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National Institute  
for Public Health  
and the Environment

## **Biosafety versus biosecurity: synergy and potential conflict**

2<sup>nd</sup> Swiss Microbial Safety Meeting 2010

Spiez, 26-28 April 2010

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# Outline

- Definitions Biosafety and Biosecurity
- Components of Laboratory Biosecurity
- Synergy biosafety and biosecurity
- Potential conflicts
- CBRN Action plan
- Organisational cultures
- Conclusions



# Definitions :

- WHO/CDS/EPR/2006.6
- CEN Laboratory Biorisk Management Standard



- **Biosafety:** The containment principles, technologies and practices that are implemented to prevent the unintentional exposure to biological agents and toxins or their accidental release.

- **Laboratory Biosecurity:** The protection, control and accountability for biological materials within laboratories in order to prevent their unauthorised access, loss, theft, misuse, diversion or intentional release.



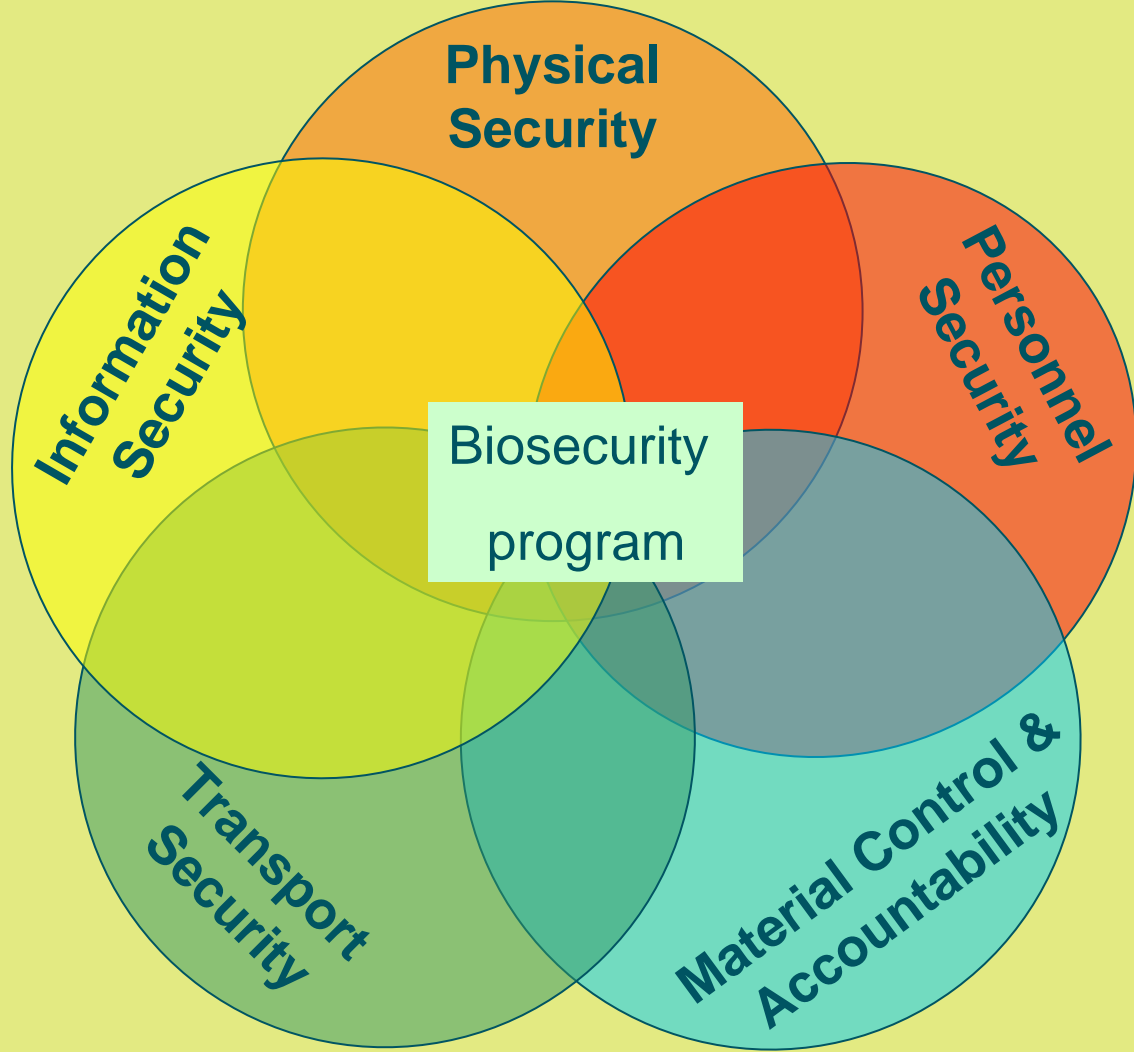
# Informal definitions

**Safety:** Protection from **non-intentional** events  
(incidents, accidents, natural disaster...)

**Security:** Protection from **intentional malicious** actions  
(sabotage, espionage, terror, crime, blackmail...)

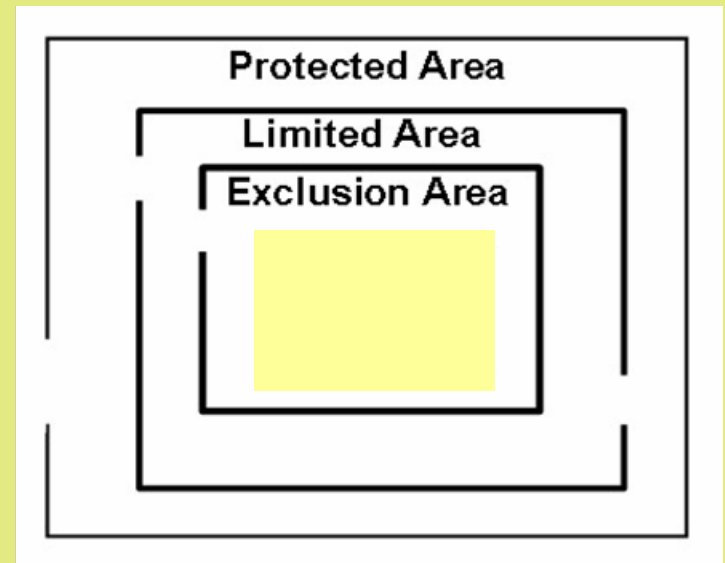
Biosafety is to **keep** bad **bugs** from people,  
**Biosecurity** is to **keep** bad people from **bugs**

# Components of Biosecurity



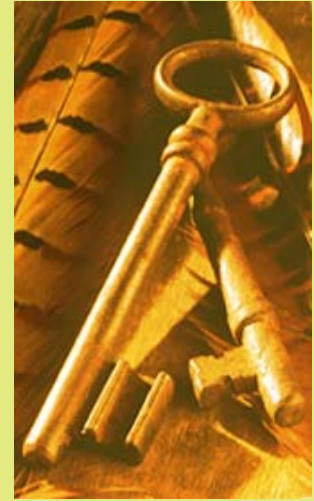
# Physical Security (graded protection)

- **Property Protection Areas**
  - **Low risk assets**
    - Grounds
    - Public access offices
- **Limited Areas**
  - **Moderate risk assets**
    - Laboratories
    - Sensitive administration offices
    - Hallways surrounding Exclusion Areas
- **Exclusion Areas**
  - **High risk assets**
    - High containment laboratories
    - Computer network center



# Access control (cards, codes or biometrics)

- Access control ensures that only authorized individuals are allowed into certain areas
- Increasingly strict controls as moving toward higher risk assets



# Personnel Screening



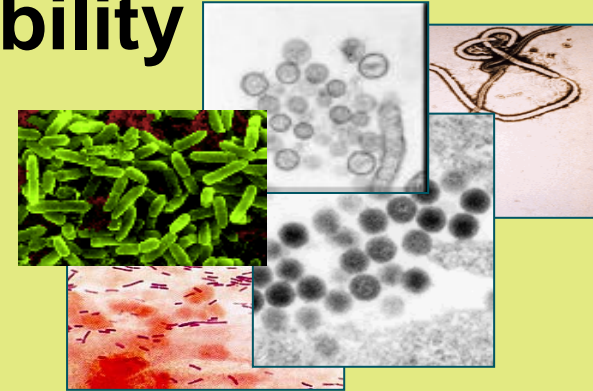
- Conduct screening for authorized individuals
  - Degree of screening depends on the level of risk associated with the position
  - Include maintenance staff, contractors and ICT staff
- Mechanisms
  - Verify credentials
  - Check references
  - Criminal history
  - In-depth background investigation
- How to deal with visiting researchers?????

social security: keep in contact with staff

“It’s hard to imagine that a terrorist becomes a microbiologist,  
but a microbiologist could become a terrorist”

(quote Reynolds *Salerno* - *Sandia* National Laboratories)

# Material control & accountability



## Biosafety

EU legislation<sup>1)</sup> demands

- to keep record of all pathogens of Class 2, 3 and 4
- to keep record of workers involved with Class 3 and 4 pathogens
- to store agents in a for unauthorized persons inaccessible area

1) Directive 2000/54/EC

## Biosecurity

- ensure the complete and timely knowledge of:
  - what materials exist
  - where the materials are
  - who is accountable for them

**Ensure that no material is “orphaned”**

# Transport security

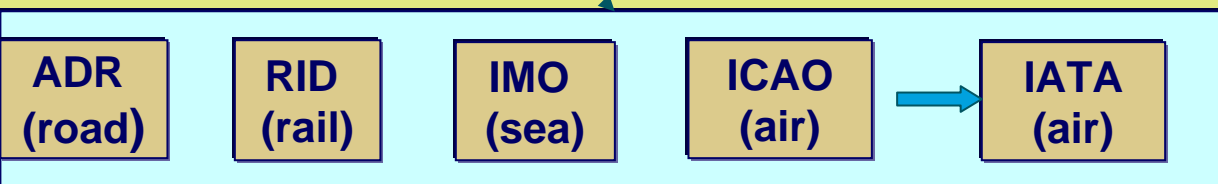
Transport can occur

- Internal transport
- External transport:
  - within a country
  - across international borders



**UN Committee of Experts  
on Transport of Dangerous Goods**

**Model Regulations on the Transport  
of Dangerous Goods**



Still a gap between  
sender and receiver

..... and don't forget the waste!

# Information security

## Bio-related information to secure

- information about stored Biological Agents (what, where)
- test procedures and diagnostic results
- personal information of lab workers in a high containment facility

## but...

- reference/diagnostic labs need to communicate especially in case of an outbreak or attack with BT organisms
- research wants to/has to publish

Where to draw the line between '**need to know**' and '**nice to know**'

# ***Characterization of the 1918 influenza virus polymerase genes.***

***Nature 437: 889–893 Taubenberger et al. (2005)***

- Press release CDC, October 5, 2005:  
“**Scientists at the Centers for Disease Control and Prevention have successfully reconstructed the influenza virus strain responsible for the 1918 pandemic, a project that greatly advances preparedness efforts for the next pandemic**”
  
- Critics like Andreas von Bubnoff:  
“**Recently, a team of US scientists resurrected a virus that has since been labeled 'perhaps the most effective bioweapons agent now known' “**

# Points to consider

- how to protect sensitive information on Intranet
- how to protect Internet connection with collaborating institutes or organisations during outbreaks
- encryption of laptop
- secured USB/memory stick
- using mobile communication or not
- policy of communication
- policy of publishing data
- prepare contingency plan with limited parties
- prevent circulation of design information related to security issues



# Information related to Building security systems and Building management systems

## Hacking will effect

- access control
- breach of containment

Control involvement of ICT and technical operators and include them in your awareness training program

# Synergy Biosafety and Biosecurity

- raising awareness of risk
- implementation of graded levels of protection based on a risk management
- access management and control
- registration of biological agents
- redundancy of building installations to ensure continuation
- waste management

# Potential conflicts

## Biosafety

- open information
- open communication
- recognisable samples
- rescue of lab workers in case of emergency
- transport by protocol
- contingency plan

## Biosecurity

- restricted information
- restricted communication
- coding storage
- guarded enclosure in case of emergency
- tackle the gap between sender and receiver
- restricted information to contingency teams

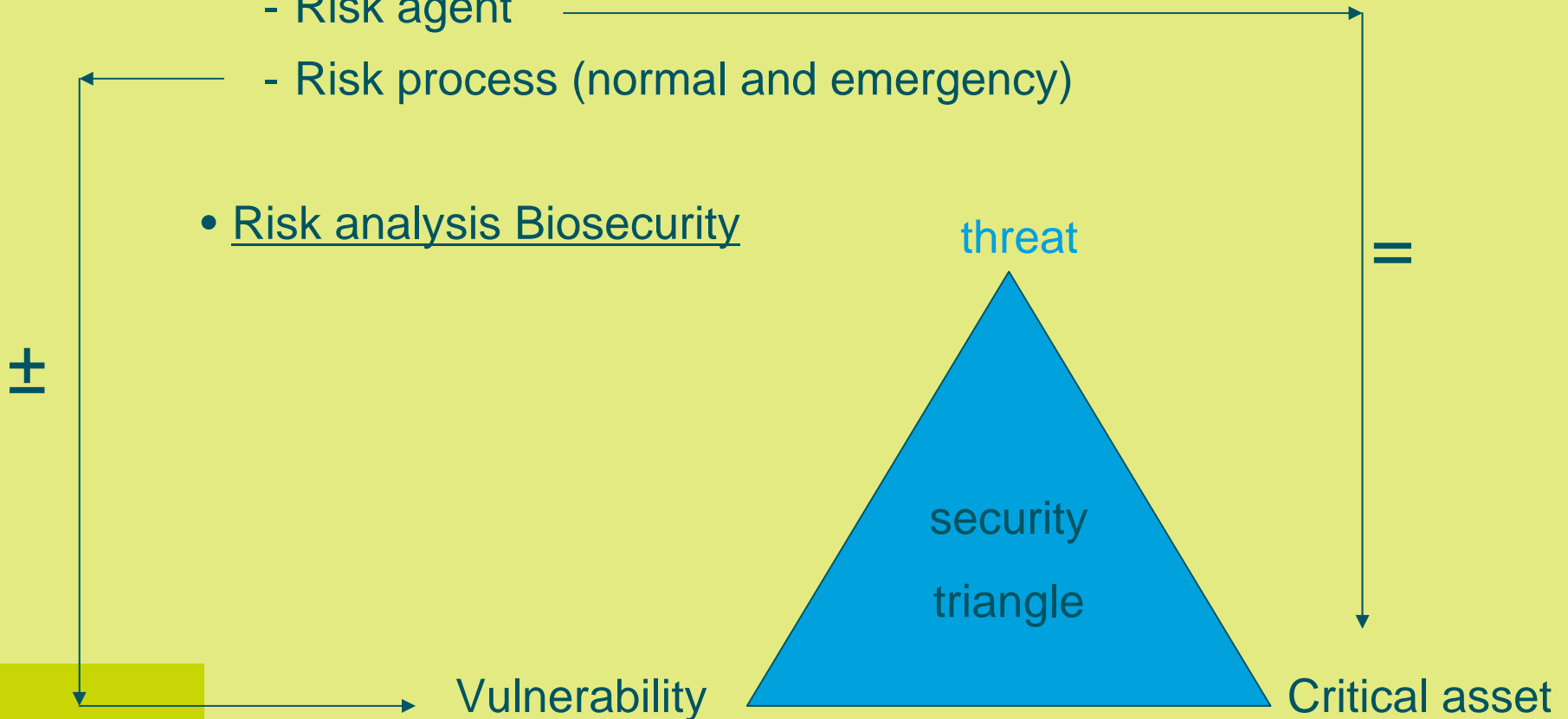
# Risk assessment and threat assessment

- Risk analysis Biosafety

- Risk agent

- Risk process (normal and emergency)

- Risk analysis Biosecurity





Council conclusions on strengthening  
chemical, biological, radiological and  
nuclear (CBRN) security in the  
European Union -  
an **EU CBRN Action Plan**

Improve information exchange

Develop high security culture of staff

Improve emergency planning

Improve communication with the public

Strengthen personnel security

= biosafety

= biosecurity

= Biorisk

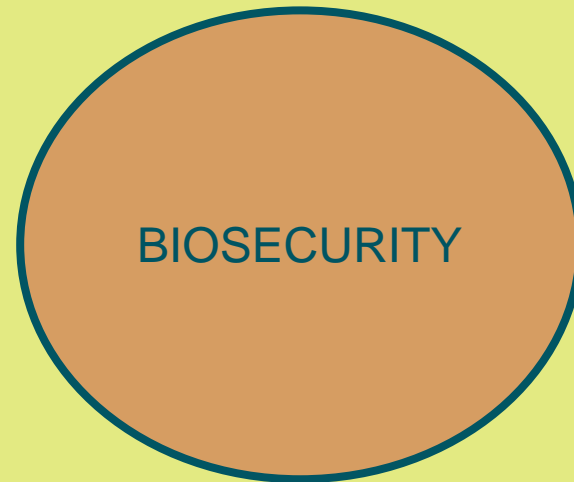
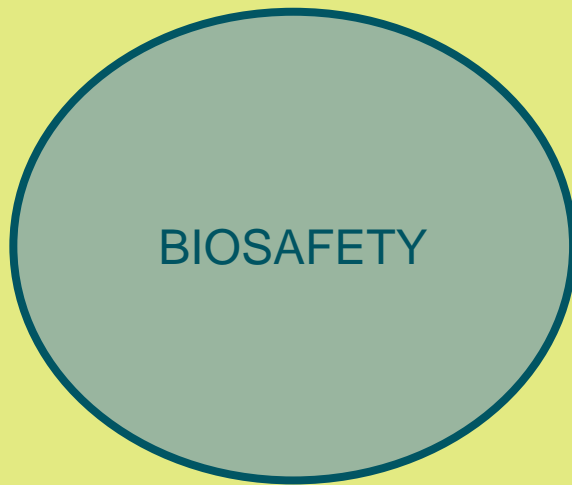
Strengthen decontamination and remediation capacity

Enhance security of transport

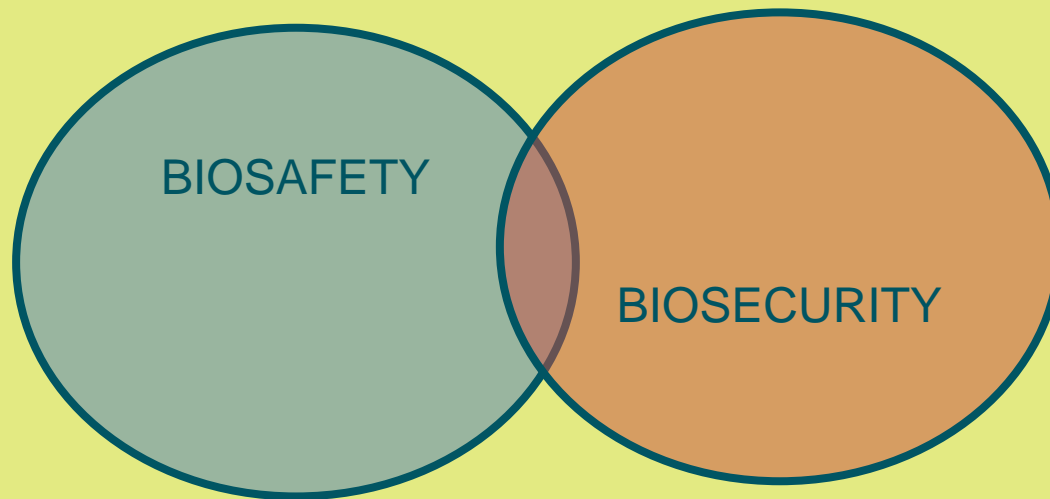
Improve training

Identify good practices related to the detection of CBRN materials  
, awareness raising and training

# Biosafety and Biosecurity



# Biosecurity and Biosafety



# The Netherlands: Code of conduct

## Based on

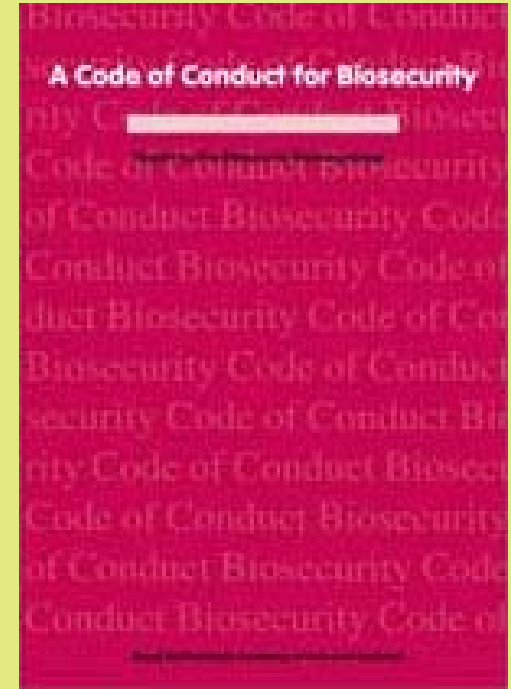
- the Biological and Toxin Weapons Convention (BTWC)
- Statement Biosecurity of the InterAcademy Panel (IAP)

## Purpose:

- to raise awareness of potential misuse of pathogens

## Target group:

- life science facilities (research, diagnostics and industry)



## To download:

[http://www.knaw.nl/cfdata/publicaties/detail.cfm?boeken\\_\\_ordernr=20071092](http://www.knaw.nl/cfdata/publicaties/detail.cfm?boeken__ordernr=20071092)

# Culture of research facilities

- rather easy to contain, but restricted funding
- the need to publish
- education program with students, also from abroad
- collaboration with PhD's, also from abroad

= protection of biological agents attainable (if funding is granted) but hard to protect knowledge and data

# Culture of diagnostic facilities

- difficult to contain, 'public' area especially in hospitals
- funding security 'hardware' less problematic than in research
- open communication about test results is a must

= protection of biological agents difficult and communication about test results to relevant parties is a must

# Culture of industrial facilities

- used to contain the facility
- funding for security 'hardware' is part of the policy
- used to restricted communication and openness based on product protection
- weak point is cooperation with the public private sector

= protection of biological agents and scientific data is standard behaviour. Problems could arise in case of collaboration with third parties

# Conclusions (1)

- **No biosecurity without biosafety.** Biosecurity and biosafety should be integrated systems to avoid hinder in important emerging disease research and diagnostics.
- Important to find **the balance between necessity and overkill** of biosafety and biosecurity measures all based on risk assessment. The only variable should be the threat assessment.
- **Awareness of biosecurity** needs improvement for scientists as well as for management. Training is the key.

# Conclusions (2)

- The **inside threat** is identified as an important aspect which should have more attention in the organisation.
- There is a difference in biosecurity approach between industry and university/hospital facilities caused by the **difference in culture**.

**THANK YOU FOR YOUR ATTENTION!**