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Editorial

Contents

- Editorial 1
- Mini review 2
- Current Trends 5
- In Profile 9
- Relaxed Mood 10
- Bug of the Month 11
- Did you Know 13
- Best Practices 14
- In Focus 16

The Journal of Hygiene Sciences has made many advances since our last issue. A quick glance at this issue verifies again our continued commitment to publish a journal of high standard & devoted exclusively to topics of Microbiology & Disinfection.

Typhoid, also known as typhoid fever or enteric fever, is an infection caused by the bacteria *Salmonella Typhi*. Typhoid is usually curable, but some bacterial strains are becoming increasingly resistant to antibiotics. Most people with typhoid in North America acquire it while travelling to developing areas of the world. **If untreated, about 10% to 16% of people with typhoid will die.**
The first step in preparing an instrument for reuse after it has been used on a patient is cleaning. The importance of this step cannot be under estimated, as studies have shown that a soiled instrument cannot be effectively sterilized. This is because the soil shields bacteria and viruses from the sterilizing agent. As a result, bacteria and viruses may very well survive the sterilization process and can cross infect the next patient.
Cleaning is defined by AAMI "as the removal of contamination from an item to the extent necessary for further processing or for the intended use.
In health care facilities, cleaning consists of the removal, usually with detergent and water, of adherent soil (e.g., blood, protein substances, and other debris) from the surfaces, crevices, serrations, joints, and lumens of instruments, devices, and equipment by a manual or mechanical process that prepares the items for safe handling and/or further decontamination".

Our In Profile section talks about **Ignaz Philipp Semmelweis** (July 1, 1818 – August 13, 1865) was a Hungarian physician of German extraction now known as an early pioneer of antiseptic procedures. Described as the "savior of mothers", Semmelweis discovered that the incidence of puerperal fever could be drastically cut by the use of hand disinfection in obstetrical clinics. Puerperal fever was common in mid-19th-century hospitals and often fatal, with mortality at 10%–35%. Semmelweis proposed the practice of washing with chlorinated lime solutions in 1847 while working in Vienna General Hospital's First Obstetrical Clinic, where doctors' wards had three times the mortality of midwives' wards.

Our Bug for this time is shigella. Shigellosis is an intestinal infection caused by *Shigella* bacteria. The bacteria produce toxins that can attack the lining of the large intestine, causing swelling, ulcers on the intestinal wall, and bloody diarrhea. Symptoms can range from just watery diarrhea to bloody diarrhea, fever, and abdominal pain. Shigellosis can affect people of any age, including teens, especially common in children ages 2 to 3 years old.
Indian curries are incomplete without garlic – a simple ingredient with packed health benefits. It is very strong and bitter but adds an unbelievable flavour to the cuisine. Any description of garlic is incomplete without mentioning its medicinal values. This miracle herb has been used since time immemorial as a medicine to prevent or treat various diseases and conditions.
Medical devices/surgical instruments are used throughout the hospital to perform procedures on patients on a daily basis. These procedures are performed in theatre, the ward, maternity and doctors rooms. Contaminated devices need to be transported safely to the CSSD to be decontaminated. Contaminated devices should be transported in a manner that will ensure the safety of the staff and other patients. For this reason it is best to transport contaminated devices in closed, durable, and easy to decontaminate trolleys. Once medical devices/surgical instruments have been decontaminated (cleaned, packed and sterilized) they need to transported and stored in a sterile store.

"Laughter is the best medicine" so have great laughs with our Relaxed Mood section.
So let's go on & explore the information……

Salmonella - Major cause of Typhoid

Typhoid fever is a bacterial infection that can spread throughout the body, affecting many organs. Without prompt treatment, it can cause serious complications and can be fatal.

It is caused by a bacterium called *Salmonella* Typhi, which is related to the bacteria that cause salmonella food poisoning.

Typhoid fever is highly contagious. An infected person can pass the bacteria out of their body in their stools (faeces) or, less commonly, in their urine.

If someone else eats food or drinks water that has been contaminated with a small amount of infected faeces or urine, they can become infected with the bacteria and develop typhoid fever.

What is typhoid fever?

Typhoid fever is an acute illness associated with fever caused by the *Salmonella* Typhi bacteria. It can also be caused by *Salmonella paratyphi*, a related bacterium that usually causes a less severe illness. The bacteria are deposited in water or food by a human carrier and are then spread to other people in the area.

The incidence of typhoid fever in the United States has markedly decreased since the early 1900s, when tens of thousands of cases were reported in the U.S. Today, less than 400 cases are reported annually in the United States, mostly in people who have recently traveled to Mexico and South America. This improvement is the result of better environmental sanitation. India, Pakistan, and Egypt are also known as high-risk areas for developing this disease. Worldwide, typhoid fever affects more than 21 million people annually, with about 200,000 people dying from the disease

How is typhoid caused?

The bacterium *Salmonella* Typhi is present only in human beings and is transmitted through contaminated food or water. People with this infection carry the bacterium in their intestines and bloodstream, and those who have recovered from the disease could still have the bacterium in their system; they are known as 'carriers' of the disease. Both ill people and carriers shed *Salmonella* Typhi in their stool. Infection is usually spread when food or water is handled by a person who is shedding the bacterium or if sewage water leaks into drinking water or food that is then consumed. That is why this disease is common in areas where proper hand washing techniques are not followed. Here's more information on proper hand-washing technique to prevent typhoid.

How is typhoid fever spread?

Salmonella Typhi lives only in humans. Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract. In addition, a small number of persons, called carriers, recover from typhoid fever but continue to carry the bacteria. Both ill persons and carriers shed *Salmonella* Typhi in their feces (stool).

You can get typhoid fever if you eat food or drink beverages that have been handled by a person who is shedding *Salmonella* Typhi or if sewage contaminated with *Salmonella* Typhi bacteria gets into the water you use for drinking or washing food. Therefore, typhoid fever is more common in areas of the world where hand washing is less frequent and water is likely to be contaminated with sewage.

Once *Salmonella* Typhi bacteria are eaten or drunk, they multiply and spread into the bloodstream. The body reacts with fever and other signs and symptoms.

Where in the world do you get typhoid fever?

Typhoid fever is common in most parts of the world except in industrialized regions such as the United States, Canada, Western Europe, Australia, and Japan. Therefore, if you are traveling to the developing world, you should consider taking precautions. Over the past 10 years, travelers from the United States to Asia, Africa, and Latin America have been especially at risk.

How can you avoid typhoid fever?

Two basic actions can protect you from typhoid fever:

- Avoid risky foods and drinks.
- Get vaccinated against typhoid fever.

It may surprise you, but watching what you eat and drink when you travel is as important as being vaccinated. This is because the vaccines are not completely effective. Avoiding risky foods will also help protect you from other illnesses, including travelers' diarrhea, cholera, dysentery, and hepatitis A.

What are the signs and symptoms of typhoid fever?

The symptoms of typhoid fever usually develop one or two weeks after a person becomes infected with the *Salmonella* Typhi bacteria.

With treatment, the symptoms of typhoid fever should quickly improve within three to five days.

If typhoid fever is not treated, the condition usually gets worse over a few weeks and there's a significant risk that life-threatening complications of typhoid fever may develop. Without treatment, it can take weeks – or even months – to fully recover, and symptoms can return.

Common symptoms

Common symptoms of typhoid fever can include:

- a high temperature, which can reach up to 39-40°C (103-104°F)
- headache
- muscle aches
- stomach pain
- feeling sick
- loss of appetite
- constipation or diarrhoea (adults tend to get constipation and children tend to get diarrhoea)
- a rash made up of small pink spots
- exhaustion
- confusion, such as not knowing where you are or what is going on around you

Persons with typhoid fever usually have a sustained fever as high as 103° to 104° F (39° to 40° C). They may also feel weak, or have stomach pains, headache, or loss of appetite. In some cases, patients have a rash of flat, rose-colored spots. The only way to know for sure if an illness is typhoid fever is to have samples of stool or blood tested for the presence of *Salmonella* Typhi.

What do you do if you think you have typhoid fever?

If you have a high fever and feel very ill, see a doctor immediately. If you are traveling in a foreign country, you can usually call the U.S. consulate for a list of recommended doctors.

Typhoid fever is treated with antibiotics. Resistance to multiple antibiotics is increasing among *Salmonella* that cause typhoid fever. Reduced susceptibility to fluoroquinolones (e.g., ciprofloxacin) and the emergence of multidrug-resistance has complicated treatment of infections, especially those acquired in

South Asia. Antibiotic susceptibility testing may help guide appropriate therapy. Choices for antibiotic therapy include fluoroquinolones (for susceptible infections), ceftriaxone, and azithromycin. Persons who do not get treatment may continue to have fever for weeks or months, and as many as 20% may die from complications of the infection.

Typhoid fever's danger doesn't end when symptoms disappear

Even if your symptoms seem to go away, you may still be carrying *Salmonella* Typhi. If so, the illness could return, or you could pass the disease to other people. In fact, if you work at a job where you handle food or care for small children, you may be barred legally from going back to work until a doctor has determined that you no longer carry any typhoid bacteria.

If you are being treated for typhoid fever, it is important to do the following:

Keep taking the prescribed antibiotics for as long as the doctor has asked you to take them.

Wash your hands carefully with soap and water after using the bathroom, and do not prepare or serve food for other people. This will lower the chance that you will pass the infection on to someone else.

Have your doctor perform a series of stool cultures to ensure that no *Salmonella* Typhi bacteria remain in your body.

How Is Typhoid Fever Treated?

Typhoid fever is treated with antibiotics which kill the *Salmonella* bacteria. Prior to the use of antibiotics, the fatality rate was 20%. Death occurred from overwhelming infection, pneumonia, intestinal bleeding, or intestinal perforation. With antibiotics and supportive care, mortality has been reduced to 1%-2%. With appropriate antibiotic therapy, there is usually improvement within one to two days and recovery within seven to 10 days.

Several antibiotics are effective for the treatment of typhoid fever. Chloramphenicol was the original drug of choice for many years. Because of rare serious side effects, chloramphenicol has been replaced by other effective antibiotics. The choice of antibiotics is guided by identifying the geographic region where the infection was contracted (certain strains from South America show a significant resistance to some antibiotics.) If relapses occur, patients are retreated with antibiotics.

Those who become chronically ill (about 3%-5% of those infected), can be treated with prolonged antibiotics. Often, removal of the gallbladder, the site of chronic infection, will provide a cure.

For those traveling to high-risk areas, vaccines are now available.

Typhoid fever can usually be successfully treated with a course of antibiotic medication.

In most cases, you can be treated at home, but hospital admission may be required if the condition is severe.

Treatment at home

If typhoid fever is diagnosed in its early stages, a course of antibiotic tablets may be prescribed for you. Most people need to take these for 7 to 14 days.

Some strains of the *Salmonella* Typhi bacteria that cause typhoid fever have developed a resistance to one or more types of antibiotics. This is increasingly becoming a problem in typhoid infections originating in Southeast Asia.

Any blood, stool or urine samples taken during your diagnosis will therefore usually be tested in a laboratory to determine which strain you are infected with so you can be treated with an appropriate antibiotic.

Your symptoms should begin to improve within two to three days of taking antibiotics, but it is very important that you finish the course to help ensure the bacteria are completely removed from your body.

Make sure that you rest, drink plenty of fluids and eat regular meals. You may be able to tolerate eating smaller, more frequent meals rather than three larger meals a day.

You should also take care to practice good personal hygiene, such as regularly washing your hands with soap and warm water, to reduce the risk of spreading the infection to others.

Contact your GP as soon as possible if your symptoms get worse or if you develop new symptoms while being treated at home.

In a small number of cases, the symptoms or infection may reoccur. This is known as a relapse.

Staying off school or work

Most people being treated for typhoid fever can return to work or school as soon as they start to feel better.

The exceptions to this are people who work with food and vulnerable people, such as children under five, the elderly and those in poor health.

In these cases, you should only return to work or nursery after tests on three stool samples taken at weekly intervals have shown that the bacteria are no longer present.

Hospital treatment

Hospital admission is usually recommended if you have severe symptoms, such as persistent vomiting, severe diarrhoea or a swollen stomach.

As a precaution, young children who develop typhoid fever may be admitted to hospital.

In hospital, you will be given antibiotic injections and may also be given fluids and nutrients directly into a vein thorough an intravenous drip.

Surgery may be required if you develop any life-threatening complications, such as internal bleeding or a section of your digestive system splitting. However, this is very rare in people being treated with antibiotics. Read more about complications of typhoid fever.

Most people respond well to hospital treatment and improve within three to five days. However, it may be several weeks until you are well enough to leave hospital.

Relapses

Some people who are treated for typhoid fever experience a relapse, which is when symptoms return. In these cases, the symptoms usually return around a week after antibiotic treatment has finished.

The second time around, symptoms are usually milder and last for a shorter amount of time than the original illness, but further treatment with antibiotics is usually recommended. See your GP as soon as possible if your symptoms return after treatment.

Long-term carriers

After your symptoms have passed, you should have another stool test to check if there are still *Salmonella* Typhi bacteria in your faeces. If there are, it may mean you have become a potentially long-term (chronic) carrier of the typhoid infection, and you may need to have a further 28-day course of antibiotics to "flush out" the bacteria.

Until test results show that you are free of bacteria, avoid handling or preparing food. It is also very important that you wash your hands thoroughly after going to the toilet.

Complications of typhoid fever

Complications caused by typhoid fever usually only occur in people who have not been treated with appropriate antibiotics, or who have had delayed treatment.

In such cases, about 1 in 10 people experience complications, which usually develop during the third week of infection.

The two most common complications in untreated typhoid fever are: (1) internal bleeding in the digestive system, (2) splitting (perforation) of a section of the digestive system or bowel, which spreads the infection to nearby tissue

These are described in more detail below.

Internal bleeding

Most internal bleeding that occurs in typhoid fever is not life threatening, but can make you feel very unwell.

Symptoms include:

- feeling tired all the time
- breathlessness
- pale skin
- irregular heartbeat
- vomiting blood
- passing stools that are very dark or tar-like

A blood transfusion may be required to replace lost blood, and surgery can be used to repair the site of the bleeding.

Perforation

Perforation is potentially a very serious complication. This is because bacteria that live in your digestive system can move into your stomach and infect the lining of your abdomen (the peritoneum). This is known as peritonitis.

Peritonitis is a medical emergency, as the tissue of the peritoneum is usually sterile and germ-free. Unlike other parts of the body, such as the skin, the peritoneum does not have an inbuilt defence mechanism for fighting infection.

In cases of peritonitis, an infection can rapidly spread into the blood (sepsis) before spreading to other organs. This carries the risk of multiple organ failure. If it is not treated aggressively, it may result in death. The most common symptom of peritonitis is sudden abdominal pain that gets progressively worse.

Peritonitis requires admission to hospital, where you will be treated with injections of antibiotics. Surgery will then be used to seal the hole in your intestinal wall.

What can one do to avoid contracting the condition?

Today, there are vaccines that can protect you from contracting typhoid. The Ty21a vaccine is administered intramuscularly (injected into a muscle) and requires the patient to take a booster shot after five years. That being said, even if a person has taken the vaccine, they should not expose themselves to possible infectious agents, because the vaccine is still not very effective. As of last year the IISc (Indian Institute of Science) was working on an improved vaccine that would be foolproof.

Apart from the vaccine, there are some basic things that one can take care of in order to avoid the condition:

Do not eat food cooked on the road side. This is because it is very difficult to judge the water source they use and the cleanliness of the food handler.

Do not have ice or popsicles prepared locally. Since the water source and cleanliness of the manufacturing facility is unknown, it is best avoided.

Do not eat fruits and raw vegetables that have been precut.

One must make sure they wash their hands well before cooking a meal or eating.

Always drink either bottled water or boiled water. It is essential that the water is brought to a rolling boil. This means that the water reaches a boiling point and is allowed to boil for about two to three minutes.

Typhoid fever vaccination

Vaccination against typhoid fever is recommended if you are travelling to parts of the world where the condition is common.

High-risk areas

Typhoid is found throughout the world, but is more likely to occur in areas where there is poor sanitation and hygiene. High-risk areas include:

- Africa
- Central America
- the Indian subcontinent
- the Middle East
- South America
- South and Southeast Asia

In particular, vaccination is recommended for those who will be staying or working with local people, and those who will have frequent or prolonged exposure to conditions where sanitation and food hygiene are likely to be poor.

In the UK, most people who get typhoid fever have visited India, Pakistan and Bangladesh. It is therefore especially important that you are vaccinated if you are visiting these countries.

Vaccination against typhoid fever is usually free of charge from GP surgeries on the NHS. Alternatively, you can have it done at a private travel clinic from around £25.

Choosing a vaccine

Two main vaccines are available for typhoid fever in the UK:

1) Vi vaccine – given as a single injection
2) Ty21a vaccine – given as three capsules to take on alternate days

There are also combined typhoid and hepatitis A injections available for people aged 15 to 16 or older.

No vaccine offers 100% protection against typhoid fever, but the Vi vaccine is generally more effective than the Ty21a vaccine. However, some people prefer to have the Ty21a vaccine because it does not require an injection.

As the Ty21a vaccine contains a live sample of *Salmonella* Typhi bacteria, it is not suitable for people who have a weakened immune system (the body's natural defence against infection and illness), such as people with HIV. It is also not usually recommended for children under six, whereas children can have the Vi vaccine from two years of age.

The protective effect of the Vi vaccine will last for around three years, after which a follow-up booster vaccination will be required. The Ty21a vaccine will last for around one year before a booster dose is required.

Ideally, the typhoid vaccine should be given at least one month before you travel, but, if necessary, it can be given closer to your travel date.

Side effects

After having the typhoid fever vaccine, some people experience temporary soreness, redness, swelling or hardness at the injection site. About 1 in every 100 people experience a high temperature (fever) of 38ºC (100.4ºF). Less common side effects include:

- abdominal pain
- headache
- feeling sick
- diarrhoea

Importance of Cleaning/Pre-cleaning of Surgical Instruments

Cleaning is the removal—usually with cleaning agent and water—of adherent visible soil (i.e., blood, pus, tissue, etc.) from the surfaces, crevices, serrations, jaws and lumens of instruments, devices and equipment, by a manual or mechanical process that prepares the items for safe handling and/or further decontamination.

Decontamination is the first and most critical step in breaking the chain of disease transmission and cleaning is the first step in the decontamination process.

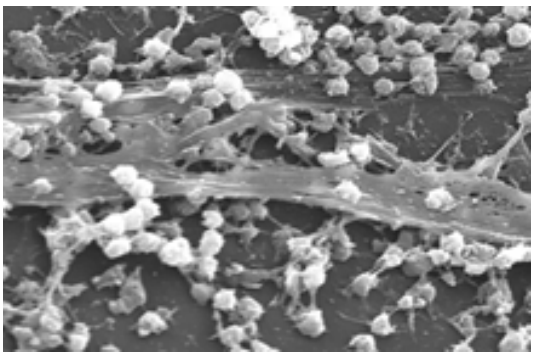
Why is cleaning important?

The process of disinfection or sterilization is dependent upon direct contact of the sterilant or disinfectant with the surface of the items to be sterilized. Soils (e.g., blood, mucous, tissue) left on items can be "baked on" during sterilization. Sterilization is a multi-step process and proper cleaning is the first step in that process.

Ineffective cleaning may result in endotoxin accumulation. Endotoxins are potentially toxic, natural compounds commonly associated with pathogens such as bacteria. Classically, an endotoxin is a structural component of the bacteria which is released mainly when bacteria are lysed. Endotoxins are part of the outer membrane of the cell wall of gram-negative bacteria. Although the term "endotoxin" is occasionally used to refer to any cell-associated bacterial toxin, it is usually associated with the outer membrane of gram-negative bacteria such as *E. coli, Salmonella, Shigella, Pseudomonas, Neisseria, Haemophilus*, and other significant pathogens. Endotoxins account for an estimated 99 percent of the pyrogens found on the surface of medical devices; they are not completely destroyed with sterilization.

Surgical instruments

Biofilms



Biofilms are produced by microorganisms and consist of a sticky structure of organic contaminants. They create a slime layer which can be anchored firmly to a surface and provides a protective environment for microorganisms to grow. Generally biofilms form on any surface that is exposed to non-sterile water or other liquids and is consistently found in many environments including industrial and medical systems. AAMI recommends the use of a towel moistened with water or foam, spray or gel product specifically intended for this use when instruments need to be soaked for a prolonged period of time.

Prions

Prions are the infectious agent that causes Creutzfeldt-Jakob disease (CJD). CJD is a progressive neurological disease with a very low incidence (1 in 1 million). However, prions are difficult to kill and are resistant to virtually every known disinfection and sterilization method. The World Health Organization (WHO) has identified eye tissue as high risk tissue for contamination with prions from individuals infected with the disease. Identification of high risk patients is difficult because of the long incubation period associated with CJD. Furthermore, flash sterilization is contraindicated for decontamination or sterilization of prion-contaminated devices. Where instruments are suspected of being contaminated with prions they should be quarantined and the procedures recommended by the AAMI (ST79), the CDC, WHO, and your institution's policies followed as appropriate.

Universal Precautions

All used supplies and equipments are considered contaminated. The soiled instruments and devices should be collected and transported to the soiled utility or decontamination area in a manner that minimizes potential contamination of staff, patients or the environment.

Physical Design

The area in which soiled instruments are cleaned should be physically separated from other areas in the facility. It should be an enclosed area and accessible from an outside corridor if applicable. The room requires negative air pressure with 10 air exchanges per hour, per AAMI. The floors, walls and worktables should have washable surfaces. The recommended temperature is 60 degrees Fahrenheit to 65 degrees Fahrenheit (15 degrees Celsius to 18 degrees Celsius) according to AAMI.

Steps in the Cleaning Process

The following steps are recommended:

- Pre-clean devices by flushing lumens and immersing instruments in sterile distilled water immediately following use
- Contain contaminated items at the point of use
- Transport to the decontamination area
- Sort
- Soak
- Wash
- Rinse/dry

It is recommended to wipe gross soil and debris from instruments throughout the surgical procedure. This will facilitate cleaning. All items should be contained for transportation to the decontamination area to ensure protection of patients and personnel.

When decontamination activities are performed personnel must don personal protective equipment (PPE) to include:

- Impervious gown with sleeves
- Head cover
- Cuffed gloves
- Shoe covers (if shoes will be exposed to fluids containing body fluids)
- Face shield
- High-filtration mask (needed when lumened devices are being cleaned)

The Cleaning Process

Soaking is important to loosen adherent soils. The use of cleaning agents may assist in the loosening of soils to facilitate removal.

Water quality can affect the efficacy of the cleaning process. Water used for cleaning can contain rust, minerals and other components which can interfere with the action of cleaning agents. It is important to have your water tested at least annually. This service may be provided as a value-added service by the cleaning agent or washing equipment manufacturer.

Cleaning Agent Selection

Follow the recommendation of the instrument manufacturer regarding the appropriate use of cleaning agents. No single cleaning agent will remove all types of soil, or is safe to use with all types of reusable devices. Many facilities use a neutral-pH cleaning agent for cleaning and soaking surgical instruments. Liquids are preferred since they mix easier than powders. However, it is essential that cleaning agents be used according to the cleaning agent manufacturer's instructions for use including:

- Dilution
- Soak time
- Maximum water temperature
- Water quality

The recommendations of the instrument manufacturer should also be consulted regarding the use of enzymatic cleaning agents. It is important to measure the quantity of the cleaning agent as well as the water it will be placed into so the concentration is correct. Too little or too much cleaning agent can impact effective cleaning. Each cleaning agent has its own recommended soak time, from seconds to minutes. Read the label for proper use. Some cleaning agents are inactivated by temperatures above 140 degrees Fahrenheit (60 degrees Celsius). Therefore it is important to monitor the water temperature to make sure the water temperature does not exceed the range recommended by the cleaning agent manufacturer.

Basic Components of Cleaning Solutions

It is essential that an appropriate cleaning solution to be chosen, and that it to be used correctly, to assure optimal cleaning of medical devices. To do this, an understanding of the basic components of cleaning solutions is required. Only those cleaning solutions that are specifically formulated and labeled for use on medical devices should be used in reprocessing. The formulation of each cleaning solution is unique; however, most will contain some combination of the following six components. Water is the most common solvent on earth and provides the base for most cleaning solutions. Detergent helps to loosen debris from surfaces. The detergent then acts to hold the debris in suspension, preventing it from re-depositing on the device and allowing it to be easily rinsed away. Surfactants increase cleaning efficacy by reducing surface tension thus allowing for better penetration of the soil. Buffers provide better compatibility with materials and inhibit corrosion. Chelating agents assist with reducing the potential negative effects of hard water that may be used when diluting the solution. They also bind with hard water minerals to prevent them from depositing on the device or adversely reacting with the cleaning solution. It is important to note that hard water may cause spotting or leave deposits on the device.

Enzymes increase cleaning efficacy, speed the cleaning process and help to minimize the need for manual brushing and scrubbing. There are a variety of enzymes available, each targeting a particular type of soil. The most common enzyme found in solutions used for cleaning medical devices is protease, which helps to break down protein-based soils such as blood and feces. Also available are amylase to break down starches like those found in muscle tissue, cellulase to break down carbohydrates like those found in connective fluid and joint tissue and lipase to break down fats like those found in adipose tissue. Any combination of these enzymes may be present in a solution. Solutions containing enzymes can often be used at a more neutral pH and at lower temperatures than those without enzyme.

Principles of Cleaning

To ensure effective cleaning, all items must be in the open position. If possible, multi-part items should be disassembled. Handle all instruments carefully to prevent damage. When using an ultrasonic cleaner it is important to keep different metal types separated (i.e. stainless steel with non-anodized aluminum, brass, copper, chrome plating). Electrolysis can occur in wet, hot chambers of ultrasonic cleaners which can cause one metal plating to transfer to another metal.

Washing/Manual Cleaning

Many manufacturers of eye instruments recommend manual cleaning. The instruments should be submerged and disassembled. It is preferable to use a three-sink (or three-basin) method: wash, rinse, final rinse. If basins are used, they should be drained and cleaned on a frequent basis according to the instrument manufacturer's directions.

Manual Cleaning Implements

A variety of soft bristle brushes, various sizes and lengths dedicated for use in cleaning surgical ophthalmic instruments only are needed. It may also be permissible to use soft cloths depending on the instrument manufacturer's instructions for

cleaning. However, abrasive items (e.g., wire brushes) sponges/surgeons scrub brushes or materials which are permeable—such as wood—should not be used.

Ultrasonic Cleaning

Ultrasonic cleaning is an effective cleaning process. Ultrasonic machines use sound waves transmitted through a solution. The sound waves produce tiny bubbles which implode, resulting in a scouring action that cleans; this mechanical process is called cavitation. Ultrasonic cleaning is effective to remove soils in hard-to-reach areas (box locks, mouth teeth, etc.) All gross soil should be removed from instruments prior to placing in the ultrasonic cleaner. Generally, it is recommended to use cleaning agents specifically formulated for ultrasonic cleaners which are low foaming. The water temperature inside the chamber may reach as high as 100 degrees Fahrenheit to 140 degrees Fahrenheit (37.8 degrees Celsius to 60 degrees Celsius) depending on the model of ultrasonic cleaner used. The solution should be changed frequently (e.g. every two hours) based upon the volume of instruments being cleaned. The unit should be emptied, cleaned, rinsed, and dried on at least a daily basis. At least one reported TASS incident was related to *Klebsiella* contamination of an ultrasonic cleaner. "The bacteria were killed during the sterilization process but a heat-stable endotoxin remained on the instruments causing the outbreak."

The ultrasonic cleaning unit should have a cover to contain aerosols. Instrument sets should not be stacked. Each time the water is changed in the unit, the water needs to be "de-gassed." This requires running a cycle with just the metal basket (no instruments) inside.

Sonic cleaners should be routinely tested for efficacy. This can be performed using a piece of heavy-duty household aluminum foil which is placed in the metal basket and run through a cycle. The size of the piece of foil should be equal to the length and width of the chamber (e.g., 9 inches by 5 inches). At the end of the cycle, remove and inspect the foil. There should be large holes and numerous creases in the foil. There are also commercial products on the market to test the efficacy of the sonic cleaner. All testing should be documented. If the unit fails the test, the unit requires service. Following testing the unit should be emptied, cleaned, rinsed, and dried before refilling the unit and processing instruments.

Rinsing

Rinsing is the most important part of the cleaning process. Rinsing removes the debris loosened with manual and/or ultrasonic cleaning and residual cleaning agent. Sterile deionized/ distilled water is preferred for the final rinse to prevent mineral deposits and reduce the potential for pyrogens. The water should not be reused. Follow the instrument manufacturer's recommendations regarding the volume and quality of rinse water, water temperature, and number of rinses.

Items with Lumens

Items with internal passageways require special cleaning. The instrument manufacturer's recommendations must be closely followed with regard to the cleaning of lumens and internal passageways. It is essential to have the proper size brushes to create friction inside the lumen for cleaning. Rinse thoroughly after cleaning.

Manufacturer's Instructions

All instrument and device manufacturers are required to provide end users with written instructions for cleaning and sterilization based upon their testing and validated cleaning and sterilization methods. It is incumbent upon the end user to follow these instructions each and every time. This is especially relevant in specialty devices which, due to material composition or design of the device, may require a particular water quality (e.g., distilled) cleaning chemicals, cleaning implements, preparation (e.g., lubrication, disassembly) and special sterilization cycles. It is vital to patient safety that this information is obtained and the manufacturer's instructions for cleaning and sterilization followed.

Factors for the Effective Use of Cleaning Solutions

For a cleaning solution to be effective, a number of factors must be addressed including:

1. Personnel training
2. Appropriate use of personal protective equipment (PPE)
3. Quality of the water used
4. Adherence to guidelines and manufacturer's directions for use

Personnel Training

Personnel training are essential for the effective use of cleaning solutions. It is critical that personnel with responsibility for any part of device reprocessing be properly trained and provided with the tools needed to complete their task effectively and safely.

Appropriate use of PPE

When handling contaminated devices, medical professionals should wear appropriate PPE based upon the degree of risk. In the decontamination area, clean uniforms should be donned at the facility. Liquid resistant coverings with sleeves, surgical face masks and eye protection should be worn in the decontamination area. Protective apparel should be changed daily and immediately if wet, heavily soiled or visibly contaminated by blood or body fluids. Surgical head coverings should completely cover all head and facial hair except for eyebrows and eyelashes. Clean shoes, designated for facility use only, should be skid resistant and durable enough to prevent injury from dropped items. If shoe covers are selected, they should be skid resistant and liquid resistant or liquid proof. Designated shoes and/or shoe covers should be removed upon exiting the decontamination area. Additionally, general purpose utility gloves should be worn. If gloves become torn, they should be replaced immediately after appropriate hand washing. Jewelry and wrist watches should not be worn in the decontamination area. All PPE should be removed before leaving the decontamination area. Special care should be taken to avoid contaminating clothing and skin.

Water Quality

The quality of water is integral to the cleaning process. Routine water testing is often conducted by engineering staff and or engineering contractors and the utilisation of such a resource would be preferable. Opportunities to share services should be considered in order to prevent duplications and conserve resources. Useful information on the quality of water may be obtained from the local water authority and will assist in determining appropriate cleaning agents required for the SS.

Water hardness is determined by the amount of calcium and magnesium ions present in the water. Water hardness reduces the rate of kill of certain disinfectants and generally reduces the efficiency of cleaning chemicals. This occurs because divalent cations (eg magnesium and calcium) interact with some chemicals to form insoluble precipitates and a white-grey residue on the instruments.

Possible interactions between very hard water, or water with

elevated levels of dissolved chemicals justify the attention required here to the quality of water used for cleaning. These dissolved components of reticulated water have the potential to seriously retard the effectiveness of some cleaning agents and may damage instruments. Also, drying of instruments following a post-cleaning rinse with impure water can produce undesirable precipitated residues of the salts and other elements dissolved in the water.

In some cases where further filtration is required to remove the likes of chlorides, etc, systems such as Reverse Osmosis filtration are employed. This quality of water would normally only be used for final rinse applications.

Water and resource economisation should not take precedent over operational imperatives such as water quality and critical parameters for processes.

Adherence to Guidelines and Manufacturer's Directions for Use

It is important to adhere to the manufacturer's directions for use and applicable guidelines. This will ensure optimal performance of the solution. Always refer to the package label for the correct use parameters including temperature, dilution ratio and soak time, as well as rinsing and drying requirements. Typically, a minimum temperature is required for the solution to become active and to provide adequate cleaning action. Using water that is hotter than recommended is not advisable as it may inactivate enzymes contained in the solution or cause denaturing of protein-based soils making them harder to remove. The dilution ratio needs to be accurately measured based on the manufacturer's specifications which may include different dilution ratios for manual vs. automated cleaning. For manual cleaning, it is necessary to measure the volume of the sink or basin being used for cleaning, remembering that the container must be deep enough to fully immerse devices in the solution. The appropriate amount of cleaning solution must then be added based on that specific volume of water. Using less solution than is recommended may decrease cleaning efficacy. More is not necessarily better as using too much solution can make thorough rinsing difficult; however, heavily soiled devices may require higher solution concentrations. It is important to soak the devices for the minimum time recommended by the manufacturer. This allows the components of the solution to break down the soils present. Note that the manufacturer may recommend a longer soak time for heavy or dried-on soil. It is not, however, recommended to use cleaning solutions for storing devices as soaking for extended periods of time may damage the devices or allow for microbial growth in the solution. If a delay in disinfection or sterilization is anticipated, devices should be cleaned, rinsed, dried and stored temporarily. Thorough rinsing is vital to preparing a device for further processing. Residual debris or solution can lead to incomplete disinfection or sterilization and may also cause damage to the device. Always use enough water to completely rinse the device surfaces, both external and internal with extra attention to lumens, hinges and crevices. Devices should be dried of excess moisture prior to disinfection or sterilization. Excess moisture may cause over-dilution of high level disinfectants, reducing their efficacy below the minimum effective concentration. Excess moisture may also cause cycle cancellation in some sterilization technologies. Leaving moisture on or in devices for extended periods, especially in lumens and internal surfaces, may promote the colonization of waterborne microorganisms and the growth of biofilms.

Risks Associated with Improper Cleaning

Following a procedure, a medical device is contaminated with both visible and hidden bioburden. This bioburden or soil may contain hundreds if not millions of potentially infectious organisms. Any soil left on a device following cleaning can pose a risk to the patient. Therefore, it is imperative that appropriate steps be taken to ensure a thorough cleaning process. Proper cleaning of medical devices is a multi-step process. Before a medical device reaches the reprocessing area, it is critical to remember that contaminated devices should be handled as little as possible following use. Preferably, after use, devices should be soaked or sprayed to keep them moist during transport. Keeping the devices and any residual contaminants moist helps make the cleaning process easier and more effective. Thorough manual and/or mechanical cleaning is needed for all reusable medical devices prior to disinfection or sterilization. This step requires the use of the proper products and processes to assure that all surfaces, internal and external, are completely free of bioburden. Finally, the devices should be thoroughly rinsed to remove all residual bioburden and detergent. If the device is not going directly into a washer following this step, the device should also be dried. Always remember, if the device is not clean, it cannot be sterilized. Significant risks have been associated with inadequate or improper cleaning. These risks include healthcare-associated infections (HAIs) due to the presence of residual soil and/or improper disinfection or sterilization, and damage to the medical device.

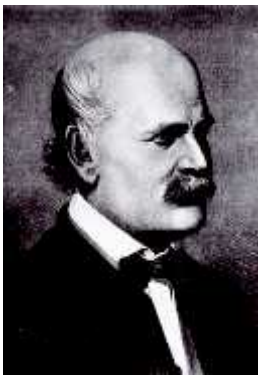
Healthcare-Associated Infections.

Due to the significance of this problem, initiatives to monitor and prevent the occurrence of HAIs have developed. Improper cleaning has been implicated in patient-to-patient transmission of microbes via contaminated devices such as bronchoscopes contaminated with Mycobacterium tuberculosis. Documented cases of pathogen transmission via gastrointestinal (GI) endoscopic procedures have been associated with a breach in accepted cleaning and disinfection guidelines, use of an unacceptable liquid germicide for disinfection, improper drying or defective equipment. In a similar case report, the transmission of Hepatitis C virus to patients during colonoscopy procedures was associated with a breach in following accepted cleaning and disinfection guidelines. Another risk of infection develops from improperly processed devices which allow for accumulation of microbial biofilms (collections of bacteria and fungi). These biofilms adhere to each other and to the surfaces of medical devices, especially those with lumens, and increase the difficulty of thorough cleaning. Cleaning devices immediately after use has the potential to eliminate this problem of biofilm contamination. Any soil or bioburden remaining on a device after cleaning poses a clear risk to the next patient. Unfortunately, this incomplete cleaning occurs all too often.

Damage to medical devices

A medical device may become damaged by cleaning solutions or medical soils that are not removed properly after the cleaning process. Using cleaning solutions that are not compatible with a device may cause damage as well. Types of damage the device may sustain include staining, pitting or corrosion, clouding or etching of optics and improper function due to accumulation of debris. In order to reduce the risks associated with improper or ineffective cleaning of reusable medical devices, the basic components and types of cleaning solutions, as well as the factors for the effective use of cleaning solutions, must be understood.

Ignaz Semmelweis
(pioneer of antiseptic procedures)



Born	:	July 1, 1818
Died	:	August 13, 1865 (aged 47)
Residence	:	Hungary
Citizenship	:	Austrian Empire
Nationality	:	Hungarian
Fields	:	Obstetrics, surgeries
Known for	:	Introducing hand disinfection standards, in obstetrical clinics, from 1847

Ignaz Philipp Semmelweis (July 1, 1818 – August 13, 1865) was a Hungarian physician of German extraction now known as an early pioneer of antiseptic procedures. Described as the "savior of mothers", Semmelweis discovered that the incidence of puerperal fever could be drastically cut by the use of hand disinfection in obstetrical clinics. Puerperal fever was common in mid-19th-century hospitals and often fatal, with mortality at 10%–35%. Semmelweis proposed the practice of washing with chlorinated lime solutions in 1847 while working in Vienna General Hospital's First Obstetrical Clinic, where doctors' wards had three times the mortality of midwives' wards. He published a book of his findings in *Etiology, Concept and Prophylaxis of Childbed Fever.*

Despite various publications of results where hand-washing reduced mortality to below 1%, Semmelweis's observations conflicted with the established scientific and medical opinions of the time and his ideas were rejected by the medical community. Some doctors were offended at the suggestion that they should wash their hands and Semmelweis could offer no acceptable scientific explanation for his findings. Semmelweis's practice earned widespread acceptance only years after his death, when Louis Pasteur confirmed the germ theory and Joseph Lister, acting on the French microbiologist's research, practiced and operated, using hygienic methods, with great success. In 1865, Semmelweis was committed to an asylum, where he died at age 47 after being beaten by the guards, only 14 days after he was committed.

His Early Life & Education

Ignaz Philipp Semmelweis was born on July 1, 1818 in Taban (Budapest) in Hungary. His well-off family was perhaps of German descent and was Jewish. His father, Josef Semmelweis (1778–1846), was born in Kismarton, then part of Hungary, now Eisenstadt, Austria. Josef achieved permission to set up shop in Buda in 1806. By 1810, he was a wealthy man when he married Teresia Müller, daughter of the famous coach (vehicle) builder Fülöp Müller.

During 1835-1837, Ignaz Semmelweis went to Catholic Gymnasium of Buda for his primary education and later finished schooling at the University of Pest. In 1837, he went to Vienna to study law at the University of Vienna but switched to medicine due to personal inclination. He received his master's (Magister) degree in medicine in 1844 with specialization in midwifery. He learned diagnostic and statistical methods and took surgical training before taking a post as assistant in the Vienna General Hospital.

Efforts to reduce childbed fever:

Semmelweis demonstrated that puerperal fever (also known as childbed fever) was contagious and that this incidence could drastically be reduced by appropriate hand washing by medical care-givers. He made this discovery in 1847 while working in the Maternity Department of the Vienna Lying-in Hospital. His failure to convince his fellow doctors led to a tragic conclusion. However, he was ultimately vindicated. While employed as assistant to the professor of the maternity clinic at the Vienna General Hospital in Austria in 1847, Semmelweis introduced hand washing with chlorinated lime solutions for interns who had performed autopsies. This immediately reduced the incidence of fatal puerperal fever from about 10% (range 5–30%) to about 1–2%. At the time, diseases were attributed to many different and unrelated causes. Each case was considered unique, just as a human person is unique. Semmelweis's hypothesis, that there was only one cause, that all that mattered was cleanliness, was extreme at the time, and was largely ignored, rejected, or ridiculed. He was dismissed from the hospital for political reasons and harassed by the medical community in Vienna, being eventually forced to move to Budapest.

Semmelweis was outraged by the indifference of the medical profession and began writing open and increasingly angry letters to prominent European obstetricians, at times denouncing them as irresponsible murderers. His contemporaries, including his wife, believed he was losing his mind, and in 1865 he was committed to an asylum. In an ironic twist of fate, he died there of septicaemia only 14 days later, possibly as the result of being severely beaten by guards. Semmelweis's practice earned widespread acceptance only years after his death, when Louis Pasteur developed the germ theory of disease, offering a theoretical explanation for Semmelweis's findings. He is considered a pioneer of antiseptic procedures.

Reaction to Semmelweis' Discovery

Although hugely successful; Semmelweis' discovery directly confronted with the beliefs of science and medicine in his time. His colleagues and other medical professionals refused to accept his findings mainly because they did not find it convincing that they could be responsible for spreading infections. The reaction reflected on his job as well when he was declined a reappointment in 1849.

Ignaz Semmelweis was himself reluctant to publish or demonstrate his research and findings publically but some of his students and colleagues wrote letters and delivered lectures explaining his work. But later, he somehow got convinced and during 1850, he delivered a few lectures in Vienna on the Origin of Puerperal Fever. He returned to Budapest in 1851 and joined St. Rochus Hospital remaining there till 1857. His antiseptic methods proved to be fruitful here as well. In 1861, he eventually published a book in German about his significant discovery followed by a series of letters written in reaction to his critics.

His Demise

The continued criticism and lash out finally broke him down. By 1865, he was suffering from depression, forgetfulness and other neural complaints and was eventually committed to an asylum. He only lasted there for two weeks and died on August 13, 1865 at the age of 47.

"When I look back upon the past, I can only dispel the sadness which falls upon me by gazing into that happy future when the infection will be banished . . . The conviction that such a time must inevitably sooner or later arrive will cheer my dying hour."

Funny Quotes

"An Intelligent Wife Is One Who Makes Sure She Spends So Much That Her Husband Can't Afford Another Women"

Lion bounced on wife
In an African Safari, A LION suddenly bounced on Santa's wife.
WIFE: Shoot him! Shoot him!
SANTA: Yes, Yes. I'm changing d battery of my camera.

What is the Difference between Mother & Wife?
A - One Woman Brings U into this world crying... & the other ensures U Continue to do so.

Husband was throwing knives on wife's picture.
All were missing the target!
Suddenly he received call from her "Hi, what r u doing?"
His honest reply, "MISSING U"

A man in Hell asked Devil:
Can I make a call to my Wife?
After making a call he asked how much to pay.
Devil: Nothing, Hell to hell is Free.

A man came home late at night after a party.
His wife yelled: "how would you feel if you don't see me for two days?"
The man couldn't believe his luck: 'that would be great'!
Monday passed and he didn't see her.....
Tuesday and Wednesday passed too.....
On Thursday his swelling became better
And now he could see her from the corner of one eye.

15 GREAT THOUGHTS BY CHANAKYA

1) "Learn from the mistakes of others... you can't live long enough to make them all yourselves!!"

2) "A person should not be too honest. Straight trees are cut first and Honest people are screwed first."

3) "Even if a snake is not poisonous, it should pretend to be venomous."

4) "There is some self-interest behind every friendship. There is no friendship without self-interests. This is a bitter truth."

5) "Before you start some work, always ask yourself three questions - Why am I doing it, What the results might be and Will I be successful. Only when you think deeply and find satisfactory answers to these questions, go ahead."

6) "As soon as the fear approaches near, attack and destroy it."

7) "The world's biggest power is the youth and beauty of a woman."

8) "Once you start a working on something, don't be afraid of failure and don't abandon it. People who work sincerely are the happiest."

9) "The fragrance of flowers spreads only in the direction of the wind. But the goodness of a person spreads in all direction."

10) "God is not present in idols. Your feelings are your god. The soul is your temple."

11) "A man is great by deeds, not by birth."

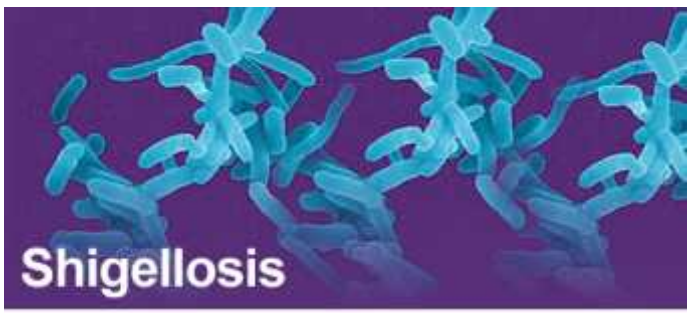
12) "Never make friends with people who are above or below you in status. Such friendships will never give you any happiness."

13) "Treat your kid like a darling for the first five years. For the next five years, scold them. By the time they turn sixteen, treat them like a friend. Your grown up children are your best friends."

14) "Books are as useful to a stupid person as a mirror is useful to a blind person."

15) "Education is the best friend. An educated person is respected everywhere. Education beats the beauty and the youth."

Shigellosis



What Is Shigellosis?

Shigellosis is an intestinal infection caused by *Shigella* bacteria. The bacteria produce toxins that can attack the lining of the large intestine, causing swelling, ulcers on the intestinal wall, and bloody diarrhea. Symptoms can range from just watery diarrhea to bloody diarrhea, fever, and abdominal pain.

Shigella bacteria can contaminate food and water supplies, especially in areas where the sanitation is not adequate. However, most of the time the bacteria are spread when a person comes into contact with another person's stool (poop). That's one of the reasons why it's important to wash your hands after using the restroom. It takes as few as 10 of these bacteria to cause an infection. That means that *Shigella* bacteria can spread easily within families, schools, child-care centers, nursing homes, and other institutions.

Shigellosis can affect people of any age, including teens. It's especially common in children ages 2 to 3 years old because they're often not toilet trained yet or they don't wash their hands after using the bathroom.

Shigella can be passed through direct contact with the bacteria in the stool. For example, this can happen in a child care setting when staff members don't wash their hands well enough after changing diapers or helping toddlers with toilet training. *Shigella* bacteria also can be passed in contaminated food or by drinking or swimming in contaminated water.

Children between the ages of 2 and 4 are most likely to get *shigella* infection. A mild case usually clears up on its own within a week. When treatment is needed, doctors generally prescribe antibiotics.

Signs and symptoms

Everyone gets diarrhea once in a while. So how can you tell if what you have is shigellosis or something else?

The severity of the diarrhea sets shigellosis apart from regular diarrhea. When someone has shigellosis, the first bowel movement is often large and watery. Later bowel movements may be smaller, but the diarrhea may have blood and mucus in it.

Other symptoms of shigellosis include:

- Abdominal cramps
- High fever
- Loss of appetite
- Nausea and vomiting
- Painful bowel movements

In very severe cases of shigellosis, a person may have convulsions (seizures), a stiff neck, a headache, extreme tiredness, and confusion. Shigellosis can also lead to dehydration and in rare cases, other complications, like kidney failure.

Treatments and drugs

Shigella infection usually runs its course in five to seven days. Replacing lost fluids from diarrhea may be all the treatment you need, particularly if your general health is good and your *shigella* infection is mild.

Avoid drugs intended to treat diarrhea, such as loperamide (Imodium) and diphenoxylate with atropine (Lomotil), because they can make your condition worse.

Antibiotics

For severe shigella infection, antibiotics may shorten the duration of the illness. However, some *shigella* bacteria have become drug resistant. So it's better not to take antibiotics unless your *shigella* infection is severe.

Antibiotics may also be necessary for infants, older adults and people who have HIV infection, as well as in situations where there's high risk of spreading the disease.

Causes

Infection occurs when you accidentally swallow *shigella* bacteria. This can happen when you:

- **Touch your mouth**. If you don't wash your hands well after changing the diaper of a child who has *shigella* infection, you may become infected yourself. Direct person-to-person contact is the most common way the disease is spread.
- **Eat contaminated food**. Infected people who handle food can transmit the bacteria to people who eat the food. Food can also become contaminated if it grows in a field that contains sewage.
- **Swallow contaminated water**. Water may become contaminated either from sewage or from a person with *shigella* infection swimming in it.

How Long Does It Last?

Once a person gets infected with the *Shigella* bacteria, it usually takes anywhere from 12 hours to several days for the symptoms to appear. Most cases get better within 1 week even without use of antibiotics.

If someone becomes very dehydrated or has serious rectal bleeding, he or she may need to be admitted to the hospital for intravenous fluids and to control bleeding.

The *Shigella* bacteria live in the intestine the whole time a person is sick and they remain there for a few weeks after symptoms disappear. This means that people with shigellosis can be

contagious (meaning they can spread the infection) even when they start to feel better. A person can become infected if he or she comes into contact with anything contaminated by stool from an infected person. This includes clothes, items around the house, surfaces of sinks and counters, and even food prepared by the infected person (if that person didn't wash his or her hands properly). The disease can also spread in water supplies in areas with poor sanitation.

Risk factors

- **Being a toddler**. *Shigella* infection is most common in children between the ages of 2 and 4.
- **Living in group housing or participating in group activities**. Close contact with other people spreads the bacteria from person to person. *Shigella* outbreaks are more common in child care centers, nursing homes, jails and military barracks.
- **Living or traveling in areas that lack sanitation**. People who live or travel in developing countries are more likely to contract *shigella* infection.
- **Being a sexually active gay male**. Men who have sex with men are at higher risk.

Complications

Shigella infection usually clears up without complications, although it may take weeks or months before your bowel habits return to normal.

Complications may include:

- **Dehydration**. Persistent diarrhea can cause dehydration. Symptoms include lightheadedness, dizziness, lack of tears in children, sunken eyes and dry diapers. Severe dehydration can lead to shock and death.
- **Seizures**. Some children who run high fevers with a shigella infection have seizures. It's not known whether the convulsions are a result of the fever or the *shigella* infection itself. If your child has a seizure, contact your doctor immediately.
- **Rectal prolapse**. In this condition, straining during bowel movements may cause the mucous membrane, or lining, of the rectum to move out through the anus.
- **Hemolytic uremic syndrome**. This rare complication of *shigella*, more commonly caused by bacteria called *E. coli*, can lead to a low red blood cell count (hemolytic anemia), low platelet count (thrombocytopenia) and acute kidney failure.
- **Toxic megacolon**. This rare complication occurs when your colon becomes paralyzed, preventing you from having a bowel movement or passing gas. Signs and symptoms include abdominal pain and swelling, fever, and weakness. If you don't receive treatment for toxic megacolon, your colon may break open (rupture), causing peritonitis, a life-threatening infection requiring emergency surgery.
- **Reactive arthritis**. Reactive arthritis develops in response to infection. Signs and symptoms include joint pain and inflammation, usually in the ankles, knees, feet and hips; redness, itching and discharge in one or both eyes (conjunctivitis); and painful urination (urethritis).

Fluid and salt replacement

For generally healthy adults, drinking water may be enough to counteract the dehydrating effects of diarrhea.

Children may benefit from an oral rehydration solution, such as Pedialyte, available in drugstores. Many pharmacies carry their own brands.

Children and adults who are severely dehydrated need treatment in a hospital emergency room, where they can receive salts and fluids through a vein (intravenously), rather than by mouth. Intravenous hydration provides the body with water and essential nutrients much more quickly than oral solutions do.

Prevention

Although the World Health Organization has been working on a *shigella* vaccine, none is available yet. To prevent the spread of *shigella*:

- Wash hands frequently and thoroughly.
- Supervise small children when they wash their hands.
- Dispose of soiled diapers properly.
- Disinfect diaper-changing areas after use.
- Don't prepare food for others if you have diarrhea.
- Keep children with diarrhea home from child care, play groups or school.
- Avoid swallowing water from ponds, lakes or untreated pools.

People who have shigellosis need to drink plenty of liquids to replace fluids lost from diarrhea, vomiting, and fever. Depending on how much fluid you're losing, your doctor may suggest changes to your diet until the diarrhea goes away. You may need to be on a liquid diet for a day or so until your stomach can handle solid foods. Your doctor may suggest you use special drinks that replace body fluids quickly or just drink more liquids. Drinking enough fluids is very important because it’s easy to become dehydrated when you have shigellosis.

Be sure to check with your doctor before taking any nonprescription medicines to relieve your diarrhea. These medicines might actually make your case of shigellosis worse because slowing down the diarrhea keeps the bacteria and their toxins in your body longer.

As you recover from shigellosis, your bowel movements will slowly return to normal. Most people get better without any long-lasting problems.

There is no vaccine or surefire way to prevent shigellosis. The most important thing you can do to prevent shigellosis is to wash your hands thoroughly with soap and warm water after you use the bathroom and before you eat or prepare food. Remind everyone else in your family to do the same.

If you're caring for anyone who has shigellosis (like changing the diaper of a younger sibling or even a child you're babysitting), be sure to wash your hands carefully before touching anyone else or handling food. After someone with shigellosis uses a toilet, it should be cleaned and disinfected before anyone else uses it. By following these simple steps, you can help keep yourself and everyone in your family healthy.

The Chemotherapeutic effects of Garlic

Other common name(s): garlic clove, garlic powder, garlic oil, allium, allyl sulfides, ajoene
Scientific/medical name(s): *Allium sativum*

Description
Garlic is a member of the lily family and is closely related to onions, leeks, and chives. Extracts and oils made from garlic are sometimes used as herbal remedies.

Overview
Garlic is currently under study for its ability to reduce cancer risk. However, there is not enough evidence at this time to support eating large amounts of garlic or taking garlic supplements for cancer prevention. Garlic may have the potential to interfere with anesthesia or other medicines. It is reasonable to include garlic as part of a balanced diet, unless one has a particular health problem or is taking medication that has been shown to be adversely affected by garlic.

How is it promoted for use?
Garlic and garlic supplements are sometimes promoted to prevent or treat cancer. Several compounds in garlic may have anti-cancer properties, but compounds of one type in particular—the allyl sulfur compounds—are said to play a major role. These compounds reportedly help the body get rid of cancer-causing chemicals and help cause cancer cells to die naturally, a process called apoptosis. There have also been claims that garlic has immune-boosting properties that may reduce cancer cell growth and help the body fight off diseases such as colds or the flu. These claims are currently being studied.
Proponents claim garlic can be used to treat bacterial, yeast, fungal, and parasitic infections and can be used to treat high blood sugar levels. They also say it has properties that may help stomach and abdominal problems. Garlic has also been claimed to reduce risk of heart disease, lower cholesterol, and reduce blood pressure.

What does it involve?
Garlic is a vegetable commonly used to enhance the flavor of foods. Extracts of garlic are also sold as dietary supplements in health food stores, drug stores, and over the Internet.
There is much debate about what form and amount of garlic to use to influence health. Proponents disagree as to whether garlic is more helpful when eaten either raw or cooked, or whether garlic extracts, powders, and oils available in tablet form are more or less effective.
Garlic is on the Commission E (Germany's regulatory agency for herbs) list of approved herbs. They suggest a dosage of fresh garlic equal to 4 grams per day (or about one large clove per day) to help reduce heart disease risk.

What is the history behind it?
Garlic has been used in cooking throughout recorded history in many cultures around the world, especially those in the Orient, Middle East, and the Mediterranean. Garlic is believed to be one of the first cultivated plants, with cultivation thought to have started about 5,000 years ago in the Middle East. Garlic has also been used medicinally for thousands of years and continues to be popular today.

What is the evidence?
Several studies from around the world have found that people who eat more garlic seem to have a lower risk of certain types of cancer. In particular, large human studies that looked at diet and cancer have suggested that people who eat more garlic have a lower risk of stomach, prostate, mouth and throat, kidney, and colorectal cancer. The effect on risk of breast, bladder, ovarian, and lung cancers is less clear. As always in population-based studies, it is possible that other factors may account for the differences in cancer risk. The few human studies that have looked at garlic supplements have not found them to be helpful against cancer.
Many laboratory studies done in cell cultures and animals suggest garlic may help reduce tumor growth. Cell culture studies have shown garlic can help cancer cells die off normally, a process called apoptosis. Other studies in cell cultures have found that substances in garlic seem to be able to act as antioxidants. Some studies have also suggested that garlic can act against *Helicobacter pylori*, a bacterium thought to be a major cause of stomach cancer. Studies in laboratory animals have found garlic may help protect against cancer of the colon, skin, liver, and breast, among others.
Although results of some observational studies are encouraging, randomized clinical trials in which people assigned by researchers to receive either garlic or an inactive control substance provide more reliable information. Very few studies of this type have studied garlic and cancer risk. In one recent study conducted in China, where stomach cancer is quite common, aged garlic extract and steam-distilled garlic oil did not prevent this disease.
While some research on garlic is promising, it is very hard to determine the exact role a particular food may have against cancer. It is even more difficult when the food in question is often used in small amounts, as is garlic. A balanced diet that includes 5 or more servings a day of fruits and vegetables along with foods from a variety of other plant sources such as nuts, seeds, whole grain cereals, and beans is likely to be more effective than eating one particular food in large amounts.
Some studies suggest that garlic can lower blood cholesterol levels, although a recent clinical study funded by the National Center of Complementary and Alternative Medicine did not confirm any effect. This California study compared raw garlic with aged garlic extract, powdered garlic, and a placebo in nearly 200 randomly assigned volunteers. The garlic was given in doses of 4 grams per day over 6 months. At the end of the study, there was no significant difference in LDL ("bad") cholesterol among the 4 groups. Other studies suggest that garlic makes blood less likely to form clots, which might help prevent heart disease and stroke. However, there is no reliable direct clinical evidence that garlic can actually prevent heart attacks or strokes. Evidence on garlic and blood pressure is mixed.
While some research on garlic is promising, it is very hard to determine the exact role a particular food may have against cancer. It is even more difficult when the food in question is often used in small amounts, as is garlic. A balanced diet that includes five or more servings a day of fruits and vegetables along with foods from a variety of other plant sources such as nuts, seeds, whole grain cereals, and beans is likely to be more healthful than eating one particular food in large amounts.

Storage and Handling of Sterile Instruments/Devices

Medical devices/surgical instruments are used throughout the hospital to perform procedures on patients on a daily basis. These procedures are performed in theatre, the ward, maternity and doctors rooms. Contaminated devices need to be transported safely to the CSSD to be decontaminated. Contaminated devices should be transported in a manner that will ensure the safety of the staff and other patients. For this reason it is best to transport contaminated devices in closed, durable, and easy to decontaminate trolleys. It is not acceptable to transport contaminated items on open trolleys only covered with a piece of linen. Linen is not impermeable and will not contain pathogenic soils and microorganisms.

Once medical devices/surgical instruments have been decontaminated (cleaned, packed and sterilized) they need to transported and stored in a sterile store. The Centre for Disease Control state in their guidelines that medical devices/surgical instruments that have been sterilized must be handled using aseptic techniques in order to prevent contamination. A pack will only stay sterile if it is not exposed to any adverse events. It is difficult to say how long an item will remain sterile for on a shelf as contamination is event related. The chances of a pack becoming contaminated are greater if a pack is handled frequently. Other factors that could compromise sterility include; poor storage conditions, conditions during transport and quality of packing materials. For this reason packs should be stored on shelves that are easy to clean and slotted to allow for adequate circulation of air. Sterile packs and sets should not be compressed. Sets should rather be stored one per shelf, and gowns, linen and bowl packs can be stored on their sides to prevent compression. They should be arranged in a manner that they are easy to locate and handling is reduced.

It is critical that contaminated and sterilized medical devices are transported in safe manner and stored correctly to prevent cross contamination, to protect the staff, the patients and to ensure sterility is not compromised.

Packaging

Once items are cleaned, dried, and inspected, those requiring sterilization must be wrapped or placed in rigid containers and should be arranged in instrument trays/baskets according to the guidelines. These guidelines state that hinged instruments should be opened; items with removable parts should be disassembled unless the device manufacturer or researchers provide specific instructions or test data to the contrary; complex instruments should be prepared and sterilized according to device manufacturer's instructions and test data; devices with concave surfaces should be positioned to facilitate drainage of water; heavy items should be positioned not to damage delicate items; and the weight of the instrument set should be based on the design and density of the instruments and the distribution of metal mass. While there is no longer a specified sterilization weight limit for surgical sets, heavy metal mass is a cause of wet packs (i.e., moisture inside the case and tray after completion of the sterilization cycle). Other parameters that may influence drying are the density of the wraps and the design of the set.

There are several choices in methods to maintain sterility of surgical instruments, including rigid containers, peel-open pouches (e.g., self-sealed or heat-sealed plastic and paper pouches), roll stock or reels (i.e., paper-plastic combinations of tubing designed to allow the user to cut and seal the ends to form a pouch) and sterilization wraps (woven and nonwoven). Healthcare facilities may use all of these packaging options. The packaging material must allow penetration of the sterilant, provide protection against contact contamination during handling, provide an effective barrier to microbial penetration, and maintain the sterility of the processed item after sterilization. An ideal sterilization wrap would successfully address barrier effectiveness, penetrability (i.e., allows sterilant to penetrate), aeration (e.g., allows ETO to dissipate), ease of use, drapeability, flexibility, puncture resistance, tear strength, toxicity, odor, waste disposal, linting, cost, and transparency. Unacceptable packaging for use with ETO (e.g., foil, polyvinylchloride, and polyvinylidene chlorine [kitchen-type transparent wrap]) or hydrogen peroxide gas plasma (e.g., linens and paper) should not be used to wrap medical items.

In central processing, double wrapping can be done sequentially or non-sequentially (i.e., simultaneous wrapping). Wrapping should be done in such a manner to avoid tenting and gapping. The sequential wrap uses two sheets of the standard sterilization wrap, one wrapped after the other. This procedure creates a package within a package. The non-sequential process uses two sheets wrapped at the same time so that the wrapping needs to be performed only once. This latter method provides multiple layers of protection of surgical instruments from contamination and saves time since wrapping is done only once. Multiple layers are still common practice due to the rigors of handling within the facility even though the barrier efficacy of a single sheet of wrap has improved over the years. Written and illustrated procedures for preparation of items to be packaged should be readily available and used by personnel when packaging procedures are performed.

Loading

All items to be sterilized should be arranged so all surfaces will be directly exposed to the sterilizing agent. Thus, loading procedures must allow for free circulation of steam (or another sterilant) around each item. Historically, it was recommended that muslin fabric packs should not exceed the maximal dimensions, weight, and density of 12 inches wide x 12 inches

high x 20 inches long, 12 lbs, and 7.2 lbs per cubic foot, respectively. Due to the variety of textiles and metal/plastic containers on the market, the textile and metal/plastic container manufacturer and the sterilizer manufacturers should be consulted for instructions on pack preparation and density parameters.

There are several important basic principles for loading a sterilizer: allow for proper sterilant circulation; perforated trays should be placed so the tray is parallel to the shelf; non-perforated containers should be placed on their edge (e.g., basins); small items should be loosely placed in wire baskets; and peel packs should be placed on edge in perforated or mesh bottom racks or baskets.

Storage

Studies in the early 1970s suggested that wrapped surgical trays remained sterile for varying periods depending on the type of material used to wrap the trays. Safe storage times for sterile packs vary with the porosity of the wrapper and storage conditions (e.g., open versus closed cabinets). Heat-sealed, plastic peel-down pouches and wrapped packs sealed in 3-mil (3/1000 inch) polyethylene overwrap have been reported to be sterile for as long as 9 months after sterilization. The 3-mil polyethylene is applied after sterilization to extend the shelf life for infrequently used items. Supplies wrapped in double-thickness muslin comprising four layers, or equivalent, remain sterile for at least 30 days. Any item that has been sterilized should not be used after the expiration date has been exceeded or if the sterilized package is wet, torn, or punctured.

Although some hospitals continue to date every sterilized product and use the time-related shelf- life practice, many hospitals have switched to an event-related shelf-life practice. This latter practice recognizes that the product should remain sterile until some event causes the item to become contaminated (e.g., tear in packaging, packaging becomes wet, seal is broken). Event-related factors that contribute to the contamination of a product include bioburden (i.e., the amount of contamination in the environment), air movement, traffic, location, humidity, insects, vermin, flooding, storage area space, open/closed shelving, temperature, and the properties of the wrap material. There are data that support the event-related shelf-life practice. One study examined the effect of time on the sterile integrity of paper envelopes, peel pouches, and nylon sleeves. The most important finding was the absence of a trend toward an increased rate of contamination over time for any pack when placed in covered storage. Another evaluated the effectiveness of event-related outdating by microbiologically testing sterilized items. During the 2-year study period, all of the items tested were sterile. Thus, contamination of a sterile item is event-related and the probability of contamination increases with increased handling.

Following the sterilization process, medical and surgical devices must be handled using aseptic technique in order to prevent contamination. Sterile supplies should be stored far enough from the floor (8 to 10 inches), the ceiling (5 inches unless near a sprinkler head [18 inches from sprinkler head]), and the outside walls (2 inches) to allow for adequate air circulation, ease of cleaning, and compliance with local fire codes (e.g., supplies must be at least 18 inches from sprinkler heads). Medical and surgical supplies should not be stored under sinks or in other locations where they can become wet. Sterile items that become wet are considered contaminated because moisture brings with it microorganisms from the air and surfaces. Closed or covered cabinets are ideal but open shelving may be used for storage. Any package that has fallen or been dropped on the floor must be inspected for damage to the packaging and contents (if the items are breakable). If the package is heat-sealed in impervious plastic and the seal is still intact, the package should be considered not contaminated. If undamaged, items packaged in plastic need not be reprocessed.

Quality Control/Monitoring

A quality control program should be established within the practice setting that applies to all aspects of the sterilization process and sterilizer performance, including:

- Sterilizer equipment documentation
- Preventive maintenance
- Mechanical, biological, and chemical monitoring
- Product identification, traceability and recall procedure
- Visual inspection of packaging when applicable
- Residual-air (Bowie-Dick type) testing of prevacuum steam sterilizers

Documentation

Information recorded from each sterilization cycle should include, but not be limited to:

- Identification of the sterilizer used (e.g. sterilizer)
- Type of sterilizer and cycle used
- Load or lot control number

Contents of the load

- Exposure time and temperature if not provided by recording chart
- Name of operator
- Results of biological and chemical monitoring.

Event-Related Shelf Life Policy

- All sterile items will no longer have an expiration date; loss of sterility is event related. These items may be used as long as the integrity of the package is not compromised (e.g., wet, torn, damaged, suspected of being contaminated).
- Place an indefinite shelf-life label on each sterilized item.
- Document each label with at least the sterilizer identification number, load number, operator's initials, and sterilization date.
- Properly wrap and heat sterilize each item to provide an effective barrier to microbes.
- Do not use instrument packs if mechanical or chemical indicators indicate inadequate processing.
- Examine wrapped packages of sterilized instruments before opening them to ensure the barrier wrap has not been compromised during storage. Reclean, repack, and resterilize any instrument package that has been compromised (e.g., dropped, torn, or wet).
- Ensure proper storage of items to reduce package contamination and compromise.
- Maintain stock rotation according to the principle “first in, first out” so that older items are used first.

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   CAT No.: M-20305202 Pack size: One Set
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    (Ethionamide, Ciprofloxacin, Kanamycin, para-Aminosalicylic acid, Lomefloxacin, Rifabutin, Clarithromycin, Ofloxacin, D-cycloserine and Amikacin)
    L.J. solid media based, ten secondary drug panel for MTB sensitivity tests with 2 control.
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    (Ethionamide, Kanamycin, , Clarithromycin, para-Aminosalicylic acid, Pefloxacin, D-cycloserine, Rifabutin, Levofloxacin, Ofloxacin, and Amikacin)
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BIOSPRAY™

"Ideally, hand hygiene should be an automated behavior…"
WHO guidelines on hand hygiene in health care. ISBN 9789241597906, 2009, pg91

Product description:

BIOSPRAY™ is a state of art, touch-free and wall mounted dispenser to dispense handrub / handwash in medical and industrial settings. BIOSPRAY™ automatically dispenses both liquids and gels at a prefixed dose. This ensures adequate disinfection of hands without contaminating the environment.

FEATURES	BENEFITS
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ABS plastic	Rust free, Durable and easily cleanable
Fixed dose dispensing	Adequate disinfection Reduced wastage of handrub / handwash
AC adapter provided	No need of battery
Compatible with liquids and gels	Versatile

Compatible with

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Highlights of the coming issue

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