



# biosecurity and responsible science

PREVENTION OF  
BIOLOGICAL WEAPONS  
DEVELOPMENT

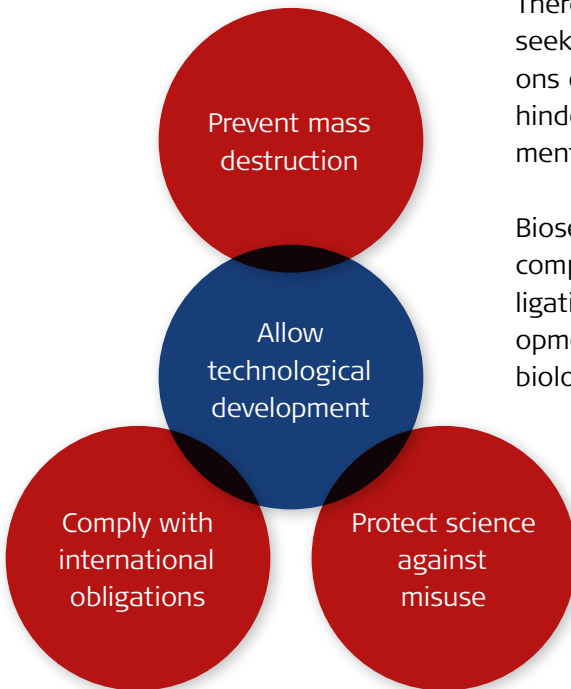
## The biological threat

Biological weapons are weapons of mass destruction. Terrorists and states can use them for malicious purposes, and they pose a serious threat to national, regional, and global stability.

## Biosecurity measures

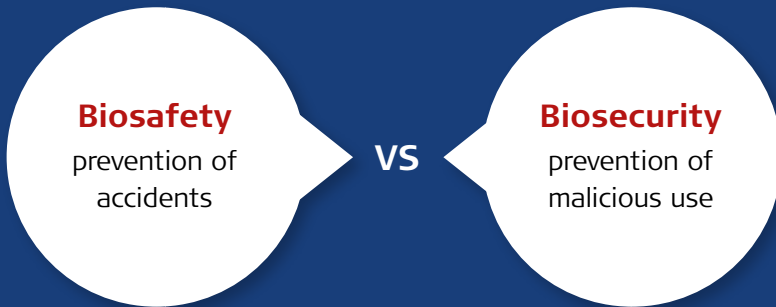
Biosecurity is designed to prevent the misuse of dual-use materials to produce biological weapons. Therefore, biosecurity measures seek to prevent biological weapons of mass destruction without hindering technological development.

Biosecurity is also a means of complying with international obligations that prohibit the development, possession and use of biological weapons.



## Biosecurity vs. biosafety

Biosecurity and biosafety are related concepts, but with important differences:



Biosafety measures primarily prevent accidents and protect the people who work with dangerous biological substances.

Biosecurity measures serve to prevent ill-intended use of dangerous biological substances, i.e. bioterrorism and development of biological weapons.

## Dual-use materials

Dual-use materials are biological substances, related materials and immaterial technology that researchers and manufacturers use for legitimate purposes, e.g. medical research or food production, but which could also be used to develop and distribute a dangerous biological agent.

Development of a biological weapon requires:

- A biological agent (e.g. bacteria, viruses, toxins)
- Processing material (e.g. fermentors, centrifuges, filtration equipment)
- A delivery system (e.g. spray or mist systems, delivery aircrafts/vehicles, improvised dispersal devices)
- Skills and know-how (e.g. microbiological knowledge, processing skills)

## Dual-use technology

Dual-use technology is legitimate skills and expertise that is applicable in biological weapon production too. Due to its intangible nature, dual-use technology is complicated to control in terms of biosecurity. It requires awareness and knowledge to realise if certain skills or know-how have dual-use potential and should be kept safe from outsiders.

Examples of potential dual-use technology:

- Changing a pathogen's resistance to medical treatment
- Augmenting the infectiousness of a pathogen
- Creating a new biological substance that can cause harm

## Where is biosecurity relevant?

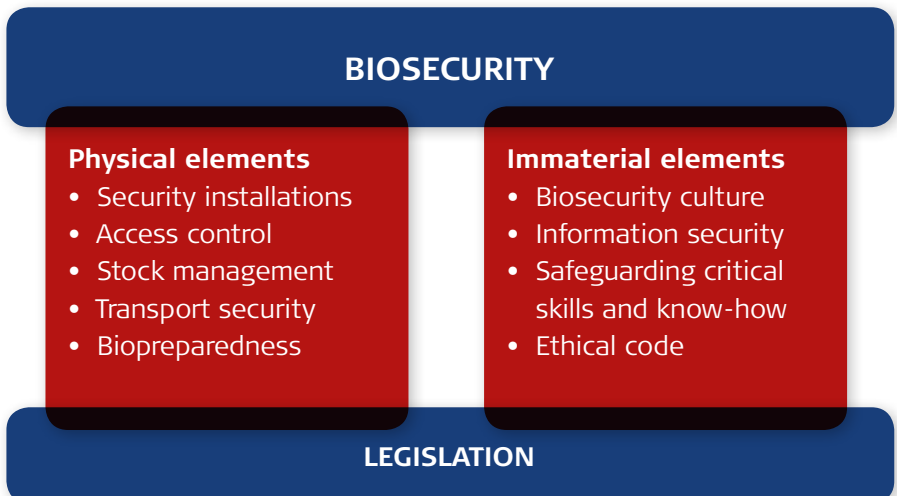
Biosecurity is relevant in a variety of sectors, e.g.:

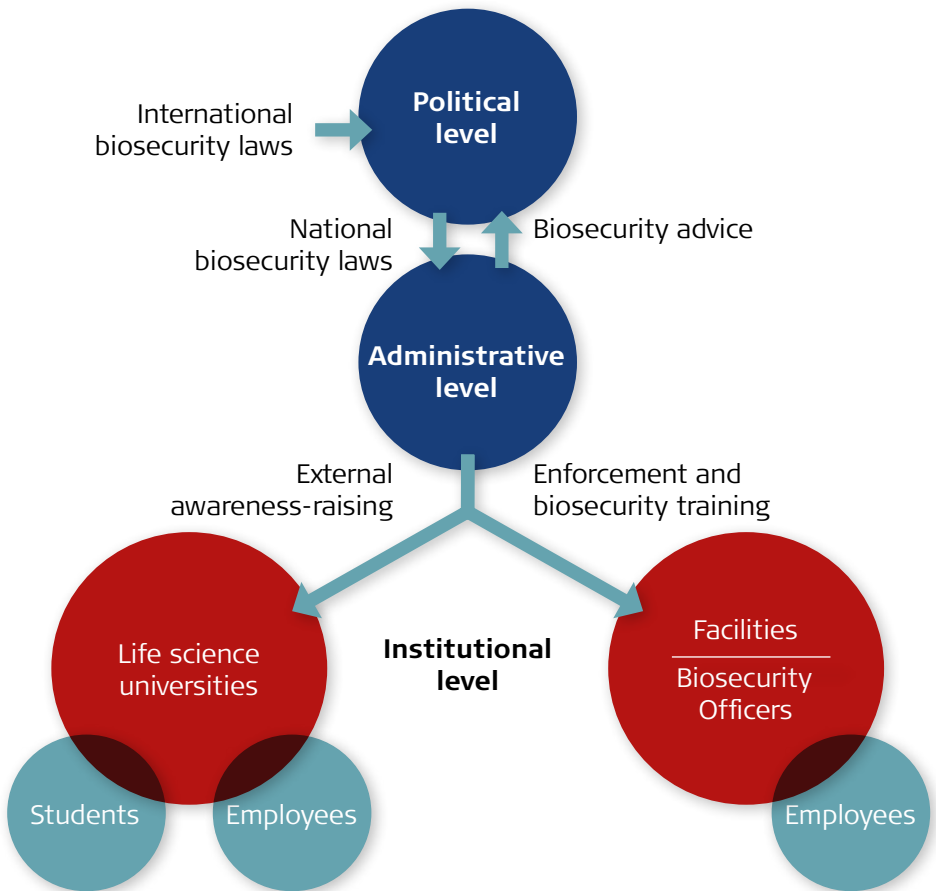
- Research institutions
- Universities
- Biotechnological and pharmaceutical companies
- Producers of biological production equipment
- Diagnostic laboratories

## Elements of biosecurity

Biosecurity should be founded on legislation and encompass both physical and immaterial elements.

- **The physical elements** are concrete measures, such as security installations that prevent intruders from accessing dual-use material, and access control to limit the number of people with access to dual-use material.
- **The immaterial elements** include e.g. a biosecurity culture and safeguarding critical skills, that is, dual-use technology. Biosecurity culture is about understanding the necessity of biosecurity followed by a willingness and effort to make it work.





## An operational biosecurity system

There are three levels to address in a good biosecurity system. A political, an administrative and an institutional level. Once the legislation is in place (and enforced) it is up to the institutional level to uphold a high biosecurity standard. It is essential to appoint a biosecurity officer among the staff to oversee the day-to-day biosecurity practices and train relevant colleagues, students etc. At the institutional level, the biosecurity culture among all relevant personnel and students is key to making the biosecurity system work.

## The Danish Centre for Biosecurity and Biopreparedness (CBB)

is the Danish government agency for biosecurity. The Centre promotes and enforces biosecurity in Denmark and maintains a 24/7 response capability to counter the effects of biological incidents. CBB also promotes biosecurity internationally and through bilateral collaboration with the Government of Kenya.

Questions and enquiries are welcome. Please see our contact details below.

For more information and digital publications, please visit: [www.biosecurity.dk](http://www.biosecurity.dk) and The Danish Partnership Program.

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