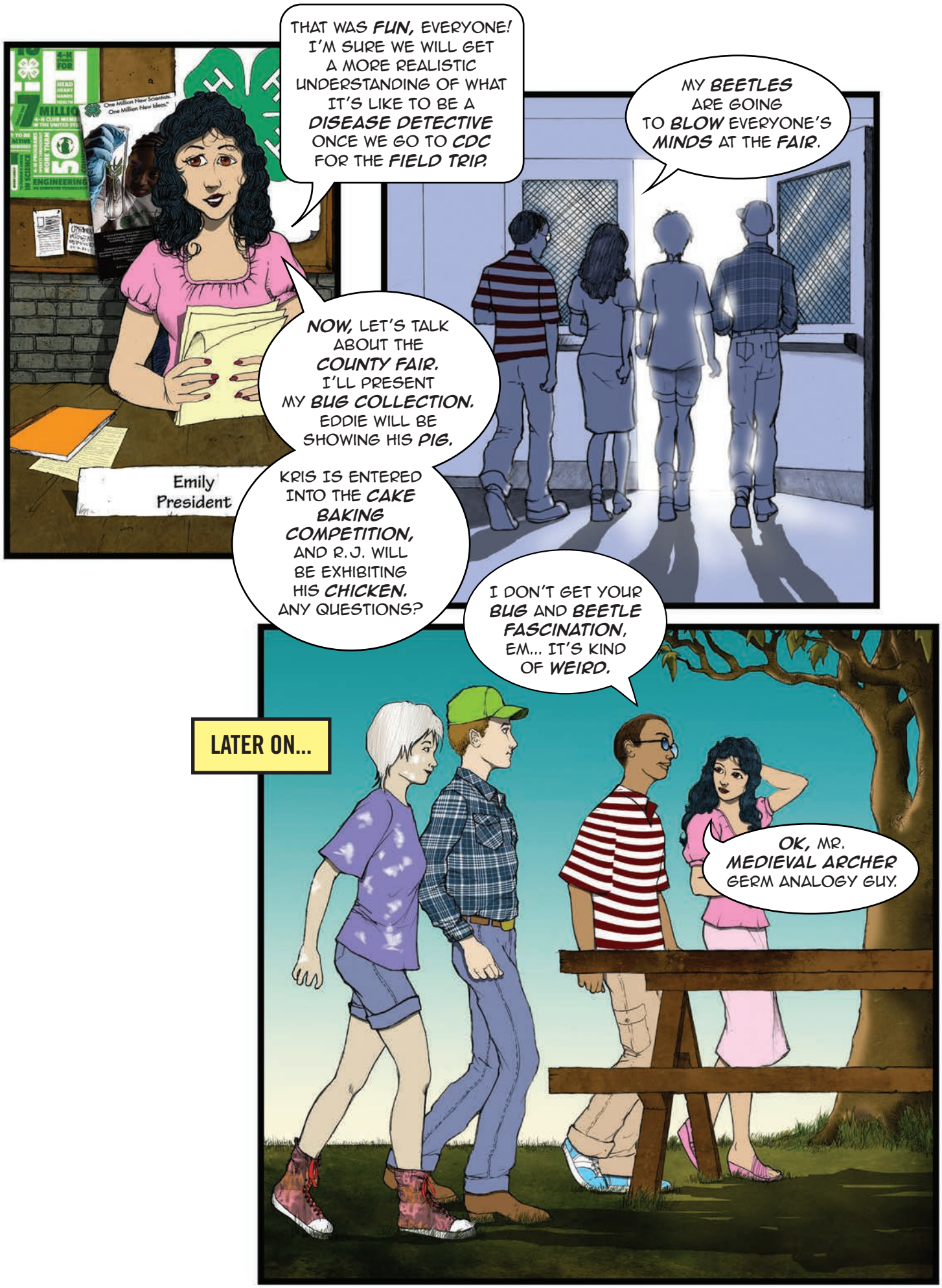
I THINK YOU ACTUALLY MANAGED TO PULL OFF THE PUBLIC HEALTH ANGLE!
SEE, I TOLD YOU GUYS IT WOULD MAKE SENSE BY THE END!
NICE, R.J.!
SORRY I'M LATE TO THE MEETING, I HAD A BAKING ACCIDENT.
NICE ENTRANCE. WHAT'S THAT ON YOUR FACE?
3X
MILLION
4-H CLUB MEMBERS IN THE UNITED STATES
MORE LIKELY TO BE PHYSICALLY ACTIVE THAN NON 4-H MEMBERS
I WAS PRACTICING BAKING A CAKE TO ENTER INTO THE CAKE COMPETITION AT THE FAIR, BUT I GOT FLOUR ALL OVER ME!
Kris
Vice Preside
HEY, AT LEAST YOU MADE IT INTO MY PUBLIC HEALTH VISION.

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...

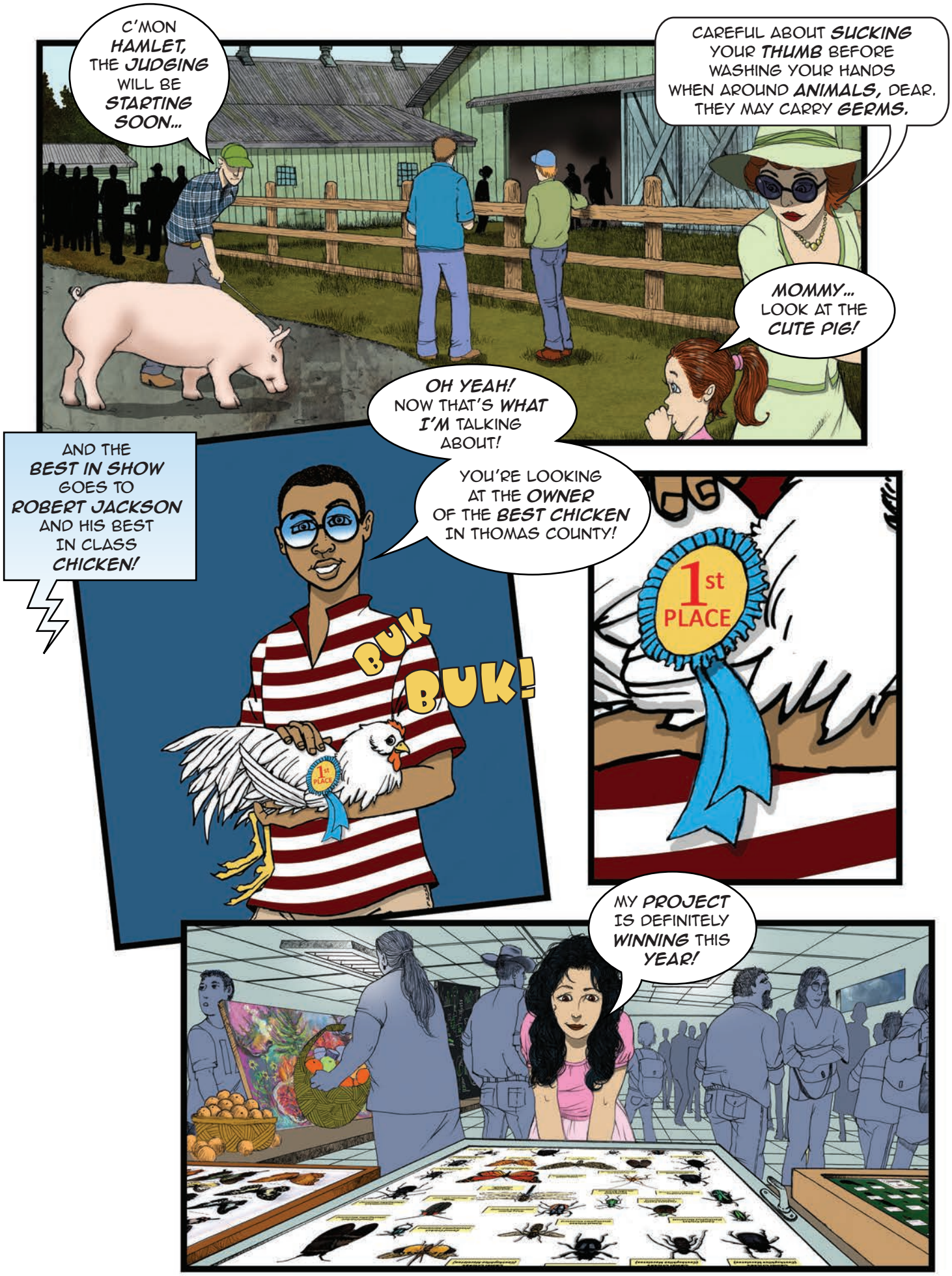
"The space station is full of people **infected** with an **alien virus,** but I am completely unaware."
"I am just going about my **business.** Little do I know that the space station is **contaminated** with the **virus.** Just by being in the environment, I'm being **exposed** to the **virus!"**
"If 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!"**
Mr. Krankheit's
SINCE 1918
"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!"**
4808148
"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?
Emily
President
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...
The THOMAS COUNTY FAIR
PARKING


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!
BUK BUK!
1st PLACE
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
3
5
FRIDAY NIGHT...
WELL, EDDIE... HOW DID HAMLET DO TODAY?
OK. HE WASN'T 100% BUT I THINK HE DID WELL ENOUGH TO IMPRESS THE JUDGES.
I ASKED THE FAIR VETERINARIAN TO LOOK AT HAMLET, JUST TO MAKE SURE HE WAS OK. WHAT CAN I SAY? I CARE ABOUT THE BIG FELLA.

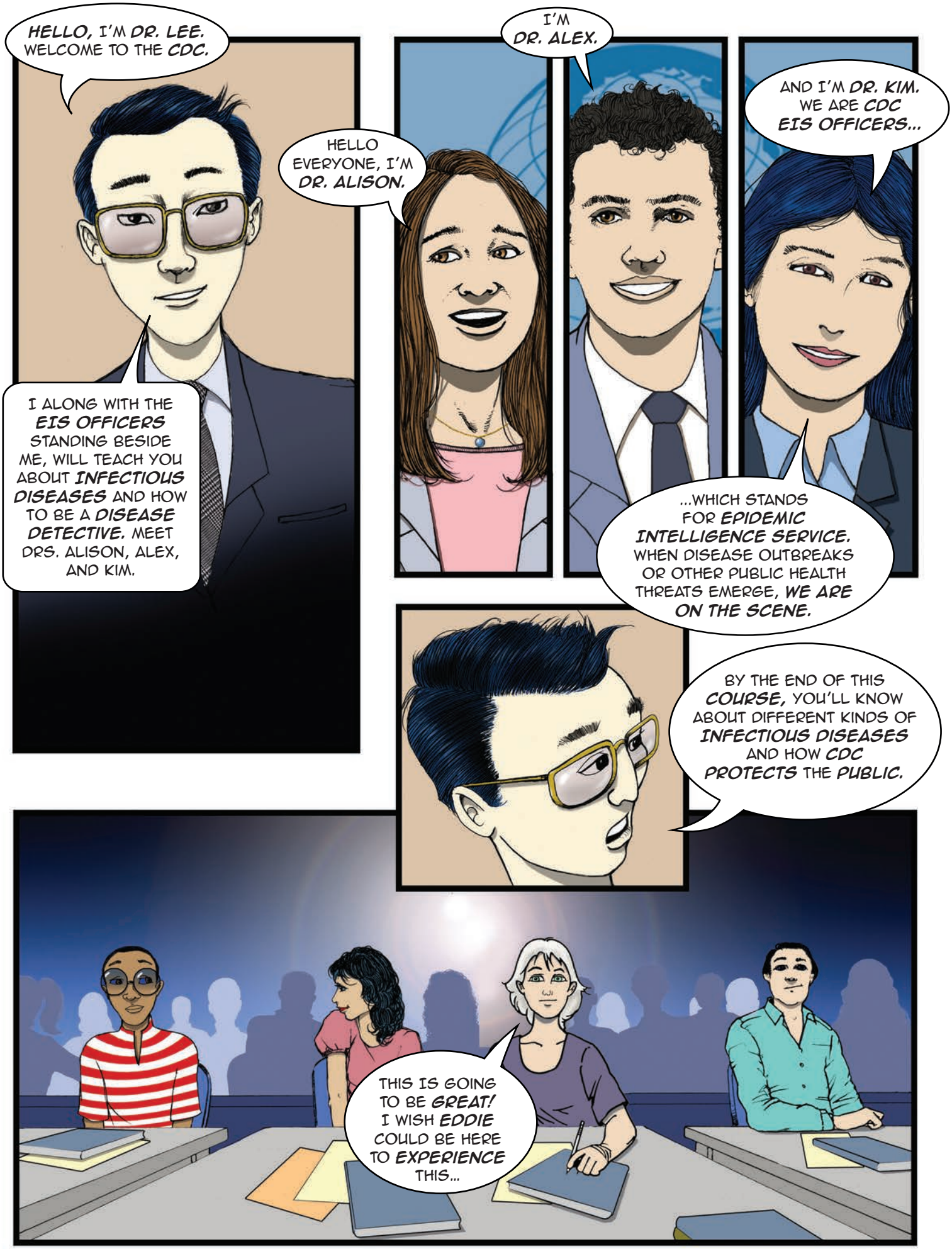
SAY, WHAT DO YOU THINK ABOUT GRABBING SOME FOOD? I'M FEELING LIKE A BURRITO.
OK, LET'S SEE IF I HAVE ANY MONEY.
AH, HERE WE GO! LET ME GUESS, I'M PAYING FOR YOU, TOO!
WOW, DOUBLING UP ON THE CORN DOGS, HUH?
DOUBLE THE DELICIOUSNESS. YOU KNOW YOU WISH YOU HAD ORDERED A CORN DOG!

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...
GRRR
EEEK!
L-LET'S GO TRY THE BUMPER CARS... OKAY?
HA!... I CAN'T BELIEVE THOSE TWO ARE REALLY SCARED!
Y-YES... LET'S...
COUGH!
COUGH!
MY ASTHMA IS KICKING IN, IT MAY BE THE FOG MACHINES IN HERE.
PUFF
ALL RIGHT, TIME FOR BUMPER CARS!
TEST YOUR LUCK

BUMPER CARS
WHEEEEEEEEE!!!
AWESOME! I LOVE BUMPER CARS!
WHOA... DUDE!
BLAM!
...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...
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...
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION
EDWARD R. ROYBAL CAMPUS
DEPARTMENT OF HEALTH & HUMAN SERVICES · USA
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 COULD'VE COME. HE WAS REALLY LOOKING FORWARD TO THIS...
VISITOR
Eddie Schwartz
207
NO.
EXPIRES:
YOU THINK HE'S STILL SICK FROM FRIDAY?
Disease
detectives


HELLO, I'M DR. LEE. WELCOME TO THE CDC.
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.
HELLO EVERYONE, I'M DR. ALISON.
I'M DR. ALEX.
AND I'M DR. KIM. WE ARE CDC EIS OFFICERS...
...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...

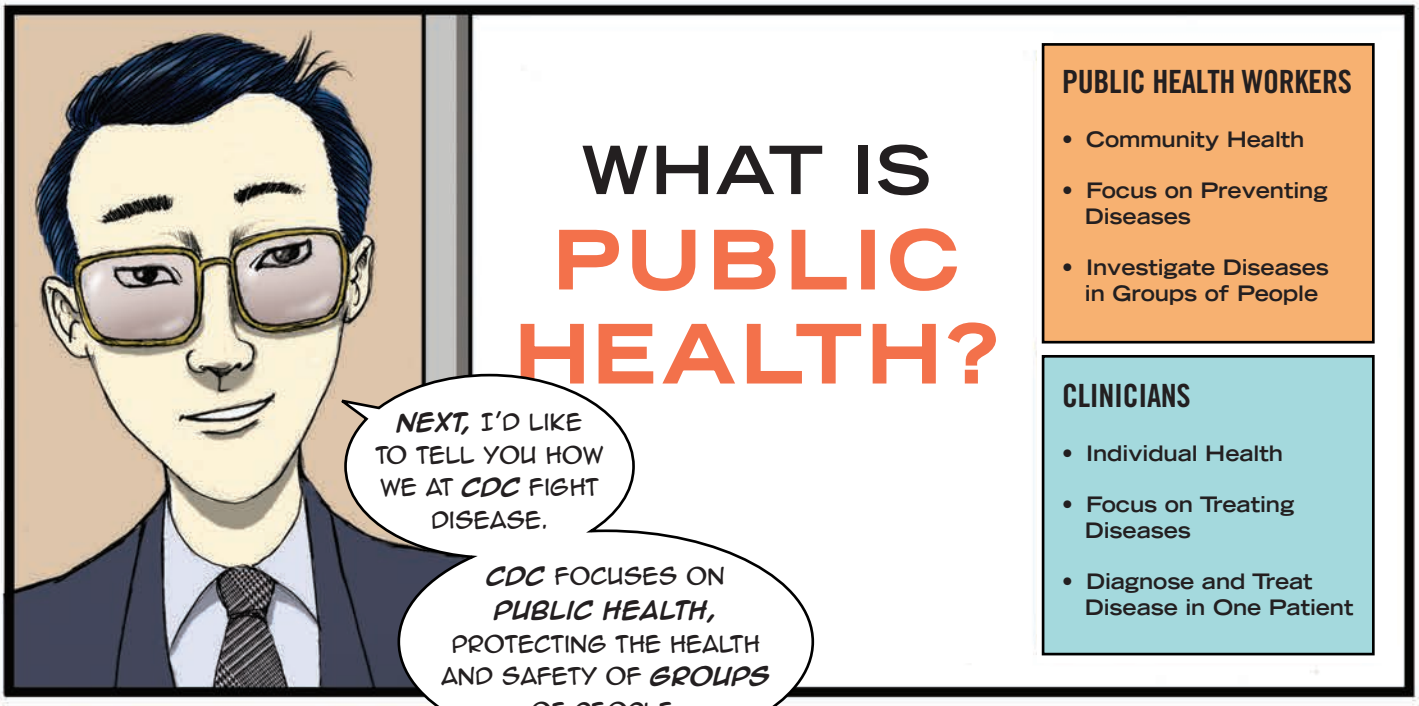
WHAT IS PUBLIC HEALTH?

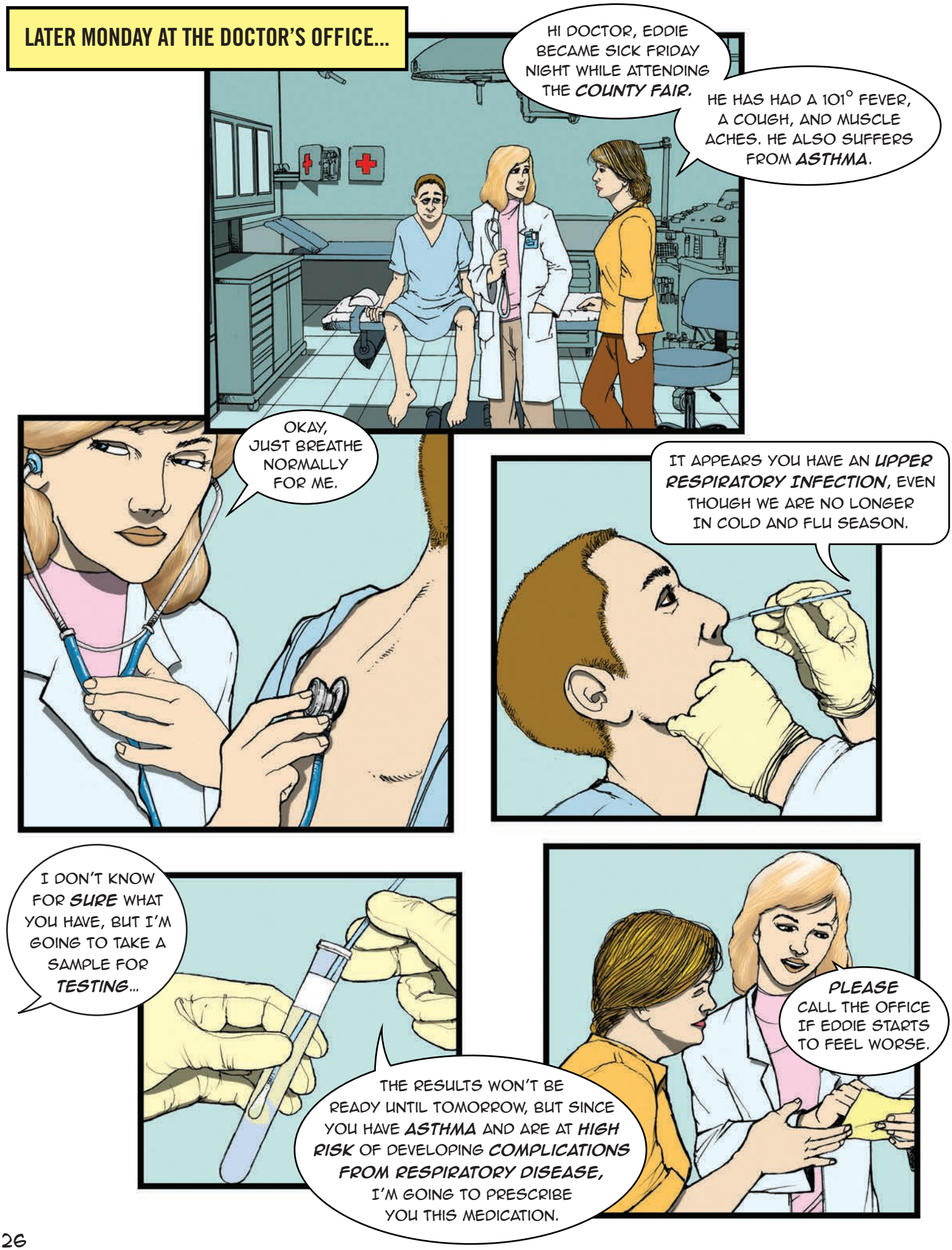
PUBLIC HEALTH WORKERS

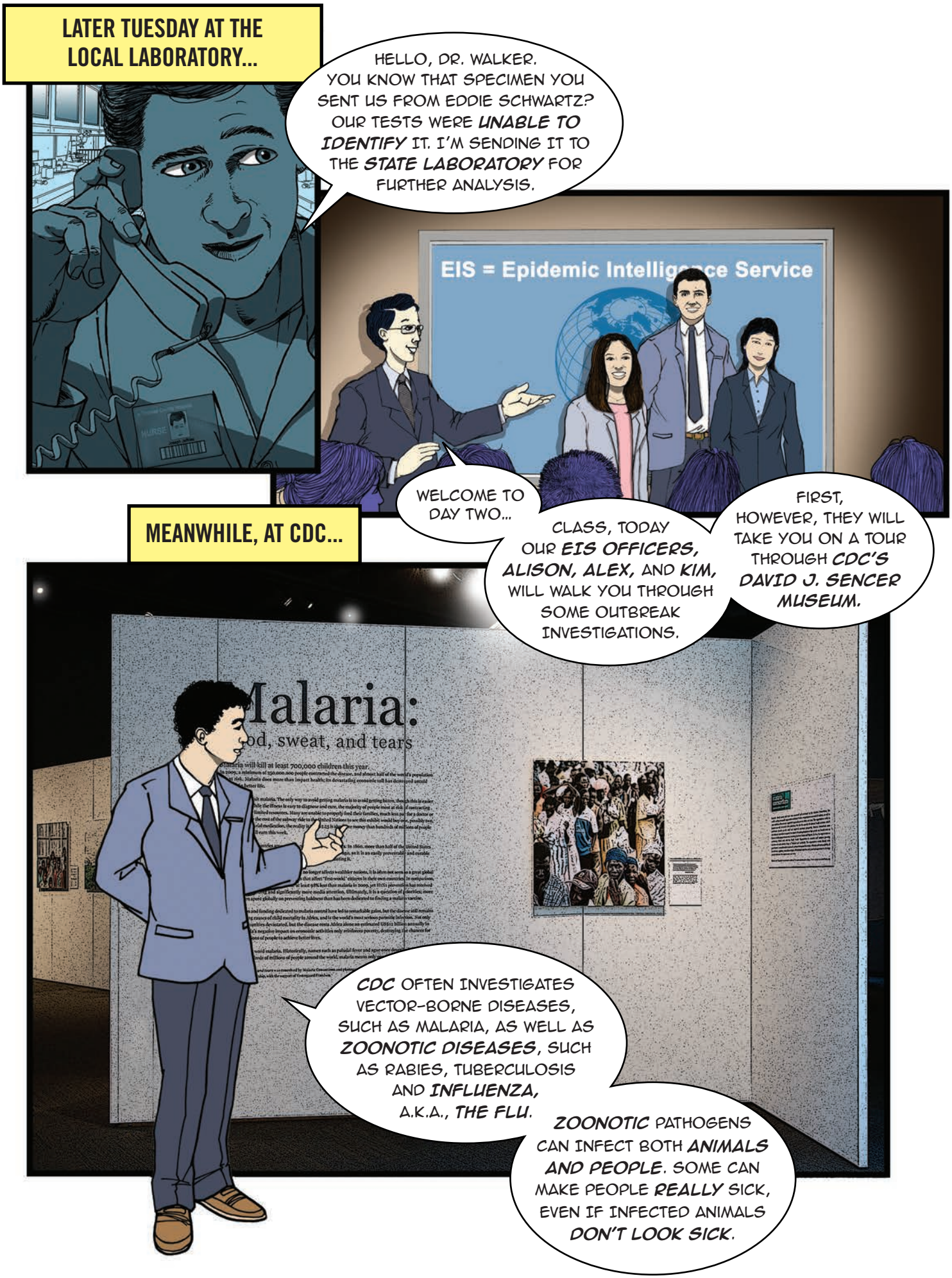
- Community Health
- Focus on Preventing Diseases
- Investigate Diseases in Groups of People

CLINICIANS

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




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.
EIS = Epidemic Intelligence Service
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.
MEANWHILE, AT CDC...
Malaria:
od, sweat, and tears
CDC OFTEN INVESTIGATES VECTOR-BORNE DISEASES, SUCH AS MALARIA, AS WELL AS ZOONOTIC DISEASES, SUCH AS RABIES, TUBERCULOSIS AND INFLUENZA, A.K.A., THE FLU.
ZOONOTIC PATHOGENS CAN INFECT BOTH ANIMALS AND PEOPLE. SOME CAN MAKE PEOPLE REALLY SICK, EVEN IF INFECTED ANIMALS DON'T LOOK SICK.

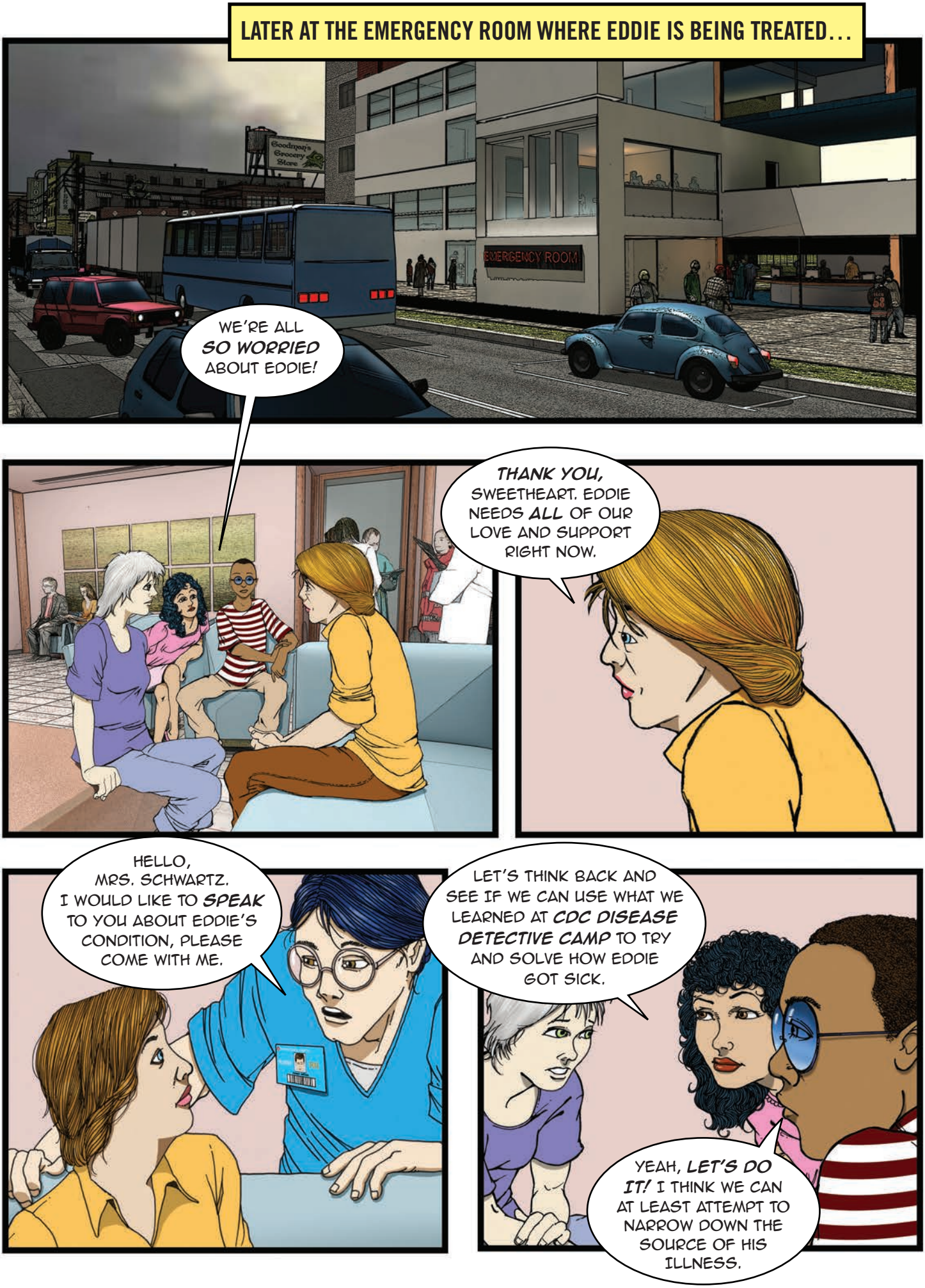
PEOPLE CAN GET ZOONOTIC DISEASES THROUGH CLOSE CONTACT WITH AN INFECTED ANIMAL, ITS ENVIRONMENT OR OTHER INFECTED PEOPLE.
MANY FOODBORNE DISEASES ARE ALSO ZOONOTIC IN ORIGIN.
FOOD PRODUCTION
PREVENTION FROM FARM TO TABLE
MAKING FOOD SAFER TO EAT
DO YOU THINK EDDIE COULD HAVE GOTTEN SICK FROM A FOODBORNE 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,
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.

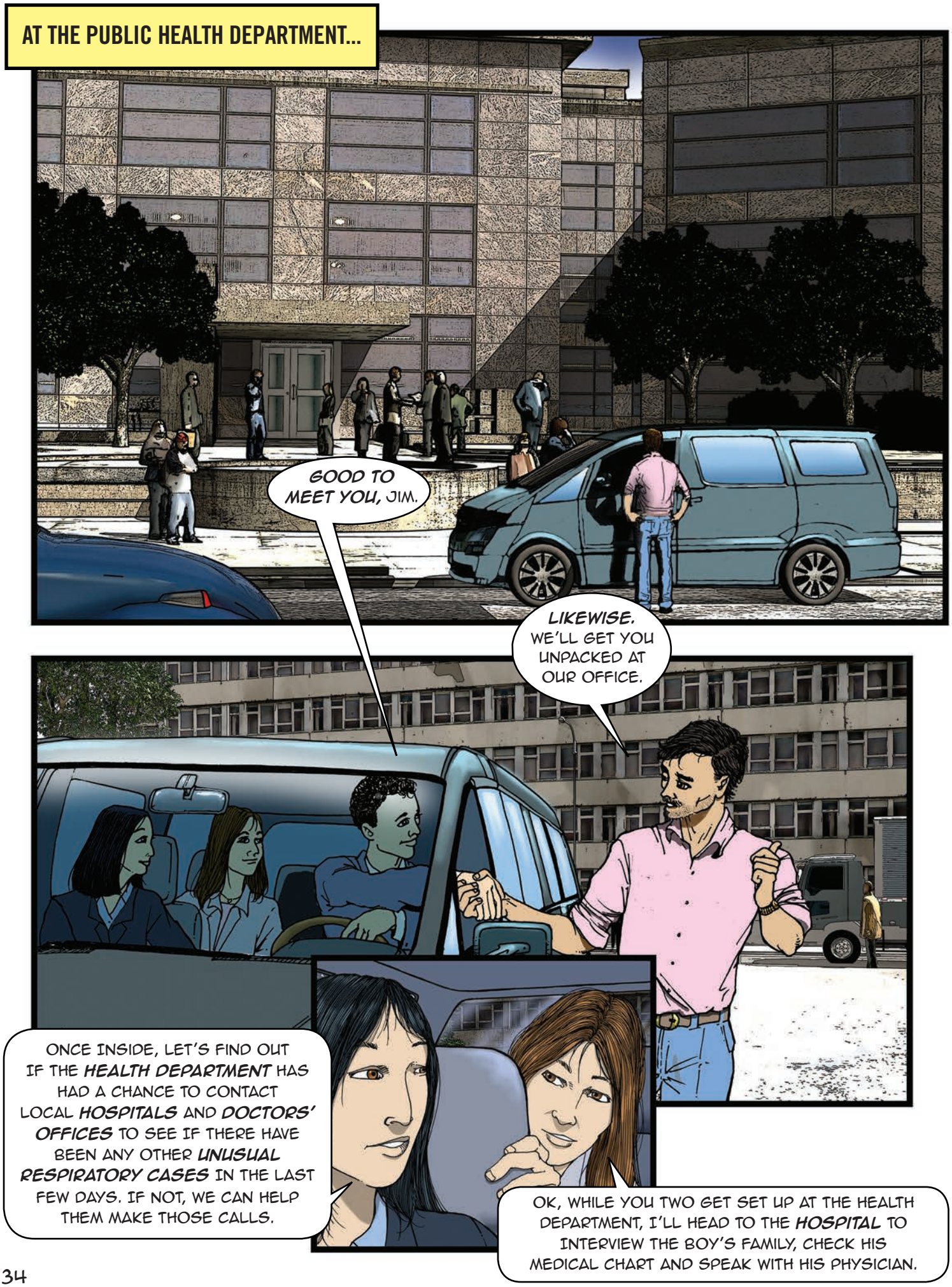
BACK AT EDDIE'S HOUSE...
EDDIE? WHAT'S WRONG?!
MOM, I FEEL WORSE.
I CAN'T... BREATHE...!
GASP
WEDNESDAY, EARLY MORNING...
EMERGENC

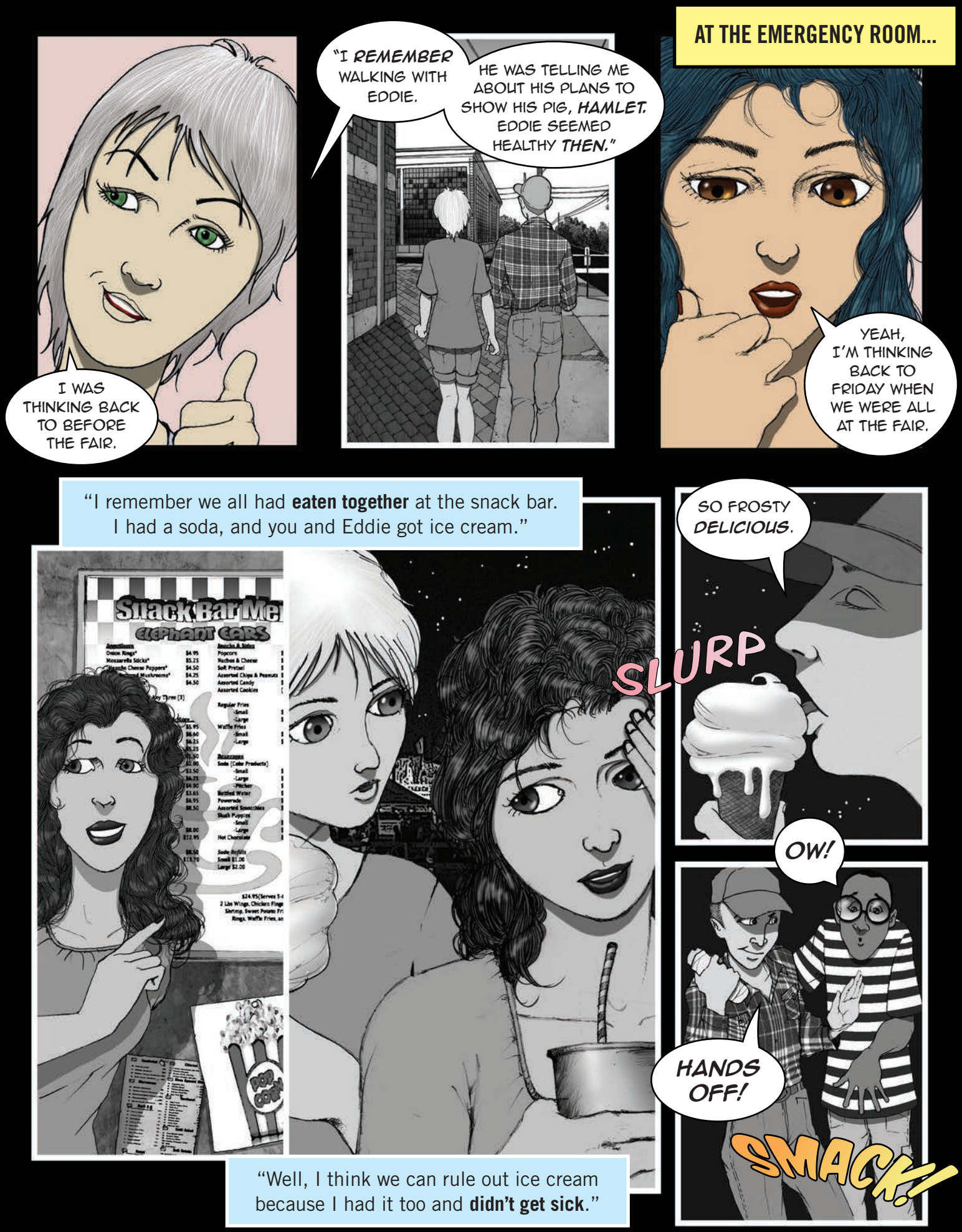
EDDIE? HOW ARE YOU FEELING?
EDDIE!!!
NOT RESPONSIVE AND BARELY BREATHING. WE MAY NEED TO INTUBATE HIM.
PULSE IS RAPID AND THREADY. LET'S GET HIM INTO ROOM #2. I'LL START A LINE.

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...
SOB
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.
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...

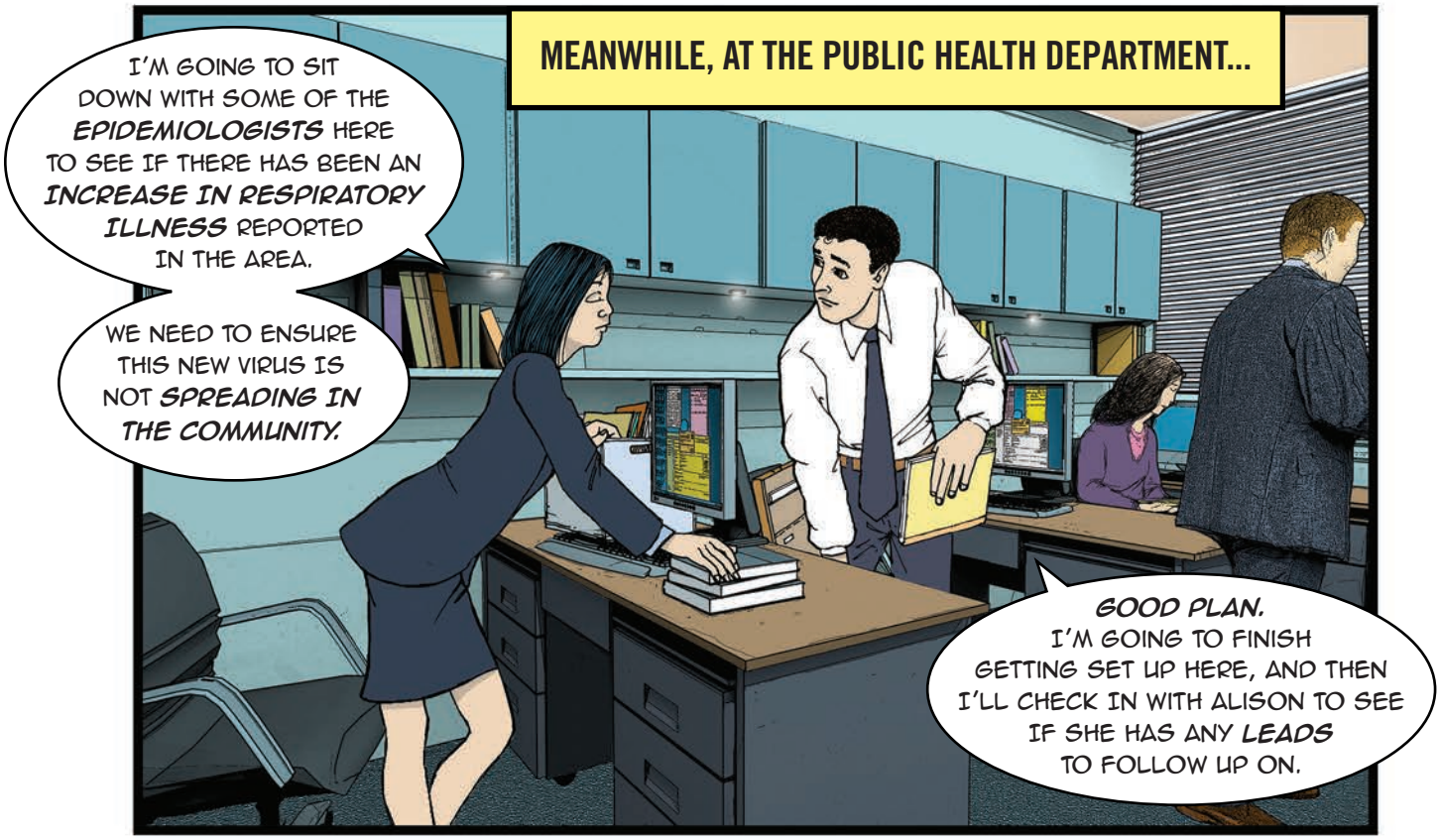
THE KIDS LEAVE CDC DISEASE DETECTIVE CAMP...
WHEN WE GET HOME, LET'S MEET UP WITH KRIS. SHE'S AT THE HOSPITAL WITH EDDIE.
LET'S SEE HOW HE IS DOING AND LEND HIM OUR SUPPORT.
I'M IN 100 PERCENT!
LET'S DISCUSS THE CASE DURING THE DRIVE. WE WILL DRIVE STRAIGHT TO THOMAS COUNTY.
SHORTLY AFTER...
FROM THERE, WE'LL MEET UP WITH REPRESENTATIVES FROM THE STATE PUBLIC HEALTH DEPARTMENT AND THE STATE VETERINARIAN'S OFFICE TO DISCUSS NEXT STEPS.
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...
Goodman's Grocery Store
EMERGENCY ROOM
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.

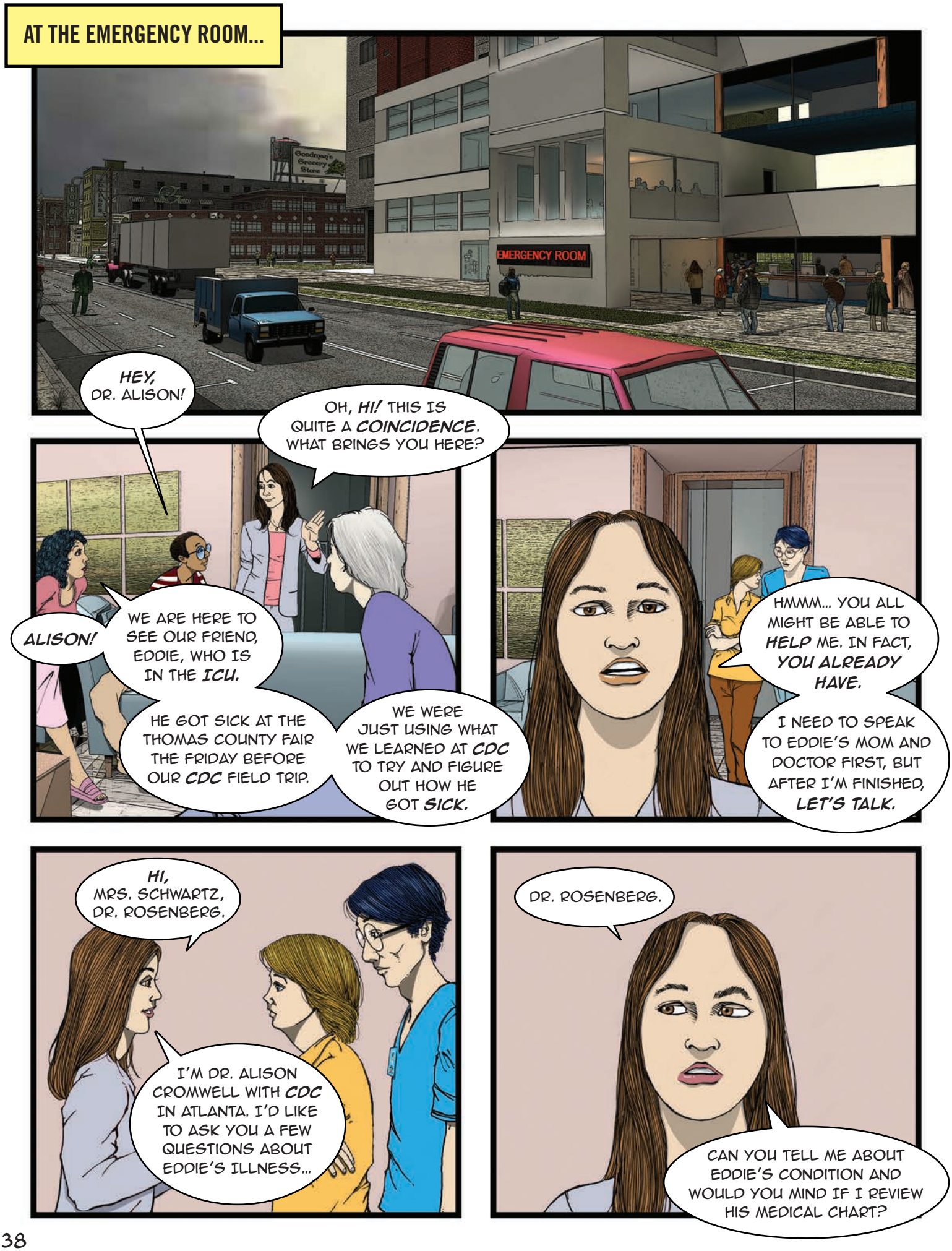

AT THE PUBLIC HEALTH DEPARTMENT...
GOOD TO MEET YOU, JIM.
LIKEWISE. WE'LL GET YOU UNPACKED AT OUR OFFICE.
ONCE INSIDE, LET'S FIND OUT IF THE HEALTH DEPARTMENT HAS HAD A CHANCE TO CONTACT LOCAL HOSPITALS AND DOCTORS' OFFICES TO SEE IF THERE HAVE BEEN ANY OTHER UNUSUAL RESPIRATORY CASES IN THE LAST FEW 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.

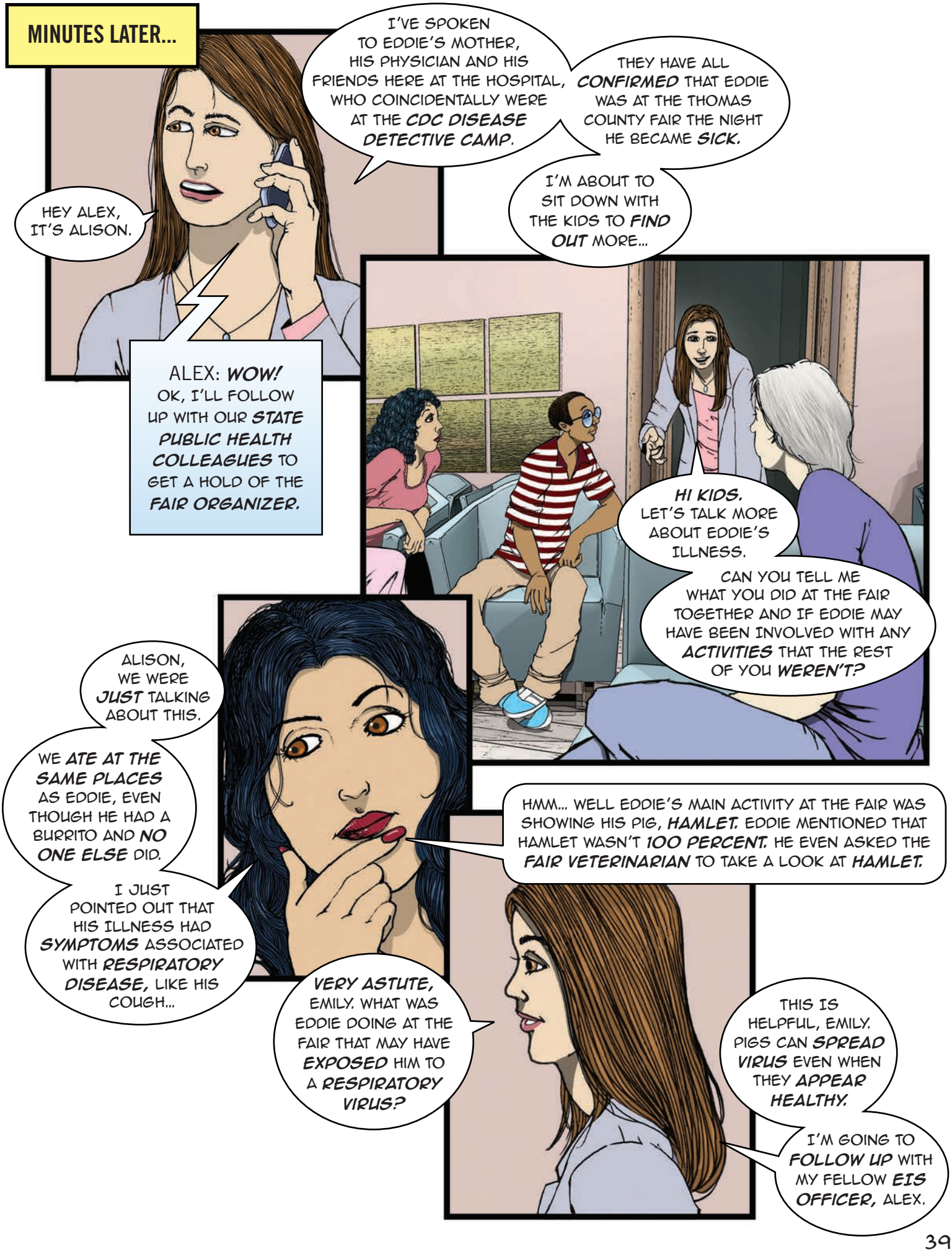

I WAS THINKING BACK TO BEFORE THE FAIR.
"I REMEMBER WALKING WITH EDDIE.
HE WAS TELLING ME ABOUT HIS PLANS TO SHOW HIS PIG, HAMLET. EDDIE SEEMED HEALTHY THEN."
AT THE EMERGENCY ROOM...
YEAH, I'M THINKING BACK TO FRIDAY WHEN WE WERE ALL AT THE FAIR.
"I remember we all had **eaten together** at the snack 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**."

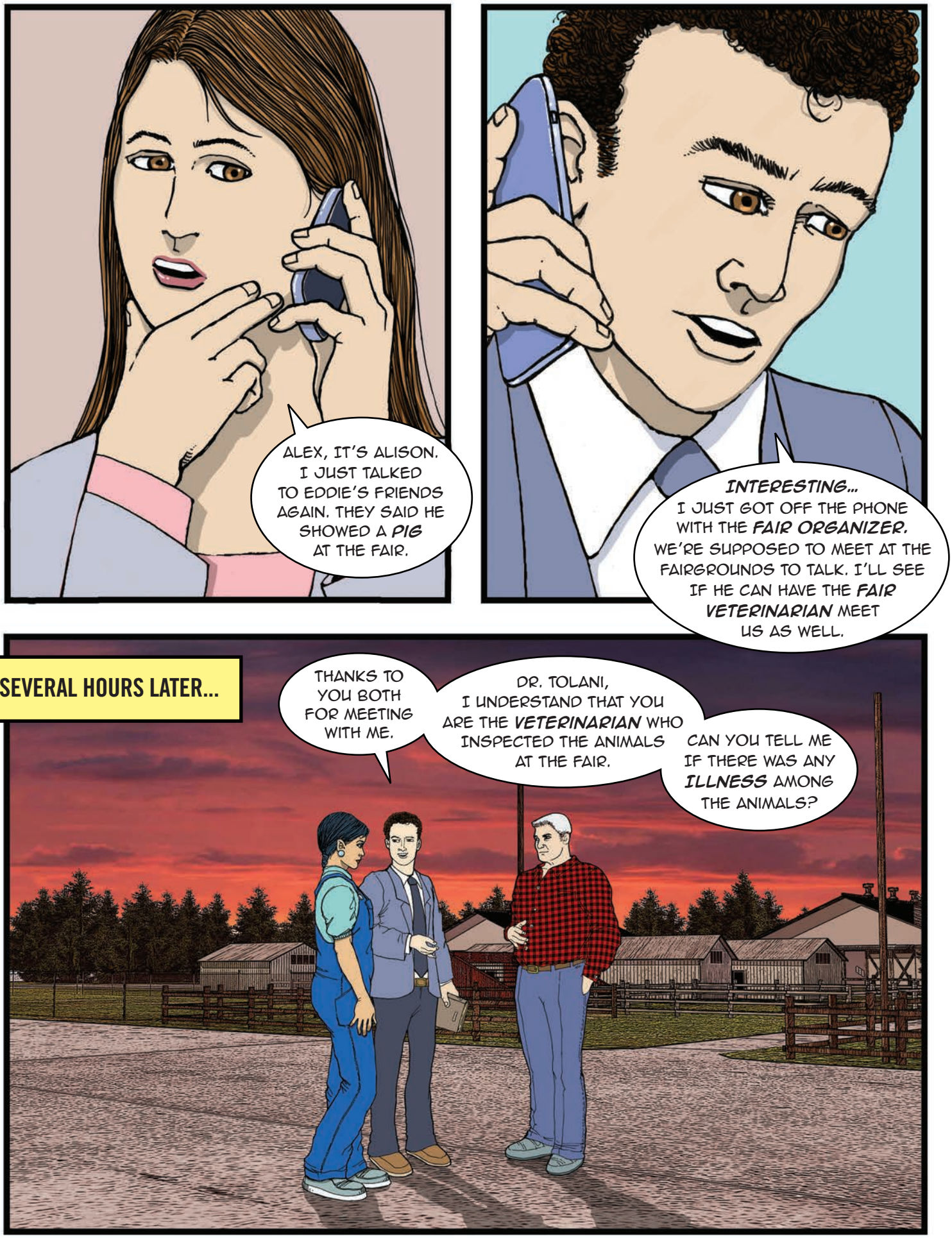
KRIS: "Yeah, he was the only one of us to eat a **burrito**."
R.J.: "Yeah, I was **doubling down** on corn dogs, but I didn't get sick."


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.

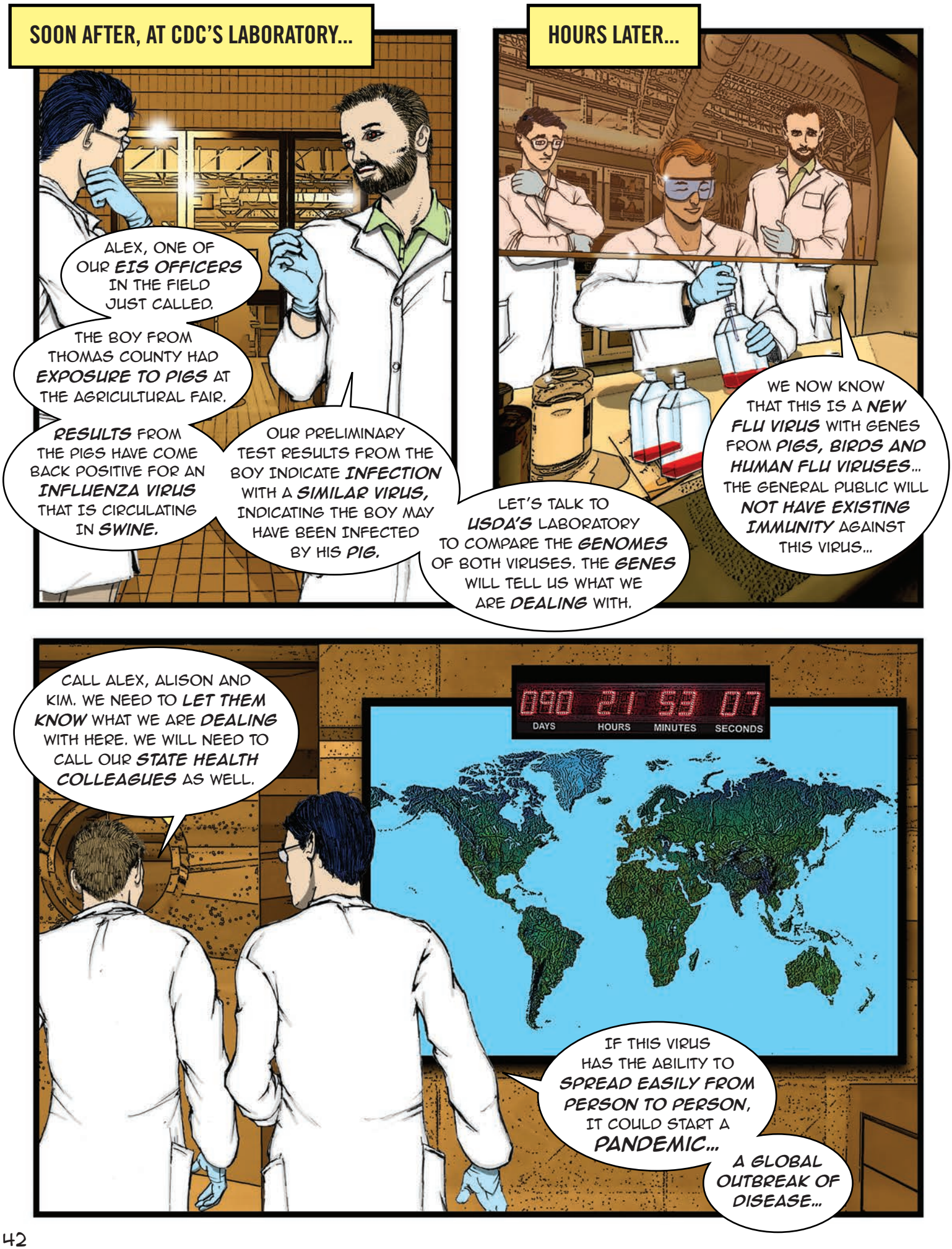
BACK AT THE EMERGENCY ROOM...
OK, I HAVE TO THINK LIKE A DISEASE DETECTIVE!
HMMM...
EVEN THOUGH EDDIE ATE A BURRITO AND THREW UP ON THE NIGHT OF THE FAIR, HIS ILLNESS HAS MAINLY HAD RESPIRATORY SYMPTOMS, LIKE COUGH, DIFFICULTY BREATHING, AND FEVER.
IT SOUNDS LIKE A RESPIRATORY VIRUS, WHICH ISN'T SOMETHING THAT HE WOULD HAVE GOTTEN FROM FOOD.
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?
HOST
PATHOGEN
"NOW LET'S TALK ABOUT HOW YOUR IMMUNE SYSTEM FIGHTS INFECTION."
I REMEMBER ALEX TALKING ABOUT ZOONOTIC DISEASES IN THE CDC MUSEUM.


AT THE EMERGENCY ROOM...
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?

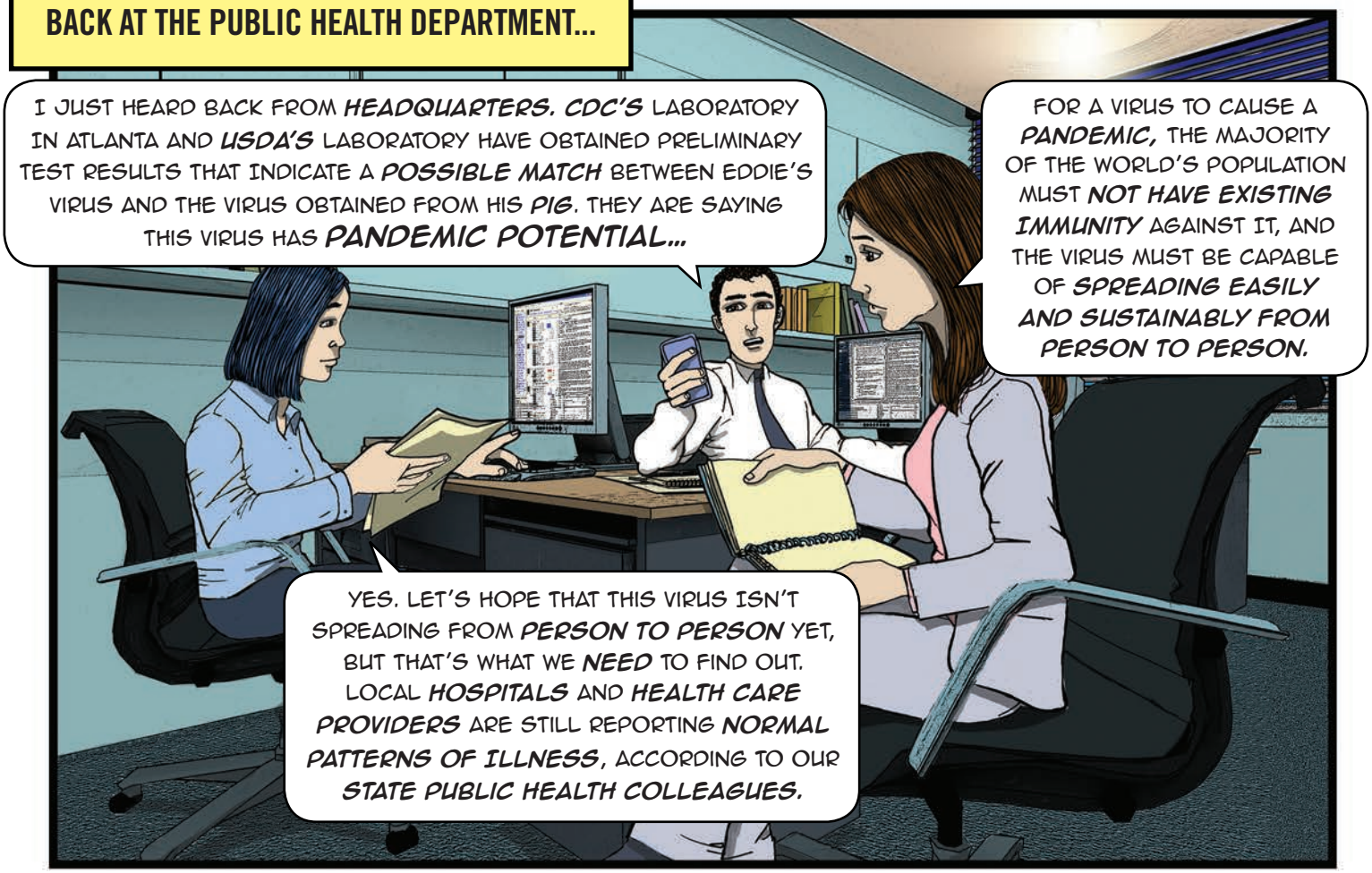

MINUTES LATER...
HEY ALEX, IT'S ALISON.
I'VE SPOKEN TO EDDIE'S MOTHER, HIS PHYSICIAN AND HIS FRIENDS HERE AT THE HOSPITAL, WHO COINCIDENTALLY WERE AT THE CDC DISEASE DETECTIVE CAMP.
THEY HAVE ALL CONFIRMED THAT EDDIE WAS AT THE THOMAS COUNTY FAIR THE NIGHT HE BECAME SICK.
I'M ABOUT TO SIT DOWN WITH THE 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...
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.
VERY ASTUTE, EMILY. WHAT WAS EDDIE DOING AT THE FAIR THAT MAY HAVE EXPOSED HIM TO A RESPIRATORY VIRUS?
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.

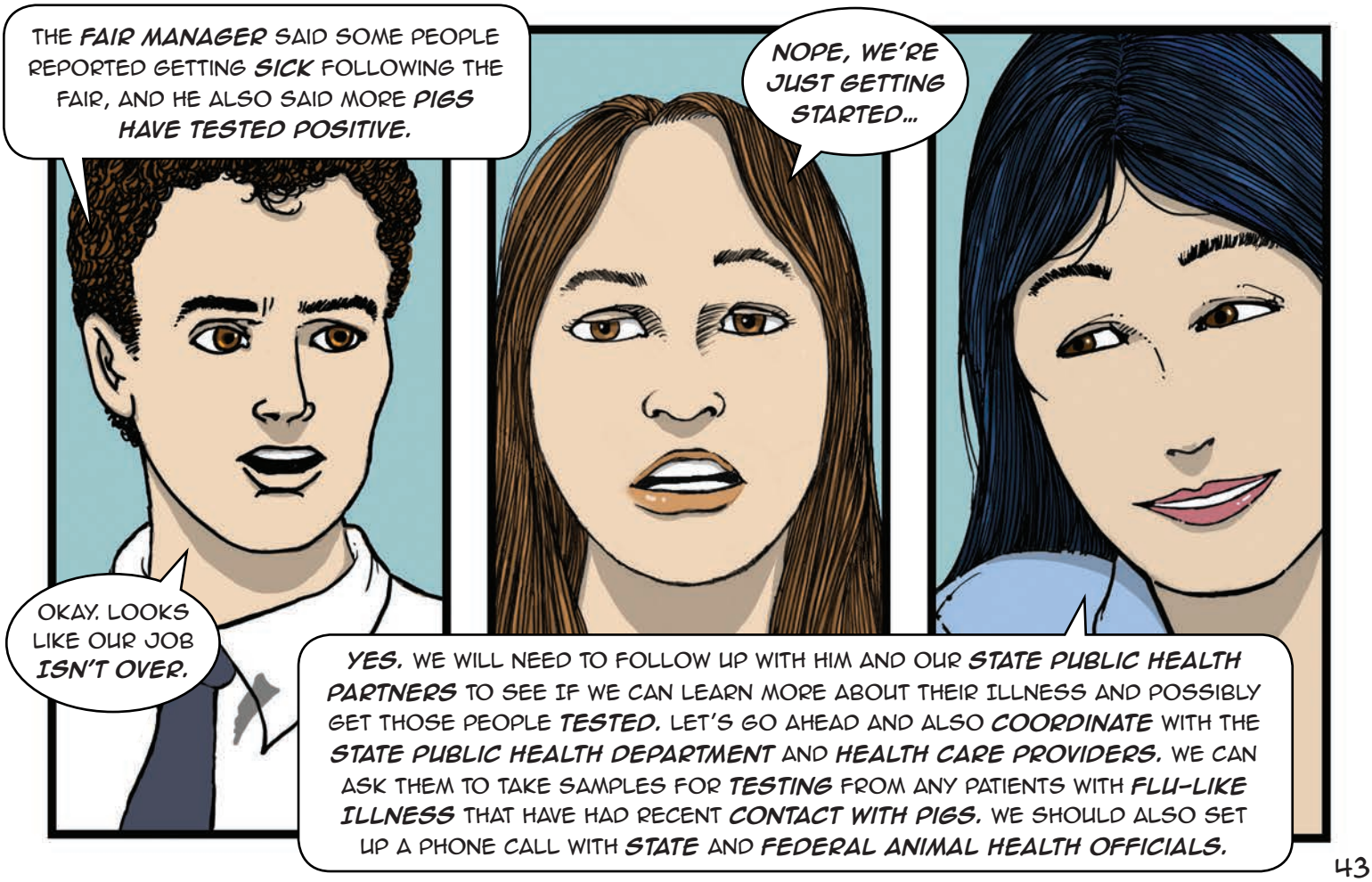

ALEX, IT'S ALISON. I JUST TALKED TO EDDIE'S FRIENDS AGAIN. THEY SAID HE SHOWED A PIG AT THE FAIR.
INTERESTING... I JUST GOT OFF THE PHONE WITH THE FAIR ORGANIZER. WE'RE SUPPOSED TO MEET AT THE FAIRGROUNDS TO TALK. I'LL SEE IF HE CAN HAVE THE FAIR VETERINARIAN MEET US AS WELL.
SEVERAL HOURS LATER...
THANKS 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?

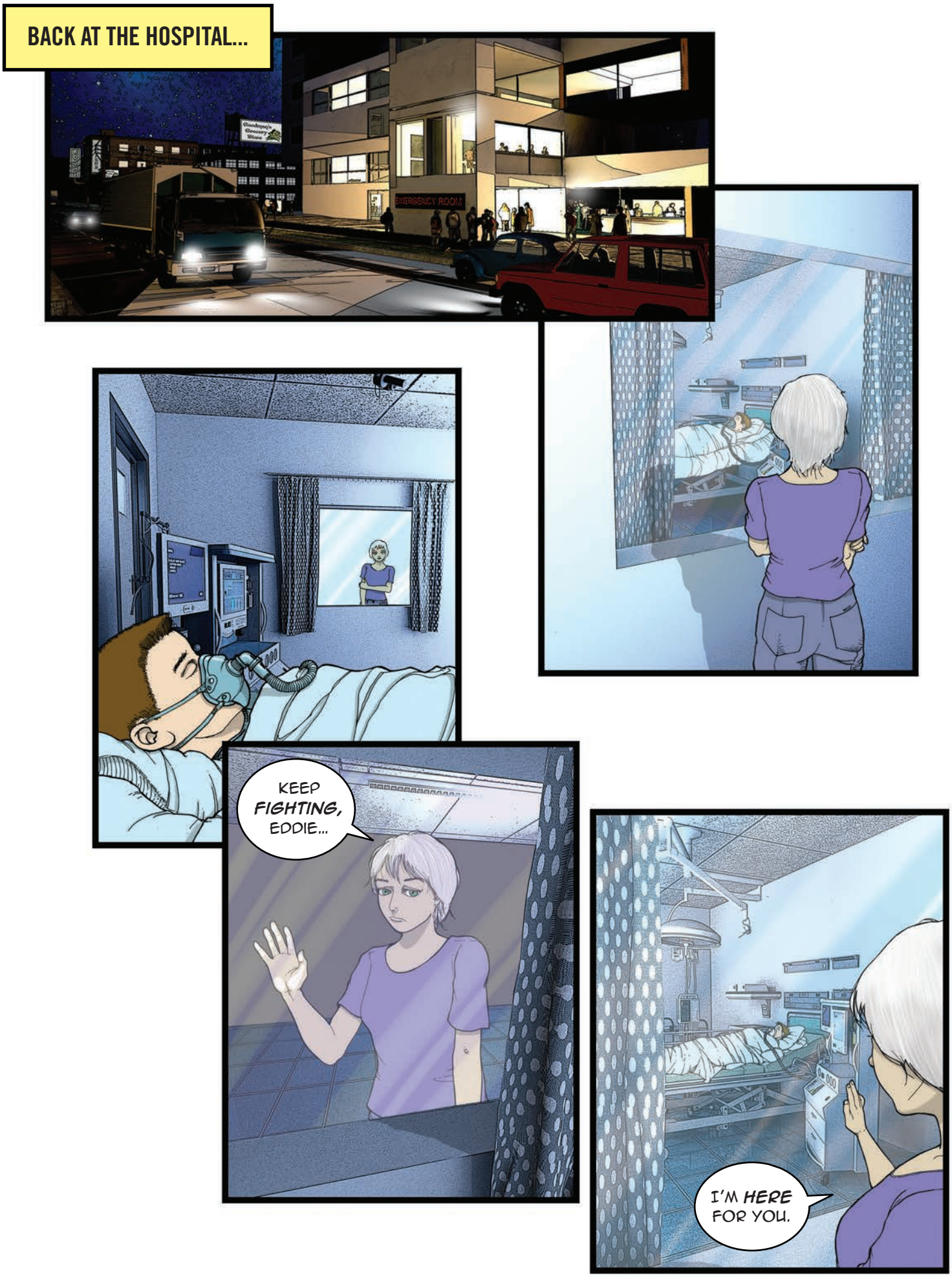
WELL, WE HAD THREE HORSES WITH COLIC AND A FEW CASES OF RINGWORM IN THE COWS.
WHEN I EXAMINED THE PIGS, A FEW HAD A MILD FEVER.
I TOOK SAMPLES FROM THEM, WHICH ARE CURRENTLY BEING TESTED AT THE STATE ANIMAL HEALTH LABORATORY.
DR TOLANI
GREAT WORK! I'M INTERESTED TO KNOW THE RESULTS OF THOSE TESTS.
ANDY, 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.
DR TOLANI
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.
HOURS LATER...
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.
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...



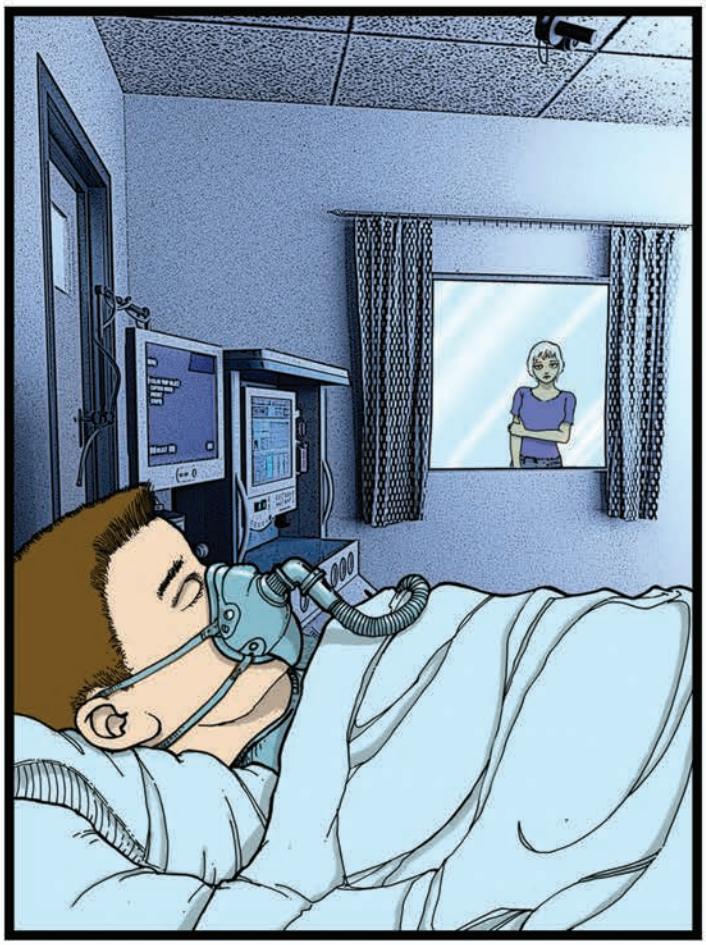


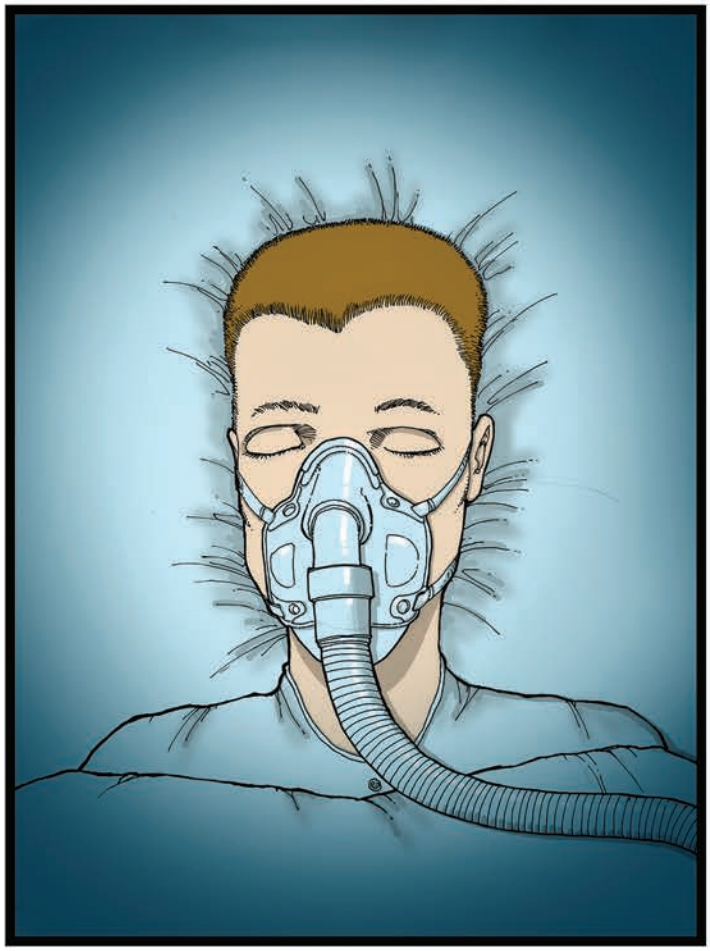

BACK AT THE HOSPITAL...
EMERGENCY ROOM
KEEP FIGHTING, EDDIE...
I'M HERE FOR YOU.

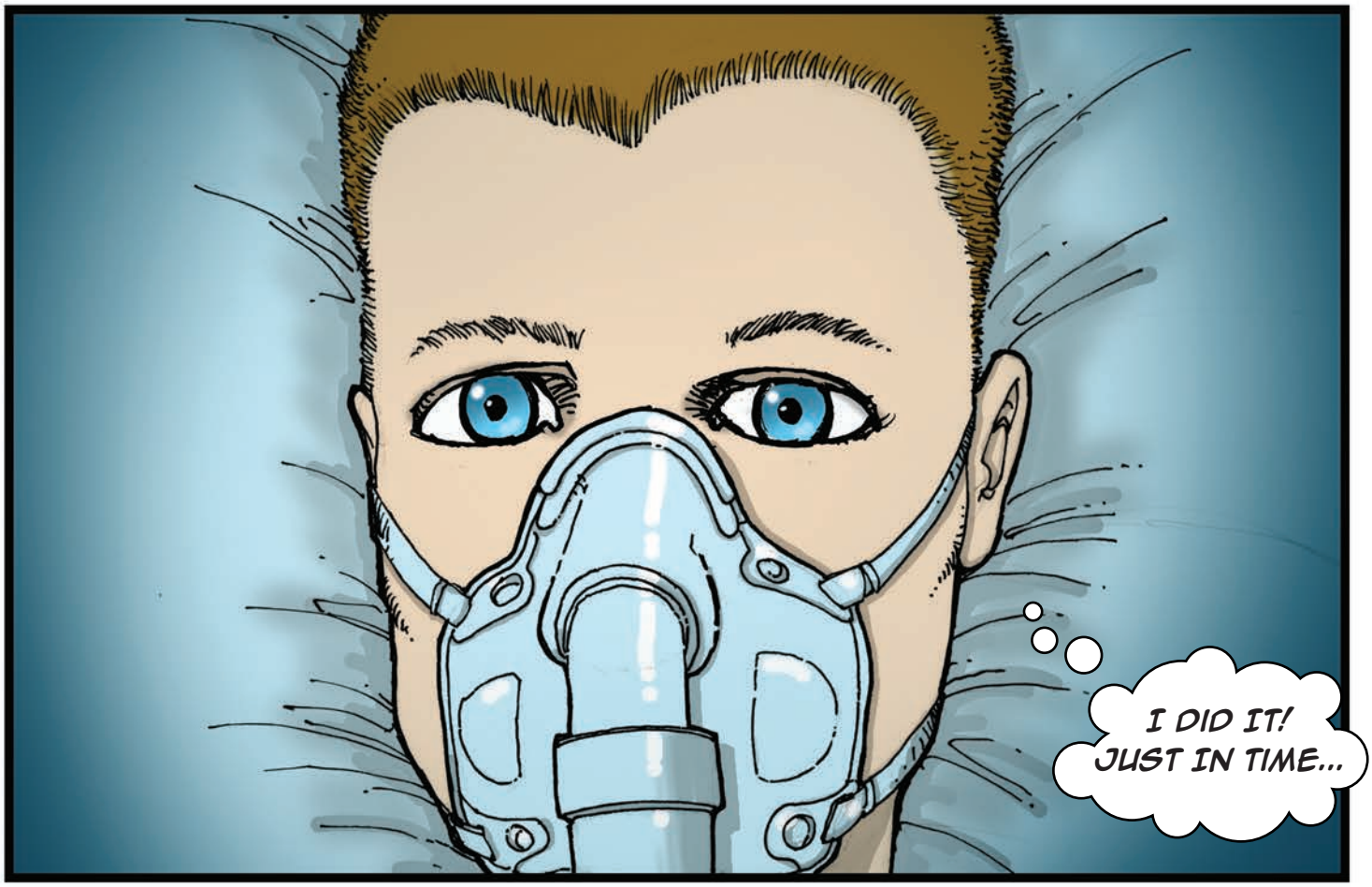
MEANWHILE, A SUBCONSCIOUS EDDIE RACES TO FIND A WAY TO ACTIVATE HIS IMMUNE SYSTEM AGAINST THE ATTACKING VIRUSES...
THESE VIRUSES ARE RIGHT ON MY TAIL...
RAAAW
WRRRRRRR
I MUST FIND THE CURE BEFORE IT'S TOO LATE!

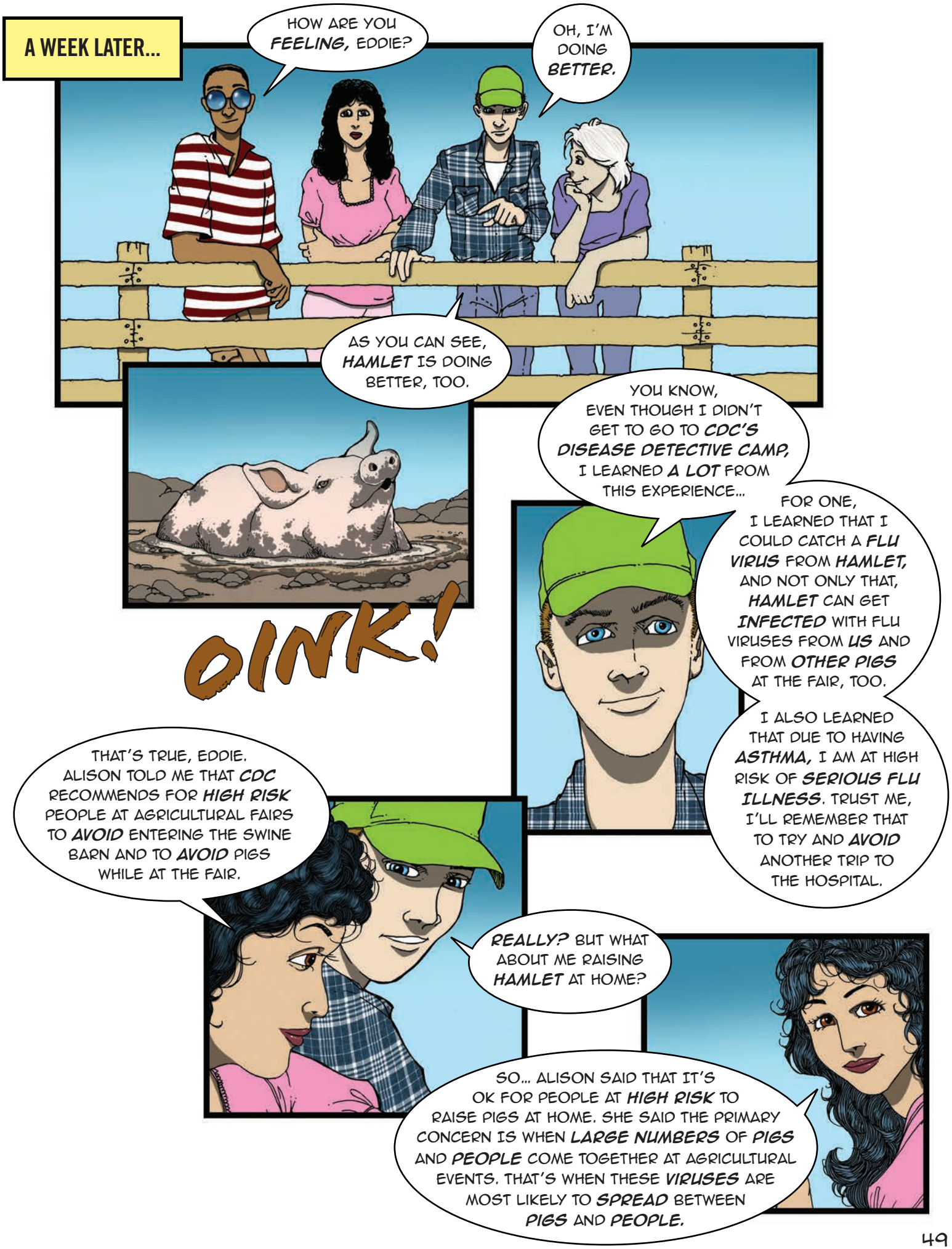
I MUST BE CLOSE...
WHOOOSH
THIS INPUT PANEL MUST OPEN ACCESS TO THE ROOM HOUSING THE CURE!
CLICK CLICK CLICK CLICK
BEEEEP
ACCESS GRANTED!
THAT DID IT! I'M IN!
THIS WILL TARGET MY IMMUNE SYSTEM AGAINST THE VIRUS!
THERE IT IS!

NOT A MOMENT TOO SOON!
RAAAWWWWRRRRRRR
001-089
GULP





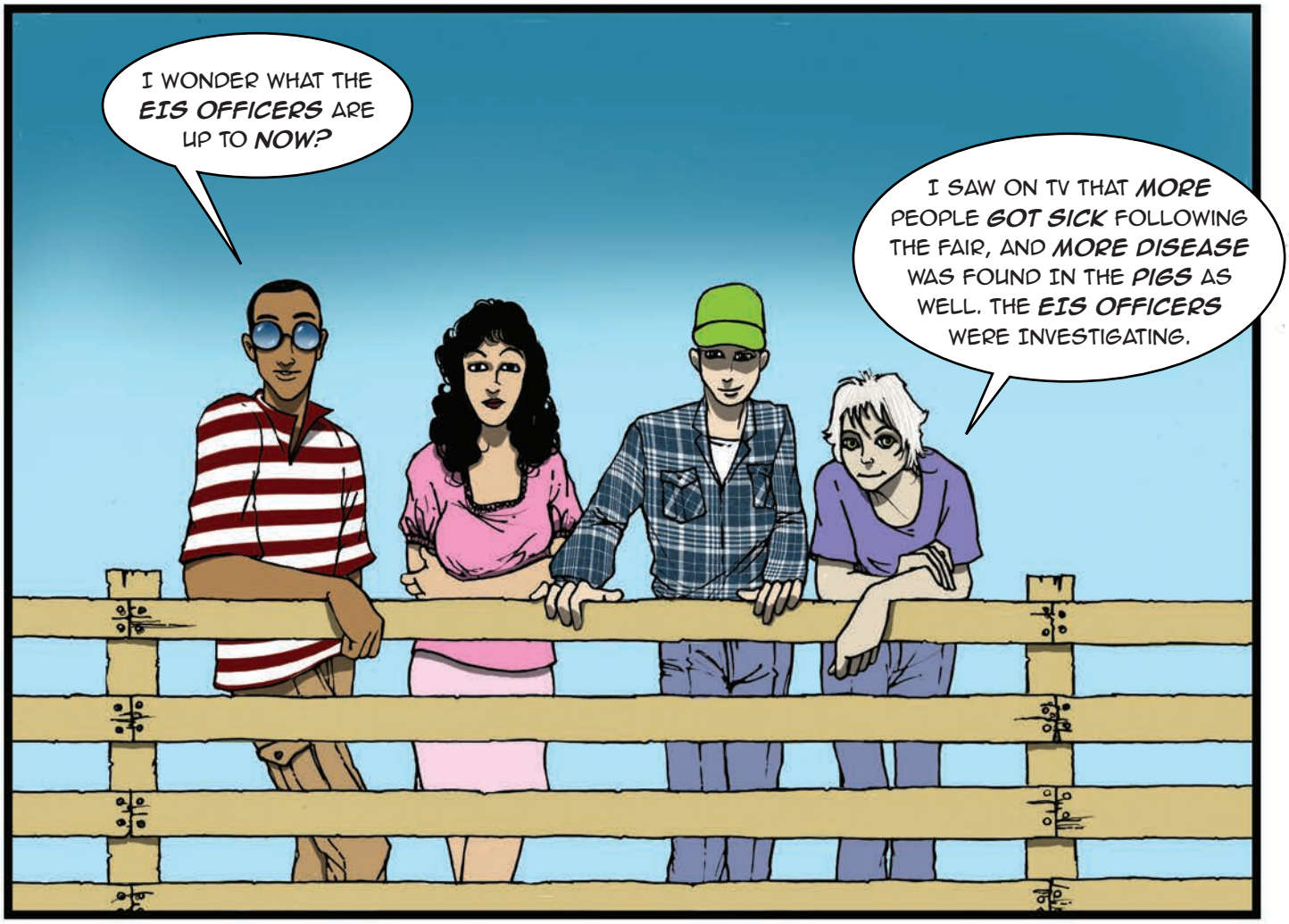

I DID IT!
JUST IN TIME...


A WEEK LATER...
HOW ARE YOU FEELING, EDDIE?
OH, I'M DOING BETTER.
AS YOU CAN SEE, HAMLET IS DOING BETTER, TOO.
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 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!


I WONDER WHAT THE EIS OFFICERS ARE UP TO NOW?
I SAW ON TV THAT MORE PEOPLE GOT SICK FOLLOWING THE FAIR, AND MORE DISEASE WAS FOUND IN THE PIGS AS WELL. THE EIS OFFICERS WERE INVESTIGATING.

YEAH, I WONDER IF THIS IS THE END OF IT...

ADDENDUM

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

CDC WEBSITE RESOURCES:

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

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

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

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

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

Key Facts for People Exhibiting Pigs at Fairs:
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/

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