Biosafety in the autopsy room
How to proceed?

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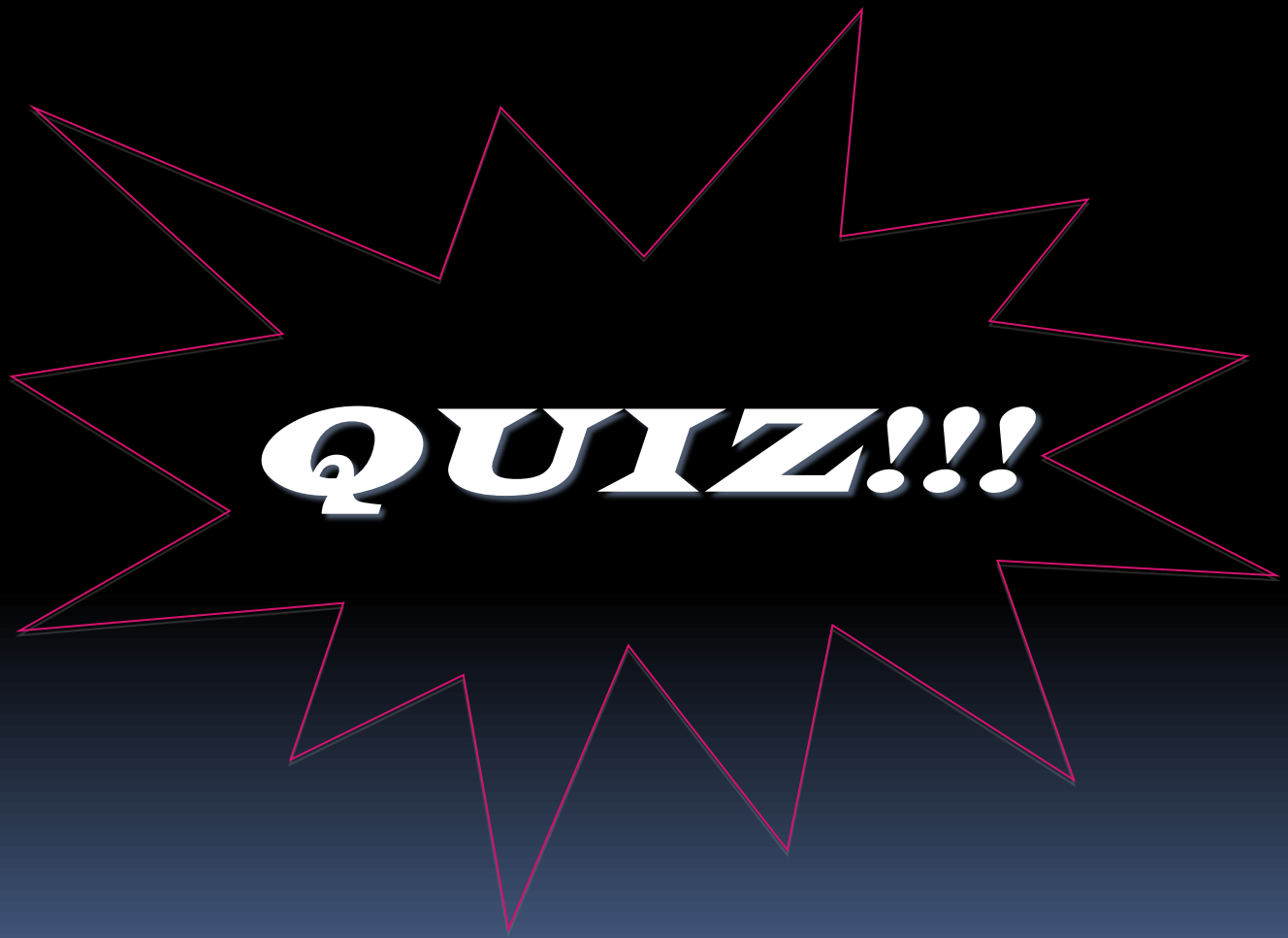
Something's just not right -- our air is clean, our water is pure, we all get plenty of exercise, everything we eat is organic and free-range, and yet nobody lives past thirty.

Outline

- Quiz!
- Blood born viruses and tuberculosis
- Existing protocols worldwide, in the Netherlands and Germany
- General rules of conduct in the autopsy room


QUIZ!!!

Highest risk of occupational infection?

A. HIV
B. Hepatitis B
C. Hepatitis C

Hepatitis B > Hepatitis C > HIV

Tuberculosis

Much ado about nothing?

- Questions:
  - What are the risks of infection with HIV/HBV/HCV and TBC
    - In HCW in general?
    - At autopsies?
  - What are the main routes of infection?
  - Does the viral load impact the risk of infection?
  - Are evidence based autopsy protocols available on best practice in the autopsy room?

HIV

- Most data from the USA (CDC)
  - Studies held amongst medical personnel (HCW). Time before HAART and PEP!
  - Cumulative risk:
    - Prevalence of HIV infection amongst patients
    - Risk of transmission after exposure
    - Nature and frequency of exposure
  - CRisk: average 0.3% after percutaneous injury (PI). Mucous membrane (≠ skin!!) exposure +- 0.09%. Transmission only with blood or bloody fluids!

- Does the risk vary according to mode of injury, amount of blood contact and viral load of the patient?
  - Bigger risk with transmission of more blood (hollow needles, deep cuts, no gloves) and high viral loads
  - Also with patients with < 50 copies/ml transmission has been reported!
  - Does death reduce infectiousness?
- PEP reduction of risk with ± 80%

- NL: no reported occupational transmission under HCW

HBV

- Reports primarily from the pre-vaccination era
- Risk of transmission up to 30% without vaccination or PEP
- Transmission:
  - blood or visible bloody fluids, sperm and other genital fluids
  - Percutaneous injuries, damaged skin and intact mucous membranes
  - After death long period of contagiousness and sturdy virus

HCV

- Transmission by percutaneous injury
- Cumulative risk: average 0.5% after PI. Mucous membrane contact not known.
- Variable seroconversion rates, ± 2%.
- Bigger risk of infection when contaminated blood from a HIV co-infected patient
- Only a risk on contamination when patient has a viral load
- No vaccination or PEP! Early treatment of active HCV may prevent chronic infection
- Depth of injury, amount etc also matter

Tuberculosis

- Big occupational transmission risk! Autopsy staff 100 - 200x bigger risk than general public


A
B
C
D

- Incidence of TBC is low, slowly increasing
- +- 1/300 autopsies, often unknown!
- Transmission through aerosols (droplets 1-5 µm) or inhalation of dry material, through PI or contact with infected materials or surfaces. Mucocutaneous systemic transmission is questionable
- Easy and far spread of contagious bacilli (distance to autopsy table is irrelevant!) Long contagiousness after death.
- Data are difficult to translate to current situation

Summary

- Blood-borne viruses:
  - HBV > HCV > HIV transmission
  - Almost primarily transmission after sharp injuries
  - No known difference between autopsy staff and other HCWs
- TBC
  - True incidence of transmission hard to define. Transmission risk is high
  - Transmission through different routes and not just after accidents/injuries


Barbie

Protocols

Worldwide:

- GB (2002, RCPath)
  - Hazard 3 (HBV, HCV, HIV, TBC, CJD)
  - No separate room obliged, desirable. Downdraft, negative ventilation
  - Double gloves. TBC mask!!!
  - Circulator ideally, not essential
  - Visitors allowed, but at distance from splash contamination. TBC mask!
  - Protective glasses/goggles
  - Standard cleaning and decontamination


3M
3M 9211 NIOSH

- USA (AM J Forensic Med Path 2002)
  - Separate suite preferable. If not available, minimal movement in/out during procedure
  - Downdraft, negative ventilation with walls that can be easily cleaned etc
  - Experienced staff. Circulator not mentioned
  - Impervious gown or apron, washable shoes
  - Goggles, TBC mask, double gloves
  - Cleaning:
    - All disposable materials to incineration
    - Instruments should be cleaned (liquid chemical/bleach) or sterilised
    - Clean surfaces with chemical. Concentration differs between levels of bloodiness.
    - TBC: phenolic products

- RIVM
  - Does not mention separate suites or negative airflow. Does mention circulation of air in general
  - No specific downdraft tables
  - Separate areas between clean (changing rooms) and rest of autopsy area . Shoes should be kept separately!
  - No mention of circulators
  - Preferably no students at level 3 autopsy. If spectators are present protective clothing. Only TBC mask upon suspicion
  - Goggles, (double) gloves, impermeable clothing
  - Suction of body fluids with automated suction system
  - No rinsing with running water!
  - Whole suite = contaminated (with 3 m perimeter)
  - Cleaning with water and soap. Disinfection with chlorine containing products

Surgery theaters?

- Cleaning protocols UMCG
- Cleaning secondary to hazard risk/isolation code
- Standard protocol (with chlorine containing liquids)

Other hospitals in NL

- Rotterdam:
  - Removal of one block instead of separate
  - No spectators
  - Weighing after fixations
- AMC and Maastricht: separate suites
- VU (Amsterdam): as UMCG
- In quite some hospitals separate cleaning by professionals

Proposal UMCG

- General:
  - always TBC masks, goggles, double gloves
  - Impermeable aprons
  - Try to minimalise aerosol formation. Automatic suction systems?
- Level 3 hazard (suspected):
  - Limit spectators: maximum (2?). Only during entire autopsy. Same protective clothing as staff
  - Weighing no problem, but scale cleanable
  - Circulator is desired
  - Disinfection needs to be reassessed

What about YOU????