

Nosocomial Infections;

Control in Dental Health-Care Settings



Kolářová M., EPI Autumn 2016

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**

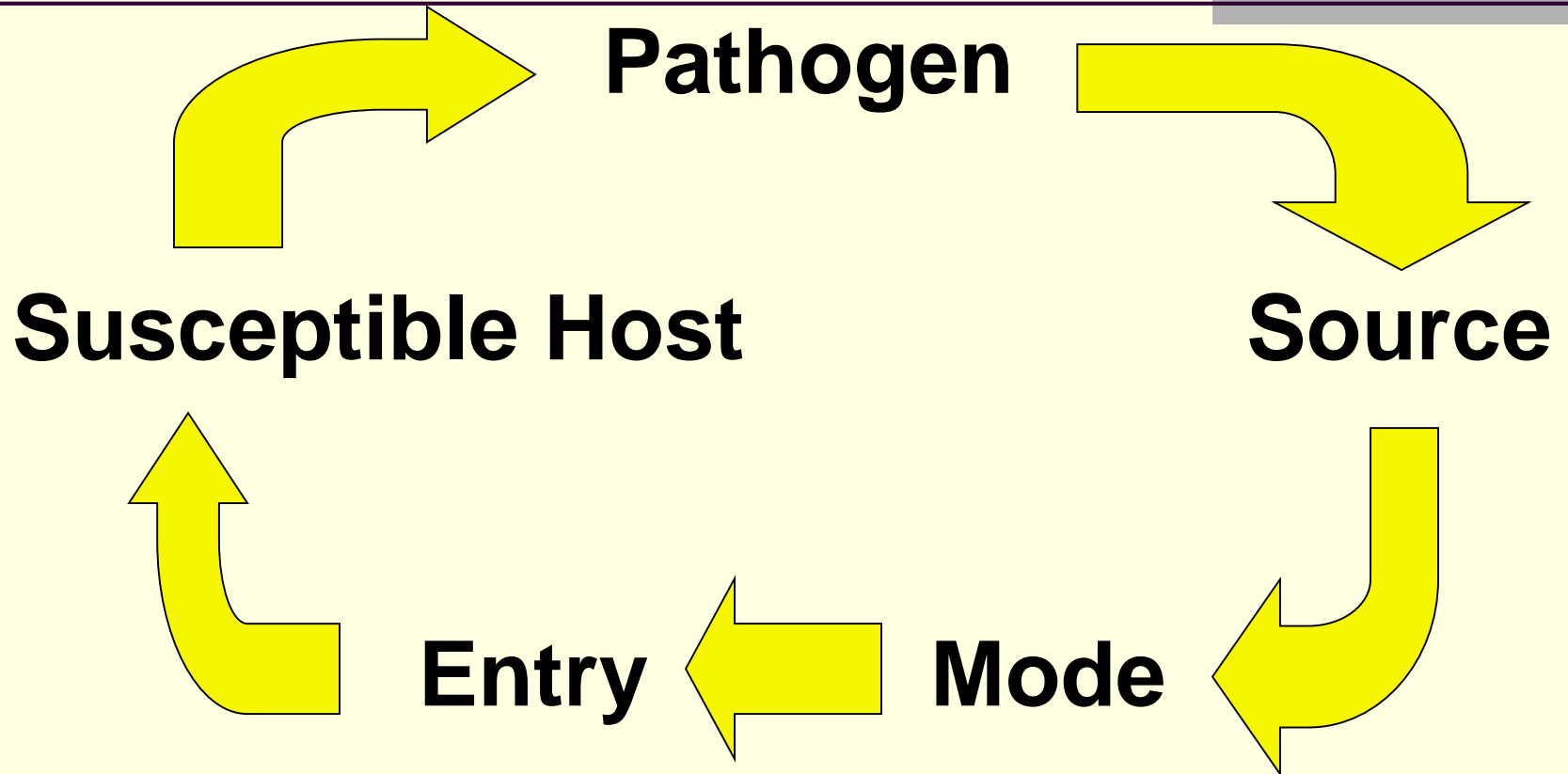
Why Is Infection Control Important in Dentistry?

- 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

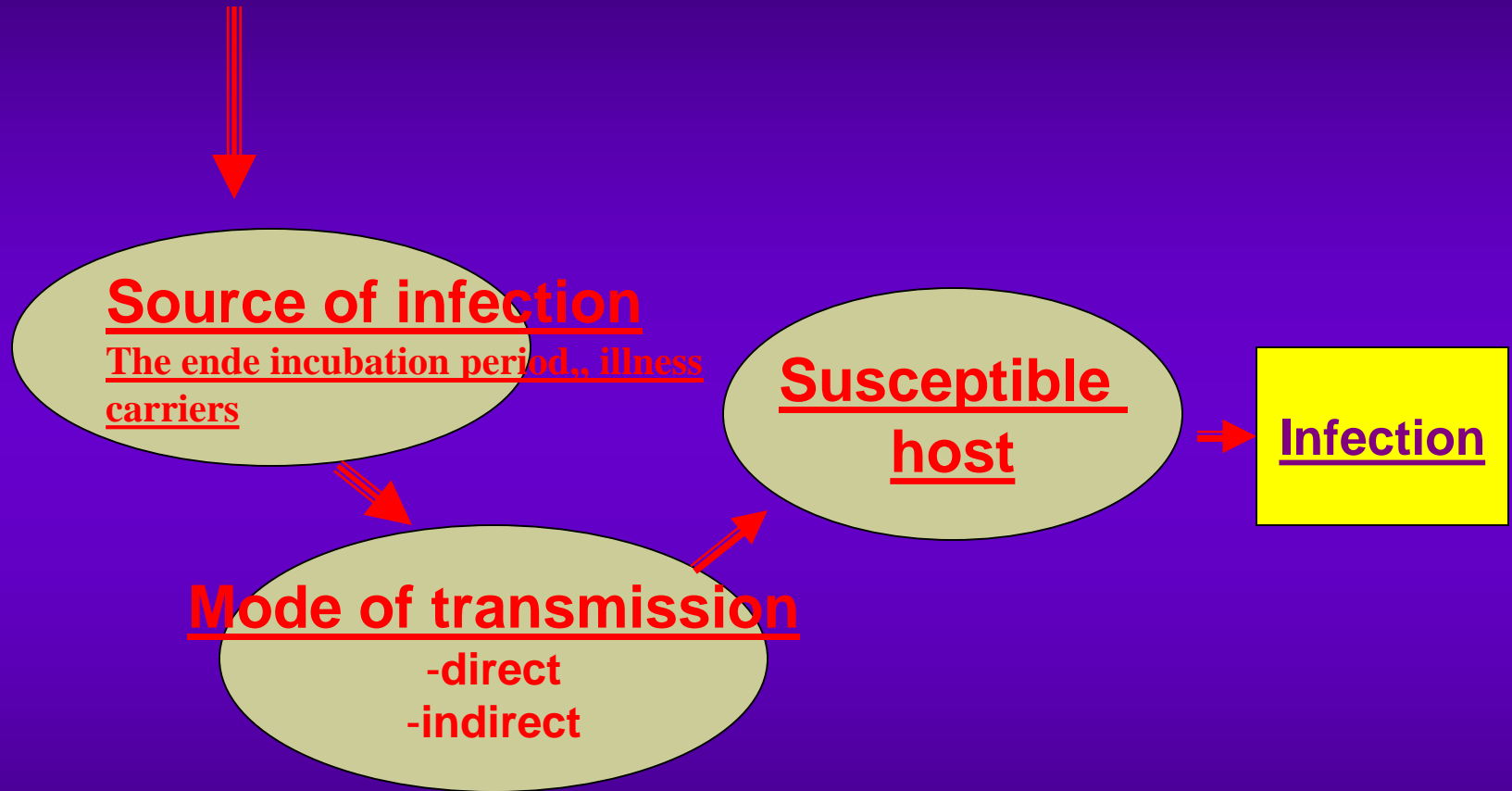
- Direct contact with blood or body fluids
- Indirect contact with a contaminated instrument or surface
- Contact of mucosa of the eyes, nose, or mouth with droplets or spatter
- Inhalation of airborne microorganisms

Chain of Infection

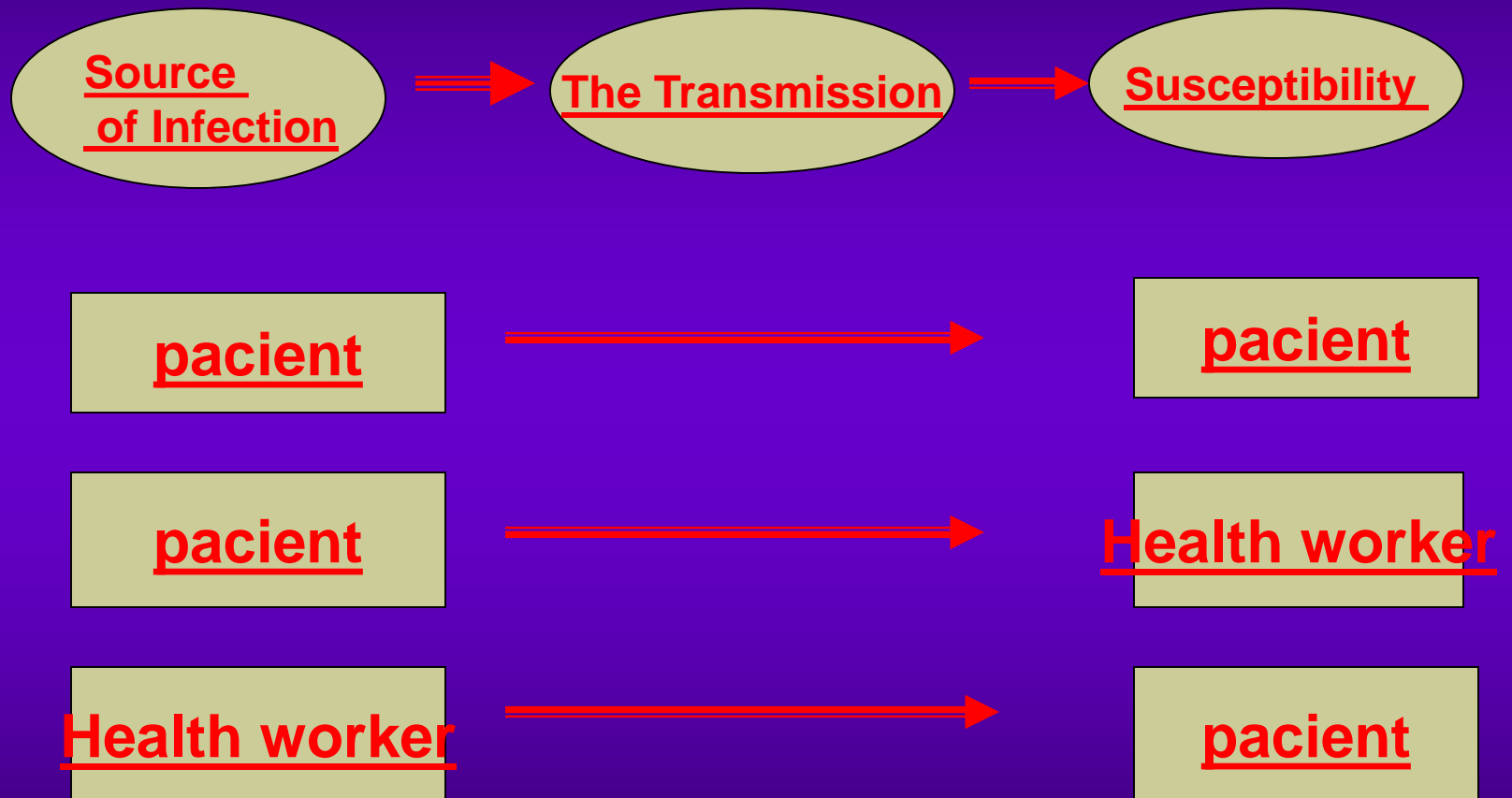


Chain of Infection

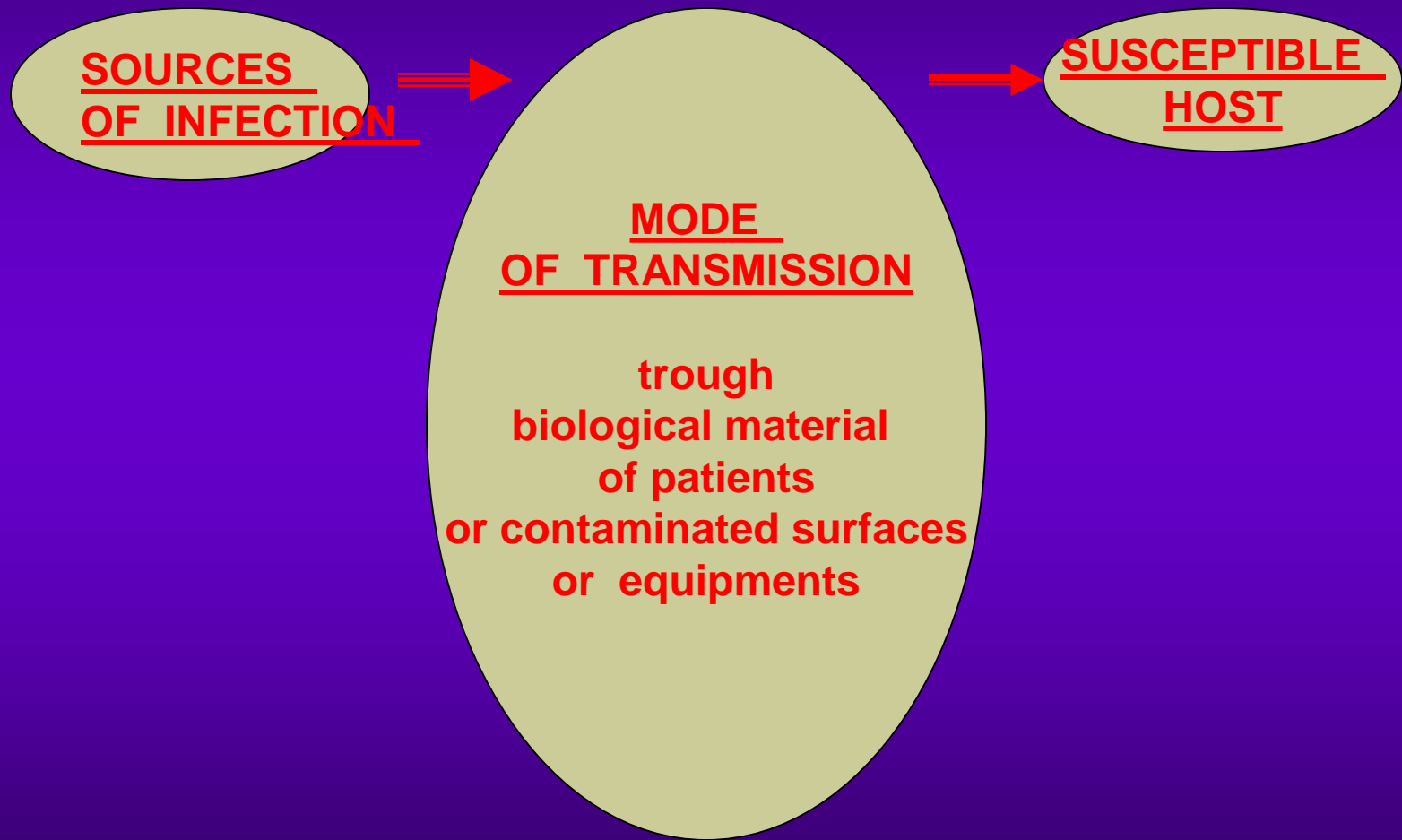
Causative agent - bacteria, viruses,
fungi, parasites, priony



Chain of Infection in Hospital Conditions



EPIDEMIC PROCESS IN THE HOSPITAL ENVIRONMENT



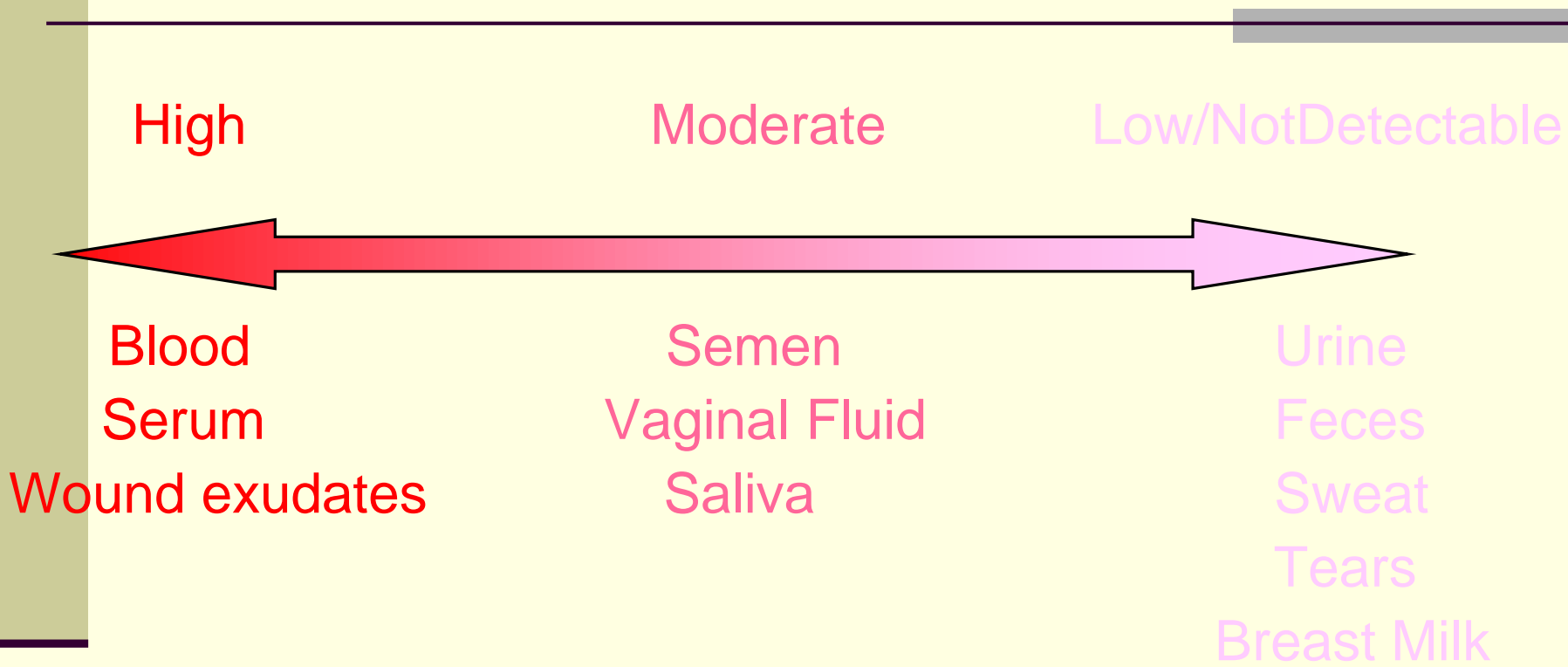
Biological materials – their infectivity

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

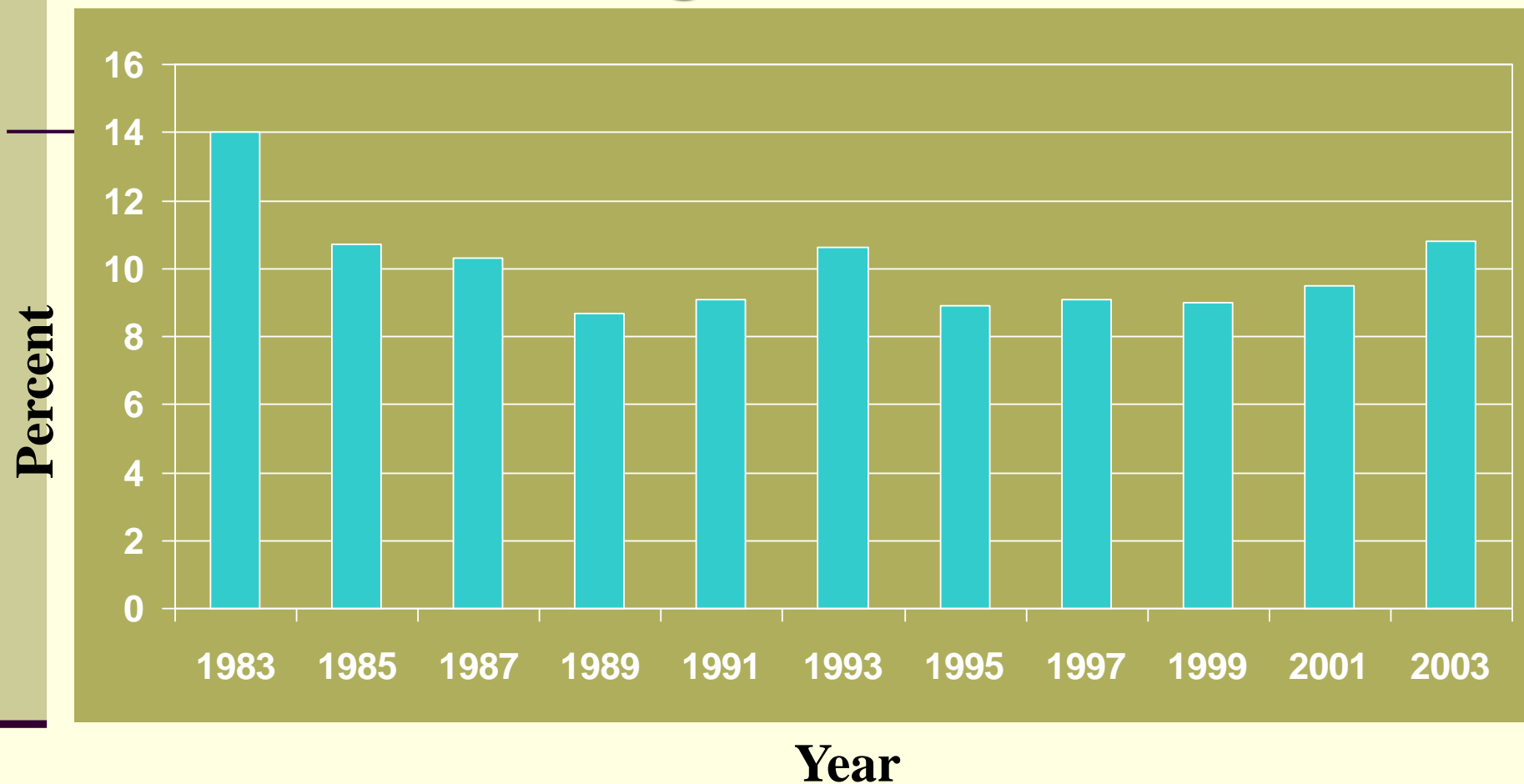
VHB, VHC, VHA (short in the blood), HIV, CMV, rarely EBV, virus of morbilli (viremie), kandy-kandidémie, malárie - (plasmodia can survive in fresh plasma 3 – 5°C - 14 days),

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**

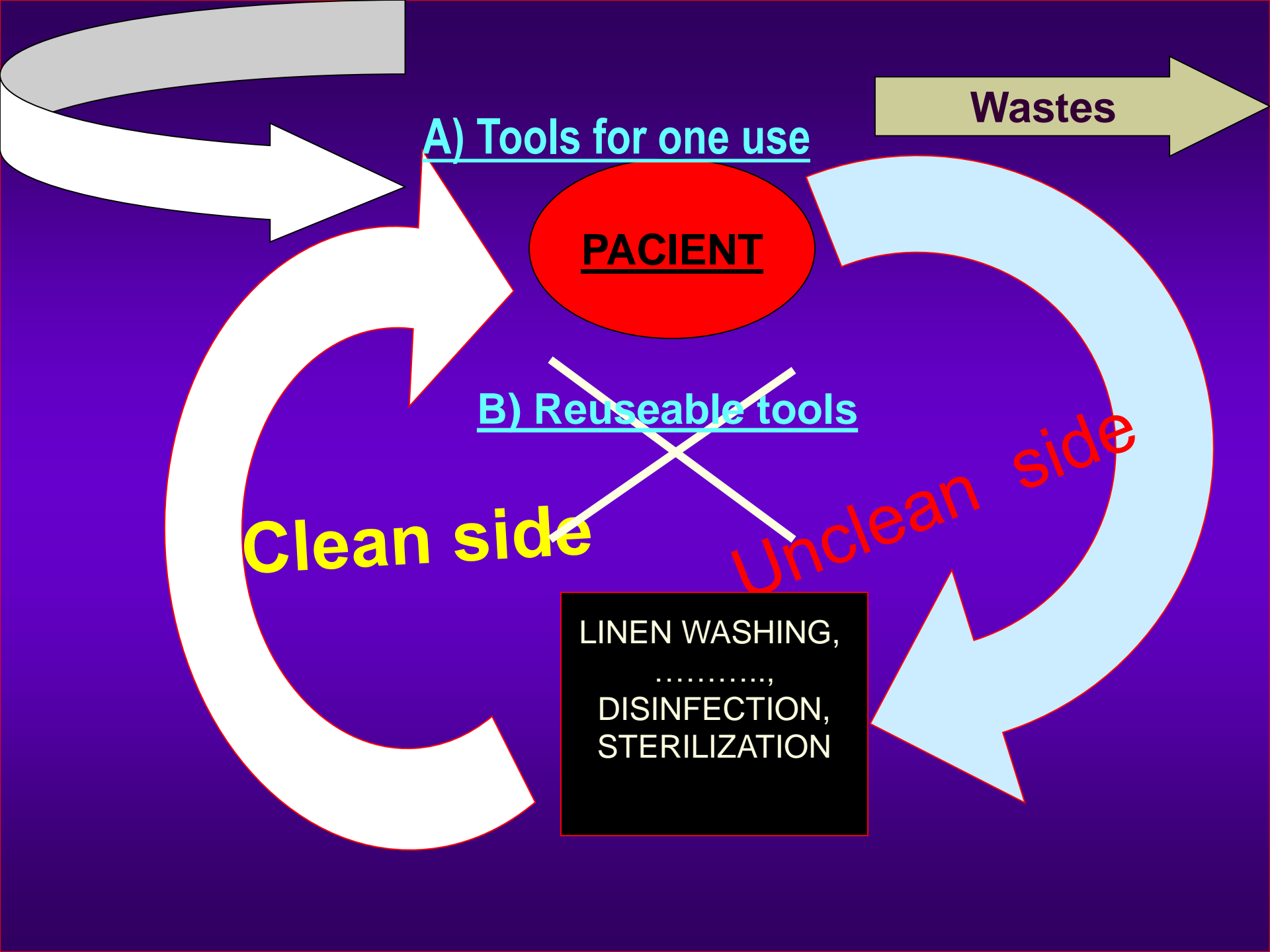
.....,

.....

DISINFECTION

STERILIZATION





A) Tools for one use

PACIENT

Wastes

B) Reuseable tools

Clean side

Unclean side

LINEN WASHING,
.....,
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**