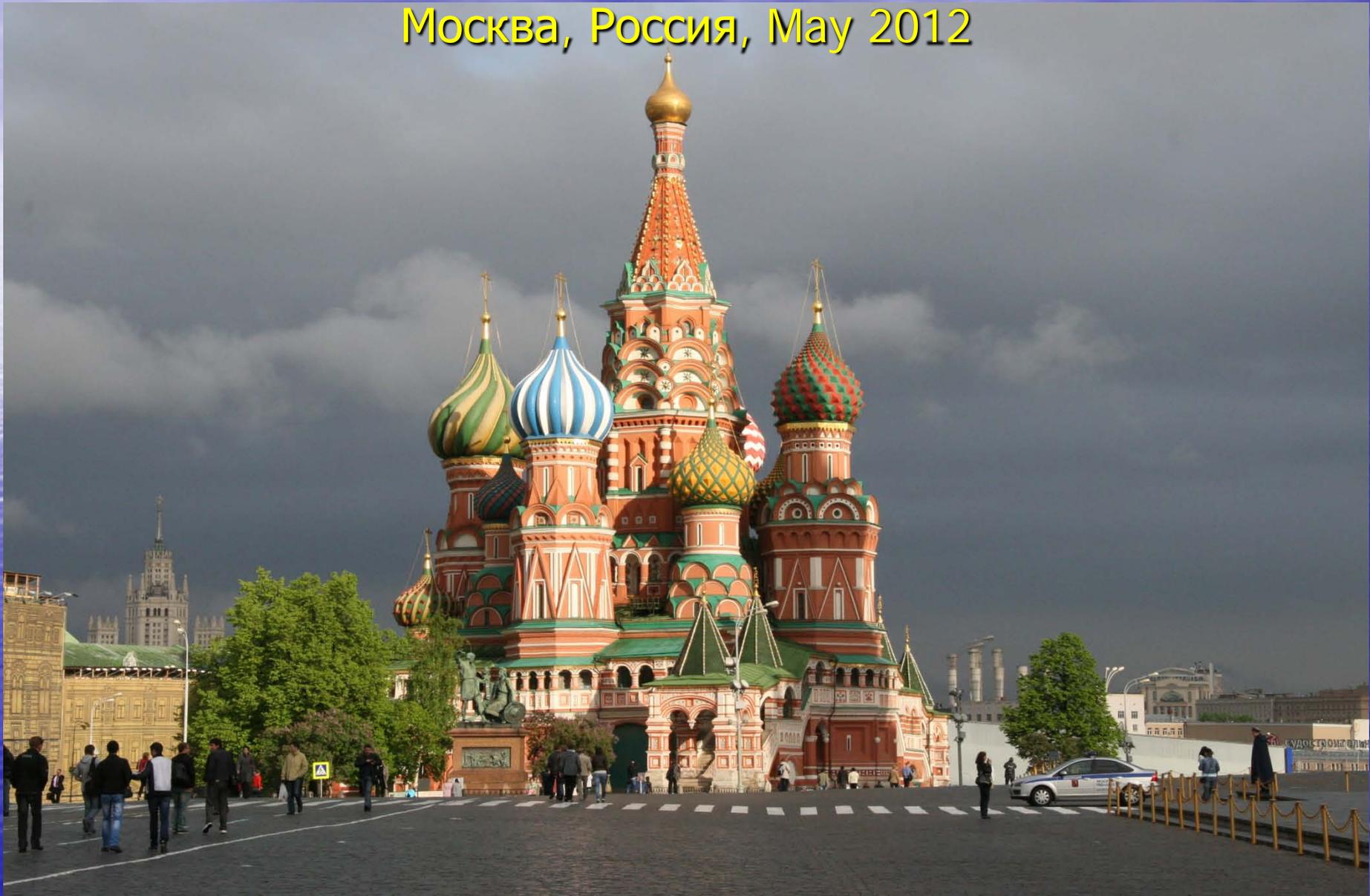


# The role of barrier precautions in infection control

Москва, Россия, May 2012





# What Are Bloodborne Pathogens?

- Microorganisms present in human blood that can cause disease
  - Viruses, bacteria, parasites, fungi
- Primary workplace pathogens
  - Human immunodeficiency virus (HIV)
  - Hepatitis B virus (HBV)
  - Hepatitis C virus (HCV)
  - Tuberculosis

# The risk of infection transmission depends on the

- Level of pathogen concentration in carrier
- Mode of transmission (intact or broken skin, mucous membranes, percutaneous)
- Volume of infectious fluid transferred.  
Length of exposure
- Effectiveness of barriers used to prevent infections

# Situations where infection risk is great:

- Sharps accidents (instruments and equipment).  
Surgical procedures.  
Passing instruments.  
Aerosolised blood/ tissue and blood and body fluid splatter.  
Blood seepage through inadequate barrier garments.

# Transmission of Pathogens

- Contaminated sharp objects or needles
- Broken skin, including rashes
- Mucous membranes
  - Eyes
  - Mouth
  - Nose



# Routes of Exposure

- Contact with a co-worker who suffers a bleeding injury
- Contact with blood while administering first aid
- Touching a contaminated surface
- Assigned to clean up blood





# Routes of Exposure (cont.)

- Contact with contaminated paper products or equipment in rest rooms
- Using a tool covered with dried blood

# Barrier protection

- Barrier precautions are a fundamental component of any infection control strategy and a critical aspect for health care workers.

# Barrier protection

- Gloves and gowns are widely recommended to provide an extra measure of protection against cross-infection
- Operating room personnel rely on personal protective equipment (PPE) to protect themselves and their patients against infectious agents

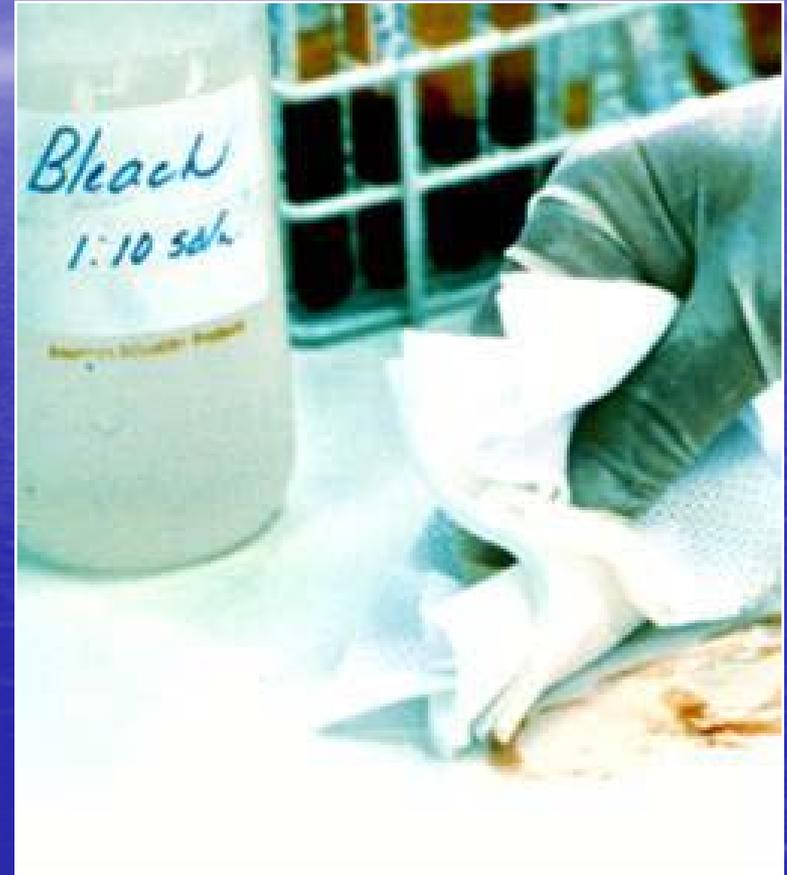


# Protect Yourself

- Take universal precautions
- Use personal protective equipment
- Follow safe work practices
- Get the hepatitis B vaccination
- Follow decontamination and disposal procedures

# Most IMPORTANT:

- Treat all blood and bodily fluids as if infected
- Use barrier protection (gloves, masks, aprons, eyewear) to avoid contact with infected bodily fluids
- Immediately clean up and decontaminate surfaces and equipment



# Use Personal Protective Equipment (PPE)

- Barrier protection prevents exposure
- Use gloves when applying bandages or cleaning up
- Eyewear or masks protect against splashes
- Protective clothing or aprons protect against spurting blood



# Avoid Puncture Wounds

- Use tongs, forceps, or similar tools to pick up contaminated items, especially to protect against sharp objects



Image Credit: State of WA-WISHA Services

# Glove Usage

Gloves have a dual role:

- to provide a barrier for personal protection
- to reduce the risk of transmission to patients



# Single use only

- Gloves other than household gloves e.g. used in the kitchen are single use only



# Gloves must fit properly



# Fit

- For this reason non-elastic gloves (plastic and vinyl) are generally not satisfactory
- Tight gloves increase the risk of dermabrasion and finger muscle fatigue
- Long term wearing of gloves leads to air occlusion and excessive sweating

# Medical gloves

- are designed to protect both the patient and the healthcare professional from:
- Organic matter/biohazards on hands and skin.
- Transmission of organic matter/biohazards already on the skin.
- Cross-infection with pathogens in blood/body fluids.

# When should gloves be worn?

- when dealing with
  - body fluids
  - secretions and excretions
  - nursing patients in isolation wards

# Aseptic techniques

- For aseptic techniques (mainly in the operating theatre, but also whenever an aseptic procedure is done at ward level),

choose sterile gloves

# For all other procedures

- to protect the health care worker from contact with blood or other body fluids, choose non-sterile gloves

# Non-sterile gloves

- Protect the worker not the patient. If you employ good hygiene practices and clean your hands properly, you do not need gloves for most clinical purposes.

# Non-sterile gloves

- When gloves are put on, they acquire your hand flora, so if you want gloved hands to be properly decontaminated, first, clean your hands properly before putting them on and secondly, rub the gloved hands with alcohol gel

# Surgical gloves

- serve two purposes:
  - protect patients from infection and cross contamination during surgery and
  - provide the first line of defense to protect healthcare workers from exposure to blood borne pathogens

# Barrier integrity

- The three variables that may affect barrier integrity in surgical gloves are material (latex or nonlatex), the type of surgery, and the length of time they are worn

# Glove perforation

- highest incidence of glove perforations:
- Orthopedic surgery:
  - open reduction of fractures with wiring, had the highest incidence of glove perforation
- followed by gastrointestinal surgery

# Glove perforation

- Suture needles and scalpels are the top two surgical items responsible for glove penetration
- followed by
  - retractors
  - skin and bone hooks
  - sharp electrode tips

# Glove perforation

- Length of surgery time and hand dominance also affected barrier integrity. Glove perforations have been noted 40 minutes into a surgical procedure, and for those lasting over an hour, glove perforations increased by 10%

# Glove perforation

- A correlation between glove perforations and hand dominance was indicated; more glove perforations occurred on the nondominant hand, and then the thumb and the index finger sustained the most perforations.

# Glove puncture and risk

- Risk of pathogen transmission is increased if a puncture is in the vicinity of pre-existing skin damage
- During single glove use blood was present on surgeon's skin due to puncture in 13% and 38% of operations

# Double gloving

- Double gloving significantly increases protection by reducing risk of exposure to blood:
  - When single-gloved, blood was present on hands in 38% of operations
  - when double-gloved, blood was present on hands in only 2% of operations.
  - Studies show that even when the overglove is punctured, the underglove remains intact in 98% and 98% of cases.

# Double gloving

- Glove perforation indicator systems use a colored pair of gloves (usually green) underneath a standard pair of gloves. Perforations can be readily detected when moisture from the operative field seeps between the layers of gloves, leading to earlier detection of glove perforation.



# Risk assessment

- Make a risk assessment of the procedure and decide whether to wear gloves. Choose your gloves according to the procedure to be carried out:

# Risk assessment

- the nature of the task (is patient or carer protection or both required?)
- the risk of exposure to blood or body fluids
- the risk of contamination
- the barrier efficacy of the gloves
- the choice of gloves (sterile, non-sterile, type of material)

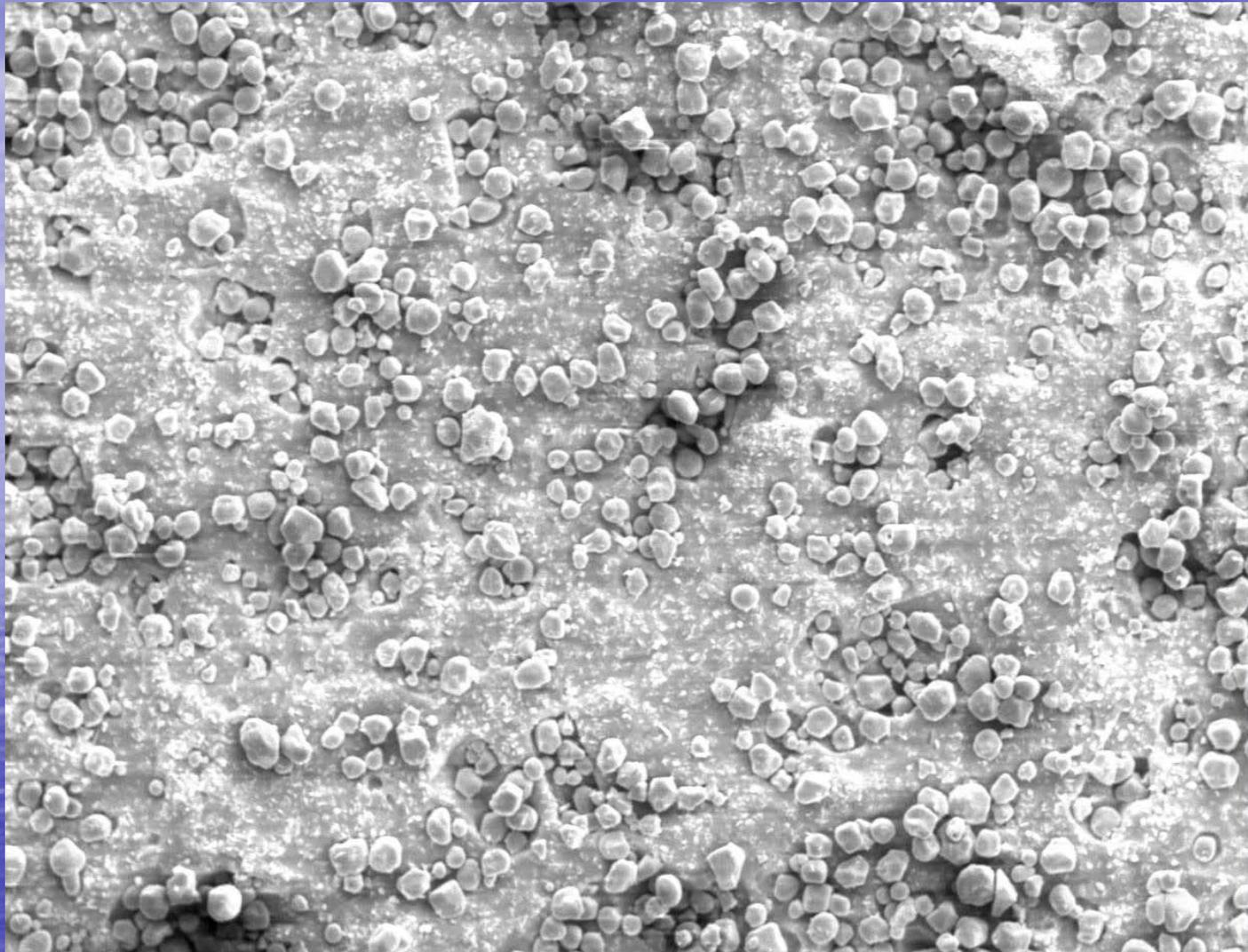
# Natural rubber latex gloves:



- Generally considered the material of choice for protection against pathogens. Thin, close fitting and comfortable. Good sensitivity. Do not impair dexterity. Not suitable if user or patient is sensitive to latex proteins.

# Powdered gloves should not be used

- If provided they must be returned to stores as not suitable
- Gloves should be low in extractable proteins (<50mg/g) and residual chemicals (<0.1% w/w)

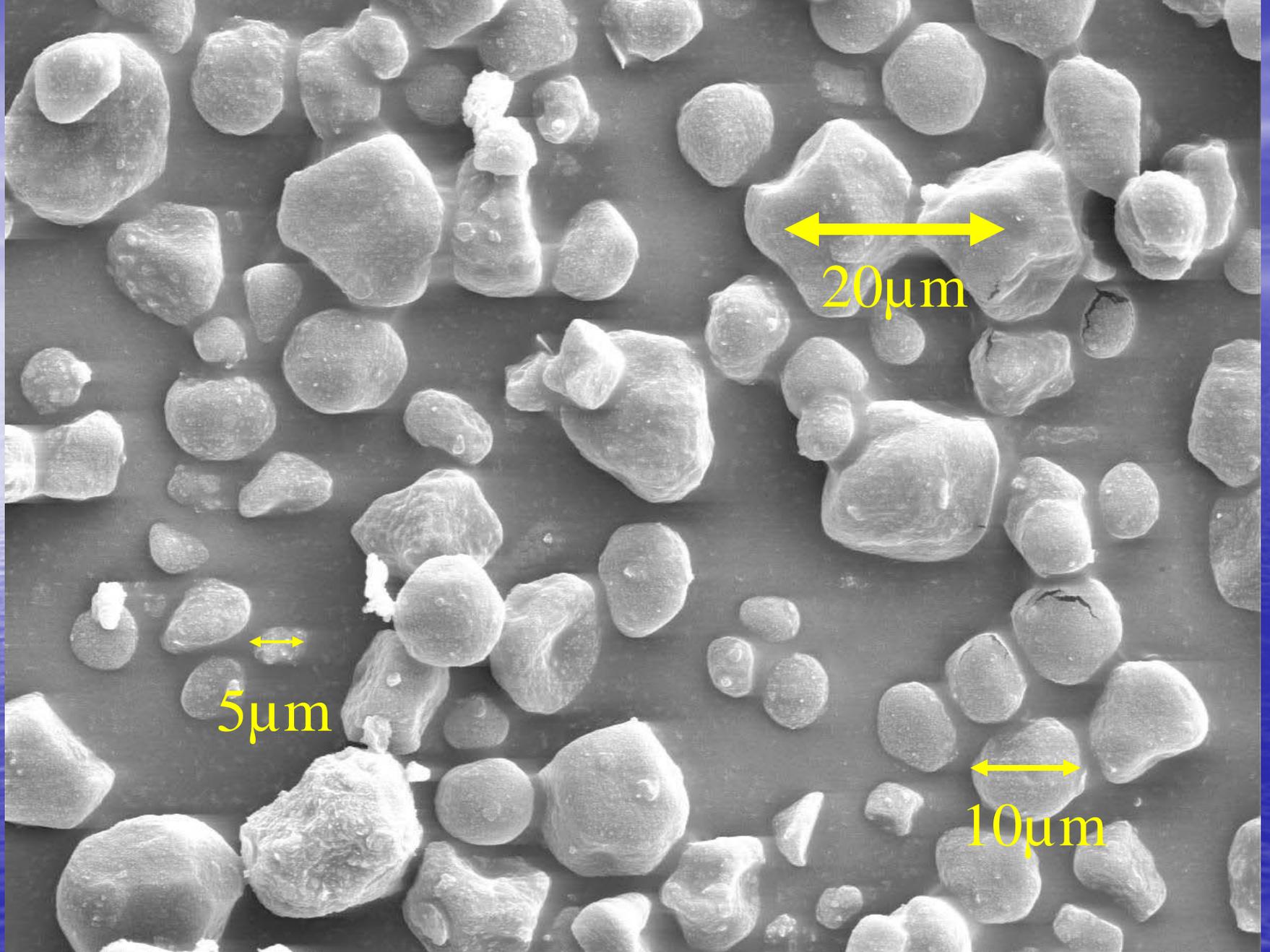


x200  
#1

200  $\mu\text{m}$   
MAISSTAERKE

15kV  
UNI 05

9mm

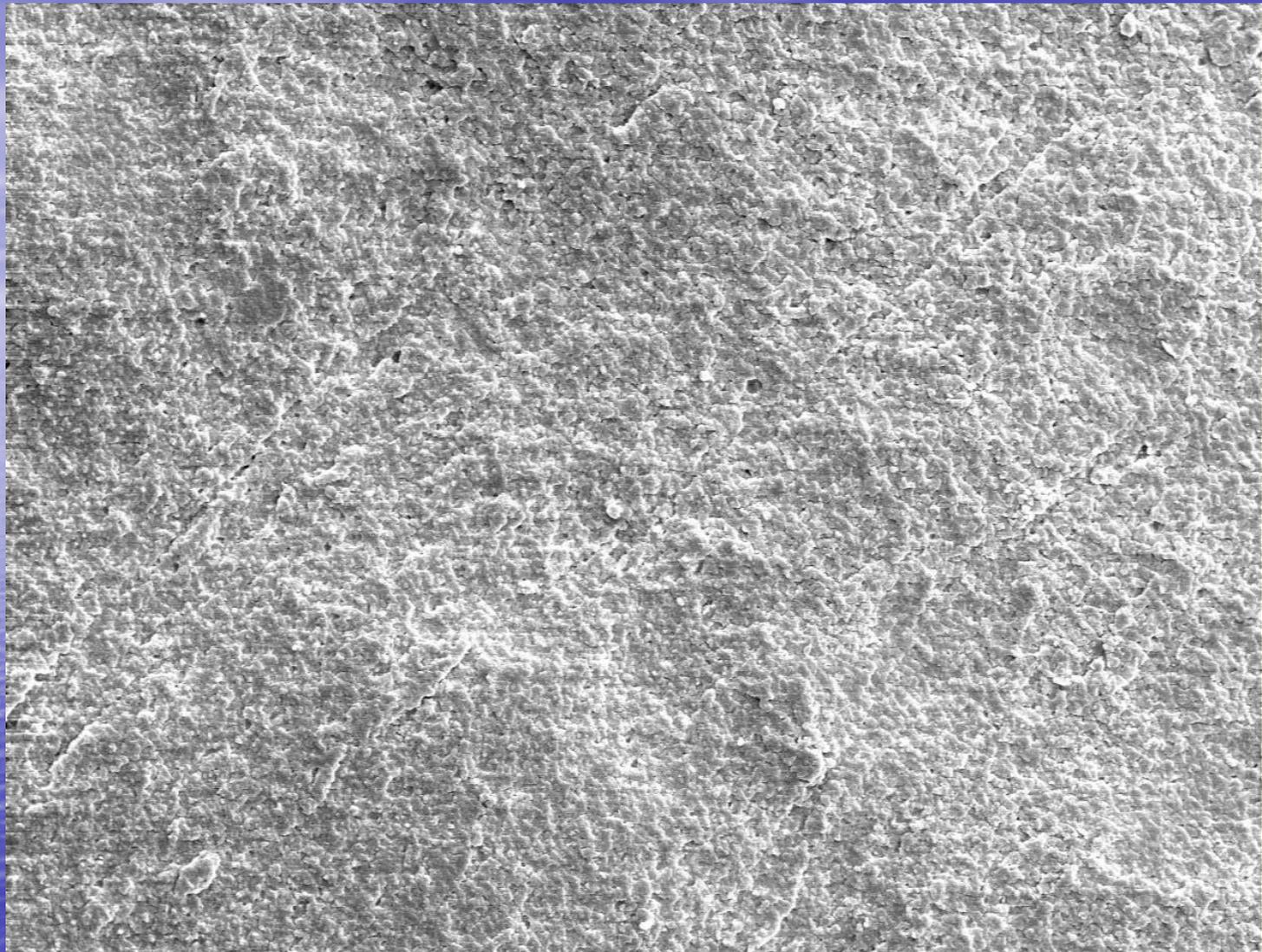


x1000  
#1

20µm  
MAISSTAERKE

15kV  
UNI 05

9mm



x200  
#1

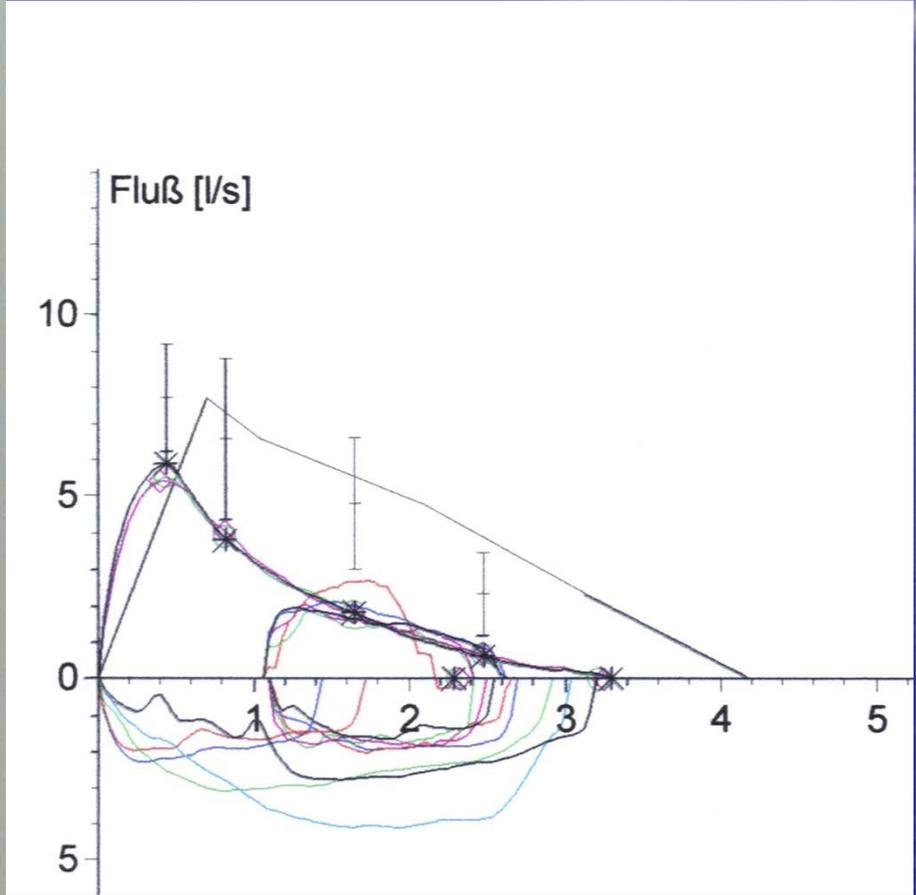
200  $\mu$ m  
Glove Outside

15kV  
UNI 05

9mm







# Final recommendations

- Yearly refresher courses are held to ensure that all staff are up to date with the equipment including when to use which type of glove

# Final recommendations

- This regular education on the correct use of the equipment ensures that when staff needs to use protective equipment they fully understand how and when to use which equipment.

Any questions?

