

Nosocomial Infections;

Control in Dental Health-Care Settings



Kolářová M., EPI Autumn 2018

Guidelines for Infection Control in Dental Health-Care Settings

CDC. *MMWR* 2003;52(No. RR-17)

<http://www.cdc.gov/oralhealth/>

[infectioncontrol/guidelines/index.htm](http://www.cdc.gov/oralhealth/infectioncontrol/guidelines/index.htm)

Background

- ◆ **Personnel Health Elements**
- ◆ **Bloodborne Pathogens**
- ◆ **Hand Hygiene**
- ◆ **Personal Protective Equipment**
- ◆ **Latex Hypersensitivity/Contact Dermatitis**
- ◆ **Sterilization and Disinfection**
- ◆ **Environmental Infection Control**
- ◆ **Dental Unit Waterlines**
- ◆ **Special Considerations**
- ◆ **Program Evaluation**

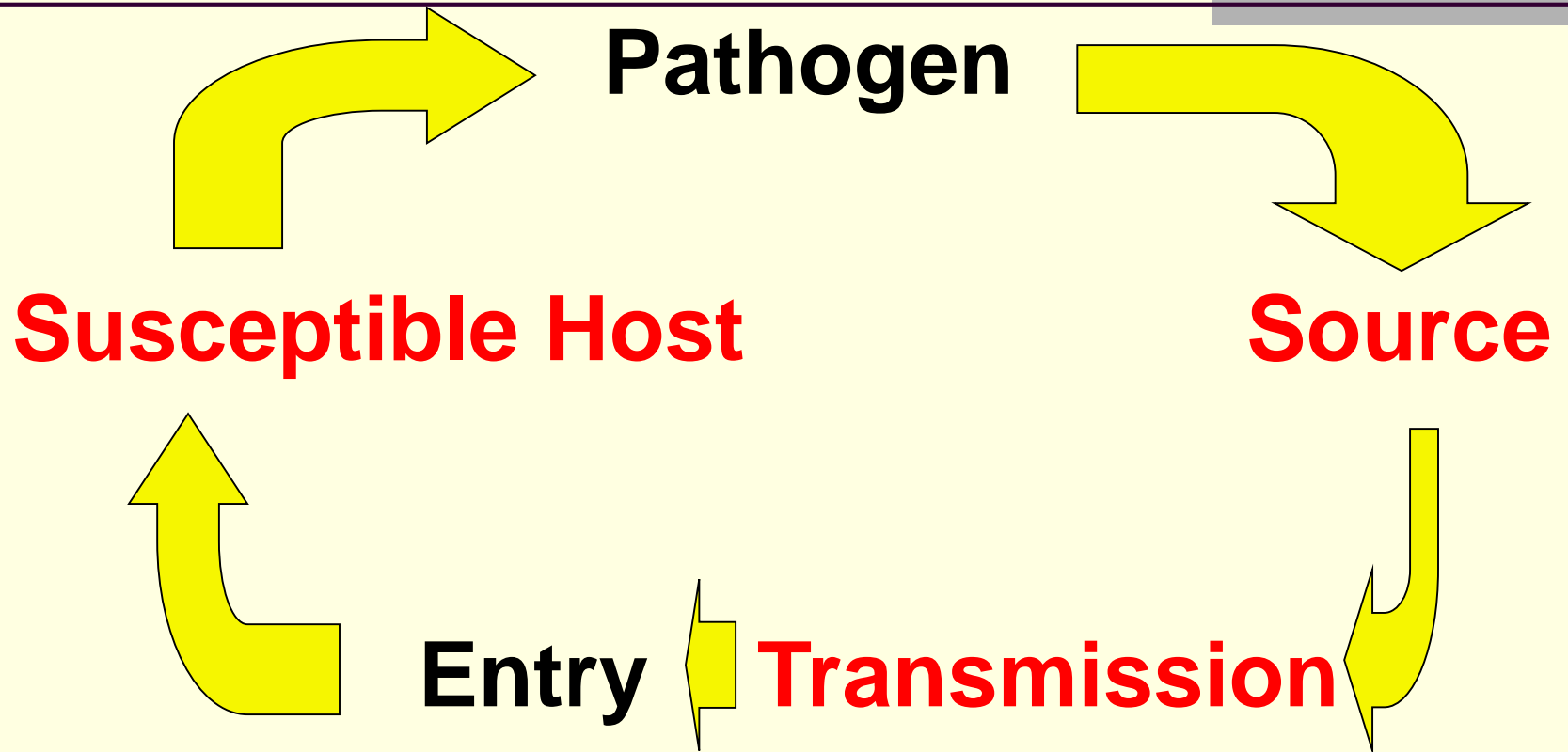
Why Is Infection Control Important in Dentistry?

- Both patients and dental health care personnel (DHCP) can be exposed to pathogens
- Contact with blood, oral and respiratory secretions, and contaminated equipment occurs
- Proper procedures can prevent transmission of infections among patients and DHCP

Modes of Transmission

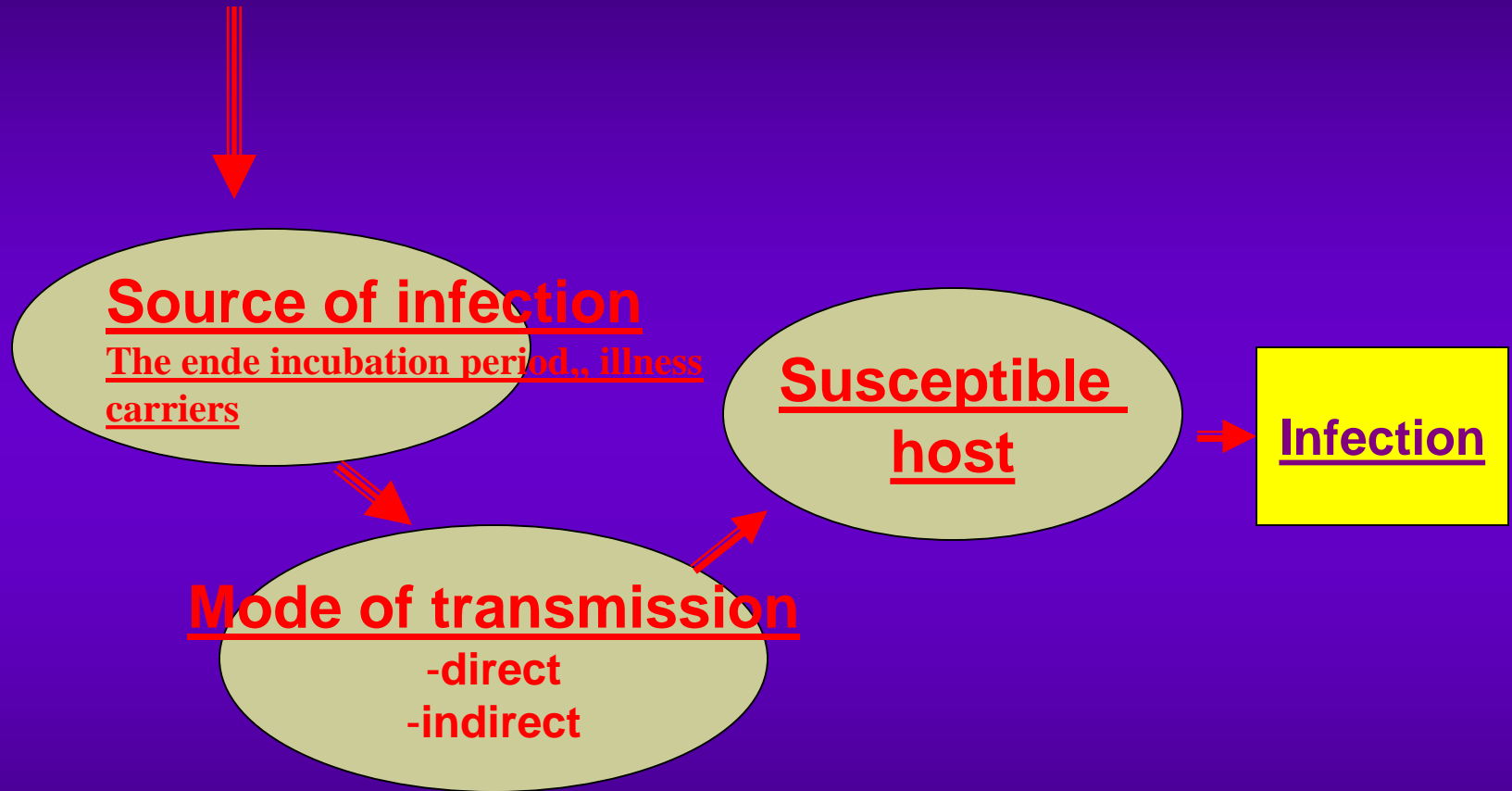
- Direct contact with blood or body fluids
- Indirect contact with a contaminated instrument or surface
- Contact of mucosa of the eyes, nose, or mouth with droplets or spatter
- Inhalation of airborne microorganisms

Chain of Infection

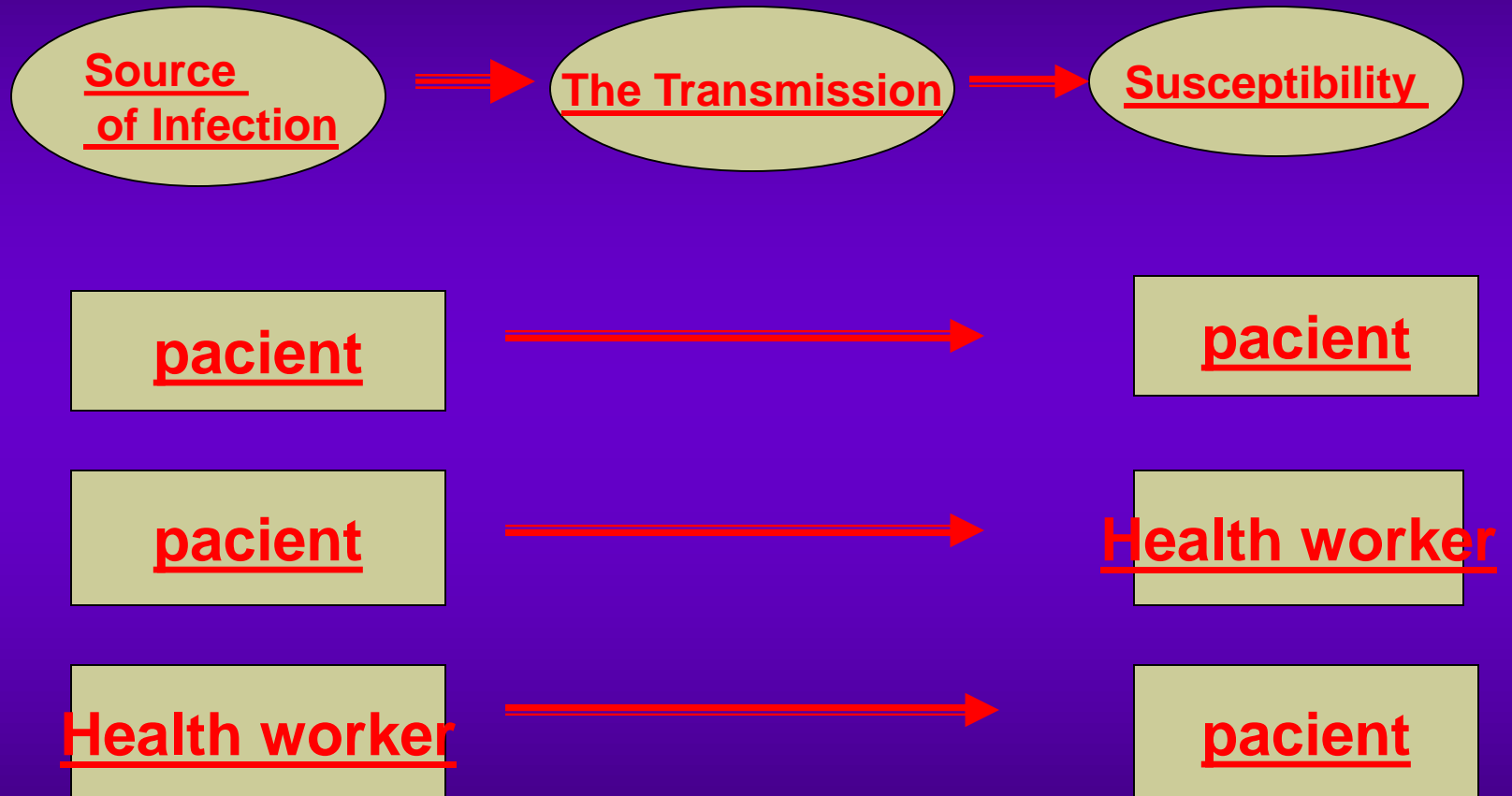


Chain of Infection

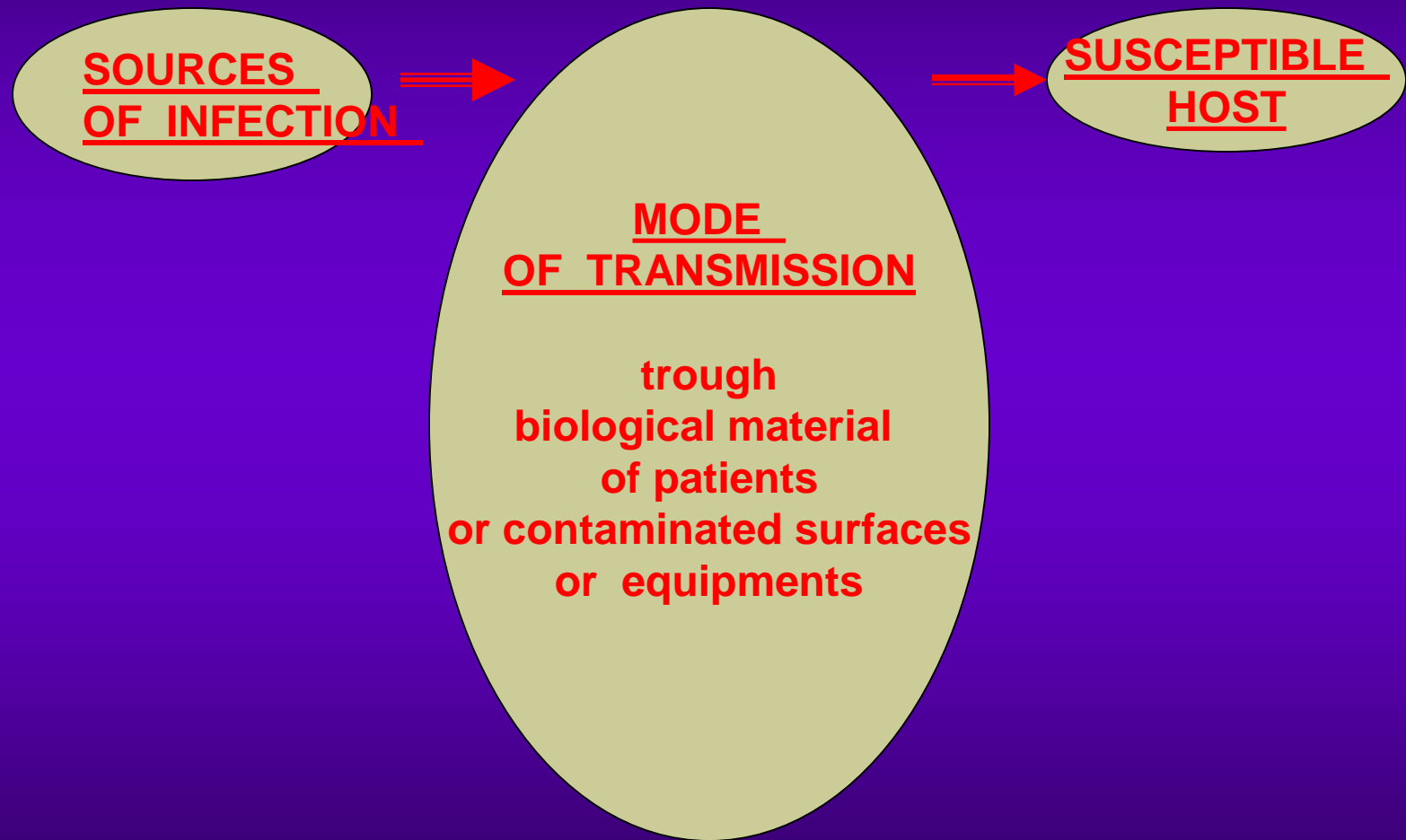
Causative agent - bacteria, viruses,
fungi, parasites, priony



Chain of Infection in Hospital Conditions



EPIDEMIC PROCESS IN THE HOSPITAL ENVIRONMENT



Biological materials – their infectivity

1. Causative agents in blood, derivatives from blood, plasma

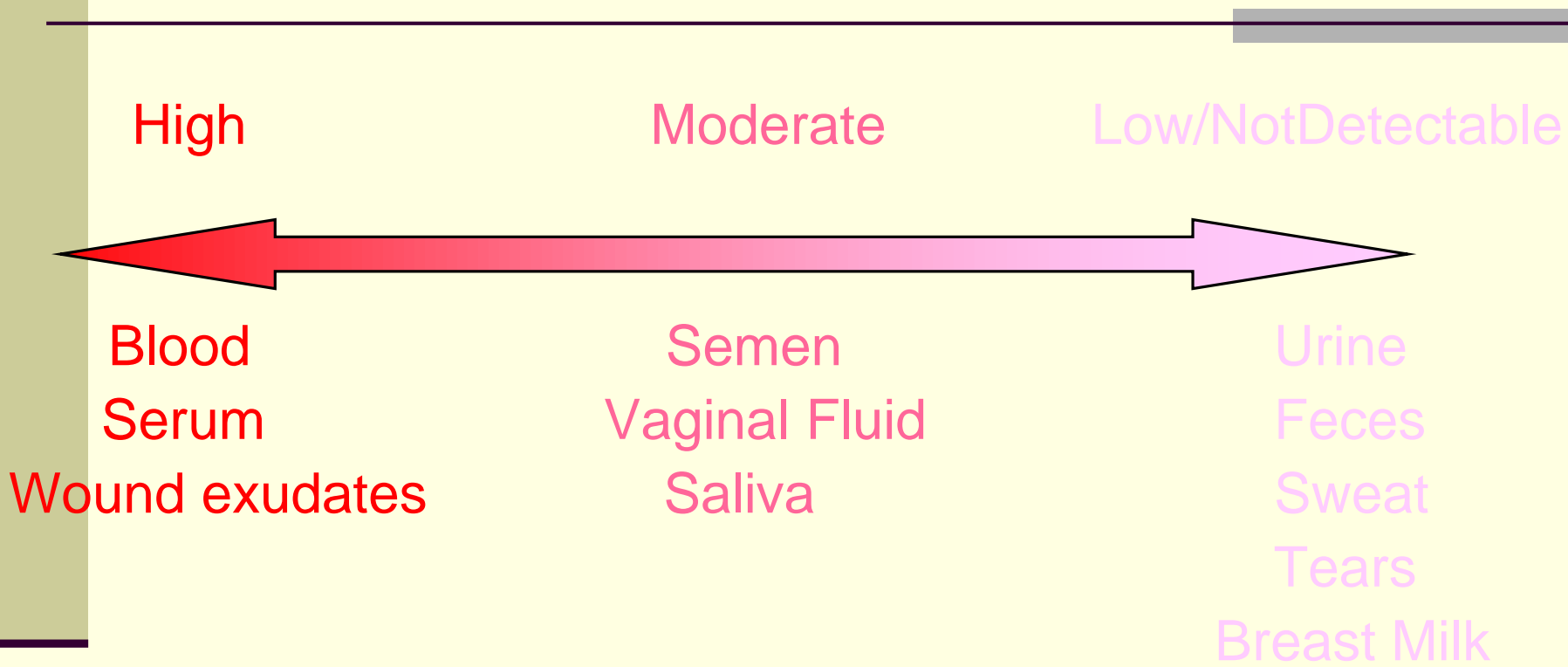
VHB, VHC, VHA (short in the blood), HIV, CMV, rarely EBV, virus of morbilli (viremie), kandy-kandidémie,

Treponema pallidum (2. stage)

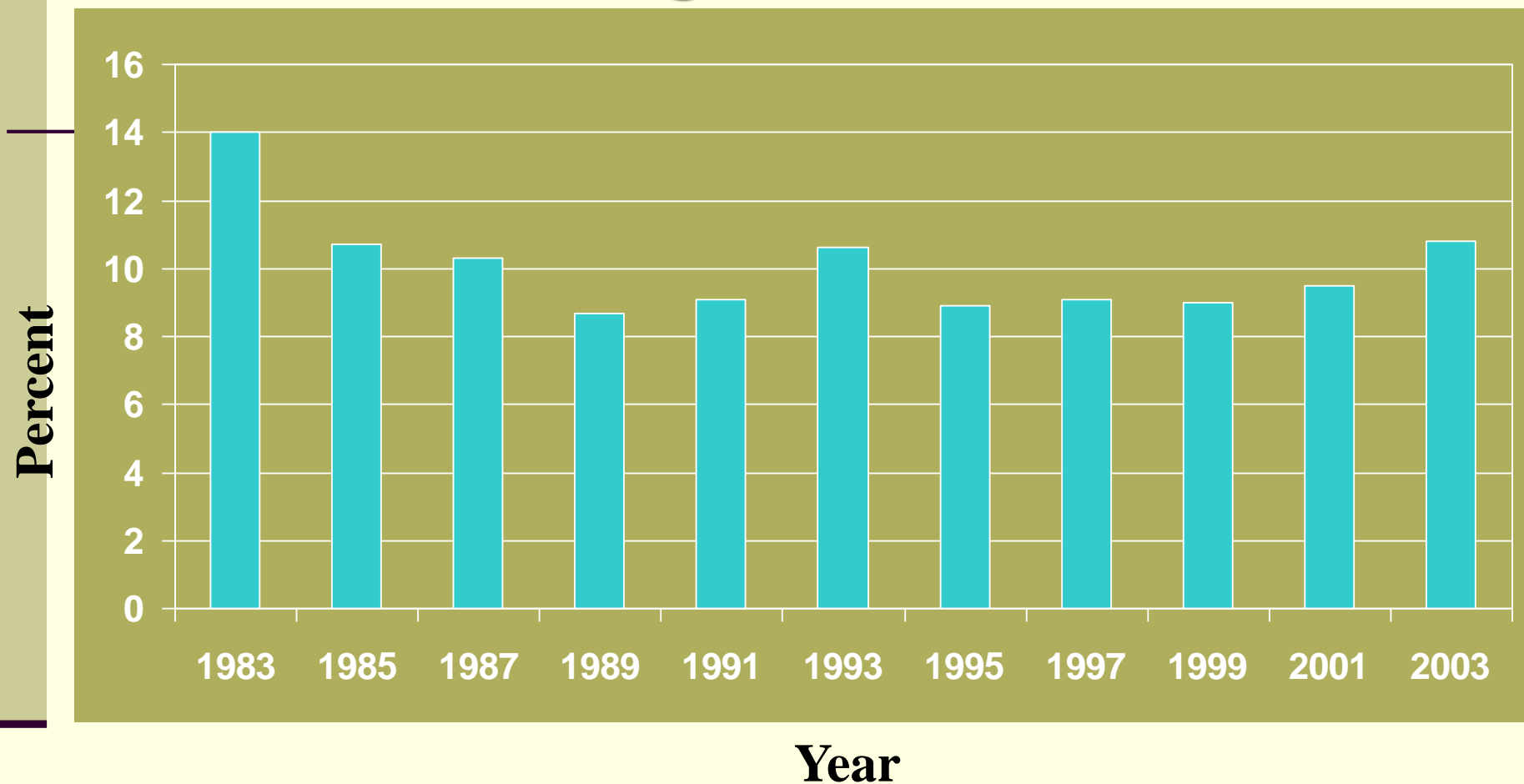
malárie - (plasmodia can survive in fresh plasma 3 – 5°C - 14 days),

Toxoplasma gondii - (can survive in blood - 56 days)

Concentration of HBV in Body Fluids



HBV Infection Among U.S. Dentists



Source: Cleveland et al., JADA 1996;127:1385-90.

Personal communication ADA, Chakwan Siew, PhD, 2005.

Transmission of HBV from Infected DHCP to Patients

- Nine clusters of transmission from dentists and oral surgeons to patients, 1970–1987
- Eight dentists tested for HBeAg were positive
- Lack of documented transmissions since 1987 may reflect increased use of gloves and vaccine
- One case of patient-to-patient transmission, 2003

Occupational Risk of HCV Transmission among HCP

- Inefficiently transmitted by occupational exposures
- Three reports of transmission from blood splash to the eye
- Report of simultaneous transmission of HIV and HCV after non-intact skin exposure

HCV Infection in Dental Health Care Settings

- Prevalence of HCV infection among dentists similar to that of general population (~ 1%-2%)
- No reports of HCV transmission from infected DHCP to patients or from patient to patient
- Risk of HCV transmission appears very low

Transmission of HIV from Infected Dentists to Patients

- Only one documented case of HIV transmission from an infected dentist to patients
- No transmissions documented in the investigation of 63 HIV-infected HCP (including 33 dentists or dental students)

Characteristics of Percutaneous Injuries Among DHCP

- Reported frequency among general dentists has declined
- Caused by burs, syringe needles, other sharps
- Occur outside the patient's mouth
- Involve small amounts of blood
- Among oral surgeons, occur more frequently during fracture reductions and procedures involving wire

Hand Hygiene

- Hands are the most common mode of pathogen transmission
- Reduce spread of antimicrobial resistance
- Prevent health care-associated infections

Hands Need to be Cleaned When

- Visibly dirty
- After touching contaminated objects with bare hands
- Before and after patient treatment (before glove placement and after glove removal)



Hand Hygiene Definitions

- Handwashing
 - Washing hands with plain soap and water
- Antiseptic handwash
 - Washing hands with water and soap or other detergents containing an antiseptic agent
- Alcohol-based handrub
 - Rubbing hands with an alcohol-containing preparation
- Surgical antisepsis
 - Handwashing with an antiseptic soap or an alcohol-based handrub before operations by surgical personnel

Efficacy of Hand Hygiene Preparations in Reduction of Bacteria



Source: <http://www.cdc.gov/handhygiene/materials.htm>

Alcohol-based Preparations

Benefits

- Rapid and effective antimicrobial action
- Improved skin condition
- More accessible than sinks



Limitations

- Cannot be used if hands are visibly soiled
- Store away from high temperatures or flames
- Hand softeners and glove powders may “build-up”

Special Hand Hygiene Considerations

- Use hand lotions to prevent skin dryness
- Consider compatibility of hand care products with gloves (e.g., mineral oils and petroleum bases may cause early glove failure)
- Keep fingernails short
- Avoid artificial nails
- Avoid hand jewelry that may tear gloves

Personal Protective Equipment

Masks, Protective Eyewear, Face Shields

- Wear a surgical mask and either eye protection with solid side shields or a face shield to protect mucous membranes of the eyes, nose, and mouth
- Change masks between patients
- Clean reusable face protection between patients;
if visibly soiled, clean and disinfect

Sterilization and Disinfection of Patient Care Items

Critical Instruments

- Penetrate mucous membranes or contact bone, the bloodstream, or other normally sterile tissues (of the mouth)
- Heat sterilize between uses or use sterile single-use, disposable devices
- Examples include surgical instruments, scalpel blades, periodontal scalers, and surgical dental burs

Semi-critical Instruments

- Contact mucous membranes but do not penetrate soft tissue
- Heat sterilize or high-level disinfect
- Examples: Dental mouth mirrors, amalgam condensers, and dental handpieces

Noncritical Instruments and Devices

- Contact intact skin
- Clean and disinfect using a low to intermediate level disinfectant
- Examples: X-ray heads, facebows, pulse oximeter, blood pressure cuff

Instrument Processing Area

- Use a designated processing area to control quality and ensure safety
- Divide processing area into work areas
 - Receiving, cleaning, and decontamination
 - Preparation and packaging
 - Sterilization
 - Storage

Biological materials – their infectivity

2. Causative agents in droplets

Adenovirus, coronaviruses, enteroviruses, herpes virus, myxovirus (**influenzae**), paramyxovirus, RSV, rhinovirus, *Stafylococcus*, *Streptococcus spp.*, *Meningococcus spp.*, *Haemophilus Influenzae*, *Neisseria meningitis*, *Bordetella pertussis*, *Bordetella parapertussis*, *Mycoplasma pneumoniae*, *Pneumocystis carinii*, *Kandidy*....

Biological materials – their infectivity

3. Causative agents in stool

Enterovirus (VHA, poliomyelitis), VHE, coxsackievirus, Adenovirus,

Enterobacteriaceae (*E.coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus spp.*, *Citrobacter*, *Enterobacter*, *Serratia* **apod**)

Listeria monocytogenes, *Clostridium perfringens*, *Clostridium tetani*, *Pneumocystis carinii*

Biological materials – their infectivity

Causative agents in:

4. URINE

Virus of measles, parotitis, CMV, VHB, papovavirus, *Listeria monocytogenes*, *Candidae*

5. LIQUOR

HIV, **different causative agents of** meningitid

6. Salive

VHB, HIV, CMV, EBV, herpes virus hominis typ 1,2, virus of measles, rubella

Biological materials – their infectivity

7. TEARS, EYE - SECRET

VHB, HIV, adenoviruses, Enterovirus typ 70, Coxsackie A 24, *Staphylococcus aureus*, hemophylus, pneumokoky, moraxely, chlamydie

8. VAGINA AND CERVIX - SECRET

HIV, VHB, rare VHC, herpes virus hominis typ 1,2, *Streptococcus agalactiae*, *Neisseria gonorrhoea*, *Haemophilus Ducreyi*, *Treponema pallidum*, *Trichomonas vaginalis*, *Chlamydia lymfogradulomatosis*, *Chlamydia trachomatis*

9. EJACULAT

VHB, HIV, rare VHC, CMV,

Chain of Infection in Hospital Conditions



HANDWASHING, DISINFECTION OF HANDS

**LINEN WASHING,
CLEANING**

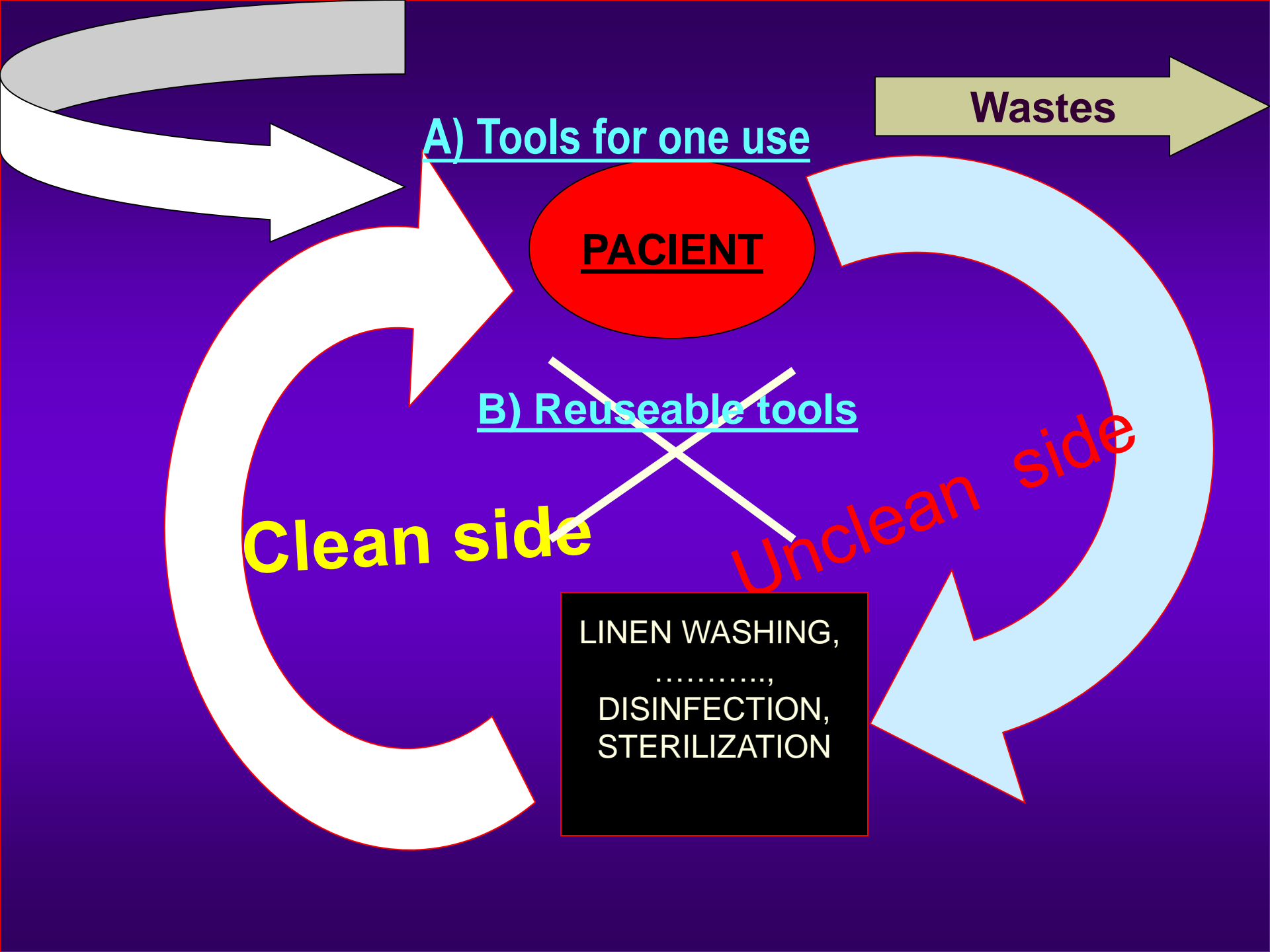
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DISINFECTION

STERILIZATION





Standard Precautions

Apply to all patients

Integrate and expand Universal Precautions to include organisms spread by blood and also

- Body fluids, secretions, and excretions except sweat, whether or not they contain blood
- Non-intact (broken) skin
- Mucous membranes

Elements of Standard Precautions

- Handwashing
- Use of gloves, masks, eye protection, and gowns
- Patient care equipment
- Environmental surfaces
- Injury prevention

Personnel Health Elements of an Infection Control Program

- **Education and training**
- **Immunizations**
- **Exposure prevention and postexposure management**
- **Medical condition management and work-related illnesses and restrictions**
- **Health record maintenance**