The Guide to Antibiotic Safety and Resistance Prevention
The artwork was created by the students engaged in Project Protect
Upper left to upper right: Hepatitis C, Smallpox, Polymavirus
Middle left to middle right: Tetanus, Salmonella, West Nile Virus
Lower Left to Lower Right: Influenza, Hepatitis B, H1N1

Section 8. Immunizations

Immunizations are important especially in very young children and individuals over the age of 65 because immune activity is low in these individuals.

Hepatitis B
For individuals from birth throughout life.
Given in 3 doses a few months apart.

Influenza
Once a year for individuals 6 months and older

Hepatitis A
For individuals one year and older
Given in two doses to individuals

Tetanus
Every 10 years throughout life

HPV
Given between ages 11-26

Meningococcal
College freshmen and military recruits

Varicella
Given to adults 19 and older who have not been vaccinated or had chickenpox

Herpes zoster
Given once at age 60 to prevent Shingles

Pneumonia
Given at Age 65 or older
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Dean Baluch
Gerri Baluch
Carroll Barlow
James and Carmen Beaubeaux
Wei-Chun Chin
Carlos Llarena
Portia Mira
Patsy Perry

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Section 1. What you need to know about not taking antibiotics .......... 6
Antibiotics can harm our bodies directly through dangerous side effects. .... 6
Antibiotics kill off bacteria that promote health ................................. 6
Section 2. Things you can do to avoid taking antibiotics .................. 7
Care for wounds properly ................................................................. 7
Don’t share food and drinks ......................................................... 8
Install brass door knobs in your home and other places, when possible. 8
Maintain good hygiene ................................................................. 8
Both you and your partner should get checked for sexually transmitted
infections before initiating a sexual relationship ................................ 8
Eat healthy foods .......................................................................... 8
Exercise and sleep ......................................................................... 9
Avoid going to the hospital unless it is necessary .............................. 9
Section 3. What to do when you after you have taken antibiotics ...... 10
Use probiotics ................................................................................ 10
Eating foods with bacteria ............................................................... 10
Avoid hospitals if at all possible ..................................................... 10
Section 4. Antibiotics ..................................................................... 11
Fluoroquinolones ........................................................................... 11
Aminoglycosides ............................................................................ 12
Tetracyclines .................................................................................. 12
β lactams ......................................................................................... 13
Macrolides ....................................................................................... 13
Section 5. How to care for your immune system so that it can do the
fighting for you ............................................................................. 14
Don’t smoke .................................................................................... 14
Avoid Food Poisoning .................................................................. 14
Maintain a healthy weight .............................................................. 14
Control your blood pressure ......................................................... 14
If you drink alcohol, drink only in moderation .............................. 14
Get adequate sleep ........................................................................ 14
Exercise regularly .......................................................................... 14
Section 6. Diet and Supplements ................................................... 15
Vitamin C ....................................................................................... 15
Zinc ............................................................................................... 15
Vitamin A ....................................................................................... 15
Vitamin B ....................................................................................... 15
Vitamin D ....................................................................................... 15
Vitamin E ....................................................................................... 15
Selenium ......................................................................................... 15
Aloe Vera ....................................................................................... 16
Vitamin C ....................................................................................... 16
Garlic ............................................................................................. 16

Section 7. Medical Screening
Get regular medical screening tests for people in your age group and risk
category.

Age 18 • Hearing Test every 10 years until age 50 and then every three years
• Self Skin Exams every month and doctor skin exams if something
  abnormal appears or it something changes.

Age 21 • Blood pressure check every year, or two years if in the normal range.
• Cervical Cancer Screening for women every three years.

Age 35 • Cholesterol check for men

Age 40 • Mammograms for women every year

Age 45 • Prostate Cancer Screening for African American men and men with a
  family history of prostate cancer
• Diabetes Screening for people at a healthy weight and cholesterol level
• Cholesterol Screening for women

Age 50 • Prostate Cancer Screening for all men
• Colorectal Cancer Screening for all men and women

Age 65 • Osteoporosis Screening in women
• Abdominal Aortic Aneurism Screen in men who have smoked
• Complete Eye Exams every year
Aloe Vera
Aloe Vera applied topically is useful for treating minor burns, frostbite, and wounds.

Garlic
Garlic has some anti-infective and anti-cancer properties.

Richly colored fruits.
Pomegranates, blueberries, blackberries, etc have anti-infective properties and may have anti-cancer properties also.

Probiotics
Probiotics are bacteria that can live in the gut and that are involved in promoting the immune system, assisting in digestion, and preventing the establishment of pathogens in the intestines. Probiotics can be found in yogurt, kefir, and other food products that are made with the assistance of microbes. They can also be purchased as dietary supplements. There are many types and no one type has been shown to be better than all others.
Section 1. What you need to know about not taking antibiotics

The most important thing to understand about antibiotics is that they are drugs. Like all drugs, they have useful properties. However, they also have side effects and limitations. While they are very good at saving people’s lives from bacterial infections, it is safer not to take them if recovery from an infection is not greatly assisted by them.

Here is the damage they can do.

Antibiotics kill off bacteria that promote health

Any antibiotic will kill off harmless and helpful bacteria associated with the body. Without a healthy population of non-pathogenic bacteria, the body is susceptible to pathogenic (disease causing) bacteria. Some of the infections that can occur after taking antibiotics are:

a. Yeast infections which can occur in the vagina, mouth and throat. This can cause itching, cracking and bleeding of the skin. While not life-threatening, yeast infections can be very painful and uncomfortable.

b. Clostridium difficile infections of the intestines. These can cause pain, bleeding and diarrhea. This infection can last for months to years and in the most severe cases is life threatening.

Besides these infections, antibiotics can have other harmful effects. The bacteria that colonize the gut are involved in determining body weight, and are also involved in issues such as Crohn’s disease, irritable bowel syndrome and gastritis.

Maintaining a healthy community of bacteria associated with your body is an important part of being healthy. After killing that population off, it takes time and effort to re-establish healthy populations of bacteria. If you don’t need to take antibiotics to save your health and life, it is much easier to stay healthy without them.

Antibiotics can harm our bodies directly through dangerous side effects.

As with any drug, antibiotics have side effects. They can cause fatigue, gastrointestinal discomfort, nausea, liver failure, chronic pain, tendon rupture, yellowing of teeth, seizures, and possibly contribute to heart problems and stroke. Antibiotics can be dangerous to our health and should only be taken when the benefits outweigh the risks.

Section 6. Diet and Supplements

Eat a diet high in fruits, vegetables, and whole grains, and low in saturated fat and sugar. A high-quality multivitamin can help to compensate for dietary deficits.

Vitamin C
Many people use vitamin C to help fight off colds and minor ear nose and throat associated illnesses. Vitamin C is water soluble and easily excreted, so it is difficult to overdose on this vitamin. Large doses of vitamin C such as those contained in EmergenC or other over the counter cold remedies can be safely consumed.

Zinc
Zinc is critical to the function of the immune system. However, taking too much zinc inhibits the immune system.

Vitamin A
Deficiencies in vitamin A can make a person more susceptible to illness, but taking extra vitamin A can be toxic because vitamin A is lipid soluble and is not easily excreted. Taking a quality vitamin A supplement at the recommended dose should be sufficient.

Vitamin B
Vitamin B deficiencies can also compromise the immune system. An excess of vitamin B complex does not appear to help increase immune function. Vitamin Bs are water soluble and can be safely consumed in larger than normal quantities. Although not caused by an infectious microbe, taking a vitamin B supplement can treat canker sores in the mouth.

Vitamin D
Vitamin has been shown to fight tuberculosis. It may have the ability to fight other infections also.

Vitamin E
Vitamin E has been shown to increase the immune response to some but not all vaccinations. It may have the ability to enhance the immune system, but taken in excess, it can become toxic. Taking a vitamin E supplement at the recommended dose should be sufficient.

Selenium
Selenium may help the immune system to fight cancer.
Section 5. How to care for your immune system so that it can do the fighting for you

Don’t smoke.
Nicotine inhibits neutrophil function. Neutrophils are “White blood cells” that are a part of the immune system.

Find good methods for handling stress
Prolonged stress can shut down the immune system. Social stresses may be more damaging than physical stresses. Spending enjoyable or restful time with friends or family can help alleviate stress. Exercise can also help to relieve stress

Avoid Food Poisoning
Take steps to avoid infection, such as washing your hands frequently and cooking meats thoroughly. Stomach flu is nearly always caused by food poisoning. The most common form of food poison is Norwalk virus, which causes vomiting and/or diarrhea for 24 hours. It is transmitted by not washing hands after using the toilet and does not be prevented through proper refrigeration although it will be killed during cooking. About one third of the population is not susceptible to Norwalk virus and many individuals are only partially susceptible, so people who seem healthy can transmit this infection.

Maintain a healthy weight.
Overeating causes fat cells to elicit an inflammatory response. Overweight children may be twice as likely to have a respiratory infection as children who have a healthy weight.

Control your blood pressure.
Infections can cause high blood pressure.

If you drink alcohol, drink only in moderation.
Chronic drinking lowers the body’s ability to fight viruses

Get adequate sleep.
Sleep deprivation lowers T-cell levels in the body and makes individuals more susceptible to illness. There are probably other ways in which the immune system is compromised that have not yet been detected.

Exercise regularly.
It is not known whether exercise directly boosts immunity. However, exercise can help prevent diabetes, high blood pressure, stress and other health problems that can cause a greater risk of infection.

Section 2. Things you can do to avoid taking antibiotics

There are a lot of ways to take care of your body so that you don’t become seriously ill and need antibiotics.

Care for wounds properly.
a. There are a lot of misunderstandings about how to care for wounds. Drying out a wound actually slows down healing and does nothing to prevent infection.
b. When you have a wound, it is important to keep the wound moist and covered. This allows new cells to grow and cover the wound more quickly. The proper way to prevent a wound from drying out is to clean it with soap and water and then apply triple antibiotic ointment, or if it is unlikely to get infected, aquaphor can be applied. Placing a bandage over the wound will help to protect it and to keep the protective barrier of antibiotic ointment intact. If the wound is on the face or will take a long time to heal, triple antibiotic ointment should not be applied daily for extended periods because it can become an allergen with prolonged exposure. Bacitracin, or polysporin are less likely to become allergens, but should still be used judiciously, because both are still likely to become allergens after a long time.
c. If you would like to use Vitamin E oil to reduce scarring, do not use Vitamin E capsules because they contain common allergens to the skin. Instead, purchase a high quality bottle of Vitamin E oil.
d. It is important to change the bandage daily to check the progress of the wound while healing and to apply a clean bandage.
e. If your wound becomes infected, then you should not reuse towels or clothing without washing them. Also, washing with benzoyl peroxide can help prevent skin infections from spreading and can help clear them. You can find benzoyl peroxide washes at the drug store and they are available without a prescription.
f. If a skin infection is not being diminished by triple antibiotic ointment, you may have MRSA. A visit to the doctor may result in a prescription of mupirocin ointment that is effective at treating MRSA. The the infection has not spread elsewhere on the body, disinfectants such as hydrogen peroxide, alcohol, or iodine may help to clear up the infection. They oxidize skin as well as the infectious agent and may slow down the ability of the skin to repair itself, but they are often effective at clearing infections.
Don’t share food and drinks.
Sharing food and water, particularly with children can result in illness. Children are wonderful and it is very easy to give them a drink from a water bottle or soda that you are drinking. The risk of drinking after little children is that they are carriers for Streptococcus including the strains that cause Strep throat. Little children may show no symptoms, or they may have a runny nose but otherwise seem healthy. However, adults can still become infected by Streptococcus strains transmitted through food and drinks by children.

Install brass door knobs in your home and other places, when possible.
Door knobs are covered in bacteria usually. However, this isn’t true if they are made from brass. Copper is a powerful antibacterial (but shouldn’t be ingested at high levels because it is toxic to humans too. That said, if a child manages to swallow a penny without choking to death, no real harm will happen because very little of the copper will actually make it into the blood stream, and the penny will pass through). Brass doorknobs contain copper and are thus less germy than stainless steel, nickel, glass, or other materials.

Maintain good hygiene.
Good hygiene is important for staying healthy, and maintaining healthy populations of bacteria on the skin. While this includes bathing regularly, it also includes brushing teeth twice a day and flossing once a day. It can be very difficult to remove the films of bacteria that grow on teeth if they are allowed to grow for 24 hours without brushing. This can result in bad breath, and gum infections.

Both you and your partner should get checked for sexually transmitted infections before initiating a sexual relationship.
Many sexually transmitted infections can be treated successfully with antibiotics. Syphilis and chlamydia are two that have evolved very little resistance to antibiotics. Gonorrhea however has become resistant to nearly every antibiotic that exists and the time may soon come when it will no longer be curable. The occurrence of sexually transmitted infections also makes people much more susceptible to HIV infections.

Eat healthy foods
Vitamin C can help prevent sore throats and colds. Foods like arugula and basil, pomegranates and blueberries contain natural antibiotics.

β lactams
β-lactam (Penicillin related drugs) are fairly safe antibiotics except that up to 10% of patients can be allergic to them. Common allergic reactions to penicillin include rashes, hives, itchy eyes, and swollen lips, tongue, or face.
In rare cases, an allergy to penicillin can cause an anaphylactic reaction, which can be deadly. This type of reaction usually happens within an hour after you take penicillin. Symptoms include difficulty breathing, hives, wheezing, dizziness, loss of consciousness, rapid or weak pulse, skin turning blue, diarrhea, nausea, and vomiting. If you think you are having an anaphylactic reaction,

Macrolides
Azithromycin and Clarithromycin are two of the most common. Their serious side effects are listed separately below:
Contact your physician and ask whether you should stop taking them if you experience any of these side effects:
• diarrhea that is watery or bloody;
• chest pain, uneven heartbeats;
• nausea, stomach pain, low fever, loss of appetite, dark urine, clay-colored stools, jaundice (yellowing of the skin or eyes); or
• severe skin reaction -- fever, sore throat, swelling in your face or tongue, burning in your eyes, skin pain, followed by a red or purple skin rash that spreads (especially in the face or upper body) and causes blistering and peeling.
Aminoglycosides
Patients should contact their doctors if they experience any of the following serious side effects while on aminoglycoside therapy:

- An allergic reaction (shortness of breath; closing of the throat; hives; swelling of the lips, face, or tongue; rash; or fainting);
- Little or no urine;
- Decreased hearing or ringing in the ears;
- Dizziness, clumsiness, or unsteadiness;
- Numbness, skin tingling, muscle twitching, or seizures; or
- Severe watery diarrhea and abdominal cramps.

Tetracyclines
Patients should contact their doctors if they experience any of the following serious side effects while on tetracycline therapy:

- severe headache
- blurred vision
- skin rash
- hives
- difficulty breathing or swallowing
- yellowing of the skin or eyes
- itching
- dark-colored urine
- light-colored bowel movements
- loss of appetite
- upset stomach
- vomiting
- stomach pain
- extreme tiredness or weakness
- confusion
- joint stiffness or swelling
- unusual bleeding or bruising
- decreased urination
- pain or discomfort in the mouth
- throat sores
- fever or chills

Exercise and sleep
Both exercise and sleep are necessary for a healthy immune system. Additionally, doing both of these things can help avoid other health problems such as heart attack, stroke, cancer and gastric bypass surgery. For all of these health concerns, antibiotic resistant infections are a serious threat. Any time surgery occurs, or the immune system is compromised through chemotherapy, the risk of contracting an infection increases greatly. 10% of cancer patients are admitted to the hospital with antibiotic resistant infections. Proper sleep can help people avoid accidents that could cause injuries.

Avoid going to the hospital unless it is necessary
The hospital is full of the sickest people and houses the most resistant bacteria. Going to the hospital for any reason puts you at risk for multidrug resistant bacterial infections. While the hospital is a good place for life support equipment, doctors, surgeons and expensive medical devices that can save lives, it is a risky and dangerous place to be. Unless absolutely necessary to be at a hospital for those resources, it is much safer to recover and receive treatments at home than in a hospital.
Section 3. What to do when you after you have taken antibiotics

When you take antibiotics, it kills off non-pathogenic bacteria along with the pathogens. This can result in being sick while non-pathogenic bacteria become re-established. This does get better with time but can take up to six months. These are some things that can help.

Use probiotics

Probiotics contain non-pathogenic bacteria that are found in healthy individuals. There are probiotics that can help restore the GI tract microbial communities, and there are also probiotics to restore vaginal flora. Both of these are available at most drug-stores.

Eating foods with bacteria.

There are many foods that contain non-pathogenic bacteria. Yogurt, cheese, pickles, sauerkraut, and kefir, contain cultures of bacteria. Fruits and vegetables have some bacteria in low frequencies on them, and the fiber in them can help to promote the growth of beneficial bacteria. Additionally, whole milk from any mammal will likely promote the growth of non-pathogenic bacteria. Human milk has been shown to have sugars that specifically promote the growth of bacteria, and that are not digestible by humans. This is likely the case for other mammalian species such as cows and goats.

Avoid hospitals if at all possible.

Clostridium difficile infects people for up to six months after taking antibiotics. This is often acquired in hospitals.

Section 4. Antibiotics

Antibiotics are drugs and like most drugs, they have side effects that can make you very sick.

Fluoroquinolones

Fluoroquinolones are the most dangerous antibiotics, with the most harmful side effects.

Fluoroquinolones are associated with an increased risk of tendinitis and tendon rupture.

This risk is further increased in those over age 60, those on concomitant steroid therapy, as well as in kidney, heart, and lung transplant recipients. The fluoroquinolone should be discontinued if the patient experiences pain or inflammation in a tendon (symptoms that may precede rupture of the tendon), or tendon rupture. Patients, at the first sign of tendon pain, swelling, or inflammation, should stop taking the fluoroquinolone, avoid exercise and use of the affected area, and to promptly contact their healthcare provider about changing to a non-fluoroquinolone antimicrobial drug.

Fluoroquinolones are also associate with Peripheral neuropathy.

This is damage to the nerves that send information to and from the brain and spinal cord and the rest of the body. Damage interrupts this connection, and the symptoms depend on which nerves are affected. In general, the symptoms are in the arms and legs and include numbness, tingling, burning, or shooting pain.

Peripheral neuropathy symptoms typically begin rapidly, within a few days of starting the fluoroquinolones. Nerve damage symptoms may last for months or even be permanent, despite stopping the drug. The risk for peripheral neuropathy appears to affect only those who take fluoroquinolones by mouth or by injection. Fluoroquinolones used in the eyes or ears are not linked to the risk.

Contact your doctor immediately if you develop numbness, tingling, weakness, burning, shooting pains, or other symptoms while taking a fluoroquinolone.

Your doctor may tell you to stop taking the medication and prescribe a different type of drug, unless the benefits of fluoroquinolones outweigh the risks. Never stop taking any medication before first talking to your doctor.