



Stay healthy

Recommendations to help prevent
hospital infections



Dear patient

Soon, you will undergo surgery to feel better again. You and your relatives can make an important contribution to your fast recovery and help to prevent infections. You may have heard of hospital infections before. Every year, an estimated 400,000 to 600,000 cases of hospital infections occur in Germany alone.⁽¹⁾ In the worst cases, they can be fatal. Many of these infections can be avoided when doctors and nursing staff follow appropriate hygiene measures. You as a patient as well as your relatives can do your share and follow these hygiene rules.

What exactly is a hospital infection?

What defines a hospital infection⁽²⁾ is that it occurs during a stay or treatment in a hospital. Sometimes they only become noticeable after the stay. The type of infection can vary and may affect different parts of the body.

How exactly does a hospital infection develop?

There are millions of germs on and in the body of every human being, e.g. on the skin and in the intestines. These are important to protect us, and the latter ones also support our digestion. As long as these germs stay where they belong, they

are completely harmless. Infections can only occur when germs enter sterile parts of the body. They can also be triggered by the body's own pathogens or foreign pathogens. The body's own pathogens may come, for example, from your own skin flora, whereas foreign pathogens come from the skin of other people or from the environment.

Are there different types of hospital infections?

Yes, the term hospital infection includes all infections which occur during treatment in a hospital. The most common are respiratory tract, urinary tract and postoperative wound infections or bloodstream infections.⁽¹⁾ Depending on the type of infection, they may heal without complications or entail further treatment. The latter can be associated with pain or an extended hospital stay. Patients treated in an intensive care unit have a higher risk of infection, as more medical, diagnostic or therapeutic procedures are carried out on them and because these patients tend to be more susceptible to infections.⁽¹⁾ The same applies to patients with a weakened immune system, such as tumor patients.

Helping to avoid infections with meticulous hygiene measures

Entire hospital teams take great care to avoid infections every day. Germs are usually transmitted via the hands, especially if hygienic hand disinfection is neglected. If anyone does not follow the correct hand hygiene procedures in your eyes, speak to them. You as a patient and your relatives can contribute greatly to avoiding infections after your operation. This could also help other patients and the whole hospital care team. Your contribution can be an important part of the mission to help prevent infections.

Get ready

Having an operation is a major event in someone's life and you may feel anxious about it. This brochure serves as a road map, preparing you for both your surgery and the recovery that follows. It gives step-by-step recommendations on what to do, right up through the day of your hospitalization, surgery and aftercare.

Your physician might like to know...

8 weeks > 4 weeks > 5 days > 4 days > **OP** > 1 day...

The better your physician knows your medical history, the better they can prepare you for the planned procedure. This includes information that is not directly related to the medical procedure.

For example, the risk of germ transmission has increased due to the high frequency of global travel. Therefore, information about stays abroad is valuable for your physician so that they can make further clarifications in advance if necessary.⁽³⁾

The healthcare sector is also concerned with the issue of antibiotic resistance, which means that your body no longer reacts to certain antibiotics. It is therefore important to let your physician know if you have taken antibiotics in the past and what experiences you have had with them.

Furthermore, inform your physician

- if you have been tested for and treated in the past as a carrier of multi-resistant pathogens such as MRSA (methicillin-resistant *Staphylococcus aureus*), ESBL (extended-spectrum beta-lactamases) or VRE (vancomycin-resistant enterococci).
- if you have been abroad during the past months.
- if you have been hospitalized in your home country or abroad.
- if you have problems with your teeth or if you are due to have major dental restorative work. Dental clarification BEFORE surgery is especially important when implanting foreign material (e.g., hip prosthesis, pacemaker, vascular prosthesis).
- if you are carrying foreign material, e.g., a heart valve. By the way, this information is also important for your dentist before major dental surgery is performed.
- if you are currently taking antibiotics.

What you can do



1. Do you smoke?

Smoking is a known independent risk factor for postoperative wound infections.⁽⁴⁾ Smokers are more likely to have complications after surgery than nonsmokers. This applies to all medical fields.

- **Inform your physician about your smoking habits before the operation.**
- **Stop smoking. Ask for nicotine replacement. This can help you stop smoking – at least temporarily.**

2. Pay attention to your diet

8 weeks → 4 weeks → 5 days → 4 days → **OP** → 1 day...

Appropriate nutrition is one of the cornerstones to help you avoid possible clinical complications. It starts before your hospital admission.

Nutritionists can create your individual plan for a well-balanced diet in the weeks before the operation – we call that prehabilitation. During your hospital stay, especially in the perioperative period, this plan will be adapted. When you are discharged from hospital, you will ideally be given a new nutrition plan, which is part of the rehabilitation process. Studies have shown that adapting your diet for these three phases can have multiple benefits and a positive influence on your recovery and rehabilitation.^(5, 6)



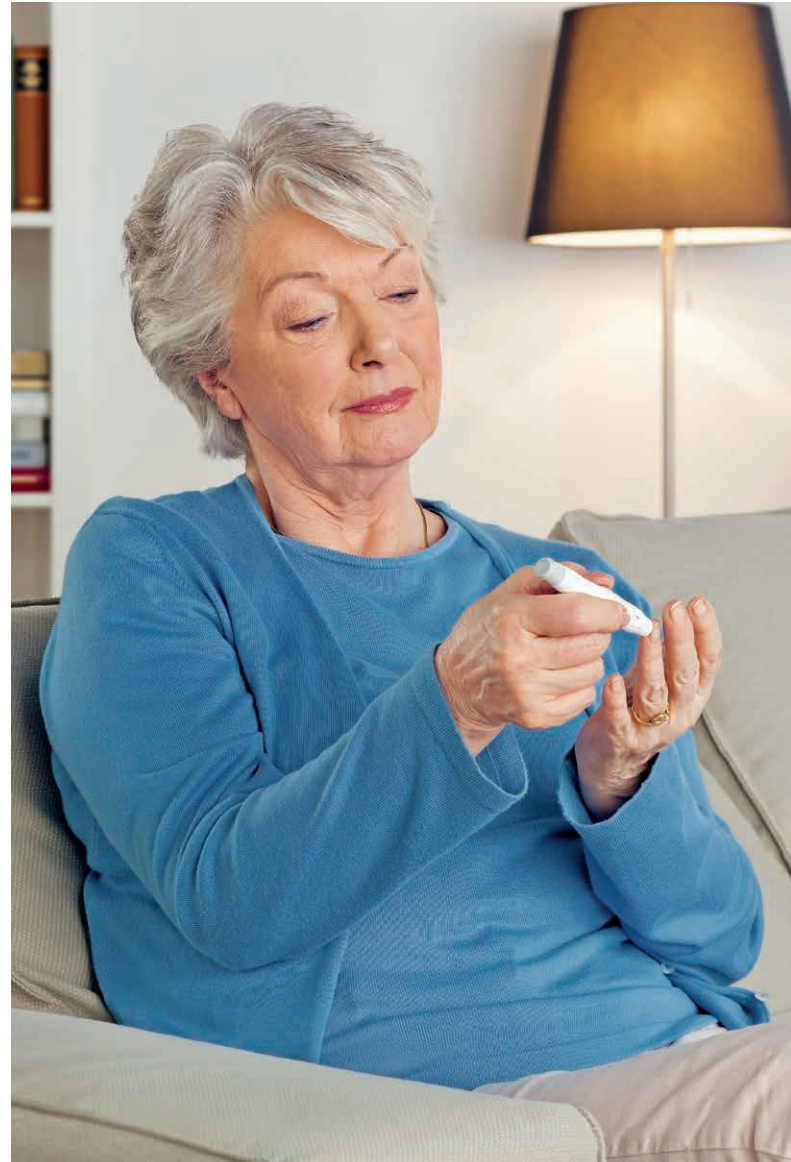
- **Contact your physician and, if advisable, a registered dietician in due time to discuss your individual presurgical nutrition plan.**
- **Ask whether oral nutrition supplements are advisable.**
- **Make sure you can stick to the recommended diet. If not, let your dietician know.**
- **Drinking is part of nutrition. Make sure you drink as much as recommended by your physician or dietician.**
- **Clarify with your physician how long you can eat and drink before your hospital admission.**
- **Your nutrition plan after your hospital stay should be coordinated between your in-hospital team and your dietician or primary care physician.**

3. Do you have diabetes mellitus?

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

An operation means physical stress for the body, which may lead to increased blood sugar levels. Disturbances of your blood sugar levels can affect numerous defense mechanisms, which may increase the risk of postoperative wound infections.^(7, 8) Help to keep your blood sugar levels well controlled to prevent avoidable risks.

- **If you have diabetes, see your diabetes specialist in advance and get their advice.**
- **If you are admitted to hospital, inform the staff about your individual medication and your insulin therapy.**



4. Do not shave your body hair yourself

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

It is still widely believed that hair around the surgical site interferes with the procedure, wound closure or wound dressing and must therefore be removed. Recent studies based on a broad international consensus strongly urge that shaving should be avoided, because micro-injuries that increase the risk of infection can occur.^(9, 10) Depilatory creams are allowed in principle but may cause skin irritation.

If hair has to be removed for technical reasons, this is done with clippers and the shearing blades do not touch the skin, thus protecting the skin from cuts and abrasions. This hair removal is either done in the evening before or on the morning of the operation by the nursing staff. Never shave yourself without consulting your surgery staff.



- **DO NOT** remove any body hair at the planned surgical site yourself, even if you are asked to do so. The skin can suffer minor injuries and small cuts, which bacteria or other microorganisms can penetrate. If you shave regularly, you should refrain from shaving near the surgical site for at least five days before the operation.
- Ask your physician in charge whether hair removal is necessary. If YES, ask whether it can be done with electric clippers.

5. Personal hygiene before surgery

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

Bacterial colonization on our body is quite normal, physiological and even beneficial, e.g., for the skin's protective acidic mantle. However, during a medical procedure, such normally harmless bacteria can enter the wound and cause wound-healing disorders and other complications.

Additionally, a critical risk is the transmission of multidrug-resistant organisms (MDROs) from the skin into wounds or the blood during surgery. That's why one current approach in many hospitals is to screen patients for MDROs prior to surgeries. Thus, if patients are found to have multidrug-resistant pathogens, in many cases they are immediately isolated or sent back home and surgery or other treatment is postponed.

We therefore recommend a whole-body application with Prontoderm® to decolonize your skin, hair, mouth and nose, reducing the risk of infections.

- **Coordinate the decolonization measures with your attending physician and follow their instructions.**
- **Start with germ-reducing body washes four days before the operation and carry out the fifth and final wash of the decolonization cycle on the day of the operation.**
- **Remove nail polish, make-up and all your body jewelry, including piercings.**
- **Shower or bathe as usual and dry yourself with a fresh towel.**
- **Then use Prontoderm® products for decolonization of the skin, hair, nose, mouth and throat, applying them according to the enclosed instructions for use.**
- **Please change into fresh clothes afterward.**
- **Do not apply any body lotion or other skin-care products to your skin after the treatment.**

To find out more about whole-body decolonization with Prontoderm®, scan the QR code:

www.bbraun.com/infection-in-hospital.html



6. Hand disinfection in hospital

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

Hand hygiene is known to be able to prevent and control hospital infections. Every healthcare worker, caregiver or person involved in direct or indirect patient care needs to take hand hygiene seriously and should be able to perform it correctly at the right time.

In your personal environment, it is sufficient to wash your hands with soap and water when they are visibly soiled, after going to the toilet, before eating or before preparing food.

In hospitals, hands should be disinfected with an alcohol-based hand disinfectant according to the "five moments" rule.

1. When entering the patient's room
2. When leaving the patient's room
3. After using the sanitary facilities
4. After contact with other patients or their surroundings
5. Before and after contact with wounds or with mucous membranes (e.g., in the nose or mouth) or before entering high-risk areas

For you and your visitors, this means:

- Disinfect your hands when entering and leaving your room as well as after using the sanitary facilities.



7. Pay attention to your body temperature

8 weeks > 4 weeks > 5 days > 4 days > **OP** > 1 day...

Mild hypothermia, which frequently occurs during surgery, can increase susceptibility to postoperative wound infection due to vasoconstriction and reduced immunity.⁽¹¹⁾

- **It is important that you do not cool down before, during or after the operation. Ask the physician or nurse about the procedure used to ensure that your body remains warm during the operation.**
- **Take a hot shower just before the planned procedure and stay under a blanket after the shower to maintain a warm body temperature.**
- **Stay covered before the operation.**
- **Ask for extra blankets to keep warm during transport from the ward to the operating theater.**
- **Speak to the physician or nursing staff if you feel cold before or after the operation.**

8. Handling of drains

8 weeks > 4 weeks > 5 days > 4 days > **OP** > 1 day...

During an operation, there may be an accumulation of wound secretion, which is then cleared via so-called drains. Drainage provides entry points for microorganisms into sterile areas of the body. Special care is therefore required at this point of entry. Touching or manipulating those tubes yourself increases the risk that pathogens (e.g., from the skin) enter your body via the drain and cause infection.^(12, 13)

- **Talk to the medical staff if you feel that the drainage is no longer necessary.**
- **Do not tamper with the tubes.**

9. Postoperative wound care

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

After the operation and during the healing process, the wound will be covered with a sterile dressing.

- The wound dressing should not be changed during the first 48 hours after the operation, unless unexpected situations such as heavy bleeding or excessive pain occur. Please avoid touching the dressing if possible.
- If there is excessive discharge of wound fluids or the dressing slips, a change of dressing may be necessary. Consult your physician or nursing staff if you recognize discharge.
- Visitors should touch neither your wound nor the dressing.
- Before you leave hospital, make sure you receive instructions on how to treat your wound and how it will be cared for at home and by whom.
- If there are any signs of wound infection (redness, pain, swelling, fever), inform your physician or nursing staff.

10. Postoperative body wash

8 weeks > 4 weeks > 5 days > 4 days > OP > 1 day...

Recolonization with undesirable microorganisms cannot be ruled out postoperatively, which is why we recommend continuing the application of decolonization products for two to six days after the operation.⁽¹⁴⁾ For this purpose, the same Prontoderm® products that you used at home for the preoperative body wash can be used again. Therefore, please bring them with you to the hospital.

- After surgery, personal hygiene should be carried out under the close supervision of the doctor and nursing staff or directly by the nursing staff themselves.
- Apply Prontoderm® products for decolonization of the skin, hair, nose, mouth and throat in coordination with the nursing staff and doctor.
- Prontoderm® is a leave-on product also suitable for application on bedridden persons who are not allowed or are unable to move for their personal hygiene.
- Change into fresh clothes afterward.
- Do not apply any body lotion or other skin-care products to your skin after the treatment.

11. Your discharge report

8 weeks > 4 weeks > 5 days > 4 days > **OP** > 1 day...

Certain complaints after surgery are normal. You need particular information on how to act and react correctly after your operation. This is why all important information is written down in your discharge summary, as patient information is an important aspect of quality work in the healthcare system. It can be helpful to keep copies of your discharge summaries yourself.

Additionally, when leaving the hospital, you should make sure that you have the contact details of somebody you can turn to at any time if any problems occur.

Knowing the following information will make it easier for you to take care of yourself correctly after your stay in hospital. Most of it is contained in your discharge report as well:

- **Medication schedule**
- **Next check-up appointment**
- **A legible and comprehensible medical report**
- **Expected pain progression**
- **Expected course of recovery (stress, everyday life, etc.)**
- **Contact person in case of complications**
- **Who is responsible for further dressing changes?**
- **Information about how you can contribute to recovery – exercise, diet, smoking, sleep/rest, etc.**

We wish you all the best
for your upcoming operation
and a quick recovery!



Checklist before and after the operation



References

1. Gastmeier P, Geffers C. Nosokomiale Infektionen in Deutschland: Wie viele gibt es wirklich? *Dtsch Med weeksschr* 2008; 133(21):1111–5.
2. Sikora A, Zahra F. Nosocomial Infections. 2023 Apr 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. PMID: 32644738.
3. Friedrich AW. Control of hospital acquired infections and antimicrobial resistance in Europe: The way to go. *Wien Med weeksschr* 2019; 169(Suppl 1):25–30.
4. Sørensen LT. Wound healing and infection in surgery. The clinical impact of smoking and smoking cessation: A systematic review and meta-analysis. *Arch Surg* 2012; 147(4):373–83.
5. Gupta R, Gan TJ. Preoperative Nutrition and Prehabilitation. *Anesthesiol Clin*. 2016 Mar;34(1):143–53. doi: 10.1016/j.anclin.2015.10.012. PMID: 26927744.
6. Weimann A, Braga M, Carli F, Higashiguchi T, Hübner M, Klek S, Lavinio A, Ljungqvist O, Lobo DN, Martindale RG, Waitzberg D, Bischoff SC, Singer P. ESPEN practical guideline: Clinical nutrition in surgery. *Clin Nutr*. 2021 Jul;40(7):4745–4761. doi: 10.1016/j.clnu.2021.03.031. Epub 2021 Apr 19. PMID: 34242915.
7. Martin ET, Kaye KS, Knott C, Nguyen H, Santarossa M, Evans R et al. Diabetes and risk of surgical site infection: A systematic review and meta-analysis. *Infect Control Hosp Epidemiol* 2016; 37(1):88–99.
8. Kao LS, Phatak UR. Glycemic control and prevention of surgical site infection. *Surg Infect (Larchmt)* 2013; 14(5):437–44.
9. Tanner J, Melen K. Preoperative hair removal to reduce surgical site infection. *Cochrane Database Syst Rev*. 2021 Aug 26;8(8):CD004122. doi: 10.1002/14651858.CD004122.pub5. PMID: 34437723; PMCID: PMC8406791.
10. Niël-Weise BS, Wille JC, van den Broek PJ. Hair removal policies in clean surgery: Systematic review of randomized, controlled trials. *Infect Control Hosp Epidemiol* 2005; 26(12):923–8.
11. Kurz A, Sessler DI, Lenhardt R. Perioperative normothermia to reduce the incidence of surgical-wound infection and shorten hospitalization. Study of Wound Infection and Temperature Group. *N Engl J Med* 1996; 334(19):1209–15.
12. Mohamedahmed AYY, Zaman S, Ghassemi N, Ghassemi A, Wuheb AA, Abdalla HEE, Hajibandeh S, Hajibandeh S. Should routine surgical wound drainage after ventral hernia repair be avoided? A systematic review and meta-analysis. *Hernia*. 2023 Aug;27(4):781–793. doi: 10.1007/s10029-023-02804-0. Epub 2023 May 14. PMID: 37179521.
13. Patel PK, Advani SD, Kofman AD, Lo E, Maragakis LL, Pegues DA, Pettis AM, Saint S, Trautner B, Yokoe DS, Meddings J. Strategies to prevent catheter-associated urinary tract infections in acute-care hospitals: 2022 Update. *Infect Control Hosp Epidemiol*. 2023 Aug;44(8):1209–1231. doi: 10.1017/ice.2023.137. Epub 2023 Aug 25. PMID: 37620117; PMCID: PMC11287483.
14. Bode LG, Kluytmans JA, Wertheim HF, Bogaers D, Vandembroucke-Grauls CM, Roosendaal R, Troelstra A, Box AT, Voss A, van der Tweel I, van Belkum A, Verbrugh HA, Vos MC. Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. *N Engl J Med*. 2010 Jan 7;362(1):9–17. doi: 10.1056/NEJMoa0808939. PMID: 20054045.

