



# **DISINFECTION POLICIES AT HOSPITALS: WHY? HOW? WHERE? WHEN?**

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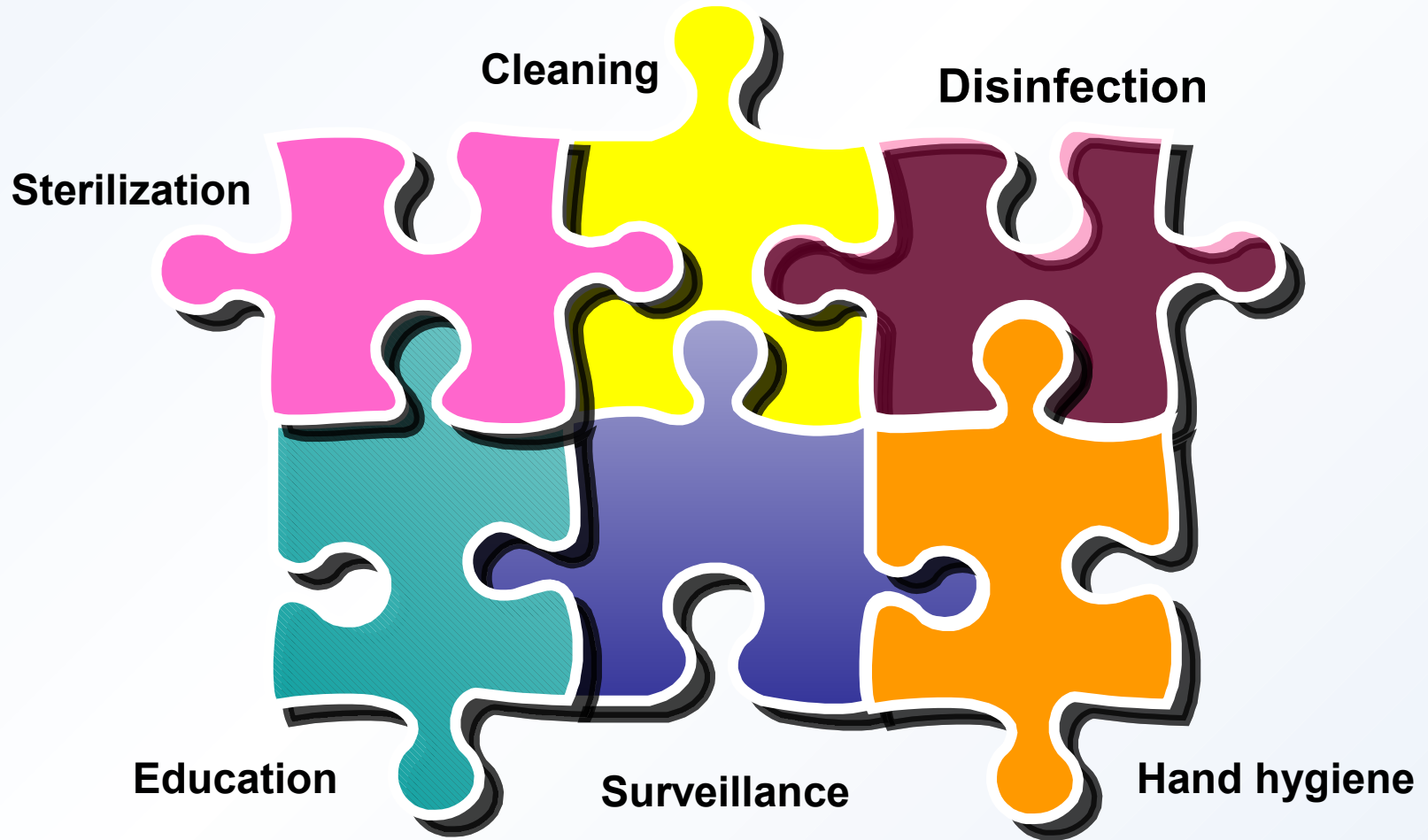
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# Infection Control in Hospitals



# Disinfection



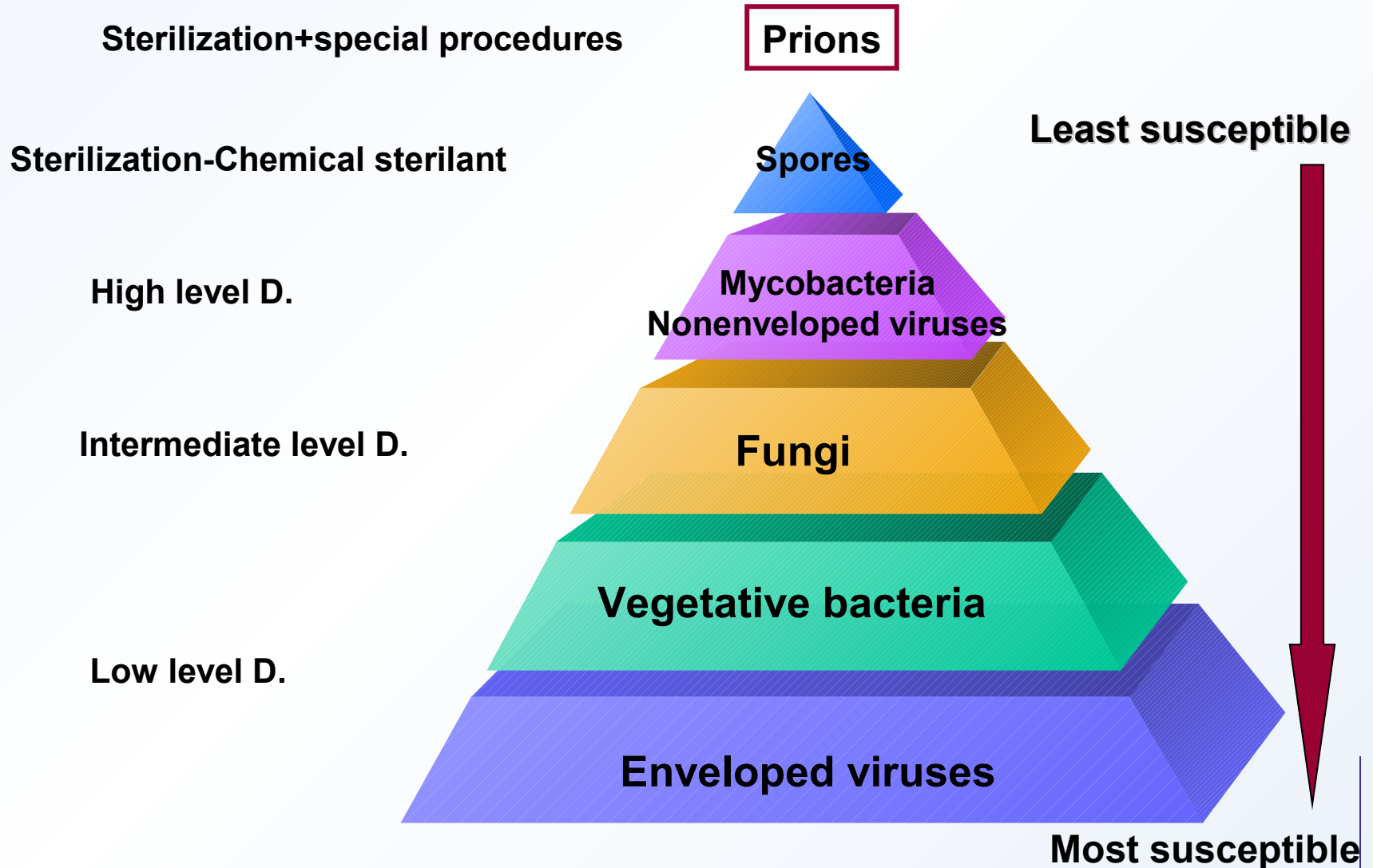
- Disinfection is the removal or destruction of “**adequate numbers**” of “**potentially harmful**” microorganisms to allow the item to be handled or used safely
- The objective is to prevent infection

# SPAULDING CLASSIFICATION



- **Spaulding approach to disinfect items depends on their intended use:**
  - **Critical:** devices that enter normally sterile tissue or the vascular system (surgical instruments, implants...)
  - **Semicritical:** devices that touch mucous membranes or nonintact skin (endoscopes...)
  - **Noncritical:** devices that come in contact with intact skin (blood pressure cuffs, crutches, bed rails, EKG leads, bedside tables...)

# Susceptibility to Disinfectants



# Chemical Sterilization of “Critical Objects”



<b>Chemical sterilant</b>	<b>time</b>	<b>condition</b>
Glutaraldehyde (> 2.0%)	10 hours	20-25°C
Hydrogen peroxide-HP (7.5%)	5 hours	20-25°C
Peracetic acid-PA (0.2%)	12 min	50-56°C
HP (1.0%) and PA (0.08%)	8 hours	20°C
HP (7.5%) and PA (0.23%)	180 min	20° C
Glutaraldehyde (1.12%) and Phenol/ phenate (1.93%)	12 hours	25°C

**FDA, September, 2006**

# High Level Disinfection of “Semicritical Objects”



<b>Germicide</b>	<b>Concentration</b>
Glutaraldehyde	> 2.0%
Ortho-phthalaldehyde (OPA)	0.55%
Hydrogen peroxide (HP)*	7.5%
HP and peracetic acid*	1.0%/0.08%
HP and peracetic acid*	7.5%/0.23%

\*May cause cosmetic and functional damage

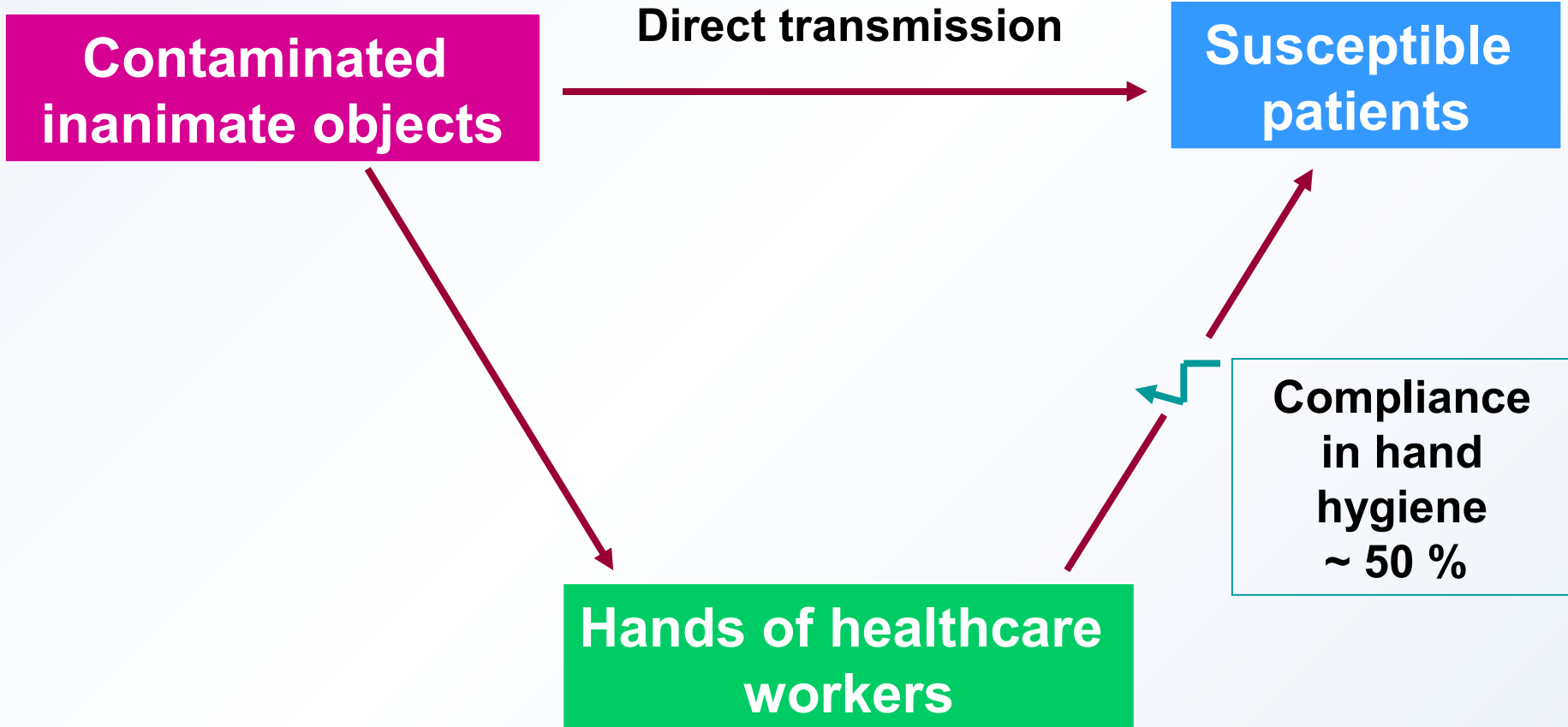
# Low level disinfection and cleaning of noncritical devices



- Cleaning with a detergent and drying is normally adequate
- Disinfection: any article which comes into contact with bodily fluids (bedpans, linen)
- Disinfection of environment of the patient
  - Only if it is necessary, e. g. ICU high touch surfaces!



# Contribution of environmental contamination to hospital infections



# Persistence of clinically relevant bacteria on inanimate surfaces (1)



<i>Acinetobacter</i> spp.	3 days-5 months
<i>C. difficile</i> spores	5 months
<i>E. coli</i>	1,5 hour-16 months
Enterococci (including VRE)	5 days-4 months
<i>Klebsiella</i> spp.	2 hours-30 months
<i>M. tuberculosis</i>	1 day-4 months
<i>P. aeruginosa</i>	6 hours-16 months
Staphylococci (including MRSA)	7 days-7 months

# Persistence of clinically relevant bacteria on inanimate surfaces (2)



<i>Candida albicans</i>	1-120 days
<i>C. parapsilosis</i>	14 days
<i>Torulopsis glabrata</i>	100-150 days
SARS associated virus	72-96 hours
CMV	8 hours
HAV, HBV	>1 week
HIV	>1 week

# **Guidelines for Environmental Infection Control in Health-Care Facilities**

**Recommendations of CDC and the Healthcare Infection Control  
Practices Advisory Committee (HICPAC)**

**U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention (CDC)  
Atlanta, GA 30333**

**2003**

# According to the guideline:



- High-touch surfaces must be disinfected at least once a day in **high risk areas**
- Cleaning with water and detergent is sufficient for floors and walls, but if contaminated with blood or blood stained bodily fluids, floors must be disinfected

# Categories of environmental risk



<b>Minimal Risk</b>	<b>Low Risk</b>	<b>Intermediate Risk</b>	<b>High Risk</b>
Offices  Storage areas  Archive	<ul style="list-style-type: none"><li>•Kitchen</li><li>•Laboratories</li><li>•Waiting lounges</li><li>•Ambulatory patient clinic</li><li>•Rehabilitation rooms</li></ul>	<ul style="list-style-type: none"><li>•Emergency CSSD</li><li>•Bacteriology lab</li></ul>	<ul style="list-style-type: none"><li>•Operating rooms</li><li>•ICU</li><li>•Burn units</li><li>•Oncology department</li><li>•Infectious diseases department</li></ul>

# Choosing surface disinfectant



- What do we want to achieve, what's the spectrum?
- How fast does the disinfectant work?
- Is the disinfectant inactivated by organic material?
- Is it compatible with the surfaces on which it will be used?
- Is it safe enough for the healthcare workers and patients who will come into contact with the surface?
- What about cost of the disinfectant?
- What is the environmental impact?

# Chlorine compounds



- Most frequently used surface disinfectant
- Effective against a wide variety of microorganisms
- Less suitable in the presence of organic matter
- Effective between a pH range of 6-8
- Strength decreases over time
- Corrosive for metal surfaces
- Inexpensive



# Dilution of household bleach (5% Sodium hypochlorite with 50000ppm)



Intended use	Dilution	Available chlorine
Cleanup blood spills	1 part bleach to 9 parts water	0.5 % 5000 ppm
Surface disinfection	1 part bleach to 50 parts water	0.1 % 1000 ppm
Food surfaces	1 part bleach to 200 parts water	0.025 % 200 ppm
surfaces contaminated with tissue infective for CJD	1 part bleach to 1 part water or undiluted	2.5 % 20 000 ppm or % 5- 50 000 ppm

# Quarternary ammonium compounds



- Narrow antimicrobial spectrum
- Bacteriostatic in low concentrations
- Not active against HBV
- *P. aeruginosa* strains have intrinsic resistance to QAC
- Inactivated by organic material, soap and anionic detergents as they are cationic disinfectants

# Alcohols



- Can be used with other disinfectants (quaternaries, phenolics, and iodine) to make solutions
- Fairly inexpensive
- Flammable, toxic and eye irritant
- **NOT** recommended for disinfecting large surfaces and biosafety cabinets
- **NOT** active when organic matter present
- **NOT** active against certain viruses

# Controversy over contribution of environmental contamination



- Presence of any microorganism on a surface never means that it is the cause of the infection

*Clin Infect Dis 2004;39:1182-9*

- There is an increasing body of evidence that cleaning or disinfection of the environment can reduce transmission of healthcare associated infections

*J Hosp Infect 2007;65:50-4*

# Controversial issues regarding surface disinfection



- Using disinfectants leads to antibiotic-resistant organisms
- Surface disinfection (including floors) must be done only if there is an MDRO in normal wards
- Disinfectants harm the environment

# Why a disinfectant policy?



- We need a policy in hospitals regarding disinfection
  - to protect patients and staff against transmission of infections from medical equipment and devices
  - to implement safe working practices

# Disinfection policy provides



- Team responsible for the policy
  - **Who will draft, implement, audit and update it?**
- Reasons for disinfection
- Purposes for which disinfectants are used
- Definition of terms and risk assessment of items and surfaces
- Detailed information on usage of disinfectants (preferably in tables)
  - **Items, method, frequency, concentration, condition (heat, pH...), exposure time**

# The infection control committee



Is responsible for

- Preparing a safe and effective policy
- Ensuring that the correct disinfectant and methods are used
- Updating the policy regularly
- Training the staff
- Auditing the methods



# To implement the disinfection policy



All hospital staff must

- Be aware of the policy
- Be informed about the implementation, responsibilities and priorities
- Know health and safety issues and properties of disinfectants

External contract cleaners have to be trained in the same way as the hospital staff

# Keep in mind



- Choose disinfectants according to the risk categories
- Try to limit the number of disinfectants
- Eliminate disinfectant use
  - **When sterilization rather than disinfection is the object**
  - **When single-use devices are more economical**
- Always write safety precautions as outlined in the Material Safety Data Sheet
- Follow the international guidelines about disinfection
- Follow the instructions of the manufacturer of the instruments for cleaning, disinfection and sterilization

# General rules when preparing solutions (1)



- Follow the manufacturer's instructions to prepare solutions
- Diluted disinfectants rapidly become inactive, so use the same day
- Always mix them in a clean separate vessel with fresh tap water
- Always use personal protective equipment when appropriate

# General rules while preparing a solution (2)



- Replace container caps securely after use
- A sterile solution, once opened, should be regarded as nonsterile
- The expiry date on each solution should be checked before use
- Water must never be left standing in clean buckets, even if it contains a disinfectant
- Partially full bottles of disinfectant should never be 'topped up'

# Conclusions



- Cleaning and disinfection are very important steps to prevent hospital infections
- Every hospital should have an effective disinfection policy and use disinfectants rationally
- Training of hospital staff is a must to implement the policy effectively
- Current disinfection and sterilization guidelines should be included in the disinfection policy



*Супасибо!*

*Thank you!*