

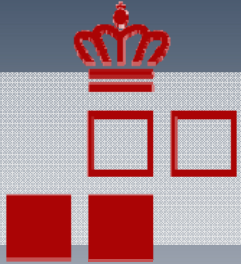


CENTRE FOR  
BIOSECURITY AND  
BIOPREPAREDNESS

# Assessment of technology with dual-use potential in Denmark

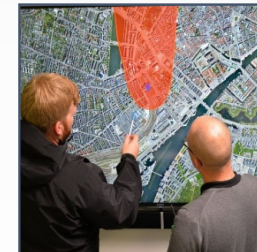
Steen B. Giese

Analyst, DVM



# Centre for biosecurity and biopreparedness

- National biosecurity agency with legal and regulative powers
- Established in 2001 under the Ministry of Health
- Expertise from natural- and medical sciences, social science, and operational expertise
- Biopreparedness team includes 6 MDs



Fotos: CBB

# Biosecurity in Denmark

It requires a license from CBB to work with dual-use material in Denmark

## **Human pathogens**

**Act 2008, Executive Order 2009**

Act on securing specific biological substances, delivery systems and related materials

## **Animal pathogens**

**Act 2017, Executive Order 2017**

Act on control of specific animal pathogens

The regulations applies to:

- Possession
- Manufacturing
- Application
- Storage
- Purchase, sale, transfer
- Transport
- Disposal

# Subjects to control in Denmark

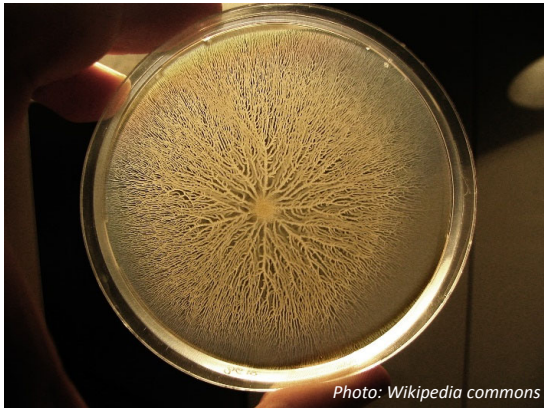


Photo: Wikipedia commons

Biological agents



Photo: Wikipedia commons

Process equipment  
and delivery systems

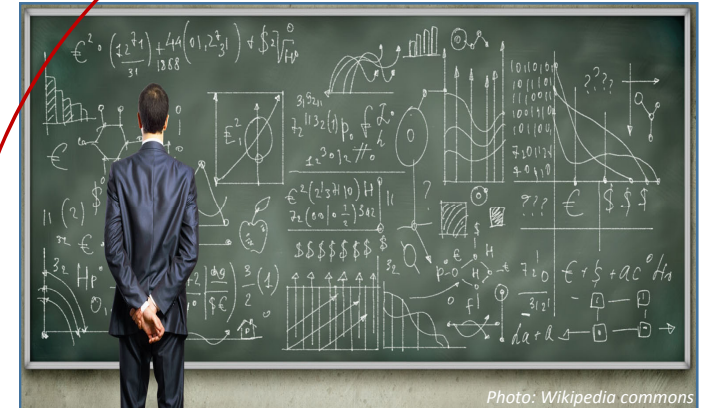


Photo: Wikipedia commons

Dual-use technology  
(data and skills)

# What is dual-use technology?

- Technology, which can be misused for the development of biological weapons or for offensive usage of biological weapons
- Dual-use technology is subject to control in DK



# Technology → specific information

## Technical data



- E.g. drawings, plans, diagrams, models, formulae, tables, design plans, manuals and instructions
- In print or stored electronically

## Technical assistance



- Know-how and skills achieved through laboratory training and practice
- Communicated through courses, peer-to-peer training, consultancy service. Can include transfer of technical data.

Does not apply to information that already exist in the public domain!



## Dual-use in research

### Examples

**2002** Polio virus is created synthetically

**2005** The Spanish Flu is recreated

**2011** H5N1 made transmissible by air between mammals (ferrets)

**2017** Horsepox virus is created synthetically

Do the benefits outweigh the risks?

# Research results with dual-use potential

- Resistance of pathogens to medical treatment increases
- Host specificity is altered
- Virulence of pathogens increases
- Transmissibility of pathogens increases
- Pathogens become undetectable to known methods
- Improved methods for dissemination in air, food or water
- New pathogens or toxins arise or extinct pathogens are recreated
- Human immune response is compromised





# Skills with dual-use potential

- Production and handling of virus or bacteria
- Environmental stabilization of microorganisms
- Microencapsulation of microorganisms
- Aerosolization of micro particles
- Genetic engineering of microorganisms, e.g. CRISPR/Cas9 expertise
- SynBio expertise



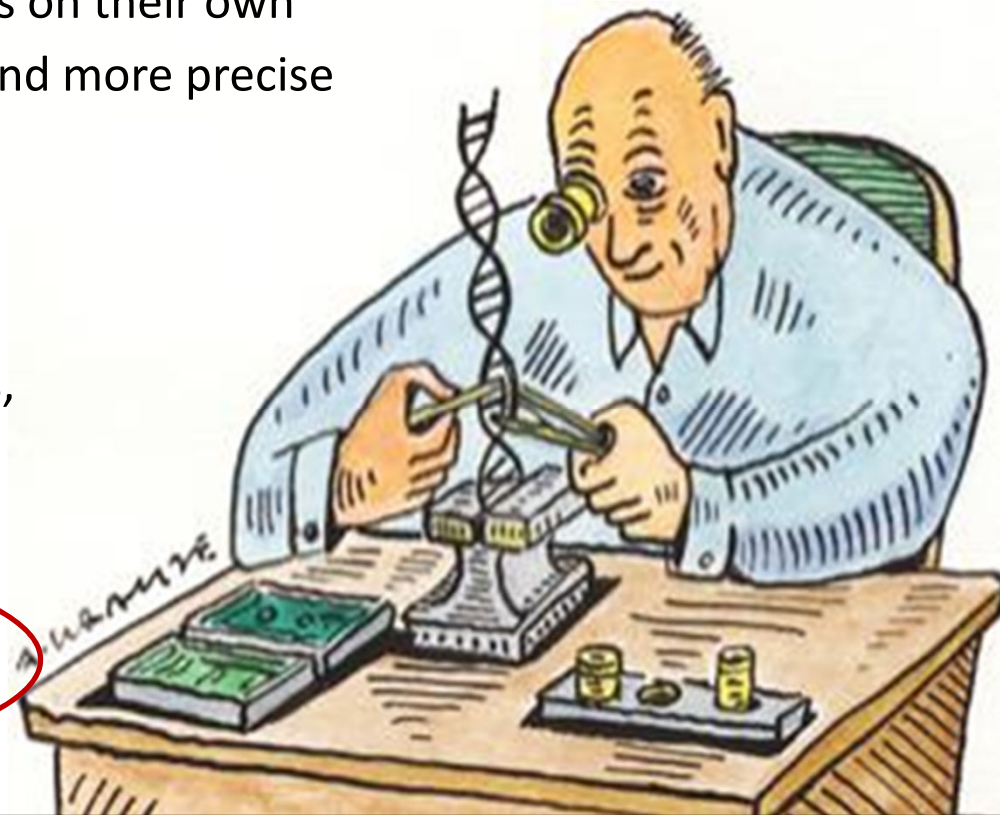
# Challenges and strategy

## Challenges

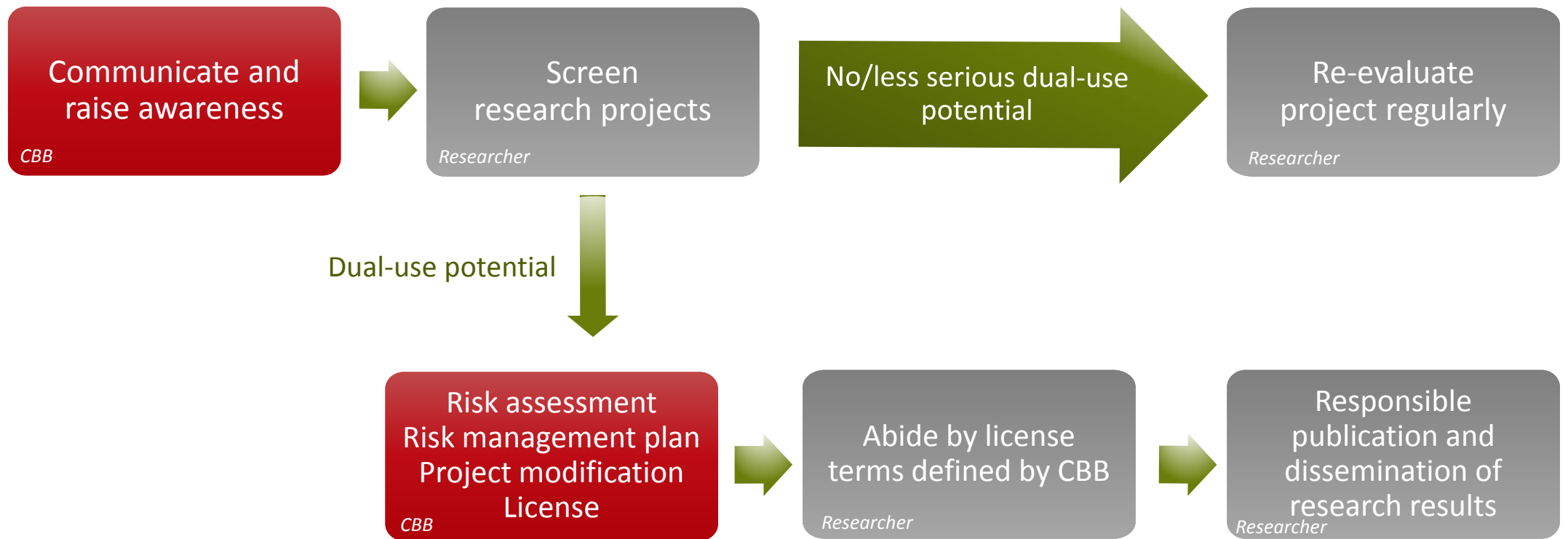
- Most building blocks and techniques are harmless on their own
- SynBio tech is rapidly becoming cheaper, easier and more precise
- Physical decoupling

## Strategy

- Screening and customer registration, watermarks, self destructive cells
- Regulation, national and international laws
- Awareness raising, codes of conduct, ethics, guidelines
  - Principal investigator & team, premises, scientific community



# A shared responsibility



# Dual-use technology control in Denmark

**A.** Dual-use technology which – without further modifications – can be used to produce or make use of biological weapons  
*A license must be obtained from CBB before project launch*

**B.** Serious potential for misuse in relation to weapons development  
*Guidance from CBB prior to project launch*

**C.** Less critical and more general dual-use potential  
*Awareness and biosecurity at the company or institution*



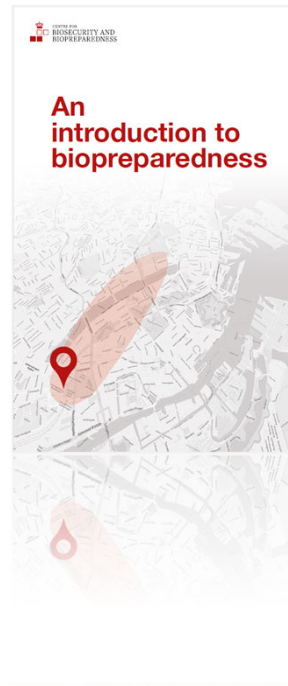
# Awareness raising

Responsible science, ethics and biosecurity

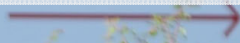
- CBB gives awareness raising talks to life science students at all Danish universities
- Biosecurity culture and dual-use technology is discussed with participants on biosecurity courses
- On inspections, CBB covers dual-use technology with management, biosecurity officers and technical/scientific staff



# Publications



# Questions?



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