MERIT BADGE SERIES

PUBLIC HEALTH

BOY SCOUTS OF AMERICA®

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"Enhancing our youths' competitive edge through merit badges"

BOY SCOUTS OF AMERICA®

Requirements

Always check www.scouting.org for the latest requirements.

1. Explain what public health is. Explain how *Escherichia coli* (E. coli), tetanus, AIDS, encephalitis, salmonellosis, Lyme disease, and coronavirus (COVID-19) are contracted. Then, pick any four of the following diseases and explain how each one is contracted and possibly prevented: gonorrhea, West Nile virus, botulism, influenza, syphilis, hepatitis, emphysema, meningitis, herpes, lead poisoning. For all 10 diseases, explain the type or form of the disease (viral, bacterial, environmental, toxin), any possible vectors for transmission, ways to help prevent exposure or the spread of infection, and available treatments.

2. Do the following:
   a. Explain the meaning of *immunization.*
   b. Name eight diseases against which a young child should be immunized, two diseases against which everyone should be reimmunized periodically, and one immunization everyone should receive annually.
   c. Using the list of diseases and conditions in requirement 1, discuss with your counselor those which currently have no immunization available.

3. Discuss the importance of safe drinking water in terms of the spread of disease. Then, demonstrate two ways for making water safe to drink that can be used while at camp. In your demonstration, explain how dishes and utensils should be washed, dried, and kept sanitary at home and in camp.

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4. Explain what a vector is and how insects and rodents can be controlled in your home, in your community, and at camp. Tell why this is important. In your discussion, explain which vectors can be easily controlled by individuals and which ones require long-term, collective action.
5. With your parent's and counselor's approval, do ONE of the following:
    a. Visit a municipal wastewater treatment facility or a solid-waste management operation in your community.
        (1) Describe how the facility safely treats and disposes of sewage or solid waste.
        (2) Discuss your visit and what you learned with your counselor.
        (3) Describe how sewage and solid waste should be disposed of under wilderness camping conditions.
    b. Visit a food service facility, such as a restaurant or school cafeteria.
        (1) Observe food preparation, handling, and storage. Learn how the facility keeps food from becoming contaminated.
        (2) Find out what conditions allow microorganisms to multiply in food, what can be done to help prevent them from growing and spreading, and how to kill them.
        (3) Discuss the importance of using a thermometer to check food temperatures.
        (4) Discuss your visit and what you learned with your counselor.
6. Do the following:
    a. Describe the health dangers from air, water, and noise pollution.
    b. Describe health dangers from tobacco use and alcohol and drug abuse.
    c. Describe the health dangers from abusing illegal and prescription drugs.

7. With your parent's and counselor's approval, do ONE of the following:

   a. Visit your city, county, or state public health agency.

   b. Familiarize yourself with your city, county, or state health agency's website.

   After completing either 7a or 7b, do the following:

   (1) Compare the four leading causes of mortality (death) in your community for any of the past five years with the four leading causes of disease in your community. Explain how the public health agency you visited is trying to reduce the mortality and morbidity rates of these leading causes of illness and death.

   (2) Explain the role of your health agency as it relates to the outbreak of diseases.

   (3) Discuss the kinds of public assistance the agency is able to provide in case of disasters such as floods, storms, tornadoes, earthquakes, and other acts of destruction. Your discussion can include the cleanup necessary after the disaster.

8. Pick a profession in the public health sector that interests you. Find out the education, training, and experience required to work in this profession. Discuss what you learn with your counselor.

Contents

Introduction

The field of public health deals with maintaining and monitoring the health of communities, and with the detection, cure, and prevention of health risks and diseases. Although public health is generally seen as a community-oriented service, it actually starts with the individual. From a single individual to the family unit to the smallest isolated rural town to the worldwide global community, one person can influence the health of many.

The public health team is made up of all sorts of members working at all levels of health care. For example, a health care provider might treat a patient for fever, vomiting, and diarrhea that was caused by a bacteria (E coli, Campylobacter, or salmonellosis). The provider reports the case to the local health department. From there, local or state public health officials might be called to investigate multiple reports of food poisoning in the area, locate the source of the infection, and initiate prevention and containment programs to help prevent others from becoming ill.

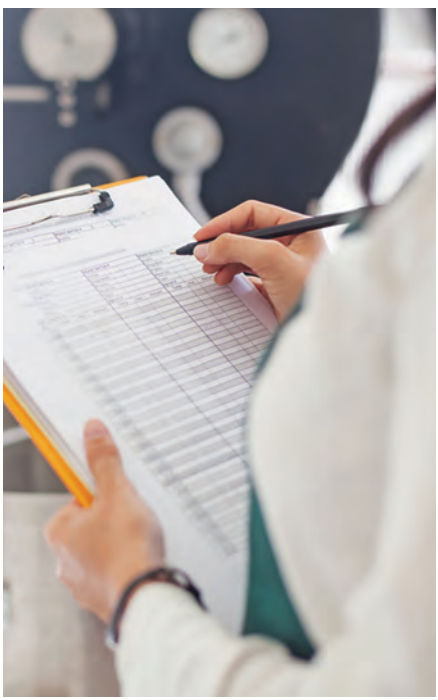
As you work on the Public Health merit badge, remember that public health begins with the individual—with you—and from there grows out into the community, and into the whole world. What you learn in earning this merit badge can be of as much value to you and your own personal health as it is to your entire community.

Public Health Goals

The four main goals of public health are

- To help prevent disease and injury
- To teach people how to be healthy
- To provide basic health services to certain communities
- To help protect people from environmental hazards such as pollution

Public health officials work to prevent disease by attacking the sources of diseases. When efforts to prevent a disease fail, health workers try to contain the source of a disease or an outbreak of illness.



Health officers enforce laws that help ensure the public's well-being.

As you can see, the goals of public health cover many different types of health issues. Because of this, many types of public health specialists with different responsibilities work together to try to meet these goals.

Local health *inspectors* make sure that health codes and regulations are being followed. They may drop by restaurants to ensure that foods are stored at the right temperature, dishes are washed properly, and the people handling food are following food-safety rules. Other kinds of inspectors will check a city's drinking water for dangerous levels of contaminants such as lead and arsenic or bacteria.

Many public health scientists investigate and research the unidentified causes of illnesses. These are the detectives of the public health world, and they are called *epidemiologists.* For example, after an outbreak of birth defects in babies worldwide, the Zika virus spread by mosquitoes was identified. When there is an outbreak of food poisoning, public health scientists try to track down the source, such as a supply of hamburger meat infected with the bacterium *Escherichia coli.*

The federal and state governments employ many kinds of public health workers, like this lab technician.

Doctors and nurses are often public health workers, especially those who work at community clinics or travel to serve remote communities. Many people live far away from hospitals and doctors' offices. The traveling medical units of public health agencies help these people by providing the medicines and checkups they need.

An *epidemic* is an outbreak, or sudden increase, of a disease that spreads quickly and widely, infecting many people at the same time. You probably have heard of or even experienced a flu epidemic. *Epidemiology* is the medical science that studies the occurrence and spread of diseases in places like a school or summer camp, and on a larger scale in cities, counties, states, nations, and even worldwide.

Some members of the public health community are educators. They may visit individual families, schools, and workplaces to teach people about the hazards they might encounter at home, in the community, or at work. For instance, they may visit factories to teach people how to protect themselves from hearing loss or other injuries. The educators may also instruct workers on the proper method of wearing the protective gear their employer provides.

Epidemiologists and *biostatisticians* keep records about the occurrence of diseases, injuries, and other threats to public health, often helping to develop new laws and regulations that help control public health risks. They provide reports that help communities predict such things as when to spray for mosquitoes or offer an immunization to help prevent an outbreak of disease.

National Health Services

In the United States, the Department of Health and Human Services (HHS) oversees many of the efforts to protect public health. The head of the department—the secretary of Health and Human Services—is appointed by the president of the United States.

The HHS is made up of many large agencies that specialize in various areas of public health. For example, the **Centers for Disease Control and Prevention** tracks data and trends related to diseases, and works to prevent the spread of disease. Together with state, county, and city health departments, the CDC provides immunizations, monitors the safety of drinking water, and investigates outbreaks of disease. Inside the CDC are many organizations that specialize in different areas of public health, such as birth defects, workplace safety, and infectious diseases.

The CDC's website, www.cdc.gov, is full of information about hundreds of issues, including travelers' health, nutrition, and fighting the flu.

Dentists and veterinarians are also part of the public health realm. Oral health is vital to an individual's well-being. Rabies and other diseases that can affect wild and domesticated animals are also a public health concern.

The **Food and Drug Administration** ensures that *pharmaceuticals* (drugs), cosmetics, and foods are safe for our use and consumption. The FDA tests drugs before they are put on the market, and approves and licenses them for human consumption and for sale. The FDA issues *consumer alerts* that warn people about things that might pose a risk to someone, such as tobacco products or some food additives, or maybe even trace amounts of peanut oil in a plain brownie mix. An alert like this could save the life of someone who is highly allergic to peanuts. The FDA also can prohibit the sale of a food or drug that it decides is too dangerous.

Another federal agency involved in public health is the **National Institutes of Health,** which conducts research in its own laboratories. It also helps other organizations, such as universities, hospitals, and medical schools, discover ways to prevent and cure illnesses all over the world. One way the NIH supports research is by maintaining the National Library of Medicine. Now available online, this is the largest research library of health sciences in the world. This library is an important source of information for scientists, health care providers, epidemiologists, and biostatisticians.

Other federal agencies also assist in public health efforts. For example, the **Environmental Protection Agency** investigates and regulates pollution. It might enforce regulations that limit the amount of chemicals a factory can discharge into a river or the air.

The **Public Health Service Commissioned Corps** is another significant branch of the HHS. According to its website (see the resources section), this unique agency has programs that

- Provide health care and related services to medically underserved populations.
- Prevent and control disease, and identify and help correct health hazards in the environment.
- Promote healthy lifestyles.
- Ensure the safety and effectiveness of drugs and medical devices, and the safety of food, cosmetics, and electronic products.
- Conduct and support biomedical, behavioral, and health services research, and assist in the distribution of the research results to health-care professionals and the public.
- Work with other countries and international agencies on addressing global health problems and developing solutions.

A uniformed service of the United States that is led by the U.S. Surgeon General, the PHS Commissioned Corps is a specialized career system "designed to attract, develop, and retain health professionals who may be assigned to federal, state, or local agencies or international organizations to accomplish its mission." This agency furnishes health expertise "in time of war or other national or international emergencies."

State, City, and Local Health Services

Local health agencies provide many public health services, some required by federal or state law. They provide drug rehabilitation programs and educate citizens about violence and injury prevention. Many local health departments also sponsor health clinics. Well-baby clinics promote good health in infants, while immunization or screening clinics stress disease

prevention. Other clinics may promote dental health or general health. Such agencies may also provide rabies control programs. They keep vital statistics about births, deaths, and marriages and the incidence of disease in a community.

Every local health department has an office that handles records of reportable diseases. A *reportable disease*—such as gonorrhea, Lyme disease, or influenza—is one that health officials and doctors are required to report to the local or state health department. When doctors report these cases, the identity of the infected person remains confidential. The local health department summarizes the number of cases and reports these findings to the state health department, which in turn notifies the federal government at the CDC.

Zoonotic diseases—diseases that affect both humans and animals—such as rabies, must be reported by veterinarians to local or state health departments.

Health clinics run by local physicians, dentists, and nurses, and public health rabies clinics run by veterinarians, usually are open to everybody.

Morbidity is the incidence of disease in a population. *Mortality* is the rate of deaths in a population. Both usually are expressed as the number of incidents per 1,000 citizens during a year.

A division of environmental health within the local department of health, or a department of public works, typically supervises a city's water and sanitation services. Services include delivering clean, *potable* (drinkable) water to homes; processing sewage and other household wastes; and disposing of solid wastes. This department might help to control pests that can carry diseases or endanger public health. Department employees might also inspect public swimming pools, local lakes, and waterfronts to ensure that the water is safe for swimming.

When a disaster such as a flood or earthquake strikes, public health departments help the community in many ways. If a hospital is flooded, public health workers may help move patients from that hospital to a nearby facility. Public health departments may also issue press releases to the media to help citizens know when it is safe to return home. Information may include tips about avoiding floodwater, which may carry disease, or staying clear of fallen power lines, which can be deadly. Public health workers might hand out clean drinking water or set up field medical units to help injured people.

Private Health Services

Some agencies that promote public health are supported by private funds and donations. Private agencies typically focus on a single problem area, help people affected by the problem, and sponsor research that might solve the problem. The **National Society for the Prevention of Blindness** is an example.

Public and private agencies may concentrate on the same problem and work together to seek solutions. For example, understanding the processes that start and promote cancer is important to both the **National Cancer Institute** (a federal agency) and the **American Cancer Society** (a private organization). Both agencies sponsor cancer research, seeking better methods for detecting and treating cancer.

Protecting the public health is everyone's responsibility. Each one of us can help ensure everyone else's health and safety by not polluting the air, water, or environment. Individuals also can help by maintaining healthy lifestyles. Communities can help by keeping streets and municipal properties clean and free of litter and by providing a pure water supply and sanitary waste disposal systems.

Adult specimen of a pork tapeworm, taken from the intestine of a human

Diseases

One of the responsibilities of public health professionals is to become familiar with diseases, their causes, and their cures to help protect the public. But individuals also can help maintain public health, and their own health, by learning about diseases.

Factors such as the natural spread and transmission of diseases, overcrowding in many underdeveloped countries, the ease of world travel, and the potential spreading of previously rare or unknown diseases through the use of infectious agents in warfare all make the responsibilities of today's public health officials more challenging.

Causes of Disease

Many diseases are caused by bacteria, viruses, parasitic worms, protozoa, fungi, and other *pathogens,* or disease-causing organisms that invade the body. Some examples of these *infectious diseases* are tetanus (bacterial), influenza and coronavirus (viral), athlete's foot (fungal), and hookworm (parasitic).

Other diseases are caused by the *environment*. For example, overexposure to the mineral lead can cause mental impairment and death. Benzene, a chemical found in tobacco smoke, vehicle exhaust, detergents, and other sources, can cause leukemia.

Diseases that are passed through the genes, from parents to offspring, are known as *hereditary* diseases. Examples include sickle-cell anemia and hemophilia.

Still other diseases may be caused by *poor lifestyle choices.* For example, cardiovascular, or heart, disease is the leading cause of death in the United States. Encouraging healthy dietary habits and regular physical activity can markedly reduce the numbers of deaths from heart attacks each year.

We call diseases *communicable* if they can be spread from one person to another. Diseases that cannot be spread this way—such as heart disease and diabetes—are *noncommunicable.* We call diseases *zoonotic* if they can be transmitted between humans and animals.

Prevention, Treatments, and Cures

Immunizations, or *vaccines,* offer protection against many infectious diseases.

Prevention is the best way to control disease. But after a person has become sick, the goal of health professionals is treatment.

Many types of treatment have been developed for battling infections. Medicines called *antibiotics* cure some diseases by killing or inhibiting bacteria, and antiviral medications treat infections caused by a virus.

However, some bacteria and viruses have become resistant to the drugs usually used for treatment. The diseases caused by such drug-resistant pathogens are becoming increasingly difficult to cure. Tuberculosis was almost eradicated, but new strains of it are causing worldwide epidemics.

Many diseases, such as AIDS and arthritis, have no medicinal cure. However, medicines and therapies can offer a great deal of help with these diseases. A person with emphysema, for instance, often benefits from breathing exercises and drugs that help dilate (open up) air passages. Physical therapy and drugs that help reduce inflammation in the body (anti-inflammatory medicines) can help people with arthritis.

Antibodies and Immunizations

In most cases, when the body is infected with a disease, it responds naturally (with help from its *immune system*) by making special substances called *antibodies* that fight the pathogen causing the disease. Often, a person's body can cure itself of a disease, such as a cold or the flu, because antibodies have been hard at work.

Antibodies play an important role in *immunization* (also known as *inoculation* or *vaccination*). Some vaccines are made of live viruses that are greatly weakened in a laboratory. If a person comes in contact with a virus for which they received a vaccine, the body responds by fighting off the infection with its own antibodies. Other vaccines are made from killed bacteria or related organisms that cause a similar but milder disease. This triggers the body's immune system to respond as if the disease was present and produce antibodies. Vaccinations can help the body build resistance to some diseases.

Immunization is one of the best ways to protect health and help us avoid infectious diseases.

The idea of vaccination is not new. People have long noticed that individuals who survive a certain disease rarely get the disease a second time. Edward Jenner (1749–1823), an English physician, created the first modern immunization program. Dr. Jenner ground up scabs from people infected with cowpox, which affected people who work with cattle, and poked this material under the skin of others who did not have active cases of cowpox. The people he treated got mild cases of cowpox and became immune to the closely related smallpox virus, a deadly disease at the time. Before immunizations became available, one-third to one-half of all smallpox victims died. The survivors usually were badly scarred. Today, through public health–sponsored international immunization programs, smallpox has been eradicated all over the world.

Regular checkups help ensure you stay on track with the recommended vaccine schedule.

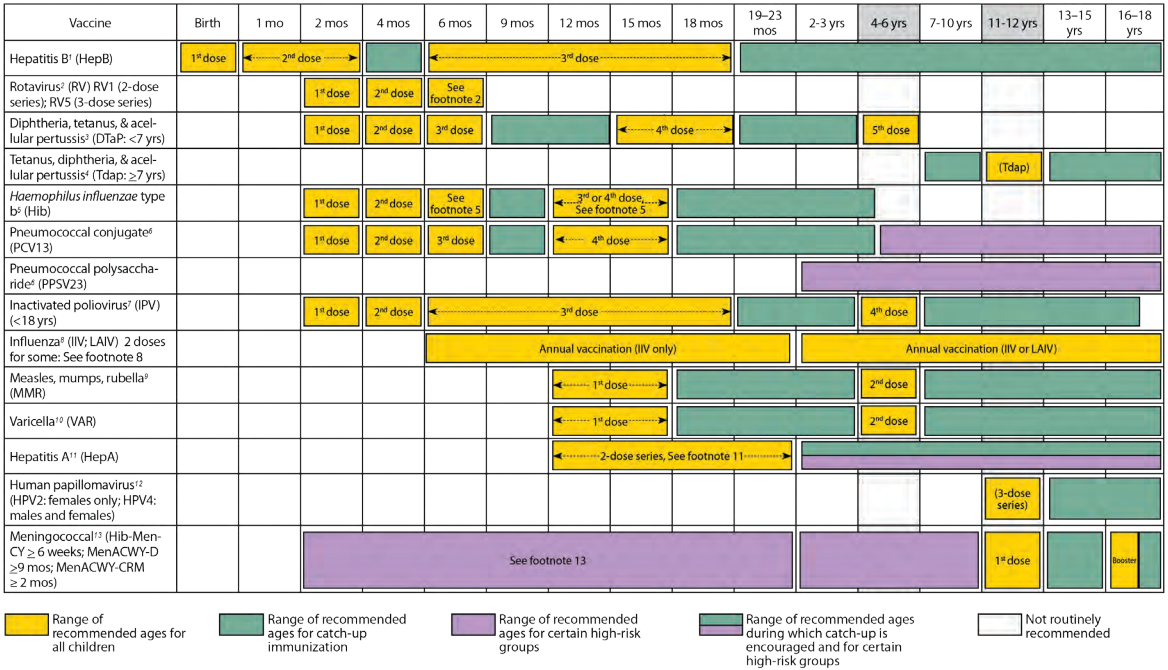
The immune system makes antibodies for each particular disease that it meets. Therefore, a different vaccine is needed for each disease. Immunization is available today against many diseases found in the United States, including diphtheria, pertussis (whooping cough), tetanus, polio, mumps, red measles (rubeola), German measles (rubella), certain strains of influenza, hepatitis A and B, and chicken pox. Immunizations also are available for many other diseases that are uncommon in the United States but common in other parts of the world, such as yellow fever and typhoid fever. Americans typically receive these immunizations when they travel out of the country or join the armed forces.

Immunization is suggested for very young children, with periodic booster injections as recommended. Antibodies are long-lasting, but the protection they give may decrease with time. A second exposure to a pathogen will increase the level of antibodies a person's body will produce. So a second injection, or *booster shot,* often is given to help strengthen immunity.

Adults need immunizations, too. For example, tetanus boosters need to be given every 10 years.

Some vaccines are swallowed; others are injected.

Recommended Immunization Schedule for Persons Through Age 18



This schedule includes recommendations in effect as of Jan. 1, 2014. Vaccination providers should consult the relevant Advisory Committee of Immunization Practices (ACIP) statement for detailed recommendations, available online at www.cdc.gov/vaccines/hcp/acip-recs/index.html. This schedule is approved by the Advisory Committee on Immunization Practices, the American Academy of Pediatrics, the American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists.

Early Detection

After a person has been exposed to an infectious agent such as a bacteria, virus, parasite, or fungus, some time may pass before symptoms appear. During this *incubation period,* the infectious agent often multiplies and spreads in the body. The incubation period for the common cold is about a week. Some diseases, however, have long incubation periods, sometimes called a long *latent period.* Examples of these diseases include tuberculosis, Bovine Spongiform Encephalopathy (Mad Cow), and HIV/AIDS.

Many of the people who are infected with tuberculosis are not aware of their infection. Tuberculosis saps a person's strength and vitality. Sometimes the disease attacks the organs. It is spread by lung discharges, like coughs. AIDS is a disease that is spread through various bodily fluids, such as blood or semen. People who do not know that they have the virus that causes AIDS can spread the deadly disease for years before they show symptoms themselves.

Clearly, it is important to detect diseases as soon as possible after they develop. Public health providers can be a great help in the early detection of diseases through testing and routine screening as well as educating the public about diseases.

Early detection and treatment of disease greatly increase the chances of a disease being cured or its negative effects being slowed, and greatly decrease the chance that the disease is passed on to other people.

Screening Tests

Public health workers often conduct *screening tests* to discover diseases and infections among large groups of people. Screening tests usually are given in convenient, public locations such as schools, shopping centers, neighborhood health centers, or specially equipped trailers that can easily be moved and set up.

Health screening tests vary. Skin tests are used to detect allergies or tuberculosis. The test for tuberculosis is required for all commercial food preparers and handlers, for health care workers, and for those in many other service professions. Chest

radiographs (X-rays) are used to screen for cancer, tuberculosis, and other lung diseases. Blood tests can detect AIDS, other sexually transmitted diseases, hepatitis, thyroid problems, and diabetes.

Screening tests are not meant to make a final diagnosis or to identify a disease. People who have positive results on screening tests should have more precise tests done. A personal health care professional should be consulted after any positive screening test.

X-rays are used to diagnose a variety of diseases and conditions. An X-ray machine's invisible electromagnetic beams produce images of tissues, bones, and organs for analysis on special film or digitally on a computer.

Common Diseases

Hundreds of diseases around the world can infect humans. While some of these diseases might be considered "exotic" or "foreign" to the rest of the world, they could be classified as "common" diseases to the affected area and its population. Many factors help determine the spread or containment of these diseases. For instance, some diseases

- Are common and deadly in one area and not another, such as malaria and cholera
- May have been common in some parts of the world and then may start appearing in another part, such as West Nile virus, Zika, and the Ebola virus
- Were once common but are now controlled or wiped out, such as smallpox
- May have a limited effect because of natural barriers (forests, jungles, mountain ranges) or climate factors (as with tropical rain forest diseases)
- Are found in specific genetic populations (for example, hemophilia) or because of cultural practices (hepatitis B is one example)

A *vector* is any animal or insect that can transmit a disease to a human. Flies, mosquitoes, ticks, and rats are common vectors. Covering trash, disposing of pet feces, removing standing water, and clearing debris and overgrown plants from your property will help keep vectors away. In the interest of public health, communities work together to keep vector-borne diseases at a minimum. Regular garbage pickup, mosquito surveillance and treatment, and enforcement of health codes are just some of the ways cities help control vectors.

Individuals can help prevent disease by making their living spaces inhospitable to vectors such as rats.

Some diseases are easily described; others do not fall into neat categories. For example, a virus, a bacterium, or even another source can bring on meningitis. Some diseases that generally are known as sexually transmitted diseases can be spread in other ways as well. *Vectors* such as mosquitoes and ticks spread many diseases. Other diseases are the result of environmental sources, such as secondhand smoke.

All of us should learn about common diseases in our area and what we can do to help prevent them; this is where public health starts. Following are some diseases that are common concerns for public health in the United States.

People with viral respiratory infections are contagious one day before and up to two weeks after they show symptoms.

Coronavirus and Influenza (the Flu)

Coronavirus and influenza are caused by viruses. They affect respiration (breathing). Symptoms include fever, muscle aches, sore throat, and a dry cough. Some people also experience nausea, vomiting, and diarrhea.

Specific viral respiratory diseases like the flu and coronavirus are extremely contagious and can spread around the world (called a *pandemic*). A sneeze or cough can carry virus-infected droplets through the air up to 3 feet, where they might fall on another person or an object people share. People with weakened immune systems, such as the elderly, can contact diseases at a substantially higher rate than more healthy populations. However, all age groups can become infected. To avoid infection, everyone must cover their mouths when coughing or sneezing and wear masks when appropriate. We must frequently wash our hands and avoid contact with others. All of these practices can greatly reduce the spread of viral respiratory disease infections.

Whenever handling food and after going to the bathroom, hand washing with soap and water will help keep you—and others—healthy.

Everyone over the age of 6 months should get a flu vaccine each year, especially those with weakened immune systems and the elderly. Each year, many Americans die from the flu and related complications like pneumonia. Vaccinations have been developed, but because the flu virus has many different strains, the vaccine may not keep a person from getting some form of the flu. Antiviral medicines may help lessen the severity of the flu and other viral respiratory infections.

Hepatitis

Hepatitis is a virus that attacks the liver. There are several types of hepatitis but the major types are type A, type B, and type C. In many cases of hepatitis, a person will not have any symptoms of the disease. When symptoms do appear, they can be similar to those of the flu. *Jaundice* may also occur.

Jaundice is the yellowing of skin and eyes. It signals that the liver is not functioning properly.

Type A hepatitis is spread through contaminated fecal matter. When people do not wash their hands well after using the bathroom and then handle food, they can pass on hepatitis to unsuspecting diners. Water can be infected by animal or human fecal matter, too. There usually is no long-term infection for hepatitis A, but types B and C can lead to serious liver disease and liver cancer.

Hepatitis B and C are spread through infected bodily fluids such as saliva, semen, and blood. An estimated 1.2 million Americans have hepatitis B, and as many as 4 million Americans have been infected with hepatitis C. Most of these people do not know they have hepatitis. Over the last few years great advances have been made in treating hepatitis C. The CDC estimates that 1 in 4 infected with hepatitis C may be able to be cured with proper treatment. There is still no cure for hepatitis B, but a vaccine to prevent this type is available for all age groups.

The tools of tattoo artists can transmit hepatitis.

All forms of hepatitis can be prevented by practicing good sanitation and personal hygiene, treating water that is not potable (drinkable), sterilizing medical supplies and equipment, and isolating people who have hepatitis A. To prevent the spread of hepatitis, do not share razors, toothbrushes, or any other items that could have tiny, even invisible amounts of blood on them. Also, when visiting countries where type E hepatitis has been found, drink only water that has been boiled.

Meningitis

Meningitis is an infection that causes inflammation of the *meninges,* the tissue surrounding the brain and spinal cord. It can be caused by many different viruses, bacteria, and even fungi.

The signs of meningitis usually include headache, high fever, and a stiff neck. There may also be sensitivity to light, vomiting, confusion or drowsiness, and a rash. The symptoms in babies include fever, refusal to eat, and difficulty in being awakened.

Viral meningitis is serious but not usually fatal. Bacterial meningitis, however, can cause brain damage, hearing loss, and death within just a few hours. That is why it is important to go to the doctor or hospital immediately if you think you have meningitis. Bacterial meningitis is treated with antibiotics. Viral meningitis may be treated with antiviral drugs or left to resolve itself. Fungal meningitis can be treated with an antifungal medicine.

A procedure called a *spinal tap,* during which a doctor takes a sample of fluid from near the spine, lets the doctor know what kind of meningitis, if any, a person has.

Many types of meningitis are spread by respiratory and throat secretions, such as mucus and saliva. A cough can spread the bacteria or virus into the air or onto things like telephones. Wash your hands often to help avoid transferring the bacteria and viruses to yourself.

Sometimes, small epidemics of meningitis occur among people living in close quarters—places like college dorms, day-care centers, and military barracks.

Emphysema

Long-term second hand smoke exposure can also lead to lung diseases in nonsmokers and must be avoided.

Emphysema is a lung condition that makes it hard for a person to get enough oxygen. The small air sacs, or *alveoli,* in the lungs lose their elasticity and become much less efficient at delivering oxygen to the blood and carrying carbon dioxide away from it. As a result, people with emphysema have trouble taking deep breaths and can become very tired after walking a short distance. Emphysema can be diagnosed by examining the lungs and by testing how strongly a person can exhale.

Emphysema is a chronic condition, and it has no cure. There are many medicines that can slow down the disease's progress and reduce inflammation and possible infections. There is no immunization for emphysema.

Air pollution, airborne toxic chemicals, and heredity contribute to emphysema, but 80 to 90 percent of emphysema is caused by smoking. The best way to keep people from getting emphysema is to keep our air clean and to encourage people not to smoke. Emphysema is a serious disease that is highly preventable.

A *chronic* disease or condition is one that lasts a long time or recurs over and over. An *acute* disease or condition lasts only a short time.

Tetanus

Tetanus is caused by a toxin formed when *Clostridium tetani* bacteria enter the body through a wound or break in the skin, most commonly through a puncture wound, such as you might get if you step on something sharp. Tetanus bacteria normally live in soil, dust, or animal droppings. Rust does not cause tetanus, but the tetanus bacteria live in *anaerobic,* or oxygen-free, conditions under rust.

The disease causes painful stiffness of muscles, *lockjaw* (the inability to open the jaw), muscle spasms, and in some cases, death. Symptoms appear from three to 21 days after infection.

Tetanus is easy to avoid because proper immunization gives complete protection. But the protection is not lifelong. Medical experts recommend a booster injection every 10 years. Most physicians will give a booster shot after any injury to a patient even if the person has been previously immunized. If the person has never received a tetanus shot, an immediate injection of tetanus antitoxin will provide protection. Tetanus immune globulin (plasma that contains antibodies) will be given to people who have tetanus, along with additional medical care.

Protection against tetanus is especially important for people who spend a lot of time outdoors. Gardeners and other people who work with manure-rich soil should wear gloves for protection against tetanus.

Lead Poisoning

Lead poisoning is caused by breathing in or ingesting (eating or drinking) the metal lead. Lead stays in a person's body and builds up over time. Eventually, lead poisoning can harm the brain, nerves, and blood. There is no immunization against lead poisoning. Doctors can help a person get rid of some lead in the body, but the damage already done is permanent.

Be careful when you participate in activities and hobbies that involve lead, such as soldering and stained-glass making.

Some people think that lead poisoning contributed to the fall of the Roman Empire because lead was commonly used in ancient times for things such as cooking utensils, water pipes, and even makeup.

If you would like to have your house or building inspected for lead, contact your local public health department.

Lead is found in many places. House paint used before 1978 may contain lead. The paint dust, flakes, and chips might be breathed in or accidentally ingested. Small children often gnaw on windowsills and other painted surfaces. They also frequently put their hands into their mouths. These practices may cause the children to ingest more lead than the adults living in the same house.

Children are especially vulnerable to lead poisoning because their growing bodies absorb lead very easily. However, children whose healthy diets include enough calcium and iron don't absorb lead as quickly as children who are not getting enough nutrients. Wash a child's hands and toys often, and use a damp sponge to keep surfaces clean of possible lead dust.

Soil can contain lead, too, from deteriorating buildings and from the lead in car exhaust. Lead pipes and solder used in older homes can add lead to the water. In older homes that have lead pipes, lead poisoning can be avoided by using cold water for drinking and making baby formula. Hot water that runs through old pipes will contain more lead than will cold water. Food or drink held in lead-glazed pottery is another source of lead buildup in a person's body.

E. Coli Poisoning

Escherichia coli is a bacterium that causes a type of food poisoning. Different strains of *E. coli* normally live in the intestines of humans and other animals and help with digestion. But some strains cause illness and others produce toxins that are among the most poisonous substances known.

The symptoms of *E. coli* poisoning can include bloody diarrhea and stomach cramps. People usually recover on their own in a week. However, serious complications can develop in children and elderly people that lead to kidney failure and death.

There is no vaccination for *E. coli.*

Eating undercooked beef or eating unwashed fruits and vegetables are ways to get an *E. coli* infection. Unpasteurized juices and alfalfa sprouts often are culprits. People with diarrhea can spread *E. coli* to others if they do not wash their hands thoroughly or if they go swimming in a public place. Be careful not to ingest water from a swimming pool, lake, or other place where even small amounts of human and animal feces may exist.

Report any cases of food poisoning to your local health department so that public health workers can help prevent other people from getting sick by the same means you did.

Always wash your hands well after handling reptiles, amphibians, fish, and pet birds—these critters can carry salmonella bacteria.

Salmonellosis

Salmonellosis is a type of food poisoning caused by bacteria that live in the intestines of animals and are transferred by feces. Unwashed, raw vegetables are a common source of salmonella because of the dirt and fertilizer often found on them. Undercooked meats, including beef and poultry, can harbor salmonella. Unwashed eggshells and the contents of eggs can be a source of salmonella, too. The bacteria also are found on reptiles, amphibians, fish, and pet birds.

The symptoms of salmonellosis include vomiting and diarrhea, which occur 12 to 72 hours after infection. In children, the elderly, and people with weakened immune systems, salmonella poisoning can be serious and cause death. Treatment includes keeping the person *hydrated* (giving them plenty of water) and preventing the infection from spreading to others through cross-contamination by food, water, and food utensils. Most healthy people can overcome salmonellosis on their own in about a week.

There is no vaccine for salmonellosis. The best ways to prevent illness are to eat meats that are cooked well enough to kill the bacteria; wash all fruits and vegetables; always prepare food on a clean surface using clean utensils; and avoid foods made with uncooked eggs, such as cookie dough.

Botulism

Botulism is caused by a nerve toxin generated by *Clostridium botulinum* bacteria. Botulism is most often a result of improperly home-canned foods. Oils infused with garlic or herbs and left at room temperature may also grow spores.

Symptoms appear between six hours and 10 days after a person ingests toxin-infected food. Botulism causes paralysis that moves through the body. Blurred vision, slurred speech, difficulty swallowing, and muscle weakness are signs that a person has botulism. When the paralysis reaches the breathing muscles, a person can die.

Ventilators and other advanced care in a hospital help a person stay alive while the body fights the toxin. There is no vaccine for botulism, but if diagnosed early, a patient can be treated with an antitoxin to help prevent the spread of the toxin through the blood.

Unpasteurized honey is another source of botulism poisoning. Children younger than 1 year old are susceptible to infant botulism and should never consume honey.

HIV/AIDS

Acquired immunodeficiency syndrome (AIDS) is a deadly disease caused by the human immunodeficiency virus (HIV). AIDS greatly weakens a body's immune system.

HIV/AIDS is spread through bodily fluids such as blood and semen. Sexual contact can transmit AIDS. People who share hypodermic needles can pass blood, and AIDS, from one person to another. Babies can get AIDS from their mothers. Treatment of the pregnant mother may prevent this.

There is no vaccination or permanent cure for AIDS. There are many useful drug treatments, however, that can prevent the HIV infection from developing into AIDS or treat AIDS if it does develop.

Gonorrhea

Gonorrhea is a bacterial infection that most often affects the mucous membrane in the genital area. However, it can also affect the throat and anal areas. Gonorrhea, which is spread through sexual contact with an infected person, is very common. When left untreated, it can lead to serious illness.

The symptoms of gonorrhea usually are obvious in men: pain when urinating and an abnormal discharge from the penis. Symptoms in women are often mild or nonexistent. However, gonorrhea can develop into a serious infection in women called *pelvic inflammatory disease.* In both men and women, untreated gonorrhea can get into the bloodstream and cause damage to organs and joints.

Gonorrhea is a reportable disease, so once a person is diagnosed with the infection the health care provider must notify the Public Health Department, which in turn will notify all those with whom there has been sexual contact.

Gonorrhea is diagnosed by a urine sample or an examination of a sample of tissue or discharge. There is no vaccine, but antibiotics will cure the infection.

Sexually transmitted diseases such as gonorrhea, syphilis, herpes simplex, and AIDS can most easily and effectively be prevented by personal abstinence and following guidelines recommended by your parents or local public health agency.

Syphilis

Syphilis is a sexually transmitted disease caused by the bacteria *Treponema pallidum.* The disease has three stages. From 10 to 90 days after the initial infection, one or more sores will appear, usually at the place where bacteria entered the body. The sores disappear in a few weeks regardless of whether or not you receive treatment. Even though the sores go away, unless treatment has begun the disease remains active in the body.

In the second stage, a rash will appear, most often on the palms of the hands and soles of the feet. The rash does not itch, and some do not notice it. In the third stage, the bacteria can damage many organs such as the liver, eyes, and brain. This damage is permanent and can lead to death.

Newborn babies can contract syphilis from their untreated mothers during their birth.

Syphilis can be cured with antibiotics, but the antibiotics cannot reverse the damage already done to organs in the later stages of the disease. There is no vaccine for syphilis.

If people have any unusual sores, discharge, or rashes, they should see a doctor.

Herpes Simplex

Herpes simplex (types 1 and 2) is caused by a virus that lives in body tissue. Type 1 usually appears on the mouth as *cold sores* or *fever blisters.* Type 2 is called *genital herpes* and appears as a cluster of tiny blisters filled with clear fluid on the genitalia or anal area. Herpes usually is passed by skin-to-skin contact with the area of the sore. Unfortunately, sores need not be present for an infected person to be contagious.

A doctor can diagnose herpes by examining the sores. There is no immunization for herpes, and no cure. Antiviral creams and pills can shorten the duration of the blisters.

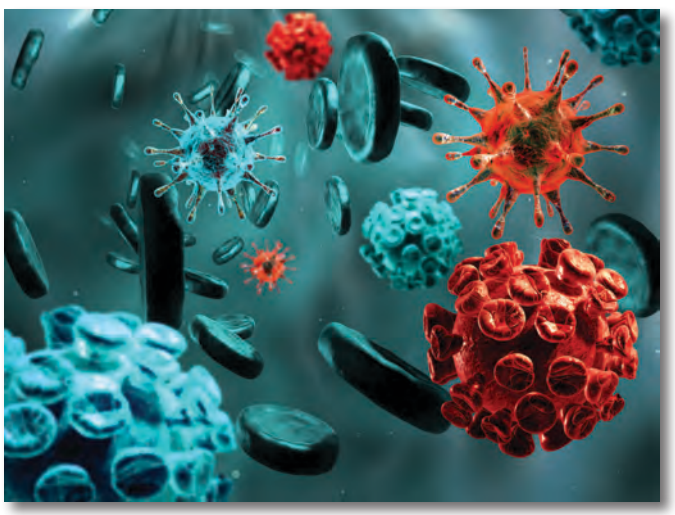
A pregnant woman with herpes must tell her doctor immediately because herpes is very serious in infants.

Encephalitis

Encephalitis is a swelling of the brain. Many different viruses and bacteria can cause it. Well-known causes of encephalitis are the *arboviruses,* or viruses carried by ticks or mosquitoes.

Sometimes encephalitis stems from a complication of another disease. For example, syphilis is a bacterial disease that can cause swelling of the brain. Mumps, chicken pox, and herpes are a few of the viral infections that can lead to encephalitis. Treatment depends on the type of virus or bacterium that caused the encephalitis. For example, if the herpes virus causes the encephalitis, an antiviral herpes medicine can be used.

Symptoms of encephalitis range from headache and fever to unconsciousness or coma. Most cases are mild with symptoms lasting only a few days, but severe cases of encephalitis can lead to brain damage or death.



West Nile Virus

West Nile virus is a common disease in Africa, West Asia, and the Middle East. But since about 2000, it has occurred throughout the United States. While WNV causes no symptoms in most healthy people, approximately one person out of 150 who has WNV will become very ill. The victim may experience unusually severe headaches, confusion, muscle weakness, and paralysis.

WNV is spread by the bite of an infected mosquito. Mosquitoes become infected with the virus when they bite an infected bird or animal before biting a human. To avoid WNV, avoid getting bitten by mosquitoes. Mosquitoes lay their eggs in standing, stagnant water, so stay away from stagnant water in places such as ditches or discarded tires. Keep mosquitoes out of your home by having intact screens on windows and doors. Wear long-sleeved shirts and pants, apply insect repellent, and try to stay inside at dusk and dawn, when mosquitoes are most active. Use of mosquito netting might also be helpful.

There is no vaccine or cure for WNV. All donated blood is tested for West Nile virus in the United States. People infected with WNV usually get better on their own, but those who develop serious symptoms should seek immediate medical attention.

Help keep mosquitoes from breeding by eliminating stagnant water. Empty water from buckets, flowerpots, and other water traps, such as old used tires. Replace water in pet dishes and birdbaths daily.

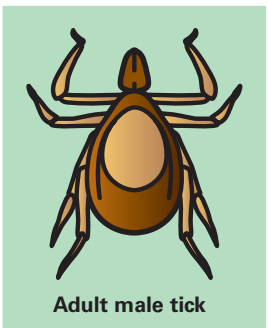
Lyme Disease

Lyme disease is caused by bacteria of the *Borrelia* type. Rodents and deer can carry this bacteria in their bloodstream. It is transmitted to humans by the bite of an infected tick. After feeding on an infected animal, a tick can pass on the disease when they bite a human.

Scientists think that a tick must be attached 24 hours before it can transfer the infection. Up to 80 percent of the time, a small red rash develops at the site of the tick bite within three to 32 days. The rash can develop a whitish ring around the center red rash. There may also be a secondary, larger red ring around the whitish area. The Lyme disease rash is called a *bull's-eye rash.* Flulike symptoms may occur. Later, joint swelling, arthritis, enlargement of the heart, and other serious symptoms can develop.

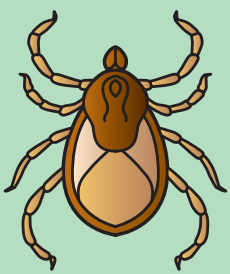
Lyme disease usually can be cured with a three- to four-week treatment of oral antibiotics. In more advanced cases, intravenous antibiotics may be necessary.

Lyme disease is difficult to diagnose, so if you remove a tick or visit areas known to have infected ticks and develop a rash or fever, see your doctor. There is no vaccine for Lyme disease.



Adult male tick

(Actual size)



Adult female tick

(Actual size)

To protect yourself from tick bites while hiking or camping, the Centers for Disease Control and Prevention suggests using insect repellant, wearing clothing treated with permethrin, and drying clothes on high heat when you return home.

You can lessen your risk for Lyme disease by frequently checking yourself and your clothing for ticks when you are in tick-infested areas. Wear long pants tucked into high socks when you walk through woods, tall grass, and underbrush. Wear closed shoes or boots and long-sleeved shirts. Light-colored clothing will show ticks better than dark-colored. Use tick or insect repellent on your clothing, but do not put it on your hands or face. Ticks are usually found low, near the ground. They like shady, moist environments. Always work to keep ticks and other disease vectors away from your home by keeping lawns mowed, removing brush and leaves, and moving wood piles away from your house. Keep pets out of wooded areas to prevent ticks from entering your home.

First Aid for a Tick Bite

An infected tick carries bacteria in its saliva, which it stores in its gut or salivary glands. Do not use nail polish, petroleum jelly, or a hot match to help remove a tick. Simply use tweezers or a tissue to grasp the tick as close to your skin as possible. Steadily and gently, pull up until the tick lets go. Treat the bite area of your skin with antiseptic, and don't forget to wash your hands. Contact your health-care provider if symptoms develop.

Food Safety and Sanitation

The purity of foods is an important factor in public health. Contaminated foods and drinks can spread illness. This is why public health professionals seek to improve methods of supplying food. They work to keep food free from contamination, *adulteration* (dilution or impurities), dangerous additives, and spoilage that might harm consumers.

Food-borne gastroenteritis is caused by food that is contaminated by bacteria, viruses, and parasites. *Toxic* (poisonous) substances and dangerous chemicals also can cause food poisoning. For example, some varieties of mushrooms are toxic.

The **Food and Drug Administration** is an independent agency of the U.S. government with a major responsibility for regulating food-processing plants and training inspectors and restaurant operators in safe food-handling practices. State and local health officers inspect restaurants and supermarkets to make sure they obey sanitation regulations. Some standards are voluntary. However, the fines and negative publicity that follow reports of uncleanness help to ensure that people will comply with regulations.

Sanitation Standards

Each year, thousands of Americans become ill from eating unsafe foods. Many factors can cause these illnesses, but most involve carelessness by a food handler. Food should be properly processed, handled, and stored.

Food Storage

Store nonperishable foods in clean, well-ventilated, and well-lit areas on clean shelves or on pallets. Do not store food on the floor. Hold perishable foods at temperatures below 40 degrees Fahrenheit. Store frozen foods at zero degrees Fahrenheit. It is important to keep hot foods hot (or above 140 degrees) before serving, cold (or below 40 degrees) during storage, and in a vacuum (cans and vacuum jars) if storage must be at room temperature.

Do not allow foods to stay at temperatures between 40 degrees and 140 degrees for more than two hours. It is preferable that foods be kept between these temperatures for no more than half an hour. This temperature danger zone allows microorganisms to greatly multiply. Food that is lightly contaminated

Refrigeration does not kill microorganisms, but it keeps them from multiplying.

with microorganisms can be safe to eat, but let those microorganisms grow for more than a few hours, and you have something that can make you very sick. This is one reason to be very careful when defrosting foods.

A good rule of thumb is to keep cold foods cold and hot foods hot. Defrosting should be done in a refrigerator, above freezing but below 40 degrees Fahrenheit.

Food Handling and Preparation

Even the best handling cannot improve poor-quality or unwholesome foods. People should not eat dirty or spoiled foods.

Preventing food contamination is the most reliable way to avoid food poisoning. Use screens or other coverings to protect food from contamination by insects or rodents. Keep poisons used to kill pests away from food. Keep domestic animals and pets away from food to prevent them from spreading droplets from their coughs or sneezes onto food. These discharges often contain organisms that can cause disease.

Anyone handling food must be strict about personal cleanliness, which starts with clean hands. Food preparers *must wash their hands* before handling any food; after using the toilet, changing a diaper, and handling pets; and after being contaminated with a cough or sneeze. Wash hands with warm water and soap; use a scrub brush if possible. Dry hands with a clean towel.

People preparing food should wear clean clothing. Street clothes may be contaminated and should be changed. Contain hair on the head with a cap, net, or a band, and contain beards with a net. Hold utensils only by their handles. Also, those who prepare food should never have any open sores on their hands.

Wash fruits and vegetables well, especially if you will be eating them uncooked. They may have been exposed to water or soil contaminated with animal or human feces, or they may have been sprayed with herbicides and pesticides.

Food preparation guidelines are as important for Scouts while camping as they are for food handlers in restaurants.

"Instantaneous" food thermometers are relatively inexpensive, and trying to estimate temperatures without them will not work well. They tell a cook when food has been heated enough to kill microorganisms. Food thermometers can be stuck into food such as a roast turkey, or into a pot of boiling fruit to be made into jam.

Here are a few temperature guidelines for safe cooking:

- Ground beef, which has many small surfaces on which bacteria can grow, should be heated to an internal temperature of at least 160 degrees.
- Roasts and steaks should be cooked to an internal temperature of 145 degrees.
- Chicken should have an internal temperature of 180 degrees, and its juices should be clear.
- Eggs should never be eaten raw or partially cooked, including eggs used in recipes (for instance, cookie dough).

CLEANING DISHES AND UTENSILS AT HOME

Even if you use an automatic dishwasher in your home, it's important to know how to properly clean dishes by hand.

- Scrape leftover food into the trash.
- Fill the sink with hot, soapy water.
- Let dishes soak a few minutes while the water cools a bit. (Wash knives separately to avoid reaching into the suds and accidentally cutting yourself.)
- Use a clean sponge or dishrag to scrub the dishes in hot soapy water, then rinse the dishes with clean, hot water.
- Let the dishes air-dry on a rack, or use a clean cloth to dry them. Air-drying is preferred.

Make ice cubes using only clean water that comes from an approved, safe water source.

Avoid Cross-Contamination

Raw meats can contain *E. coli* and *salmonella* bacteria. That is why it is important to cook meats well before you eat them. But you must also be careful with knives, cutting boards, and other surfaces that can carry the juices of raw meat to other things.

If you cut raw chicken on a cutting board and don't wash the board before using it to cut carrots, the carrots might pick up bacteria that will make you sick. An unwashed knife could spread infection the same way. Raw-meat juices also could drip from a higher shelf to a lower shelf in the refrigerator, infecting a sandwich or piece of fruit. Being aware of the dangers of cross-contamination will help you avoid small mistakes that can lead to big stomachaches.

Sanitation in the Community and at Camp

Just as you work to keep your home clean for your family, public health officials work to keep your community—the public buildings, water supply, and sewage systems—working at safe levels for the entire population. At camp, there are safeguards to help ensure everyone has a healthy and safe outdoor experience.

Solid Waste Disposal

Solid waste disposal is becoming one of our society's major problems. Solid waste includes paper, cardboard, cans, bottles, plastics, food scraps, floor sweepings, industrial waste, and yard clippings. Commonly called *garbage,* some solid waste will decompose, such as food scraps and edibles from the kitchen. Other items—like plastics, metals, glass, many types of paper, and construction debris—will remain virtually unchanged in a landfill. Many items can be recycled.

The amount of solid waste increases each year, and so does the problem of solid waste disposal. Improper or unsanitary conditions provide breeding places for insects and rodents that carry disease. Other problems at waste disposal sites include fire dangers, safety hazards, and an unattractive appearance. Improper handling can sometimes lead to air and water pollution.

Remember that camps and homes, as well as communities, have waste storage or disposal sites. Most insects and rodents can be controlled if storage and disposal areas are kept clean and neat. The municipal government is responsible for community waste storage and disposal. All other responsibilities for cleanliness belong to homeowners and individuals.

Wastes usually are collected and disposed of under the direction of a public or government agency. Public workers or private contractors may do this work. Most waste is buried. In urban areas, the landfill might be far from the city that creates the waste. There are accepted laws and regulations for creating and operating landfills.

One difference between a landfill and a dump is that a landfill is covered with dirt at the end of each day.

Some wastes are burned, or *incinerated.* Compared with landfills, incinerators reduce the amount of wastes, and the heat from incinerator facilities is often used to generate power. However, removing toxic wastes, ensuring that all waste is completely burned, and keeping harmful substances from entering the air are technically difficult. Ash from incinerators must be buried.

Recycling

Incinerators can create air pollution. Landfills take a lot of space, and no one wants to live near a landfill. One way to reduce the need for new waste disposal facilities and to make existing landfills more efficient is to recycle.

A number of items that go into landfills and incinerators can be recycled. Many plastics, metals, building materials, yard clippings, leaf litter, and paper can be recycled. Recycling helps to conserve natural resources because it reduces the amount of solid waste being sent for disposal. The more material that is removed from the *waste stream* (the total volume of solid wastes produced), the longer existing landfills can operate.

In communities that aggressively recycle, the volume of waste material has been reduced by up to 25 percent. Unfortunately, communities with aggressive recycling programs are in the minority.

Waste Storage and Disposal at Home and at Camp

At home and in camp:

- Use approved containers (like the ones supplied by a garbage removal company) to hold solid wastes until they can be collected or disposed of properly.
- Make storage facilities convenient and sanitary.
- Use containers that are strong, rust resistant, watertight with tight-fitting lids, and easily filled, emptied, and cleaned.
- Keep containers clean.

You can help your storage situation at home by using racks or stands outside that will keep containers about 18 inches above the ground and allow easy cleaning. Storage racks are easily made from wood, pipe, or metal. Concrete pads on the ground are acceptable, but raised racks are preferable.

Waste disposal in camp is often more difficult than at home. Camps, however, are bound by the same regulations as any business in the community. Waste must be disposed of correctly while at camp or on the trail. Camps should have enough approved containers (cans or bins) to hold all wastes that normally are generated between collections.

At camp, store filled plastic bags inside metal containers for better cleanliness and to make it harder for animals to gain access.

When camping in the wilderness, be sure to follow the "Leave No Trace" principles. Set a goal to leave no trace that humans were ever there. Always pack out everything that was packed in, including all wrappers, cans, boxes, foil, and food scraps. Pack recyclable items separately to be disposed of properly after the trip.

Burning solid waste on the trail creates both a fire hazard and odors that can attract animals. It also will likely conflict with the land manager's policy, so it should not be done. Food scraps can draw animals close to campsites where they might lose their fear of humans. That can be dangerous for them and for you. Animals can detect and dig up buried trash, which also creates potential sites where mosquitoes can breed.

Latrines and Catholes

Human bodily waste can be buried if sanitary facilities are not available. If you will be camping in the same area for a few days, you will want to build a latrine. Otherwise, on the trail, digging catholes for disposal of bodily wastes is recommended because flies and rodents breed in human and animal waste. Using a small trowel, dig a hole 6 to 8 inches deep. (You will want several inches of soil to cover the hole later.) Locate catholes at least 200 feet from any body of water, the trail, and the campsite. When you are done, cover the hole completely with loose soil, tamping down lightly. Leave the site in a natural condition.

Water and Wastewater Treatment

Untreated water causes infection and disease and can contain contaminants like lead, mercury, and pesticides. Infectious agents that cause diseases such as cholera, salmonellosis, and hepatitis may also be present in untreated water. Drinking water must be treated and tested often. Water in recreational facilities such as water parks, swimming pools, and lakes should not be swallowed or placed in your mouth. Trace amounts of animal and human feces can infect water, as can naturally occurring bacteria and parasites.

There are many microscopic parasites in water that are difficult to kill. Among them, *Cryptosporidium parvum* is difficult to kill because of its hard outer shell. Chlorine does not always do the job. Avoid swallowing water when you swim, even in a chlorinated pool. The disease *Cryptosporidiosis* causes diarrhea and fever and is the reason that water should be filtered or boiled before drinking.

Safe Water

Water from all city water supplies must be tested regularly. Federal and state governments have created strict standards that must be maintained for *pH* (acidity), color, *particulates* (small particles), taste, and chemicals.

Some communities draw their water from deep underground *aquifers* (groundwater). In many parts of the country, drinking water is drawn from surface sources rather than underground aquifers. Water must be treated, usually by screening, filtration, and chemical applications. Municipal water is stored in tanks—generally above the ground so that gravity will provide water pressure—and delivered to homes by a network of distribution pipes.

Treating Drinking Water at Camp

Finding safe water when camping might be difficult. Most modern campgrounds and park facilities have safe water available. But any surface water—even water that looks clear and inviting—should be thought of as unsafe to drink.

Assume that all water from an above-ground source—such as a lake, stream, river, pond, or creek—must be treated. Many *subsurface* (groundwater) sources of water, such as wells, are polluted, and that water must be treated before it can be considered safe to consume. Polluted water can be successfully treated in the field, unless contaminated by chemical pollutants. (Most chemical pollutants are of human origin, but a few occur naturally.)

If you need to filter water containing silt or organic contaminants before disinfecting it, collect the water in a container and let the particles settle to the bottom of the container. Use a clean cloth to filter the water as it is collected or, after collecting it, gently pour the water through the top of the cloth and let it filter through into a second container below.

Boiling, Filters, and Chemical Treatment

Bringing water to a rolling boil for a full minute or more will kill most organisms. Boiling is the best way to treat your own water. When you are at elevations higher than 6,500 feet, boil the water for three minutes to be sure all organisms are killed.

You also can use a combination of filters and chemical treatment tablets to treat your water.

Bringing water that has been filtered to a full rolling boil for a minute or longer is the best option for treating water. Be sure to bring enough fuel!

FILTERS

Camping stores and catalogs offer water treatment filters that are easy to use. Follow the instructions that come with the filter you have. According to the CDC, filters that stop *Cryptosporidium parvum* and *Giardia lamblia* (a tiny parasite) will have one of these four claims on the package:

- Reverse osmosis
- *Absolute* pore size of 1 micron or smaller
- Tested and certified by NSF Standard 53 or NSF Standard 58 for cyst *removal*
- Tested and certified by NSF Standard 53 or NSF Standard 58 for cyst *reduction*

Cryptosporidium parvum may *not* be filtered out by filters that say the following:

- *Nominal* pore size of less than 1 micron
- One micron filter
- Effective against parasites
- Carbon filter
- Water purifier
- EPA approved*
- Activated carbon

*Warning: The EPA does ***not*** approve or test filters.

Most filters that you can carry on a campout don't filter out viruses. Also, even well-made filters might have flaws that allow some organisms to pass through accidentally. That is why it is important to use chemical treatment tablets on the water as well.

Because the straining cartridges on filters have collected organisms from the water, the person who changes the cartridge should be in good health and wear gloves while changing the cartridge. That person should dispose of the filter properly, and then wash his or her hands.

TABLETS

Water treatment tablets are sold in small containers just the right size for hikers and campers. The instructions on the label usually are to drop one or two tablets into a quart of water and then wait 30 minutes before drinking—longer if the water is cold. The tablets might also leave a chemical taste in the water. To improve the flavor, add some flavored drink mix *after* the tablets have had enough time to do their work (i.e., after 30 minutes).

Chemical treatment tablets kill many—but not all—bacteria, viruses, and parasites. *Cryptosporidium parvum, Giardia lamblia,* and some bacteria will not be killed. That is why the tablets alone don't guarantee safe drinking water.

Treatment tablets can lose their effectiveness after the bottle has been opened. Check the expiration date on the label and use only fresh tablets.

Dishwashing in Camp

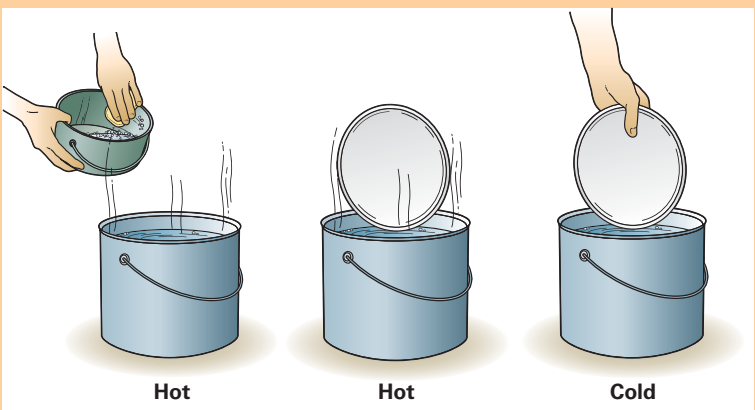
Whether you cook with a stove or over an open fire, put on two pots of water before you serve a meal. That way you will have hot dishwater by the time you finish eating.

Set up the dishwater. Boil a pot of water. Add a small amount of biodegradable dishwashing liquid and some cold treated water so that you can use it without burning your hands.

Set up the rinse water. In a second large pot, boil water to rinse the dishes.

Wash the dishes. Scrape all excess food on the plate into a garbage or plastic bag that you will pack out. Then (a) scrub the dish in the wash water and (b) use tongs to rinse the clean dish in hot rinse water, or (c) if you want to use a cold rinse, dip dishes in cold water that has been treated with six drops of unscented chlorine bleach per gallon of water at least 30 minutes before use. Allow dishes to air-dry on a clean, plastic sheet. When dry, store in a flyproof container.

Dispose of the dishwater. When you are finished washing dishes, strain food particles from the dishwater. Put the food particles in a resealable plastic bag that you will pack out. Then take the water at least 200 feet from the campsite, water source, and trails. Give it a good fling, spreading it over a wide area.



Never put anything into a water source that you would not be willing to drink.

You can make a strainer by punching small holes in a plastic bag and filling it with pine needles. Pour dirty dishwater through the bag and the needles will strain out food particles. Carry the bag of needles out of the backcountry with the rest of your trash.

Keep Soap and Detergent Away From Open Water

Many soaps, detergents, and shampoos contain chemicals that encourage algae to grow. Algae can crowd out native plants, making it harder for fish and other animals to survive. Soap and detergent can leave an oily film in water that can harm tiny aquatic life. Even biodegradable soap should be kept away from any stream, lake, or spring. Carry your pot of water away from the source, and use it to bathe or wash dishes. Scatter water over the ground, across a wide area, when you are finished.

Sewage and Liquid Waste

Sewage has the potential to spread disease, so it must be properly disposed of both at home and at camp. Wastewater from toilets is called *blackwater.* Water from washing dishes, bathing, and doing laundry is called *graywater.* If discharged improperly, either type of wastewater can contribute to water pollution.

Most urban and suburban dwellers in the United States dispose of sewage and liquid wastes through municipal disposal systems. In rural areas of the country, many homeowners have their own septic systems for household waste.

Requirement 5a calls for a visit to a municipal wastewater treatment facility like this one, or to a solid-waste management operation in your community.

Municipal Sewage Treatment Systems

Municipal sewage treatment systems are designed to handle large volumes of sewage and liquid wastes. The raw sewage flows to a treatment plant through underground pipes *(mains)*. Sewage is screened, allowed to settle, processed, dried, and disinfected before disposal.

Screening removes objects larger than an inch or two in size that have entered sewage mains. The screens are periodically cleaned. Debris is removed and then taken to a landfill or burned.

By the time incoming waste reaches the sewage treatment plant, it is mostly liquid with particles suspended in it. Many suspended particles drop out of the liquid portion as the screened sewage is allowed to settle.

Processing or treatment is done by two basic methods: *activated sludge* and *trickling.* In both methods, bacteria break down the sewage into harmless components that can be safely discharged.

In the activated sludge method, the sewage is pumped into a tank. Air is bubbled through the sewage to provide oxygen needed by the bacteria. After the bacteria have worked on the sewage long enough, the liquid contents of the tank can be pumped out. The material remaining at the bottom of the tank, called sludge, can be dried.

Apartment complexes, shopping centers, camps, and similar properties will sometimes have a small sewage treatment plant on their grounds. This type of plant operates on the same principles as an activated sludge plant, only on a smaller scale.

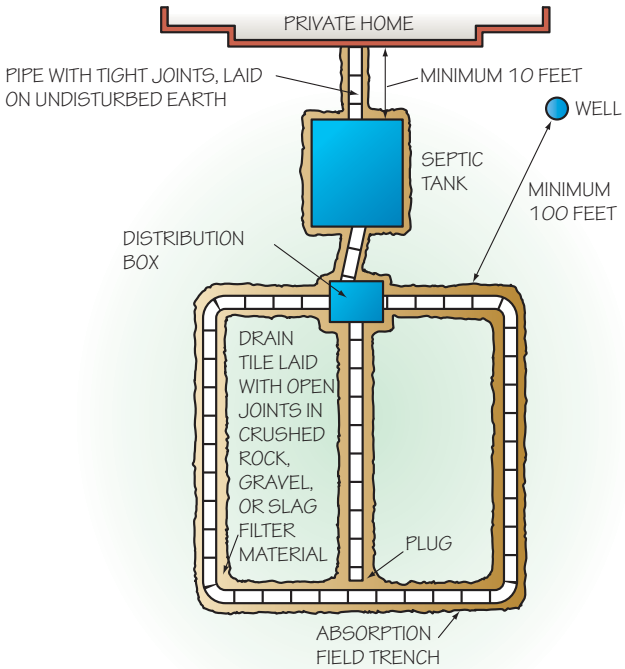
Trickling involves filtering the sewage over a bed of rocks on which bacteria grow. In time, the liquid can be pumped out and the accumulated sludge dried. The sludge, after drying, can be buried in a landfill or used as a soil conditioner.

Treated wastewater is usually clear and colorless. At this point, the water is free of contaminants and can be pumped into a river or other body of water for disposal. In some states, the water is piped to automatic lawn sprinklers and used to recharge underground water supplies. The outflow from modern treatment plants is so high in quality that it can go to a chlorinating station and be reused for drinking water.

Septic Systems

Millions of homes have their own septic systems. Homes that are built far from municipal mains, such as homes in rural areas, use septic tanks.

Wastewater from the home flows through a pipe into the septic tank, which is made of material such as concrete or steel. Solids settle to the bottom of the tank, and liquid flows out into a series of buried pipes. The liquid trickles through holes in the pipes and enters the gravel and soil of the *leach field.* The water seeps through the field and is cleaned of organic material—not with harsh chemicals, but with microorganisms that live in the soil. Eventually, this water will enter an underground aquifer (a naturally occurring water basin).



A home septic system

Bacteria break down some of the solids that remain behind in the tank. Chemicals that kill bacteria should not be put into the septic system. Medicines such as antibiotics will destroy helpful bacteria. Motor oils, gasoline, paints, solvents, pesticides, and herbicides will do the same thing. Grease, paper towels, and excessive amounts of food will not kill bacteria but will clog the pipes.

The sludge in the septic tank should be pumped out by a professional every two to five years, depending on the size of the tank and the number of people using it.

Leach fields should be at least 100 feet from any drinking water supply. The fields should be checked every year to make sure they are not flooding.

South Boston, Massachusetts, in 1973 *(top)* and 2012 *(bottom)*

Pollution and Health

Environmental pollution—including air, water, and noise pollution—affects individual and public health in many serious ways. Pollutants can enter the body as a person breathes, eats, or drinks, and through the eyes, nose, ears, and skin.

Air Pollution

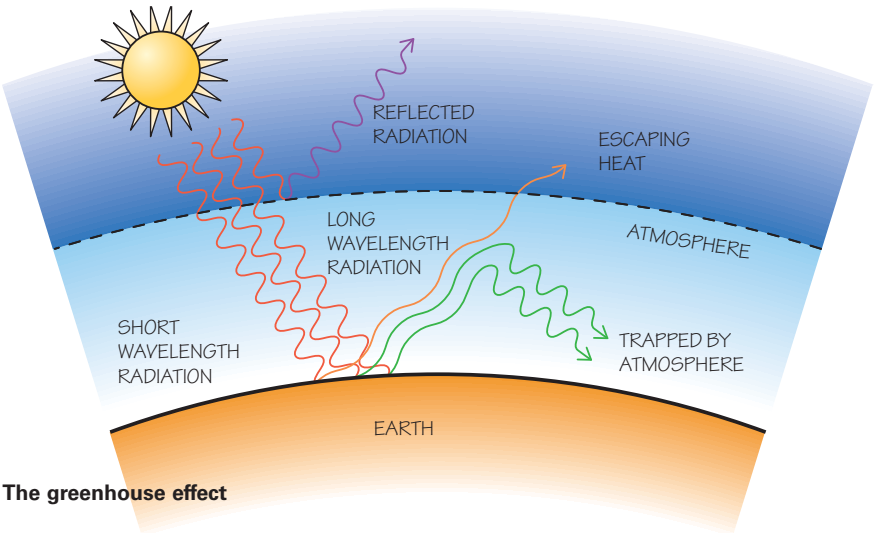
The major sources of air pollution are automobiles, power plants, and factories. They burn fuels, including fossil fuels such as natural gas, oil, or coal, that send unhealthy chemicals and particulates into the air. Dry-cleaning chemicals, wildfires, and decomposing garbage, which gives off methane gas, are a few of the many other sources of air pollution.

Particulate matter can easily get deep into the lungs. Inhaled particulates cause illness and even death. For instance, people with heart disease are more likely to have heart attacks when the particulate matter in the air is high.

Drops of sulfur dioxide and oxides of nitrogen can combine with moisture and turn into *acid rain,* which can pollute our water supplies and our land.

Ozone is a form of oxygen, but it can be a poison. It forms in the lower atmosphere, or *troposphere,* from nitrogen oxides and organic gases from automobiles and industry. High levels of it irritate everyone's lungs, but especially people with asthma, bronchitis, and emphysema. Ozone can also kill trees and damage rubber. Scientists are investigating the many possible effects of breathing in ozone.

The ozone layer, however, far up in the part of the atmosphere called the *stratosphere,* helps protect Earth from the damaging rays of the sun. Since the 1970s, scientists have been concerned that the ozone layer is depleting because of our use of various chemicals that react with the ozone and destroy it. The depletion of the protective ozone layer makes everything on Earth more exposed to radiation from the sun, which increases incidences of cancer. Though we don't want ozone in our troposphere, we need it up high in our stratosphere.



The greenhouse effect

The Greenhouse Effect

Gases such as carbon dioxide and methane collect in the atmosphere. They reflect heat from the ground back on Earth, warming it. This situation may cause long-term climatic changes to our *ecosystems.* Some species of animals may have to change habitats. Although there is some scientific evidence of what is popularly called global warming, many scientists remain skeptical about it.

An *ecosystem* is a community of organisms and their environment, all working together as a unit.

The **Environmental Protection Agency** monitors and sets standards for air quality. It also regulates many sources of air pollution. As new scientific studies are published about air pollution and the public health, the EPA wants to set stricter rules to limit air pollution.

There are two basic ways to prevent air pollution. *End-of-the-pipe* devices filter some of the chemicals and particles out of exhaust from factories and automobiles. The catalytic converter used on cars is an example of this type of device.

Until we learn more about how to prevent pollution, we can at least try to control and minimize it. Manufacturing can be designed to produce less waste. Individuals can drive less—and instead take advantage of public transportation, carpooling, and bicycling. We can all become aware of how important and far-reaching issues of air pollution are.

Water Pollution

Only about 2 percent of the world's water is available for drinking. During the 20th century, much of the world's available freshwater supply became polluted. The overall population growth and expansion of cities make maintaining water quality challenging.

There are two main sources of water pollution. *Point sources* are easy to recognize. For example, a factory dumping chemical waste directly into a river is a point source of water pollution. *Nonpoint sources* are harder to detect, track, and stop. These sources pollute the water indirectly. For example, buried waste, including landfills and buried hazardous wastes, can leach into water supplies.

Herbicides, pesticides, fertilizers, and other chemicals are another source of pollution. Rain can wash the chemicals and soil into nearby streams, rivers, and lakes. Also, the chemicals can soak down into the ground, where they can end up in an aquifer.

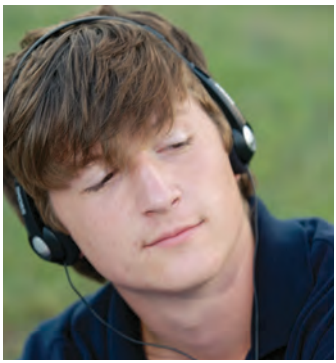
Lead, mercury, pesticides, and other toxic ingredients of polluted water can build up in our bodies and cause acute illnesses, like diarrhea, and chronic ones, like organ damage and cancer. Indirectly, polluted water can affect us by way of the food chain. If a plant uses water that is contaminated with a toxic chemical, and then we eat that plant, we can ingest that chemical. If we eat an animal that ate that plant, the concentration of the chemical is even higher.

Water pollution adversely affects all kinds of living things. Detergent can ruin an ecosystem by allowing an overgrowth of plants and algae. When those greater-than-normal amounts of plants and algae die, the decomposition depletes the oxygen in the water. Fish suffocate and die, and other wildlife higher up the food chain suffers as well.

A nonpoint source of pollution occurs when automobiles drip engine oil into the street, then rain washes that oil into the gutters, and then into streams and rivers.

Watershed dams like the one shown here help control runoff from streams and hold and store polluting sediment. Wherever you live, you are in a watershed.

People can safeguard water supplies in many ways. We can protect *watersheds*—the land areas from which water drains into rivers and lakes. Controlling chemical contamination of water is a high priority. Industrial chemicals are relatively easy to control when factories follow EPA guidelines. People can be careful of what goes into storm drains and not dump used engine oil, automobile coolant, paint, and other chemicals into the street. Homeowners can limit their use of pesticides, herbicides, and fertilizers on their lawns or use organic methods of lawn care and gardening instead. Campers can avoid using detergents near streams and other groundwater sources.



If they aren't used with caution, headphones can be especially damaging to your hearing.

Noise Pollution

Unwanted or loud noises are pollutants, too. Excessive noise can lead to hearing loss, headaches, and stress. Some people live where they are regularly subjected to loud noises. Machinery, automobiles, and trucks can all be noisy. Radios, stereos, and other entertainment equipment also contribute to hearing loss. Headphones are great for sparing the people around someone who is listening to music, but they concentrate noise in the listener's ears and can damage them.

The damage caused by noise is cumulative—it adds up over time. With each exposure to loud noises, a person suffers a tiny—often unnoticeable—loss of hearing. Eventually, the hearing loss becomes significant.

Rock musicians often wear earplugs when performing to protect their hearing. Fans who sit in front of loudspeakers may suffer *transient,* or temporary, hearing loss from a few hours to a few days after a concert.

Noise also happens at home. Power tools, lawn mowers, and televisions contribute to noise pollution. Indoor appliances such as blow-dryers and vacuum cleaners make noise. Some hobbies can be noisy, such as shooting sports and woodworking power tools. Also noisy are recreational vehicles such as motorboats, snowmobiles, motorcycles, and cars without

mufflers. In addition to hearing loss, noise can contribute to stress (physical and mental), sleep loss, and irritability, and can lead to health-related problems such as depression, gastrointestinal problems, and cardiovascular disease.

The technology exists to reduce noise pollution. Jet engines are much quieter now than they used to be. Buildings are being designed that limit noise. The **Occupational Safety and Health Administration** regulates noise in workplaces, requiring employers to reduce noise exposure that could be harmful to employees. However, noise-reduction programs require commitment and money. People should wear hearing protection wherever noise either is not or cannot be controlled. Most hearing loss is permanent; most of it also is preventable.

Noise pollution harms more than just humans. It has been shown that aircraft noise reduces the survival rate of caribou calves. Marine life is harmed by noise in the oceans from offshore drilling and ship traffic. Sonar—the sending of sound waves to detect military submarines and to chart the ocean floor—can be damaging to whales that use their own natural sonar to survive.


DON'T
DRINK AND
DRIVE

Tobacco, Alcohol, and Drugs

Tobacco, alcohol, illegal drugs, and abuse of prescription drugs are a significant source of morbidity and mortality in the United States and around the world. The World Health Organization considers tobacco use to be an *epidemic* because it kills 6 million people every year. Using these substances can damage the body, lead to accompanying diseases, and cause great numbers of injuries and accidents.

Tobacco

Tobacco contains more than 4,000 chemical compounds, many of which cause emphysema and cancer. In fact, cigarette smoking causes 87 percent of lung cancer—a rarely cured disease with poor survival rates. It is one of the leading causes of death worldwide. Smoking contributes greatly to heart disease and stroke as well.

Most smokers began smoking before they were 18 years old. Because nicotine is one of the most addictive substances known to humans, young adults who start using tobacco often become hooked for life. Smoking also causes many diseases that affect indirect users, such as people who inhale second-hand smoke and unborn babies who suffer the effects of their mothers' addiction to tobacco.

Smokeless tobacco—chewing tobacco and snuff—is dangerous, too. The *carcinogens,* or cancer-causing agents, act on the cheeks and gums at the spot where a user keeps a chaw of tobacco. The carcinogens don't stop at the mouth—tobacco use increases the incidence of all kinds of cancers.

Not only does smoking affect the lungs and cardiovascular system, it also affects the skin's chemistry, causing it to age much faster than normal, so smokers get more wrinkles at an earlier age than do nonsmokers. In addition, tobacco contributes to tooth decay, gum disease, and early loss of teeth.

Alcohol

Alcohol can injure your body, especially your liver and brain. Alcohol is absorbed through the stomach, enters the bloodstream, and is processed by the liver. A deadly disease that can be caused by the overconsumption of alcohol is *cirrhosis* of the liver. Over time, this disease causes the liver to malfunction. Alcohol also can damage the digestive system, pancreas, and nervous system. Heavy drinkers are prone to oral and throat cancers, and liver cancer. Alcohol also can cause serious damage to unborn children.

Alcohol is a *sedative;* it interferes with reflexes and brain function. It makes people react slowly to their environment. People who are intoxicated have trouble walking, speaking, and driving. Sometimes people who drink too much alcohol die because their body becomes so *sedate,* or slow, that their breathing and heart rate simply slow to a stop.

Being personally responsible to yourself is part of growing up. Remember that the decisions you make go hand in hand with their consequences.

Although you might be too young to drive a car, be aware of the dangers of drinking and driving. Even a small amount of alcohol can make a person an unsafe driver, and the results are often tragic. Thousands of teenagers die every year in crashes involving drivers who have been drinking. Never ride in a car being driven by someone who has been drinking. Never let someone who has been drinking drive a vehicle. You can always find another way home, but you might not live through a crash caused by a drunken driver.

Drugs

Drugs alter the body's chemistry. Young people should never use illegal drugs or drugs that don't come from their doctors. Marijuana, cocaine and crack, alcohol, ecstasy, LSD, heroin, inhalants (huffing), steroids, and even pain relievers like codeine, oxycodone, and hydrocodone have powerful effects on the mind and body. They can produce temporary feelings of pleasure or energy. However, they also can cause nightmares, fear, and loss of ability to make safe decisions. **An overdose can lead to serious illness, disability, or even death.**

Drug users often take risks that endanger their safety and well-being. Accidental overdoses are at an all-time high in many areas of the United States. People have drowned, fallen to their deaths, and died in motor vehicle crashes while using drugs. Besides deaths due to accidents, drug use can also harm other people by spreading hepatitis B and C or HIV/AIDS through using commonly shared drug paraphernalia.

Many drugs are addictive. After using a drug, a person might soon have an uncontrollable desire for it. Becoming addicted to drugs can occur after just one use. Overdosing and death can occur at any time with drug usage. Users often lie, cheat, and steal to get the drug. It can be physically and emotionally dangerous to stop using the drug without professional help. A drug can become more important to the user than friends, family, and even staying alive.

Be a leader, and use your own good judgment. Stay away from drugs and drug users.

Careers in Public Health

Anyone interested in helping people or doing detective work should consider a career in public health. Public health professionals find satisfaction in working to improve life for people who live in their communities. Public health is a discipline that can be applied in almost any place in the world. In fact, many countries desperately need public health workers.

Most public health professionals have training after college graduation in epidemiology, biostatistics, health behavior/education, health policy/management, and environmental health.

Who They Are

Many public health workers are scientists, doctors, nurses, and educators. Public health can use people with many other talents as well. For example, an engineer might work to design safer roadways or a better type of water treatment plant for the health of a community.

In the field of medicine, public health is a recognized specialty. Some providers have advanced training in public health. It is common for them to head a public health team.

Epidemiologists are scientists who specialize in solving health mysteries. Their work has become more important than ever, now that previously rare and new diseases are emerging, such as Ebola virus. As human beings encroach upon the rain forests and other important wildlife habitats, diseases are moving from creatures of the wild to become deadly threats to humans. In the age of airline travel, diseases have an effective new way to spread widely and quickly throughout the world.

Where They Work

Many public health specialists are employed in hospitals, universities, and private industry. Others work in consulting and research.

Public health officials are employed at all levels of government. In local communities, sanitarians and health officers ensure that establishments handle food safely. They enforce local regulations so that communities can stay safe and healthy. The requirements for these positions vary from state to state. A career sanitarian usually has some college education; health officers must have experience and, often, an advanced degree such as a masters in public health (MPH).

The Public Health Service Commissioned Corps employs thousands of professionals, including dentists, pharmacists, physicians, dietitians, veterinarians, scientists, nurses, therapists, engineers, environmental health experts, and health service workers (social workers, physician assistants, optometrists, statisticians, computer scientists, dental hygienists, and medical records administrators, among others). Public health professionals serve around the world in non-governmental organizations such as the World Health Organization, International Red Cross, Red Crescent, UNICEF (United Nations International Children's Emergency Fund), Doctors Without Borders, religious health missions, and refugee assistance centers.

Nationally, many government agencies are involved in public health, including the departments of Agriculture, Commerce, Health and Human Services (including the CDC and PHS Commissioned Corps), Labor, Peace Corps, Transportation, and Veterans Affairs. All of the armed forces have professionals to help maintain the health of their members and prevent injuries.

Internationally, the opportunities to apply public health skills are almost unlimited. Basic services such as sanitation and clean water are unavailable to many people in the world.

Volunteer agencies also employ public health professionals. The American Red Cross helps in disasters. The American Heart Association, American Cancer Association, and American Lung Association are a few other organizations that employ public health professionals.

Bringing good public health measures such as education, immunizations, and medications to communities worldwide could greatly reduce suffering and deaths from disease.

Qualifications

Public health officials often are active people who get a sense of satisfaction from helping others or doing something worthwhile. These are important traits for a public health career because many positions include travel and assisting people as part of the usual routine. Most professional careers in public health require specialized education with a college degree as a minimum requirement. Areas of study may include chemistry, biology, engineering, mathematics, and psychology, as well as policy formulation, finance, economics, and marketing. Business and law experience can be useful to a person wanting to serve as a public health professional.

Good sources of information about the field of public health are your merit badge counselor, school guidance counselor, library, local health department, science teacher, or a practicing public health professional. Scholarships and other programs are available to help qualified young people enter the field of public health.

Resources

Scouting Literature

Scouts BSA Handbook for Boys; Scouts BSA Handbook for Girls; Fieldbook; Animal Science, Camping, Citizenship in the Community, Citizenship in the Nation, Citizenship in the World, Cooking, Dentistry, Emergency Preparedness, Environmental Science, First Aid, Medicine, Safety, Search and Rescue, and *Soil and Water Conservation* merit badge pamphlets

With your parent's permission, visit the Boy Scouts of America's official retail website, www.scoutshop.org, for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books

Altman, Linda Jacobs. *Plague and Pestilence: A History of Infectious Disease.* Enslow, 1998.

American Medical Association. *Health Care Almanac: Every Person's Guide to the Thoughtful and Practical Sides of Medicine.* American Medical Association, 1998.

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White, Katherine. *Everything You Need to Know About AIDS and HIV.* Rosen, 2001.

Yount, Lisa. *Disease Detectives.* Lucent, 2001.

Organizations and Websites

Centers for Disease Control and Prevention
1600 Clifton Road
Atlanta, GA 30333
Toll-free telephone: 800-311-3435
www.cdc.gov

Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Ave. NW
Washington, DC 20460
Telephone: 202-272-0167
www.epa.gov

National Institutes of Health
9000 Rockville Pike
Bethesda, MD 20892
Telephone: 301-496-4000
www.nih.gov

Office of Disease Prevention and Health Promotion
1101 Wootton Parkway, Suite LL100
Rockville, MD 20852
Telephone: 240-453-8280
www.health.gov

U.S. Department of Health and Human Services
200 Independence Ave. SW
Washington, DC 20201
Telephone: 202-619-0257
www.hhs.gov

U.S. Food and Drug Administration
10903 New Hampshire Ave.
Silver Spring, MD 20993
Toll-free telephone: 888-463-6332
www.fda.gov

U.S. Public Health Service Commissioned Corps
1101 Wootton Parkway, Suite LL100
Rockville, MD 20852
Toll-free telephone: 800-279-1605
www.usphs.gov

World Health Organization
www.who.int

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