

## Podcast: Decontamination and reprocessing

Hello everyone, welcome to today's podcast of the Difaem Health community. My name is XXX and I am here with my colleague XXX.

In our IPC series about cleanliness and hygiene in health care settings, I have learned a lot about cleaning, disinfection and sterilization. Cleaning removes dirt, disinfection reduces microorganisms and sterilization kills all germs. Why don't we take the safe way out and sterilise everything and anything so that there are no microorganisms anymore? Maybe you can help me out here.

Hello everyone, my name is XXX and yes, I can help you out there. While sterilizing everything may seem like an ideal approach to eliminate all risks of infection or contamination, there are many situations where it is neither practical nor necessary. First, not all items or materials can withstand the high temperatures, chemicals, or radiation required for sterilization. For example, some plastics might melt in great heat; some metal might corrode in contact with certain chemicals used for sterilization. Sterilization may render equipment unusable or compromise their functionality, leading to increased costs and inefficiency. In addition, sterilization processes can be time-consuming and expensive. Sterilizing all items, even those with a low risk of transmission, would require significant resources, including equipment, chemicals, and work force. Last but not least, all sterilization methods have environmental implications. Gases are used that are bad for the climate, energy consumption is huge and so it is essential to find a balance between effective sterilization and the environmental impact of the chosen methods.

Okay, I get it, sterilizing everything is not the key to effective IPC. But who tells me what to sterilize, what to clean and what to disinfect? Can I decide that for myself?

In healthcare settings, we use a risk-based approach, which means that we classify items and surfaces based on their potential for transmitting microorganisms. Appropriate sterilization or disinfection methods are applied accordingly. There is even a classification, which is called the Spaulding classification. The Spaulding classification provides a systematic approach to determine the appropriate level of disinfection or sterilization required for different medical items. The classification is based on their level of contact with patients and the associated risk of infection. It defines three categories. However, let me start with a special category. There are items that should not be reprocessed any more. That goes for all single use items like gloves, single use syringes and needles as well as single use catheters. They lose functionality or cannot be reprocessed properly and therefore pose a risk of transmission and contamination for health care workers and patients.

Thanks for reminding us on the danger of this well-meant but harmful practice. Usually, it is the lack of resources, which might tempt health workers to reprocess single use equipment. It is important to point out that, normally, these items do not survive the reprocessing or they do not become sufficiently sterile. However, let us go back to the items that can be reprocessed according the Spaulding classification.

Yes, let us continue with Spaulding.

First, there are the critical items: critical items are those that come into direct contact with sterile body sites or vascular systems, posing the highest risk of infection if contaminated. Examples include surgical instruments, implants, and devices used during invasive procedures. These items must be sterilized to achieve complete elimination of all microorganisms, including their spores. Sterilization methods such as steam autoclaving, dry heat sterilization, or ethylene oxide (ETO) gas sterilization are typically used for all critical items.

The second class are the semi-critical items: semi-critical items come into contact with non-intact skin or mucous membranes but do not penetrate sterile tissues. Although the risk of infection associated with these items is lower than with critical items, they still require a high level of disinfection to minimize the risk of transmission. Disinfection procedures for semi-critical items aim at complete elimination of all microorganisms, except for a small number of bacterial spores. Examples of semi-critical items include endoscopes, respiratory therapy equipment, and anaesthesia equipment. High-level disinfection methods such as liquid chemical sterilants or hydrogen peroxide gas plasma are used for semi-critical items.

Finally, there are the non-critical items: non-critical items are those that only come into contact with intact skin and do not touch mucous membranes or penetrate the body. These items pose the lowest risk of infection if contaminated. Examples include blood pressure cuffs, stethoscopes, and bedpans. Non-critical items generally require low-level disinfection, which aims at eliminating most vegetative bacteria, some fungi, and some viruses. Cleaning with detergents and using intermediate-level disinfectants such as alcohol-based solutions are generally used for non-critical items.

Okay, I remember that in one of our last podcasts you talked about the stethoscope, also that it could be disinfected with an alcoholic hand rub. So this was one of the non-critical items and it is easy to keep it clean before using it again. However, what about the other items that you were just talking about? How can these be reprocessed?

There are several steps involved before critical or semi-critical medical equipment can be used again.

Before I explain the different steps, let me say, that WHO in any case discourages the soaking of instruments in disinfectants or even in saline solution before reprocessing. It was done in former times, but there are several reasons, why we should quit this practice: first, it damages metal instruments; they corrode and get rusty much faster. Second, the containers with the soaked instruments pose an unnecessary risk for health workers due to spilling and can cause possible skin damage, when not handled carefully. Finally, and in our times probably most important: soaking in disinfectant might increase the resistance of the

bacteria and other microbes that get in touch with the disinfectant over a long time. It is a task of antimicrobial stewardship in order to guarantee good function of our disinfectants and detergents not to soak instruments.

This is interesting I did not know this. We used to do this in former times, but I can see that there are good reasons, not to do it anymore. What do you do instead?

It all starts with cleaning. Thorough cleaning is essential before high-level disinfection and sterilization because inorganic and organic materials that remain on the surfaces of instruments interfere with the effectiveness of these processes. If you collect instruments during the day, let's say in the minor theatre, where you use just one or two items every now and then, rinse them and remove visible dirt and secretions. Store them in a box without any disinfectant. When you have collected several items, start the proper cleaning. Never forget the adequate PPE for this process. Always protect yourself! For the cleaning procedure, all instruments should be disassembled and if not possible, special attention should be paid to hinges and other connecting parts. Here often dirt accumulates and it is difficult to get rid of it in the nooks and crannies.

Whenever possible, use the immersion method. This means that the things to be cleaned should be put in a sink or bowl and completely covered with water and detergent. Do the manual cleaning with an appropriate brush. The whole cleaning process should take place under the water surface. Once the part is cleaned, put it in a second sink with clean water and thoroughly rinse it. Rinsing after cleaning is necessary to remove loosened soil and residual detergent. After the cleaning process, dry the device. Drying is an important step to prevent microbial growth. Devices should be air-dried or dried by hand with a clean, lint-free cloth; single use is to be preferred.

If you have a machine for cleaning, like an ultrasonic cleaner or an automated washing cart, this might save you some time and effort, but keep in mind that before putting everything in the machine, inspection and pre-cleaning is mandatory. Cleaning is the most complex and important step in the reprocessing of medical devices because if a device is not clean it cannot be disinfected or sterilized.

I will sum up once again what cleaning means. I protect myself with appropriate PPE, disassemble and open the instruments, use a proper detergent, clean under the surface of water with appropriate brushes, rinse the items in clean water, dry them and after that inspect them in order to make sure that they are really clean – if not, I probably start again from the beginning.

Yes, you are absolutely right!

And as I see, that this was already quite a lot for today, I think we will do the second part of the reprocessing in another podcast, which will be out soon.

Until then – stay safe and stay blessed.