eDynamicLearning

Discovery

Health Sciences

It Takes a Village

Today, some of the most expensive medical treatments available are for Alzheimer's and **dementia**, or a decline in memory. In fact, in 2010, caring for Alzheimer's patients cost about twice as much as caring for those with heart disease—and about three times as much as cancer.

dementia: decline in memory

But there is some good news in all of this. Many healthcare professionals are working on ways to help Alzheimer's patients find their way back to more meaningful and dignified lifestyles. But how? Many Alzheimer's patients are still full of life. They don't want to be stuck in a hospital bed away from the activities and people they do remember. But they can also become angry at times because they live in fear of all they have lost. Turns out, creativity can do wonders in this department…

Welcome to Glenner Town Square

One of the most interesting solutions for Alzheimer's patients is the recent creation of "towns" for people suffering from the disease. They first popped up in Belgium and France, but these special neighborhoods are now making their way to the United States. In 2018, a village called Glenner Town Square opened in San Diego, California. It is known as the first "Reminiscence Therapy Day Care Center" in the United States. Their mission is to provide both innovative day care to those with memory-related diseases and support for their family members. Programs such as these help them achieve this goal:

- Counseling
- Crisis intervention
- Community education
- Advocacy and assistance
- Information and referrals
- Personal case management
- Quality adult day care programs

Building an entire village for people with a disease of the mind may sound a little odd. But it actually makes a ton of sense. By studying what patients with Alzheimer's can (and cannot) do, experts created a "town square experience" that meets the unique needs of its visitors (in other words, patients). This process was made easier by matching patient challenges with creative solutions.

Challenge: Patients typically have much better long-term memories than they do short-term ones. This means people with Alzheimer's are more likely to remember people and events from the past than they are to recall details of their present lives.

Solution: Creators of the town modeled it after the 1950s and 60s because these are times that older visitors will likely remember best. Patients are far more likely to recall things from this era than the present day. When they do think back to the past, it often brings up their earlier sense memories as well. Seeing furnishings and storefronts from 50 or 60 years ago gives town patients a sense of well-being and security. These feelings—even though they're not based in reality—help them cope and live happily in the moment.

Challenge: Alzheimer's patients are often intelligent and well-educated folks who like to stay active and engaged with other people, their surroundings, and personal interests.

Solution: The village has lots of comfortable spaces for visitors to explore and access the memories they still can. This freedom inspires connections with friends and family. Patients often become more interested in new places and activities as well. And there are a lot of them! The town boasts a diner, pet store, mechanic's shop, boutique, and other active places that mirror their former day-to-day life. In this protected space, patients can move through their daily routines from prior years.

Challenge: Even though Alzheimer's is a mental disease, it does break down other parts of the body. Dementia, mixed with effects of medication and other medical conditions, can lead to physical problems. Some of these include loss of sight and balance, lack of mobility, and anxiety-related symptoms.

Solution: In the village, medical care is always close by. People working in the "shops" are, in fact, all trained medical professionals. They play their "parts" in the village but are also ready to help anyone in need.

Patients and their families who visit Glenner Town Square seem to like it. In fact, the center has already expanded into a franchise across the United States.

When I grow up, I want to be a…

Like most people, you probably think you already know what it would be like to work in the medical field. Maybe when you close your eyes and think "doctor," you see someone standing in a hospital wearing a white lab coat and light blue surgical booties. Well, it might surprise you to learn that this is not the only way to earn your living as a medical professional. Just check out these crazy specialties…

Cytotechnologist

Job Outlook: Excellent
Years of Higher Education: 4-5
Average Salary: $62K

Do you like microscopes and working with samples?

You might be interested in pursuing a career as a cyto-technologist. This lab professional studies cells and the odd things they sometimes do. Using a microscope and other devices, they look closely at human cells for signs of disease, such as cancer.

Perfusionist

Job Outlook: Very Good
Years of Higher Education: 4-6
Average Salary: $65K-135K

Are you interested in surgery and the human heart?

Perhaps the role of a perfusionist might excite you. This vital member of a **cardiovascular**, or heart-related, surgical team. Their primary job is to run the cardiopulmonary bypass machine. This high-tech machine moves blood away from the area under surgery. It adds oxygen to the blood and then returns it to the body, all without using the heart. This way, the surgeon trying to fix the heart area can work easily and quickly.

Space Psychologist

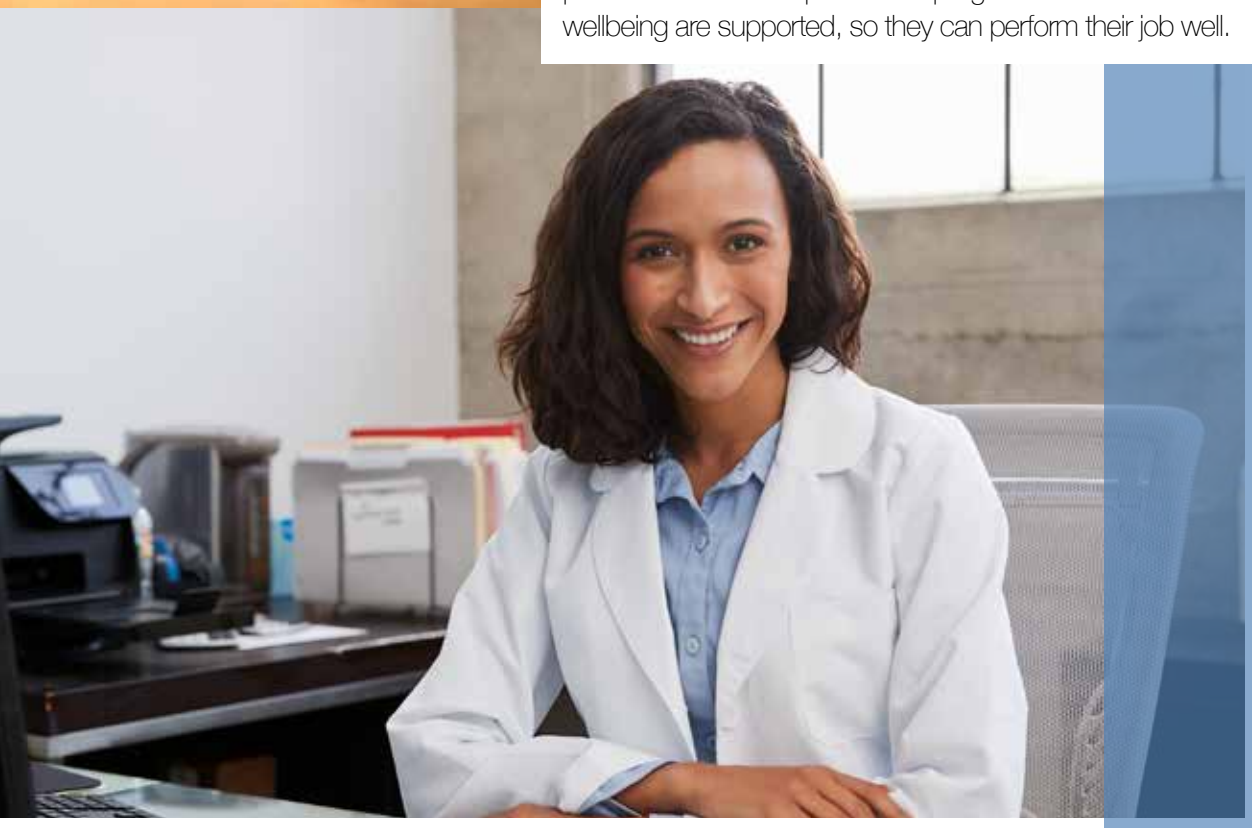
Job Outlook: Good

Years of Higher Education: 4-6

Average Salary: $65K-135K

Are you interested in outer space and what it takes to be an astronaut?

That's right—there are some medical professionals who actually work at NASA evaluating future space travelers! A space psychologist focuses on memory, emotion, and motivation to understand how a patient's brain processes certain social and sensory information. Living in space sounds neat, but astronauts do undergo a lot of physical and mental stress. These unique mental health professionals also help to create programs that ensure an astronaut's mood and wellbeing are supported, so they can perform their job well.



These three unusual medical positions are just the tip of the iceberg. When it comes to the human body, professionals have a lot of specialty areas to focus on. Skin, brain, feet, heart, eyes, teeth, organs, you name it—there really is a type of doctor for every single part of the body. What's more, there are also specialists in areas such as surgery, medicine, x-rays, high-tech machines, and anything else a patient needs to get well.

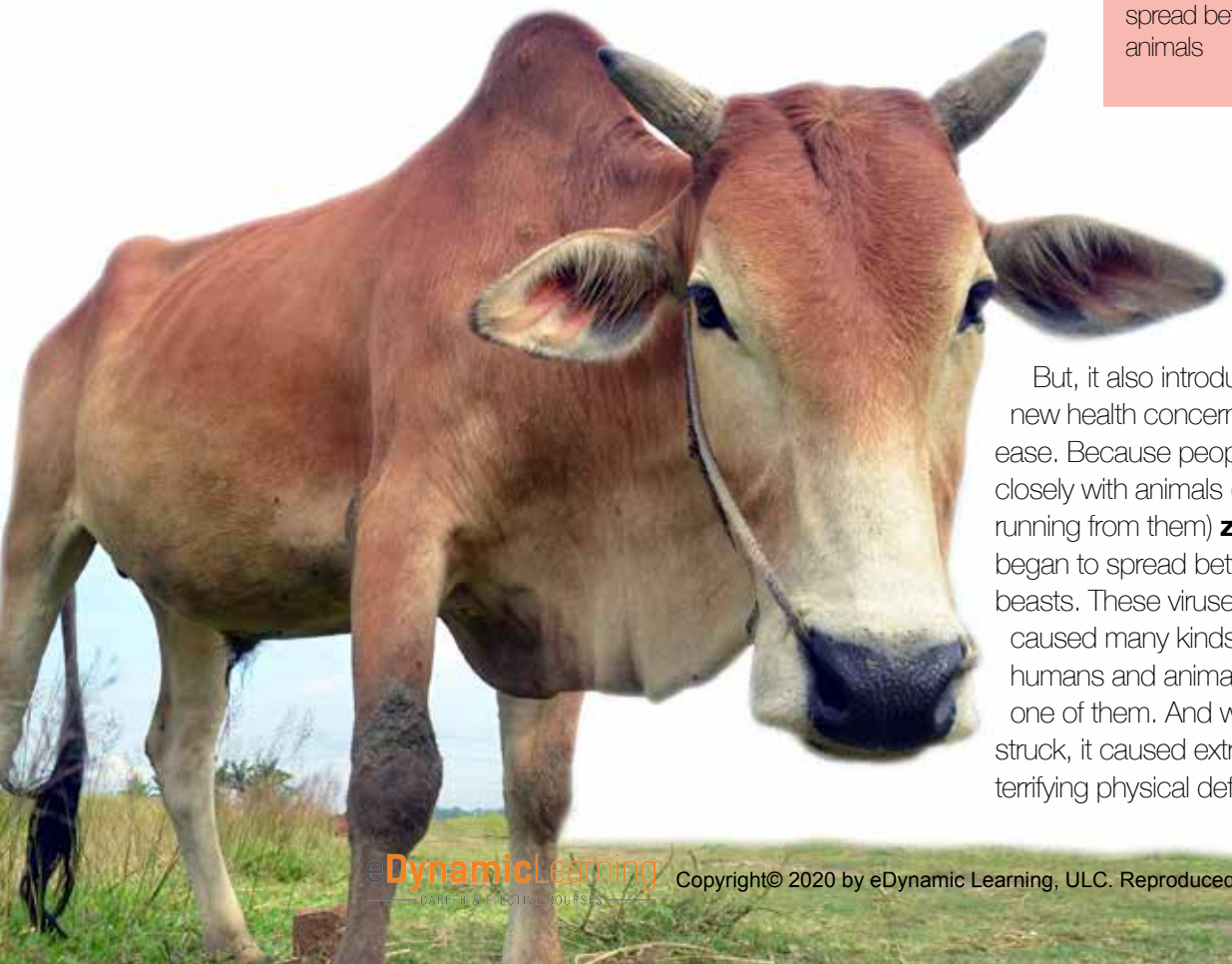
Learning from The World's Oldest Disease

The compelling history of one of the most dramatic diseases in human history…

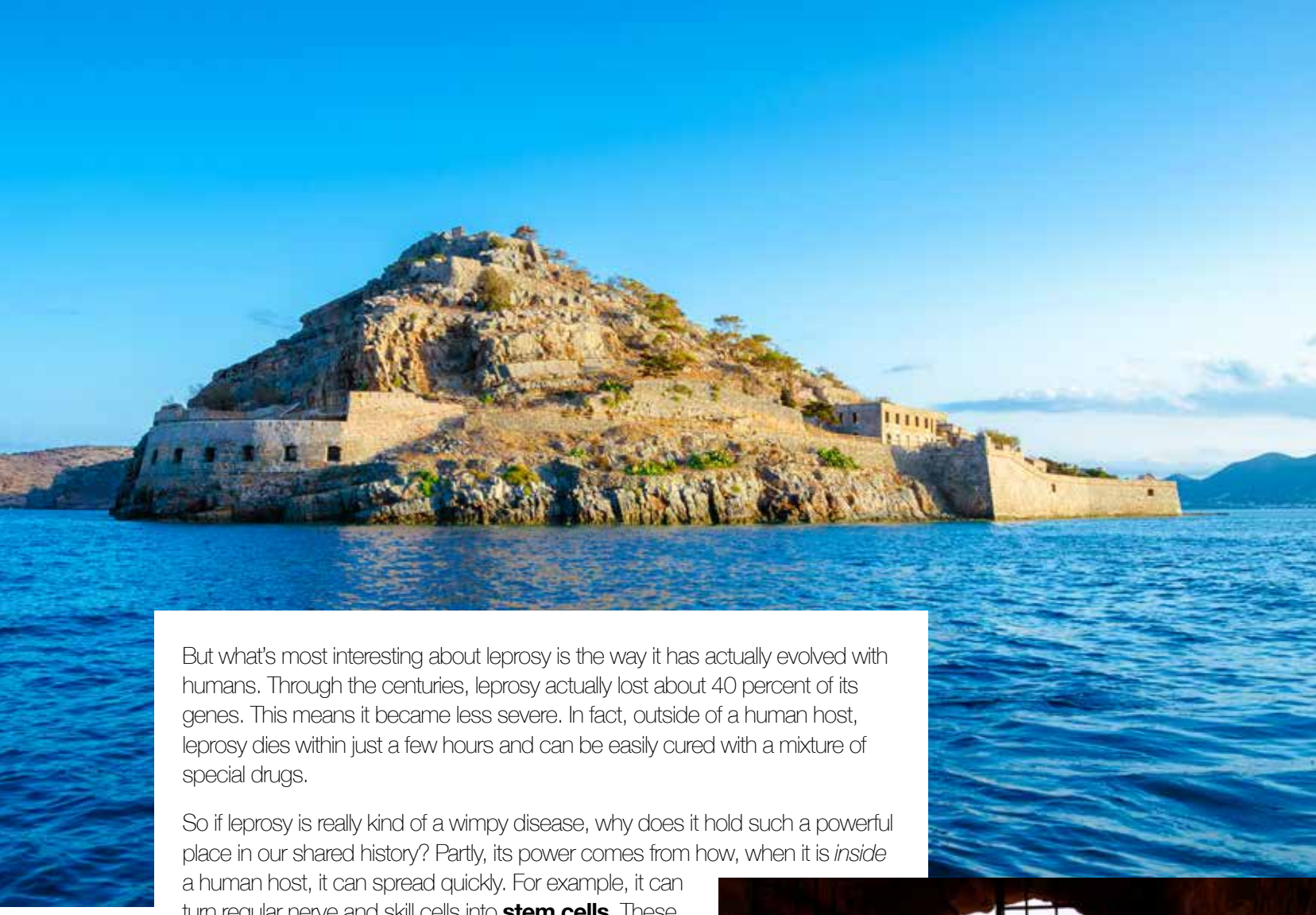
Introducing: leprosy, one of the oldest infectious diseases known to humans. In fact, archeologists have pulled 100,000-year old remains out of the ground that prove this plague has been around a long time. Historians have found written accounts on the subject dating back 3,000 years. Other illnesses like tuberculosis have also been around since the Stone Age. But, leprosy holds a unique place in human history. It can teach us a lot about human evolution and our ongoing medical and emotional relationship with disease.

Around 12,000 years ago, *Homo sapiens* (that is, humans) made a big shift in lifestyle. They moved from being roaming hunters and gatherers to living in farming communities that stayed in one area. Creating these close-knit communities offered ancient people a lot of convenience and security.

zoonotic disease: sickness spread between humans and animals



But, it also introduced a bunch of new health concerns—namely, disease. Because people were now living closely with animals (instead of always running from them) **zoonotic disease** began to spread between humans and beasts. These viruses and bacteria caused many kinds of illnesses in both humans and animals. Leprosy was one of them. And when the disease struck, it caused extremely painful and terrifying physical deformities.

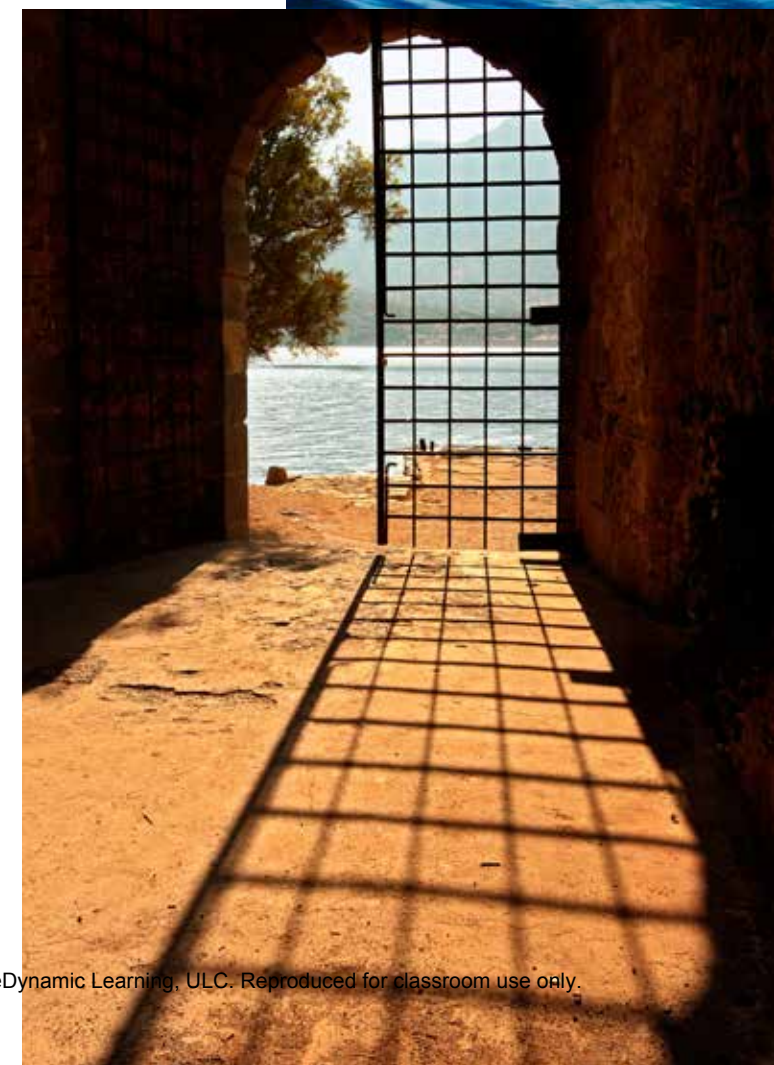


But what's most interesting about leprosy is the way it has actually evolved with humans. Through the centuries, leprosy actually lost about 40 percent of its genes. This means it became less severe. In fact, outside of a human host, leprosy dies within just a few hours and can be easily cured with a mixture of special drugs.

So if leprosy is really kind of a wimpy disease, why does it hold such a powerful place in our shared history? Partly, its power comes from how, when it is *inside* a human host, it can spread quickly. For example, it can turn regular nerve and skill cells into **stem cells**. These are cells that can move about the body and make other types of cells, more easily spreading infection. Leprosy also dominates our collective imagination because of its physical symptoms. It presents frightening signs like unsightly skin lesions, deep scarring, and missing limbs, fingers, and toes. People bearing the marks of a leper were rejected from their communities and harassed. They were even isolated to special "colonies," where they had no contact with the outside world.

In some ways, leprosy is a powerful medical mystery. It is a clever sickness that has managed to keep up with human changes. And it still, after all these thousands of years, infects people to this day. This is a testament to the power of disease and the way we, as human beings, are forever linked to it.

stem cells: cells that can move about the body and make other types of cells



When Care Creates a Crisis

The medical world is always looking for ways to battle disease and human illness through science, research, and quality health care. But sometimes it doesn't work out exactly as planned. Consider the case of **opioids**. This class of drugs ranges from prescription painkillers like codeine and fentanyl to hard street drugs like heroin. But opioids were first introduced in healthcare to relieve the pain people often feel from illness, injury, or surgery. And for a long time, this goal was being met with a slew of different prescription drugs. These medications handled pain relief well—that is, until one big pharmaceutical company pushed it too far.

> *"Confidence in our ability to control the world should be tempered by a wise skepticism and recognition of our limitations."*
>
> *The Deadly Truth: A History of Disease in America*

Back in 1995, pharmaceutical company Purdue Pharma received approval to sell a new, powerful type of painkiller known as OxyContin. Originally it was introduced to doctors as a less addictive drug than others already on the market. It's main claim to fame was its slow release, which meant the medicine affected patients more slowly and consistently. This made it harder for patients to abuse the drug, because they were less likely to feel a sudden wave of relief from a quick release of the drug.

opioids: a class of drugs including prescription painkillers

Grateful for this new product, doctors began prescribing it to patients. As was proven in court in 2007, however, Purdue Pharma misled the medical world. Turns out, OxyContin was highly addictive—but once this was discovered, the damage to patients

had already been done. Just 20 years later, in 2015, close to half of the 52,400 lethal drug overdoses in the United States were the result of opioid addiction. An **overdose** is a physical response when the human body receives too much of one substance. And by the time this case was settled, and Purdue Pharma paid their $634 million fine, some 27 million people had already become addicted to this drug. And just two years after that decision, the opioid crisis was declared a national emergency. As of 2019, Purdue Pharma executives stand to pay an additional amount (upwards of $10 billion) to settle more than 2,000 additional lawsuits.

overdose: a physical response when the human body receives too much of one substance

Once it became obvious how potentially dangerous OxyContin really was, new regulations finally came out to limit its use. This made it hard for responsible doctors to over-prescribe it. But unfortunately, this came too late for many who were already addicted. Because these people could no longer get access to prescription drugs due to new regulations, a lot of them turned to street drugs like heroin to get the same level of relief.

In fact, this is how most people come to overdose on street drugs. When people can no longer access legal drugs (because prescriptions contain refill limits, etc.), they often begin experimenting with the illegal drugs they can find. And because they are not as familiar with the strength of these street drugs, they often take too much. Even if they are aware of how a drug affects them, opioid addicts tend to develop a **tolerance** to the drug. This means the body adapts slowly to the drug. When this happens, people often need to take a higher dosage to get the same feeling.

tolerance: when the body adapts slowly to something

Not all doctors work with the intention to help. Meet Dr. Rodney Morris. In 2019, he was convicted of illegally prescribing prescription drugs. His crime came to the attention of authorities when one of his patients died from a drug overdose. Investigators found that Morris had written over 6,000 prescriptions during a 6-month period in 2017 for strong painkillers like OxyContin and fentanyl. That's a lot of opioids being handed out to the public! As you can probably guess, most of these drugs were not taken for personal pain relief. Instead, they were being sold illegally on the streets. Now Dr. Morris is facing up to 20 years in prison and a $1 million fine.

Teens are also at risk for opioid addiction. Like adults, they often first take these prescription drugs for real medical problems. But, their relationship to opioids can quickly become a dependent one.

The opioid crisis is impacting all communities. While drug abuse used to be mainly a big-city issue, the opioid crisis has reversed this. Rural communities have been hardest hit. Though these areas are still struggling, teens seem to be getting the message about the dangers of these drugs. As a result, opioid use is declining among young people.

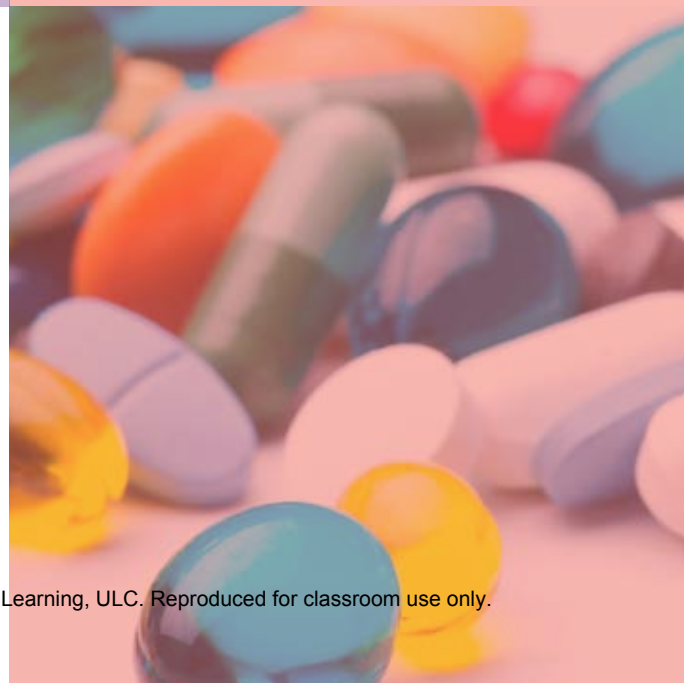
While no one wants to become addicted to any substance, people often don't realize what is happening to them until it's too late to change. Here are some tips to stay safe when taking medicine:

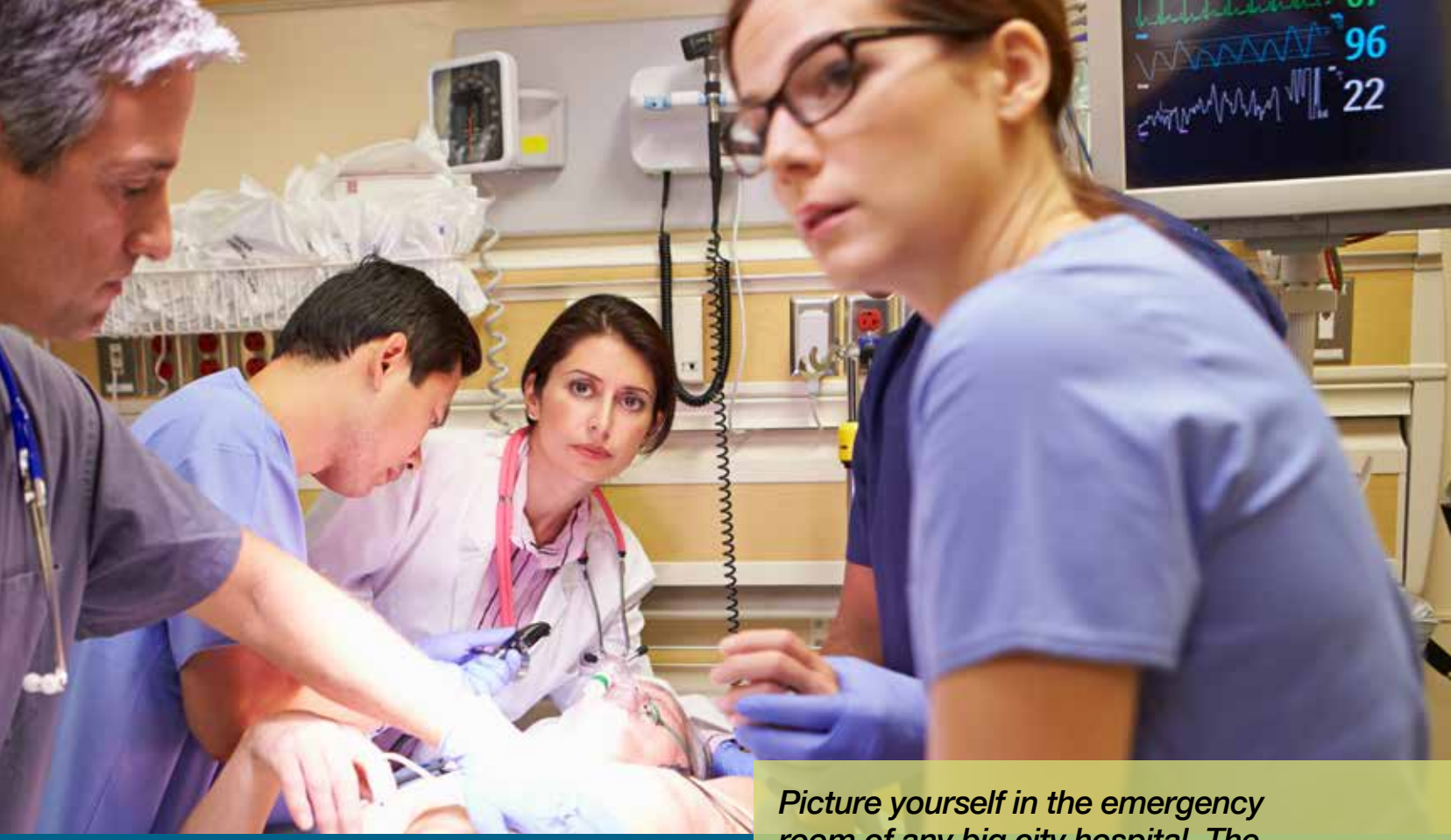
- Never take someone else's medication.
- Take medication exactly as prescribed by your doctor.
- Be aware of risks and side effects of any medication you are taking.
- Decrease doses of pain relievers as soon as you can.

If you have a friend who you think has a problem, it is important to let someone know as soon as possible. If you aren't sure how to get someone help—or need it for yourself—calling the Substance Abuse and Mental Health Services National Helpline at 1-800-662-HELP (4357) is a good first step.

Facts About the Opioid Crisis

- This crisis costs the United States an estimated **$78.5 billion a year** in health services, criminal justice processes, addiction treatment, and lost productivity.
- In 2017, **47,000 Americans** died from opioid overdoses.
- In the United States alone, over **2 million people** are currently struggling with opioid addiction.
- Opioid addiction is growing fastest in the Midwest with a **70 percent increase** between 2016 and 2017.
- Approximately **130 people die every day** from opium addiction.





Trauma Centers 101

Picture yourself in the emergency room of any big city hospital. The double doors slam open and in come two paramedics wheeling a young girl on a stretcher. As the nurse on scene, you try to speak with her, but she is unconscious. Worse, her breathing is shallow, and her pupils are the size of pinpoints. The medics tell you she has overdosed on some kind of opioid… now what?

With all this talk about the dangers of opioids, you might be wondering what a real overdose looks like. In short, it is traumatic. Some hospitals are equipped to deal with these types of **trauma**, which in medical terms means a serious or critical bodily injury. Also, serious falls, gunshots, stabbing, or horrific car accidents are the kinds of incidents that land patients in trauma centers. Most trauma centers will actually be part of an emergency room at a hospital, but trauma is actually a distinct category of care from emergency care.

Emergency responses to opioid overdoses aim first to prevent death. This means getting a patient on life support right way is key. An **antidote**, or counteracting drug, known as Naloxone (or Narcan) is given to the patient to reverse the dangerous effects of the opioid overdose. Naloxone can be given **intravenously** through the bloodstream or under the skin, shot into the muscle, or administered into the nose. And it is very effective. According to a recent US survey, distributing 50,000 Narcan kits through local drug prevention programs has led to more than 10,000 overdose rescues. Across the country, Narcan is available over the counter from a pharmacy—without a doctor's prescription.

trauma: serious or critical bodily injury

antidote: counteracting drug

intravenously: through the bloodstream

All trauma centers have a **trauma center level,** or a rating that determines what kind of emergencies it can handle. State and local governments determine what the standards are for the different levels. Hospitals are inspected every three years to make sure that their status is still correct. These levels apply to hospitals that serve both adult and **pediatric** (child) patients.

Level I

This is the highest level of care. A Level I center will have numerous specialists present or on call to deal with any kind of severe injury. These centers are often considered leaders in the field. They also have access to all needed support and aftercare services. These are best equipped to handle a traumatic injury. To maintain Level I status, these hospitals have to treat a certain number of traumatic injuries a year.

Level II

These centers can handle many kinds of trauma and will have a range of specialists available. They can provide **tertiary care**, or care that requires complex procedures, often over an extended period. They are considered resources for their communities.

Level III

There are fewer specialists available at Level III trauma centers. For patients that need a Level I or Level II center, the Level III center will often step in first and stabilize the patient first. This means they do all that they can to keep the patient's condition from getting worse. Level III centers have arrangements with Level I and II centers to take patients with more serious injuries, after they have been stabilized at the Level III center. They will sometimes take overflow of minor cases if other medical facilities are overwhelmed.

Level IV

Treating traumatic injuries isn't what these centers do. Instead, their goal is to get patients on life support until they can get them to a more appropriate trauma center. They do have some doctors and nurses trained in trauma on staff. However, their main goal is to assess patients and quickly get them to the right level of care (usually a higher-level trauma center).

Level V

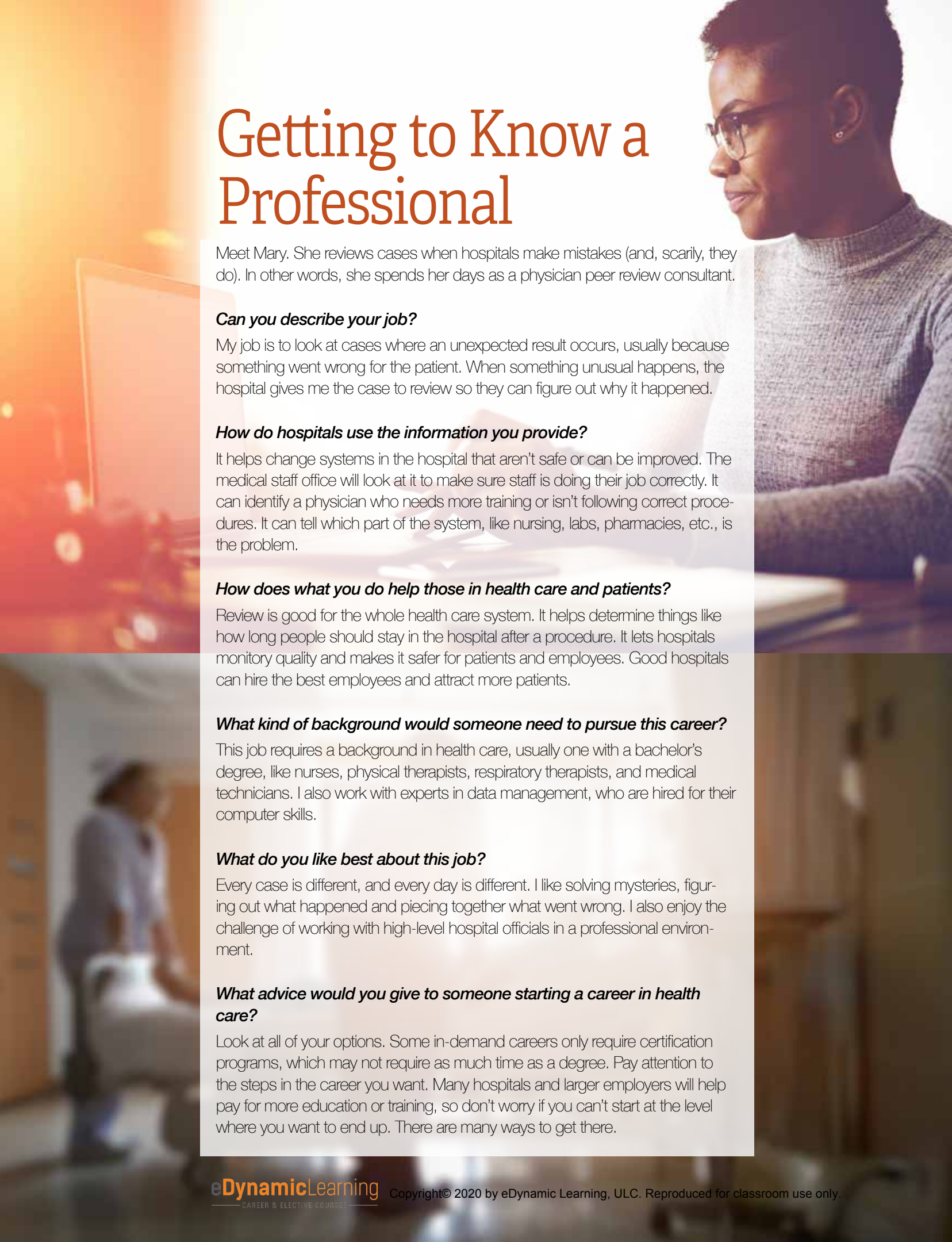
Like Level IV centers, these are designed to assess and move patients rather than provide care on site. They tend have fewer staff members than Level IV centers and may not be open 24 hours a day, like higher-level centers typically are. They share the goal of keeping patients stable until they get to a Level I or II facility.

trauma center level: a rating that determines what kind of emergencies the center is equipped to handle

tertiary care: complex, extended medical treatment

pediatric: relating to the care of children

If you ever wondered how ambulance drivers know which hospital to take patients to, the trauma level has a lot to do with it.



Getting to Know a Professional

Meet Mary. She reviews cases when hospitals make mistakes (and, scarily, they do). In other words, she spends her days as a physician peer review consultant.

Can you describe your job?

My job is to look at cases where an unexpected result occurs, usually because something went wrong for the patient. When something unusual happens, the hospital gives me the case to review so they can figure out why it happened.

How do hospitals use the information you provide?

It helps change systems in the hospital that aren't safe or can be improved. The medical staff office will look at it to make sure staff is doing their job correctly. It can identify a physician who needs more training or isn't following correct procedures. It can tell which part of the system, like nursing, labs, pharmacies, etc., is the problem.

How does what you do help those in health care and patients?

Review is good for the whole health care system. It helps determine things like how long people should stay in the hospital after a procedure. It lets hospitals monitory quality and makes it safer for patients and employees. Good hospitals can hire the best employees and attract more patients.

What kind of background would someone need to pursue this career?

This job requires a background in health care, usually one with a bachelor's degree, like nurses, physical therapists, respiratory therapists, and medical technicians. I also work with experts in data management, who are hired for their computer skills.

What do you like best about this job?

Every case is different, and every day is different. I like solving mysteries, figuring out what happened and piecing together what went wrong. I also enjoy the challenge of working with high-level hospital officials in a professional environment.

What advice would you give to someone starting a career in health care?

Look at all of your options. Some in-demand careers only require certification programs, which may not require as much time as a degree. Pay attention to the steps in the career you want. Many hospitals and larger employers will help pay for more education or training, so don't worry if you can't start at the level where you want to end up. There are many ways to get there.

Key Terms

antidote: counteracting drug

cardiovascular: related to the heart

dementia: decline in memory

intravenously: through the bloodstream

opioids: a class of drugs including prescription painkillers

overdose: a physical response when the human body receives too much of one substance

pediatric: relating to the care of children

stem cells: cells that can move about the body and make other types of cells

tertiary care: complex, extended medical treatment

tolerance: when the body adapts slowly to something

trauma: serious or critical bodily injury

trauma center level: a rating that determines what kind of emergencies the center is equipped to handle

zoonotic disease: sickness spread between humans and animals

Sources for Health Sciences

American Trauma Society. (n.d.). "Trauma Level Centers Explained." Retrieved from www.amtrauma.org

ASAM. (2016). "Opioid Addiction." Retrieved from https://www.asam.org/docs/default-source/advocacy/opioid-addiction-disease-facts-figures.pdf

Berezow, A. (22 Aug. 2018). "A Brief History of the Opioid Epidemic." Retrieved from www.acsh.org

"Getting Narcan is Simple." (n.d.). Retrieved from https://www.narcan.com/patients/how-to-get-narcan/

Healthline Editorial Team. (29 Sept. 2016). "The Most Dangerous Epidemics in U.S. History." Retrieved from www.healthline.com

Hoffman, J. (26 March 2019). "Purdue Pharma and Sacklers Reach $270 Million Settlement in Opioid Lawsuit." Retrieved from https://www.nytimes.com/2019/03/26/health/opioids-purdue-pharma-oklahoma.html

Kragen, P. (23 April 2018). "Memory Village for Alzheimer's Patients Set to Open." Retrieved from www.sandiegouniontribune.com

US Dept. of Health and Human Services. (n.d.). "Opioids and Adolescents." Retrieved from www.hhs.gov

US Dept. of Health and Human Services. (n.d.). "What is the Opioid Epidemic"? Retrieved from www.hhs.gov

Weber, D. (21 June 2019). "Alabama Pill Mill Doctor Pleads Guilty to Illegally Dispensing Prescription Drugs." Retrieved from www.dea.gov

World Health Organization. (August 2018). "Information Sheet on Opioid Overdose." Retrieved from https://www.who.int/substance_abuse/information-sheet/en/

eDynamicLearning
CAREER & ELECTIVE COURSES
http://edynamiclearning.com/