Taking Antibiotics Properly

*******Taking Antibiotics Properly (Part 1)*******

Narrator
We all get sick, the common cold, sore throats, and earaches, illnesses many of us deal with all the time. These minor conditions can usually be treated with a little rest, perhaps an over-the-counter fever reducer and some chicken soup. But many people view antibiotics as the cure-all for their illnesses and that notion has created a greater global problem.

Dr. Bala Hota, MD, Rush University Medical Center
Bacteria are smart, they are able to change and learn as time goes by. And as new antibiotics are produced, bacteria are able to learn how to evade the action of those antibiotics.

Narrator
As a former NFL defensive tackle, Brandon Noble has dealt with more than his fair share of physical injuries. But the evasiveness of bacteria became abundantly clear to Brandon a few years ago.

Brandon Noble, Patient
Over the course of playing football for as long as I did, you get dinged up. I have separated my shoulders, I have had more concussions than I would like to know about, broken both my hands, I have broken a leg.

Narrator
It was during an operation to repair one of his injuries that Brandon came in contact with a more formidable opponent than any he'd faced on the football field, a drug resistant bacterial infection known as Methicillin-Resistant Staphylococcus Aureus, M-R-S-A also pronounced as "mersa."

Brandon Noble, Patient
I was playing for the Washington Redskins, I was going into my sixth year in the NFL. I popped some cartilage loose in my knee, and had to go get a debridement just a routine scope washout. Had that done, came home and, eight days post-surgery they took the stitches out and that night I had a hotspot flare-up over one porthole, my knee felt like it was being lit on fire.

The doctor admitted me to the ER, and then an infectious disease doctor came in. 48 hours later the doctor says, "You know if you had waited another 24 hours this would have potentially killed you or you would have lost your leg."

Narrator
The only effective treatment against such a severe bacterial infection was antibiotics. But Brandon's infection was resistant to most of the commonly used medications.

Each time one antibiotic didn't work the only solution was to take a stronger one.

Brandon quickly learned the side effects of these drugs can be nearly as hard on the body as the actual illnesses they are designed to treat.

Brandon Noble, Patient
All these antibiotics take a toll on you, they affect your insides. Not only are they killing the bug but they are killing the natural bacteria inside your body.

Narrator
Antibiotics, most notably penicillin, became widely used during the World War 2 era. The discovery was hailed as a medical miracle, saving countless lives and easing the complications of many feared diseases and infections. But just four years after drug companies started mass-producing penicillin in 1943, infectious bacteria began appearing that could resist it.

Today, after more than 50 years of widespread use, antibiotics no longer perform as they once did. But to truly understand the problem of antibiotic resistance, it is first important to understand what antibiotics are and the role these drugs play in fighting disease.

Dr. Robert A. Weinstein, MD, Rush University Medical Center
Most of the drugs we use are anti-bacterial to deal with bacterial infections and they basically either inhibit or kill bacteria and allow the body defenses to mop up the remaining infection and cure the patient.

Narrator
The striking thing about bacteria is that they can multiply as often as every twenty minutes. Antibiotic resistance develops when bacteria develop mutations, which allow them to resist the effects of a particular medicine. In a large population of bacteria that are mutating all the time, a few will be resistant to an individual antibiotic. So, while the antibiotic kills off a large number of those bacteria, it can't kill that small percent that are resistant. It is this resistant bacteria that will then keep multiplying, and before too long a new population of antibiotic resistant bacteria exists.

Dr. Bala Hota, MD, Rush University Medical Center
A main driver of development of resistance is overuse of antibiotics, actually. And so that's why trying to use antibiotics judiciously, or the right way, makes a difference down the road so bacteria don't have that chance to learn how to be resistant.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
We only have a limited number of antibiotics that we can use to kill bacteria.

Narrator
Dr. Neil Fishman is a professor at the University of Pennsylvania and a spokesman for the Infectious Diseases Society of America.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
Since we are seeing more and more resistance we actually have fewer and fewer antibiotics. And we have to use them more and more.

Narrator
Drug resistance is an especially difficult problem for hospitals because they take care of critically ill patients who are more vulnerable to infections than the general population. Infections that develop in the hospital have been increasing markedly, despite the efforts to prevent them in health care settings.

Peter Angood, Vice President & Chief Patient Safety Officer, The Joint Commission
Healthcare associated infection is getting a lot of profile in the hospital environment and rightfully so, that's where the sickest patients come, that's where the most antibiotics are used that's where the resistances begin to emerge.

Narrator
According to the Centers for Disease Control CDC statistics:

- More than 70% of the bacteria that cause health care associated infections are resistant to at least one of the drugs most commonly used to treat them.
- People infected with drug-resistant organisms are more likely to have longer hospital stays and require treatment with second- or third-choice drugs that might be less effective, more toxic, and more expensive.

As a professional football player Brandon was in his physical prime, tough enough to tackle the strongest in the NFL. But this resistant bacterial infection ended his career and nearly ended his life.

Brandon Noble, Patient
I was at my peak physically health wise. I was in shape, you know, a professional athlete. And it knocked me down, it floored me, and it almost killed me.

Narrator
Coming up, so when is it appropriate to use an antibiotic? We'll take a look next.

*******Taking Antibiotics Properly (Part 2)*******

Narrator
In order to understand the inappropriate use of antibiotics, it is important to know when it is appropriate to use them. Antibiotics kill bacteria, not viruses. Understanding that simple fact is one of the most significant milestones on the path to dealing with the problem of antibiotic resistance.

Dr. Bala Hota, MD, Rush University Medical Center
Viruses require other cells to function or to cause new infections. Bacteria can grow on their own. And viruses don't respond to antibiotics where bacteria do. So, people can have viral infections and typically, in fact, those viral infections run their course and get better. And bacterial infections on the other hand, require antibiotics usually for treatment to improve.

Narrator
So here's a quiz, which of the following illnesses is viral and should not be treated with an antibiotic?

A. The flu
B. The Common Cold
C. Most Ear Infections
D. All of the Above

That's right. D. All of the above illnesses are viral. An antibiotic will do no good, and in fact may do some harm.

Still, according to the CDC tens of millions of antibiotic prescriptions are written in doctor's offices for viral infections. Doctors cite diagnostic uncertainty, time pressure and patient demand as the primary reasons for these inappropriate prescriptions.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
It takes about a minute to write a prescription for an antibiotic, and probably twenty minutes not to write a prescription.

Narrator
Pediatrician, Dr. Deborah Mulligan, knows firsthand about the pressure from parents of a sick child to prescribe an antibiotic.

Dr. Deborah Mulligan, MD, Nova Southeastern University
They're anticipating you're going to make their child feel better quickly with an antibiotic. And it's not always the answer they're looking for when you tell them, this is probably a virus and it's going to go away on its own and all you need to do is help them through it by comforting them.

Narrator
Theresa Sauer gave birth to her first child Christian two years ago. Right from the start her son's health was a top priority.

Theresa Sauer, Patient
When Christian was born I decided to stay home for the first year, and I knew I was going back to work when he turned one, so we were looking at several daycares in the area and we came down to one which we loved. However it's such a large day care that he gets sick very often.

As a matter of fact the first 2 weeks that he was there he got his first ear infection and it was his first birthday. He had been prescribed antibiotics at that point. I believe he was on amoxicillin and even though he had never been on antibiotics before that antibiotic did not work.

Narrator
After that Christian's visits to the doctor became more frequent.

Theresa Sauer, Patient
Typically Christian probably gets sick I would say about once a month, maybe once every other month, and it starts out with a little cold and then turns into a ear infection.

Dr. Deborah Mulligan, MD, Nova Southeastern University
If they have an ear infection, 80% of ear infections will go away on their own, they don't need antibiotic treatment. They need symptomatic relief.

Theresa Sauer, Patient
There are times my doctor does not want to prescribe an antibiotic, because he wants to wait it out and see if he can get over it on his own, so I would say he's been on antibiotics in the past year probably about 8 times.

Narrator
According to the CDC about 40% of the time when children visit the doctor they leave with a prescription for antibiotics. The children may feel better quickly at first, but then they are likely to get sick more often, with longer more stubborn infections caused by more resistant organisms.

Dr. Deborah Mulligan, MD, Nova Southeastern University
We're just now training and teaching our own colleagues about the guidelines on what's the best situation for selecting those children who have uncomplicated ear infections that could be those that are observed for a couple of days, to see if they can heal on their own without antibiotics, versus the small percentage of kids who absolutely have the constellation of findings we look for to suggest they require antibiotics.

Narrator
So, again, which illnesses are caused by bacteria and which ones caused by viruses? Here's a short list, bacterial infections cause:

- Some ear infections
- Severe sinus infections
- Strep throat
- Urinary tract infections
- And many wound & skin infections

Viral infections cause:

- Most ear infections
- Colds
- Influenza (flu)
- Most coughs
- And most sore throats

Dr. Robert A. Weinstein, MD, Rush University Medical Center
Don't use antibiotics for viral infections. So when you go to the doctor and you have an upper respiratory tract infection, don't demand an antibiotic because you think it's bacterial and the doctor says it's probably a virus, an antibiotic won't do any good. Don't insist upon an antibiotic.

Narrator
Coming up, we'll learn what guidelines should be followed if you are prescribed antibiotics plus, we'll see how to lower your risk of acquiring an infection that is resistant to antibiotics.

*******Taking Antibiotics Properly (Part 3)*******

Narrator
If patients do have bacterial infections, and are prescribed antibiotics, there are guidelines they should follow to ensure they properly use that antibiotic.

Things you need to know about taking antibiotics the right way:

- Take them as directed and always complete the course
- Determine whether you should take them with food or on an empty stomach
- Report any rash, diarrhea or other adverse reaction
- Never use anyone else's prescription or your own old prescription
- Always read the package insert or information label on the bottle
- Ask your doctor what you should do if you forget to take a dose on time
- Tell your doctor or pharmacist what other prescription drugs or over-the-counter medications you are taking

Your pharmacist is a good resource if you have questions and your doctor might not be available.

Since resistant bacteria already exist in both the hospital and community protecting yourself from getting an infection is a top priority. The best advice when it comes to prevention is, if you're in the hospital wash your hands often. Ask everyone who comes in contact with you to wash theirs. If you see hospital staff or health care providers not washing or sanitizing their hands or equipment before coming into contact with you, speak up and ask them to do so. Simple hygiene is the best way to prevent the transmission of resistant bacteria.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
Make sure that anyone who walks into your room, cleans their hands.

Narrator
In addition to hand hygiene, simple respiratory etiquette such as covering your nose or mouth when you sneeze or cough may decrease transmission of viruses that could cause secondary bacterial infections. And there's another problem. Only a small percentage of all antibiotics prescribed in the United States are given to people. The rest are used for animals in industrialized farms.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
Up to 80% of antibiotic use in the United States is used for animals. And the majority of that use is to not treat diseases in animals but to make them grow bigger, faster; so that they can be used in the food supply faster.

Narrator
These antibiotics being consumed by animals include many that are identical, or nearly so, to drugs used in treating humans. The animals then produce antibiotic resistant strains of bacteria, which can be spread to humans.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
Even more alarmingly is we don't have a good way in the United States of tracking what antibiotics are used, in which animals, and where are they being used.

Dr. Bala Hota, MD, Rush University Medical Center
It could potentially be a huge problem because there is so much connection in the food supply between what animals eat and then what we consume.

Narrator
The Centers for Disease Control and a number of other federal agencies convened a task force and a workshop to come up with some solutions.

Dr. Robert A. Weinstein, MD, Rush University Medical Center
Some of the controversial questions have been things like, should there be restrictions on antibiotic use in agriculture for animal feed? That's been a very controversial question, and we've not been as aggressive in the United States as some other countries. Denmark, for instance, got rid of antibiotics largely in animal feed. So that's a major question.

Narrator
Some families like the Noble family try to reduce their use of animal products as much as possible.

Brandon Noble, Patient
My daughter drinks a lot of soy milk, and the boys don't like the soy milk but it keeps it away from the animals, and I have learned a lot more than I probably would of known about things around, I am more aware about what is going into my body now. And what's going into my kids bodies.

Narrator
Still ahead, we'll look at some possible long-term solutions to the problem. And we'll see how you can protect yourself from resistant bacteria outside the hospital.

*******Taking Antibiotics Properly (Part 4)*******

Narrator
The risk of contracting a resistant bacterial infection doesn't end once you leave the hospital. Serious cases have resulted from contact outside medical facilities.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
So you don't have to be in the hospital anymore to get this infection. You can get this infection at school, you can get this infection at your gym, and people who are in prison can get this infection.

Dr. Robert A. Weinstein, MD, Rush University Medical Center
You're in the health club and the person before you hasn't cleaned off the piece of equipment and you use that piece of equipment, if there's staphylococci on that equipment you may pick up those staph and develop a staph infection.

Narrator
Also, around the world there are regional and national differences in where antibiotic resistance is a more serious problem.

Dr. Robert A. Weinstein, MD, Rush University Medical Center
If you look at the Netherlands, antibiotic resistance there is very low and their use of outpatient antibiotics is very low. You compare it to some of the neighboring countries like Spain or Italy or countries in the general area of Western Europe where there's much greater use of antibiotics in the community, there's much higher rates of antibiotic resistance.

Narrator
However the United States is the only developed country in the world that does not have ready access to data on the way antibiotics are used in either animals or people.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
It would be very valuable if they could then see what antibiotics are being used in that area to see if the antibiotic use pattern was leading to or causing that new resistant bacteria. Because if that's what was happening you could intervene rapidly and say 'stop using that antibiotic!'

Narrator
A simple solution may be for the pharmaceutical industry to develop more effective antibiotics. And that is only one answer to the problem, but there's a catch, money.

Dr. Neil Fishman, MD, University of Pennsylvania School of Medicine
We need new drugs. It takes a minimum of 800 million dollars to develop a new antibiotic and once that drug is developed it is only used here and there if you think about it.

Narrator
Again, the experts tell us antibiotic resistance is caused by antibiotic overuse. And the best way to defend against it is to use antibiotics the right way so fewer bacteria strains become resistant.

Dr. Bala Hota, MD, Rush University Medical Center
And so, trying to make sure that when an infection is known to be due to a certain bacteria, that the most targeted antibiotic that can be used for that bacteria is used.

Narrator
Vaccines can help as well. Certain vaccinations can reduce both bacterial infections and the need for antibiotics. The pneumococcal vaccine, recommended for anyone 65 or older is a good example. Ask your doctor which vaccines might be appropriate for you.

When it comes to the hospital environment effective infection control measures can help reduce the number of infections.

Peter Angood, Vice President & Chief Patient Safety Officer, The Joint Commission
Hand-washing, appropriate use of antibiotics, don't use the antibiotics too long, make sure you're identifying the patients who have got these resistant organisms and help get that controlled as best possible. And above all just be cognizant that this is a long term problem one that we really need to take a long term strategy to control this overall.

Narrator
And don't hesitate to speak to your health care providers about whether an antibiotic is the right option for you.

Dr. Deborah Mulligan, MD, Nova Southeastern University
It's totally fine and appropriate for you to ask is it possible that this is a mild illness that might go away on its own and if you think that what are some of the things we could do, or I could do for my child that would provide symptomatic relief, without prescribing antibiotics.

Theresa Sauer, Patient
As a matter of fact the last time we took Christian he did prescribe him a second antibiotic, and I questioned it this time for the first time because I thought he just came off of one.

Narrator
After his ordeal Brandon Noble has learned to never be too cautious. He also has this advice to share.

Brandon Noble, Patient
The one thing that I have told people is stay on top of it, if your kid has a cut, if you have a cut and it's starting to hurt and you think it's just a regular infection, have your doctor test it, culture it immediately for MRSA, for one of these other bugs that's out there, don't be too late on it, the test, the culture takes 48 hours and my doctor told me that I had 24 hours to go, so you know it's a quick time line, it will catch you fast.

Narrator
Over the past 50 years we have been using antibiotics quite liberally and this overuse has led to the emergence of new more serious illnesses that take lives every day. And there appears to be a tragic paradox, the more we use antibiotics the less effective they are.

Dr. Robert A. Weinstein, MD, Rush University Medical Center
It's a complex relationship in some cases, but there does seem to be a pretty much agreed upon relationship between the more you use it, the faster you lose it.