Patient preparation is important because many SSI result from contamination of the incision from the patient’s own resident bacterial flora. The skin and mucous membranes are the body’s first line defense against microbial pathogens. Proper preparation of these areas is advantageous to avoiding such infections. Antiseptic scrubs are soaps (detergents) used to remove dirt and oil from the skin prior to the surgical incision. These detergents will need to be rinsed off the patient with water or alcohol. The scrub antiseptic should be applied to the skin using a concentric circle (target) pattern that starts in the center of the proposed incision and works out to the edges. An antiseptic solution is primarily used once the organic debris has been removed, and it can be left to dry on the skin. Ideally, antiseptics should be non-irritating, effective against multiple pathogens, and require a short contact time against microbial activity. A prolonged residual activity, which is necessary in long surgeries, ensures the prevention of bacterial re-growth. Some patients may require a bath the day before surgery.

Chlorhexidine, povidone iodine, and isopropyl alcohol are the most common surgical antiseptics used to prepare the surgical site. Chlorhexidine (Nolvasan®) is a broad spectrum antiseptic that has a rapid onset, requiring a 2 minute contact time. It works by binding to the keratin on the skin, and its residual activity can last up to 2 days. It can be used to scrub the patient’s skin as well as the surgeon’s hands. It can cause deafness with contact to middle or inner ear and therefore should be avoided in patients with ruptured ear drums. Concentrations ≥ 2% are toxic to the eye, and the scrub can damage the cornea. It is available in a 4% or 2% scrub or 2% solution. The recommended concentration for wounds, mucous membranes and final prep is a 0.05% solution. Due to the difference in manufacturers, chlorhexidine color can vary from blue to light green. Inaccurate dilution can result if one were to base efficacy on color alone; therefore, care should be taken to use a precise source of measurement. The scrub is not diluted before use and is applied to the skin with moistened gauze or cotton.

Povidone iodine (Betadine®) has a broad spectrum of activity and a residual activity 4-6 hrs. It is deactivated by organic debris and can stain the skin. Skin reactions are common and many people have allergies to iodine. It is also available in a scrub or solution, scrub is not used in the eye. For ophthalmic preparation the solution is used in a 1:50, 0.2% concentration with sterile saline. Povidone iodine requires a 2 min contact time. Use of povidone iodine with alcohol lowers contact time but shortens residual activity. Clinically, povidone iodine is equally as effective as chlorhexidine.

70% Isopropyl alcohol has a fast kill of bacteria but is not effective against spores. It has no residual activity and is harsh to mucous membranes. It is often avoided in the patient skin prep due to its potential to cause hypothermia. Alcohol denatures fats and proteins and may also dry out the skin. It is best used in conjunction with povidone iodine or chlorhexidine. It is flammable and thus must be used with caution, if at all, around lasers, electrocautery and vessel sealing devices. Single prep agents such as Duraprep® (0.7% Iodine and 74 % isopropyl alcohol) and Chloraprep® (2% chlorhexidine gluconate and 70% isopropyl alcohol) must be allowed to thoroughly dry before placing surgical drapes. Alcohol is an excellent disinfectant but may be corrosive to stainless steel surfaces. It is the authors clinical experience that alcohol causes the scrotal skin to become severely erythematous in intact males and should not be used directly on the scrotum.
Prior to the use of antiseptics, the hair often needs to be removed from the surgical site. Hair removal the day before surgery has been associated with SSI, so ideally, it should be done after induction of anesthesia, or no more than 1 hour before surgery. Electric clipper blades should be sharp and will need to be cleaned and disinfected before and after each use. Clippers can harbor infectious agents and contaminate other patients. To avoid clipper burn and lacerations, hold the clippers with a pencil grip with the flat surface of the blade touching the skin. Use slow precise strokes, and change the blade or use coolant if the blades become warm to the touch. Safety razors cause micro-laceration that can lead to infection and therefore should be used sparingly. Pluck the feathers from birds and pull surrounding feathers in the direction of their normal growth to not damage the follicle. Depilatory creams can be used in patients with thin skin that would otherwise be traumatized by a blade. This can also be performed while the patient is awake, shortening the time under anesthesia. A small area away from the incision site should be tested to make sure there is not a tissue reaction with the hair removal cream.

Clipping should always be performed outside of the operating room, along with urinary bladder expressions. Thoroughly vacuum the hair from the patient and table so that hair is not brought into the operating room. The skin should be inspected for evidence of pyoderma (skin infections) on or around the incision site. Skin allergies should be documented in the patients record. At the discretion of the surgeon, patients with pyoderma may need to be recovered from anesthesia and the procedure postponed to a later date. These patients should be placed on a course of antibiotics and the skin rechecked in 2-3 weeks.

Surgeries involving the perineal region may require a purse-string suture or gauze packing in the anus to prevent fecal contamination, evacuate the anal sacs prior to placement. When using a hanging leg prep, the tie or tape used to hang the limb should be free from hair, which could fall into the surgical field. A sterile towel clamp can be inserted into the skin after a standard prep to suspend an ear pinna, toe or excessive skin off surrounding tissue. When using this technique use white tape through one finger ring (going through both finger rings will make it difficult to open the box-lock to release the towel clamp) and tie to an IV pole. Once the tissue is suspended the rest of the surgical field can be aseptically prepared. Contaminants can be stirred up by air movement, such as during OR transport or with general activity around the patient. After the preliminary surgical scrub in the prep room, a final sterile surgical prep should be performed on the patient in the OR to combat any potential contaminates during transport.