

“Keeping them in or out?”

Control of aerosols in loose housed versus caged laboratory research animals for HPAI studies

– a case study

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Engineering for a healthier world

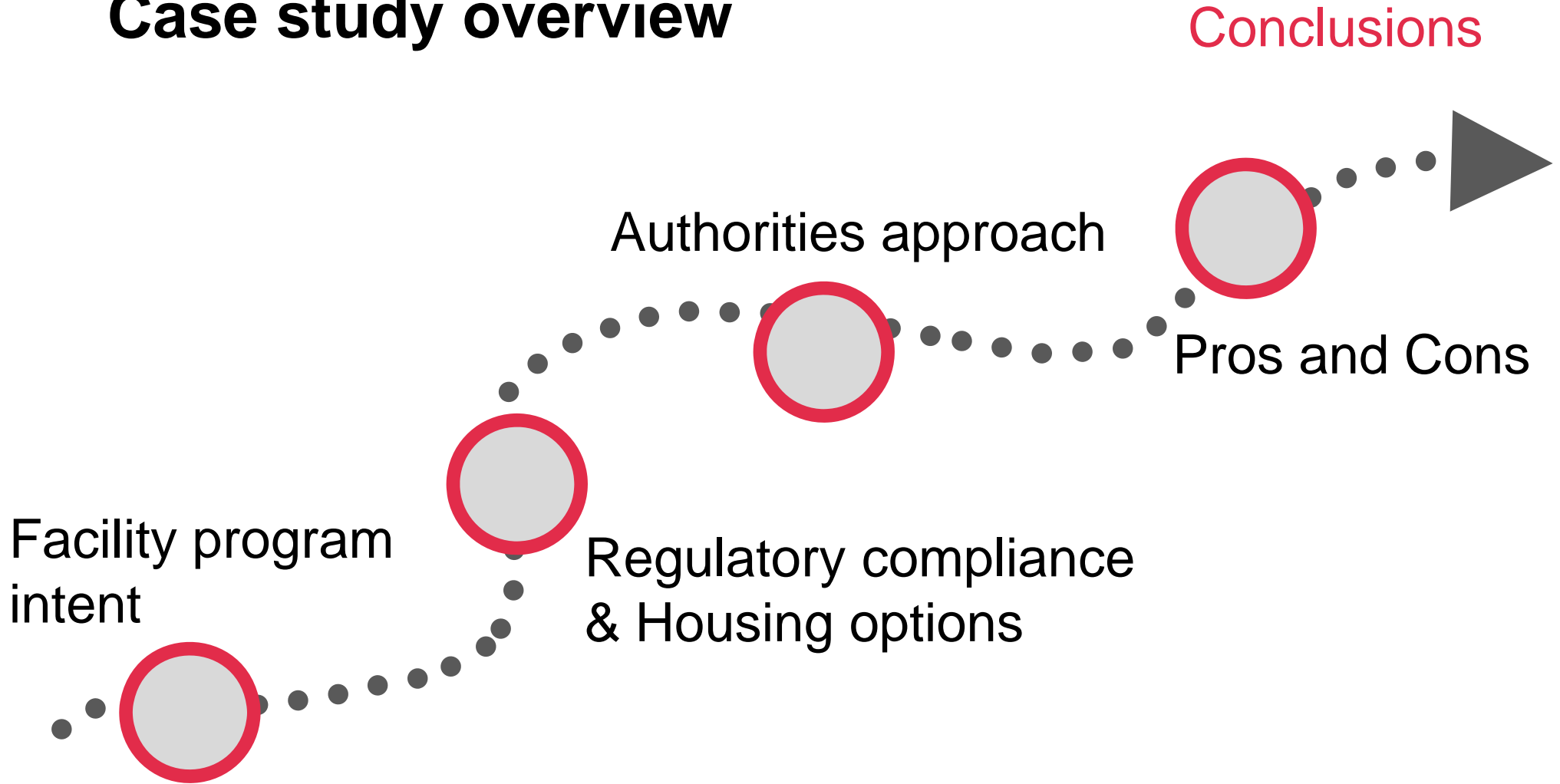


Objective of the presentation

The main objective is to discuss the pros and cons of primary barrier caging systems versus primary barrier facility design for HPAI research in ferrets in a high containment laboratory

The discussion is based on a case study

Case study overview



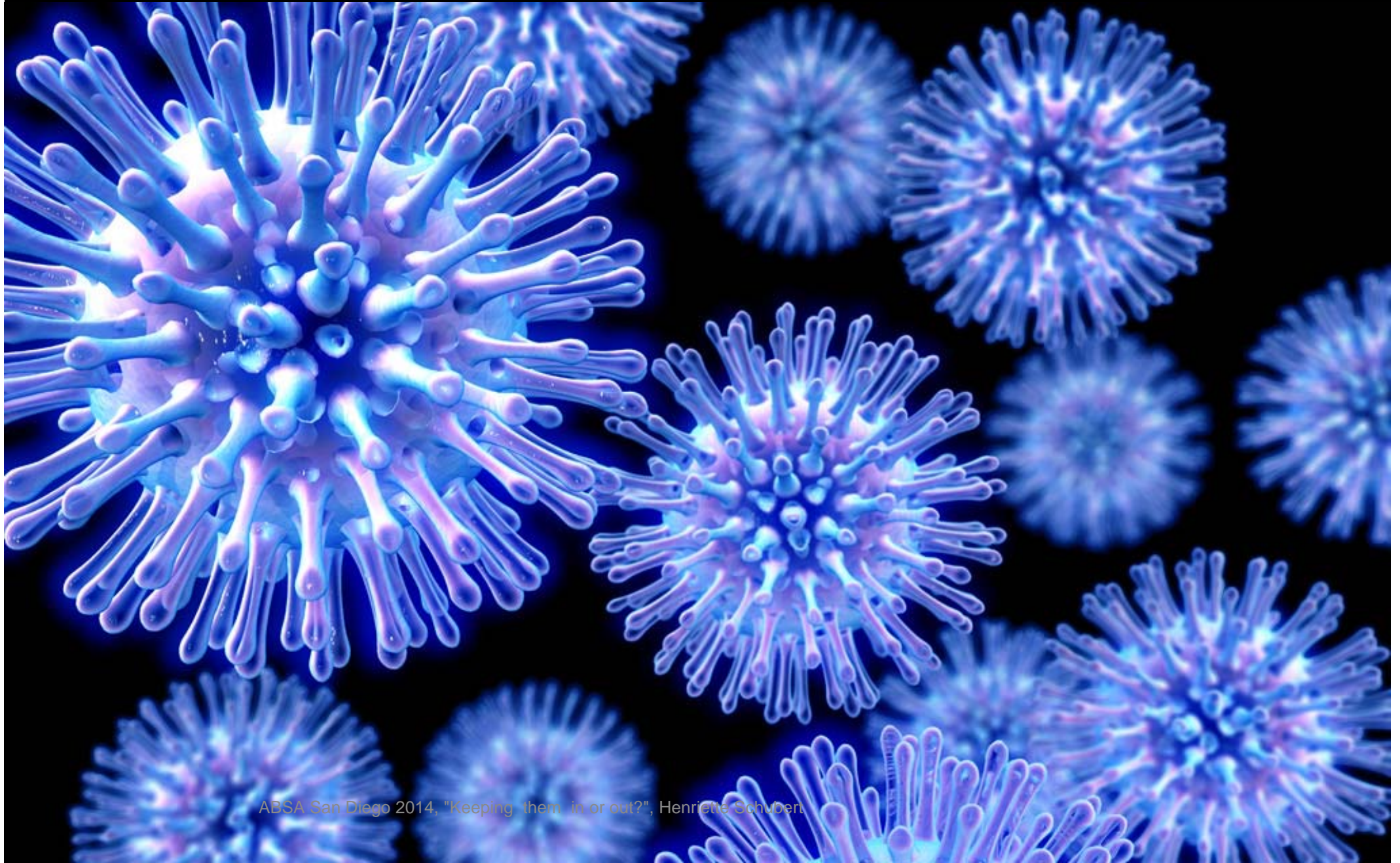
The challenge:

Choosing a housing principle for ferrets for HPAI studies

Undisclosed Facility in Scandinavia

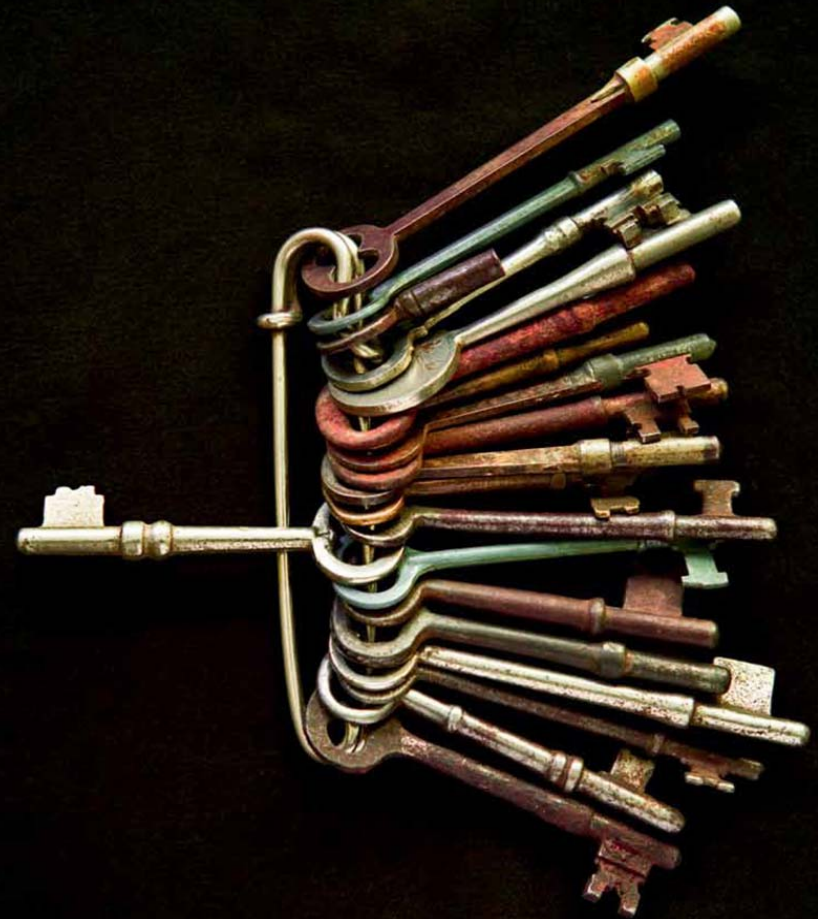


Program intent High containment multi purpose facility



Key factors & Design Drivers

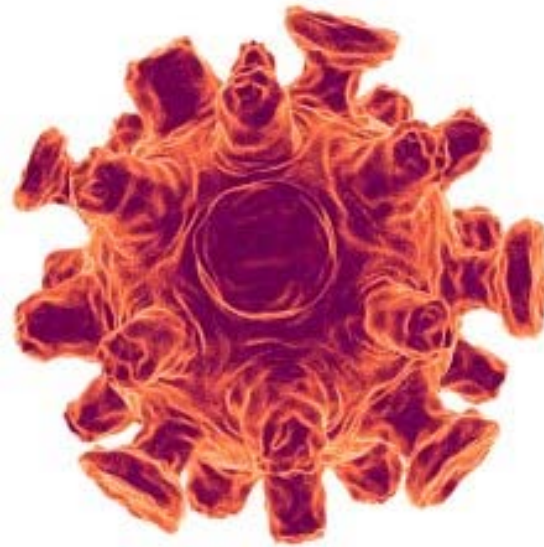
- Scientific vision & mission
- Flexibility & Multi use facility
- Regulatory compliance
- Workflow operations
- Biosafety / PPE



High containment facility for HPAI research

New Facility for research studies – the immune system
studies of the efficiency of vaccines

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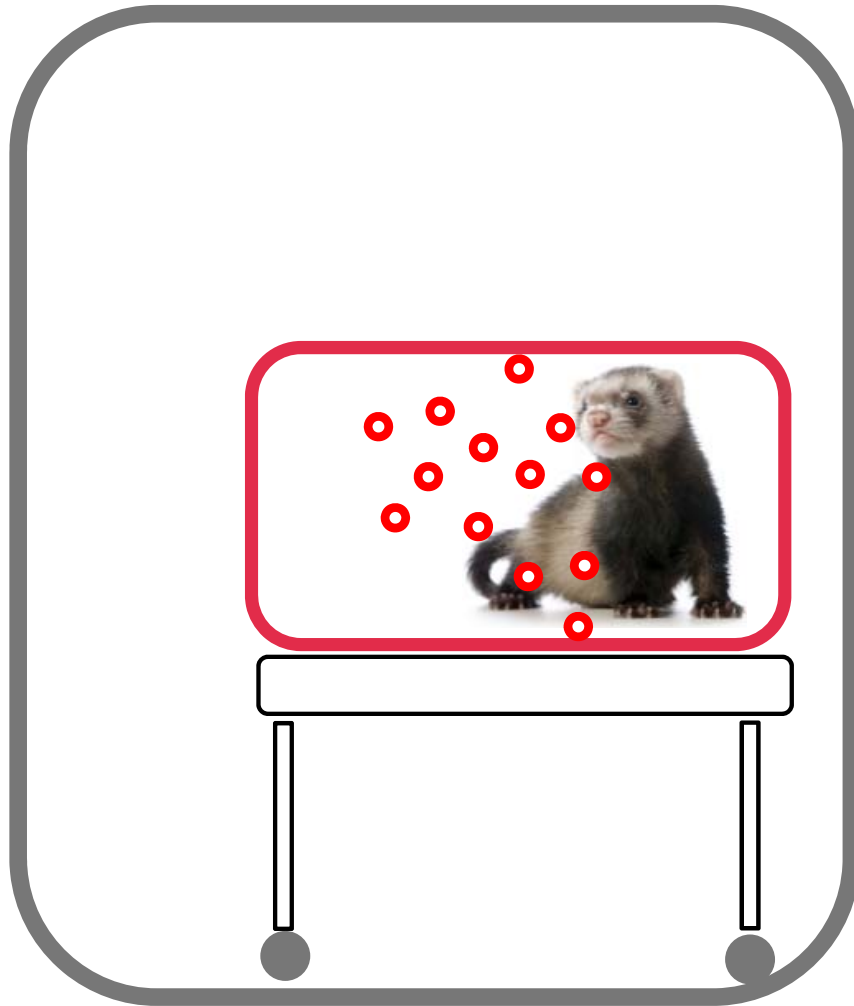
540



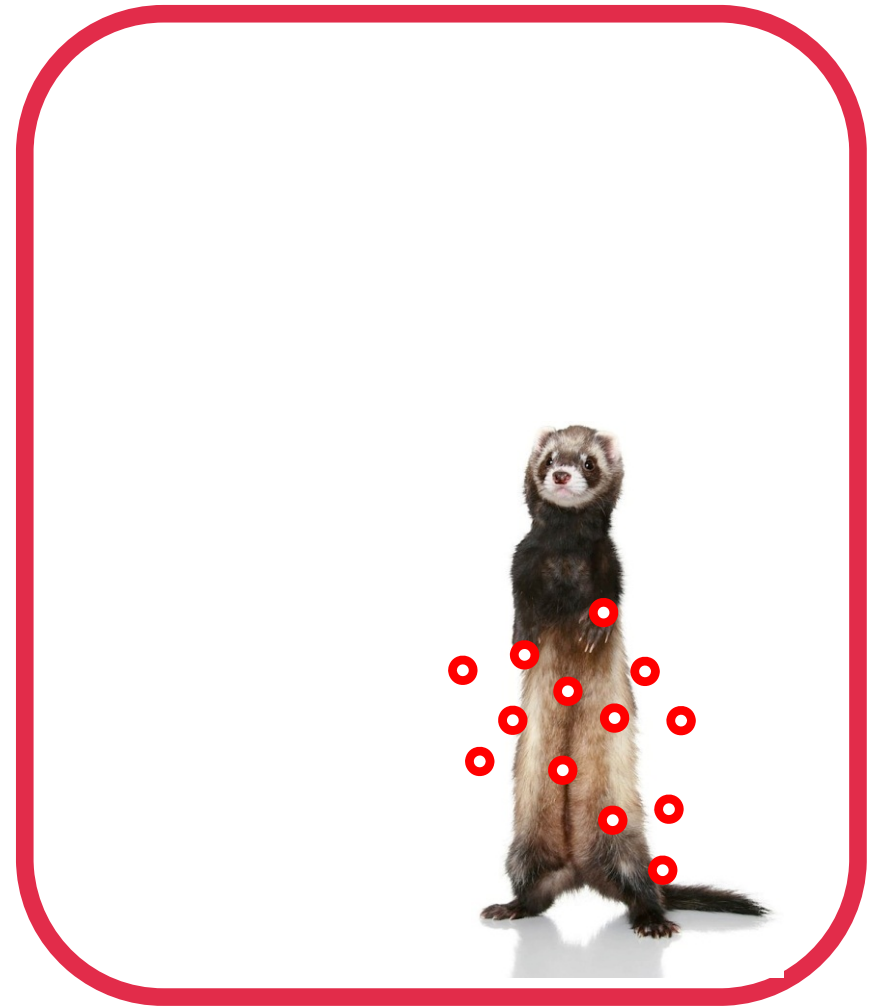
Housing of ferrets?

"Keeping them in or out"?

Animal housing and barrier principles



Primary barrier **CAGE** principle



Primary barrier **ROOM** principle

Regulations on Containment Animal research work with HPAI

*“Infected material including any animal is to be handled in a safety cabinet or isolation or **other suitable containment**”*

DIRECTIVE 2000/54/EC ,Annex V



*“Loose-housed animals infected with HPAI strains must be contained within **BSL-3-Ag facilities**”*

BMBL, Section VIII-E: Viral Agents



The starting Point principle Animal holding in IVC caging systems



The starting point Cage system evaluations for ferrets



Modified Ferret Cage



Ferret containment system / Cage

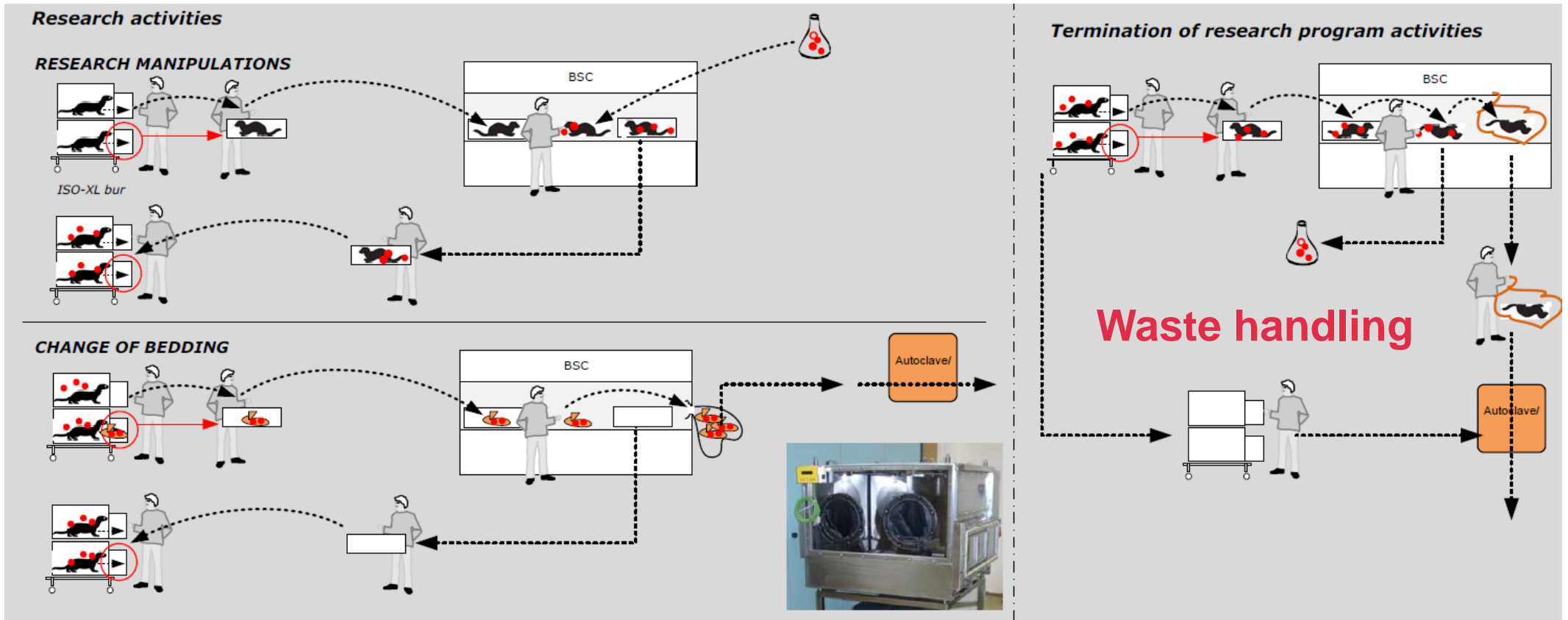
Transport module



Cage system evaluations for ferrets

Workflows & operations studies

Research activities, work flow & Operations



Bedding change activities, work flow & Operations

Animal welfare

European vs US housing standards



>600g



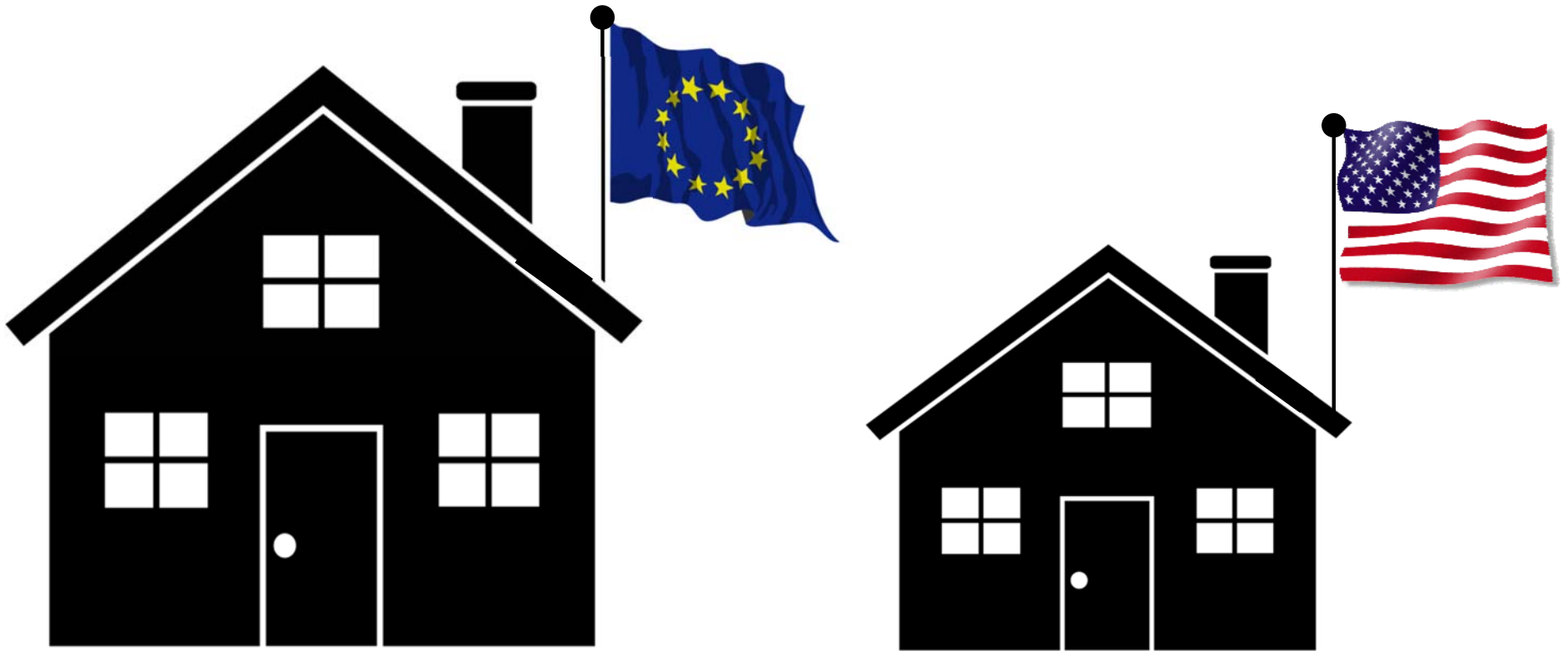
**Minimum
3000 cm² per animal**



**Minimum
1400 cm² per animal**

space

Comparison of US and EU animal housing standards & sizes

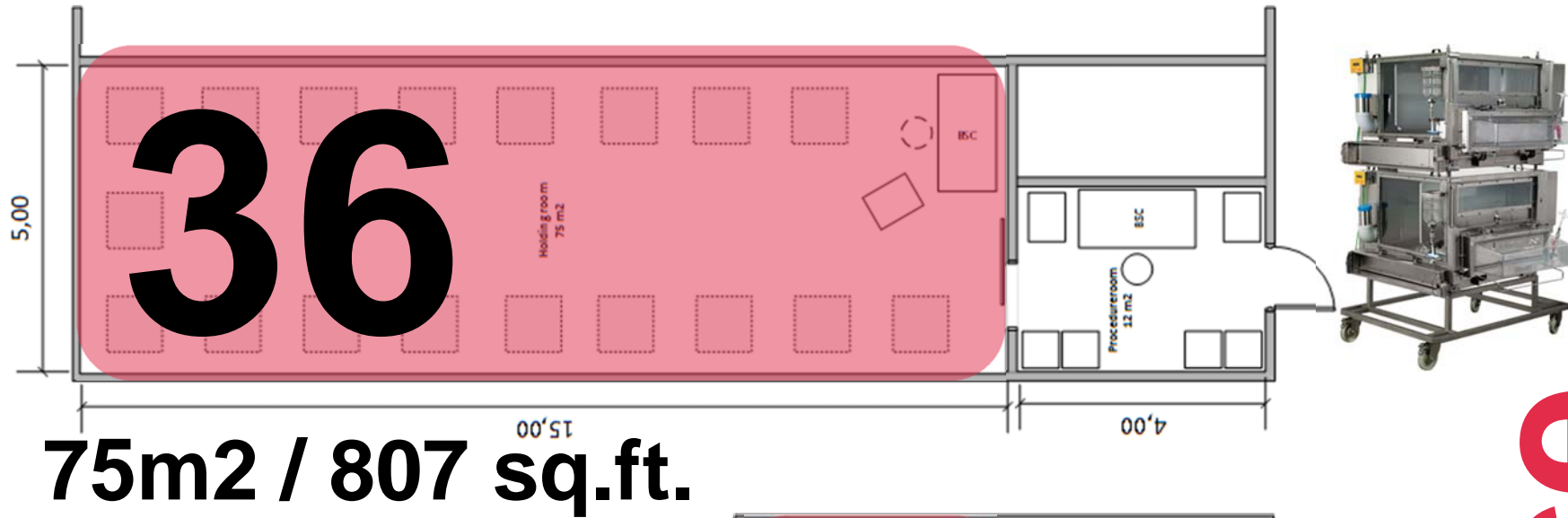




Space
Ergonomics
Welfare
ENTRY / EXIT
PPE & Risk

Challenges

Cage systems vs loose housed animals



75m² / 807 sq.ft.



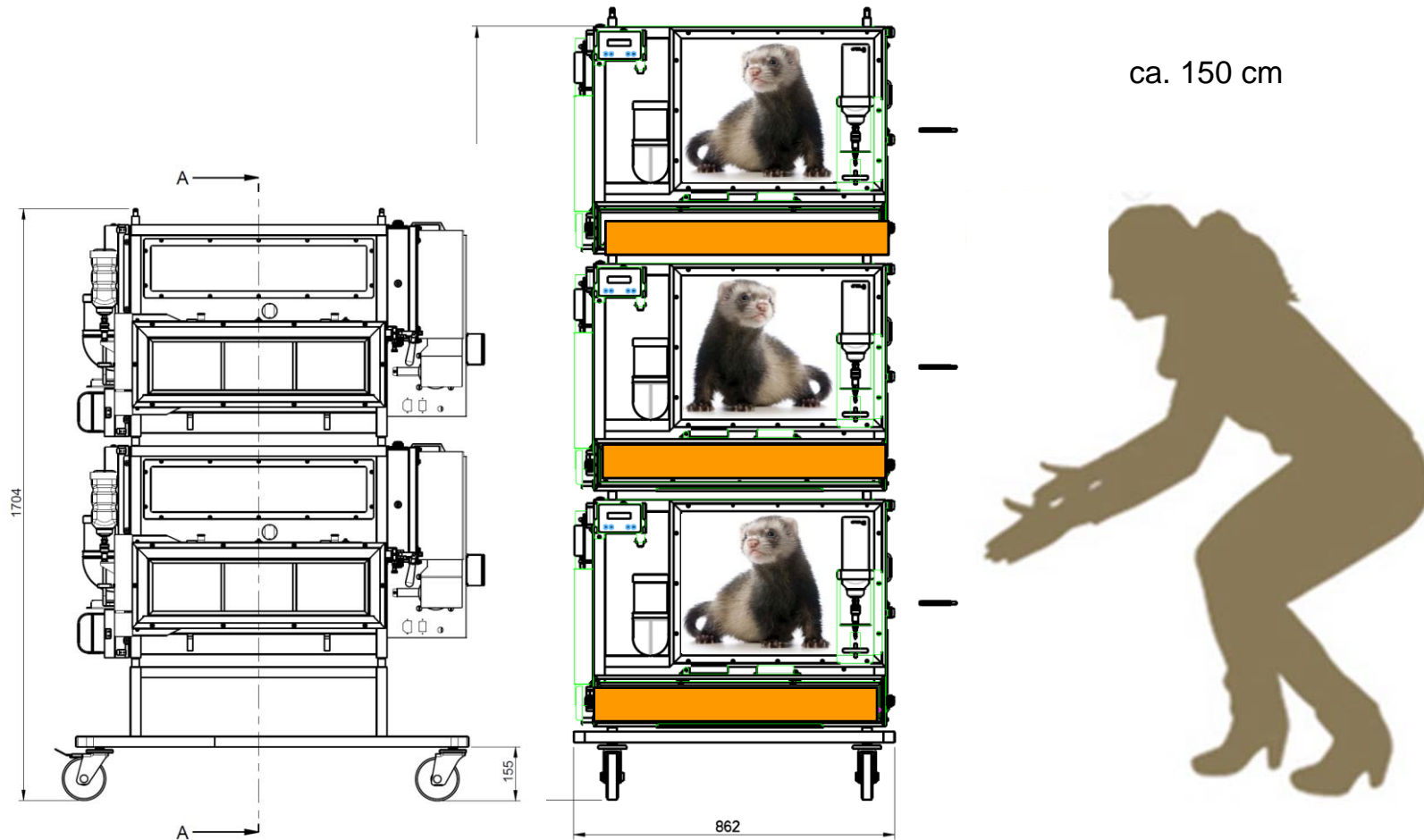
24m² / 258 sq.ft.

space

Challenges

Cage systems vs loose housed animals

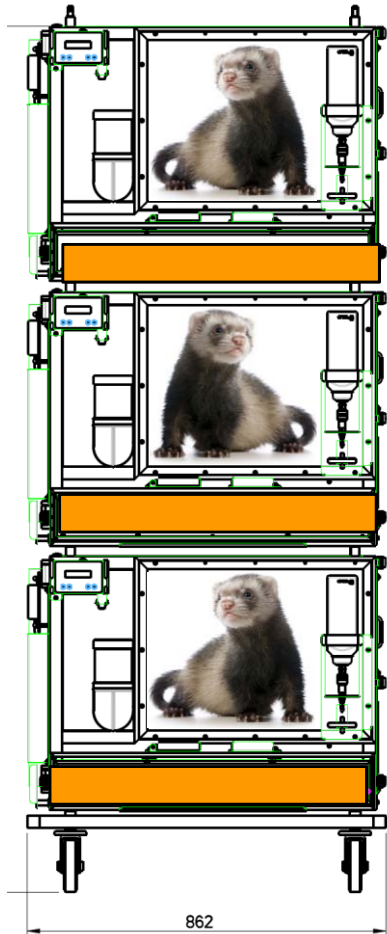
- Studies of ergonomics & work operations



Ergonomics

Challenges

Cage systems vs loose housed animals



welfare

Authorities approach & position

We may approve a principle where the room provides the primary containment for your facility....

BUT we may require a more comprehensive level of PPE and respiratory protection, perhaps even a fresh air supplied system.....

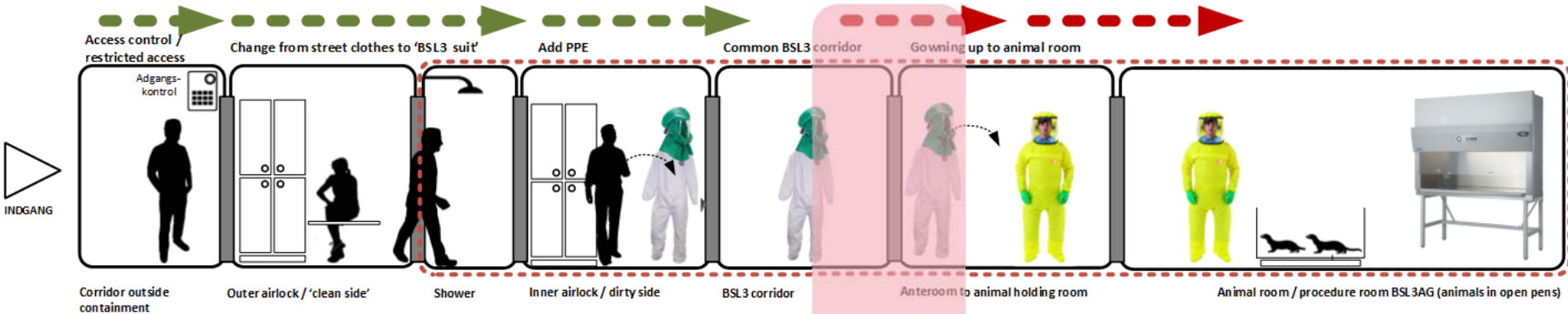


PPE

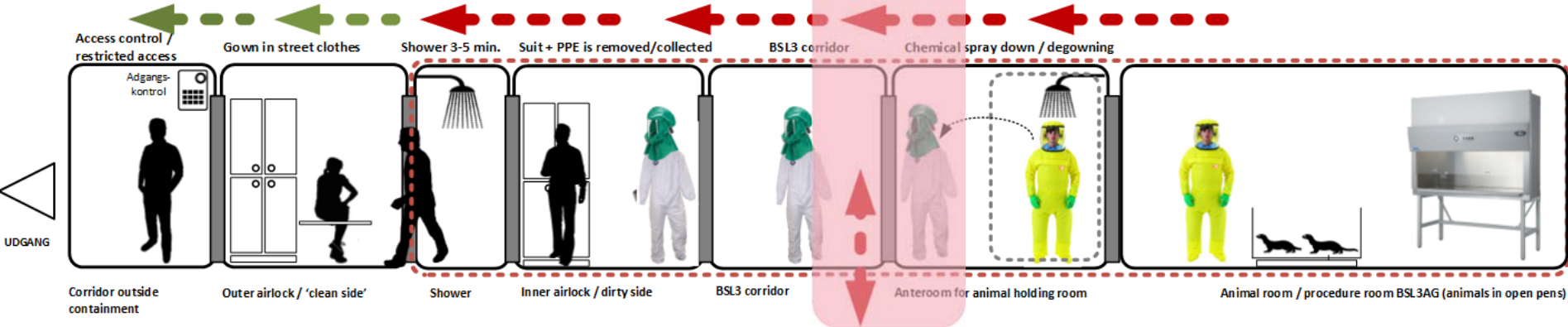
Challenges

Principle diagrams for entry and exit of facility

ENTRY

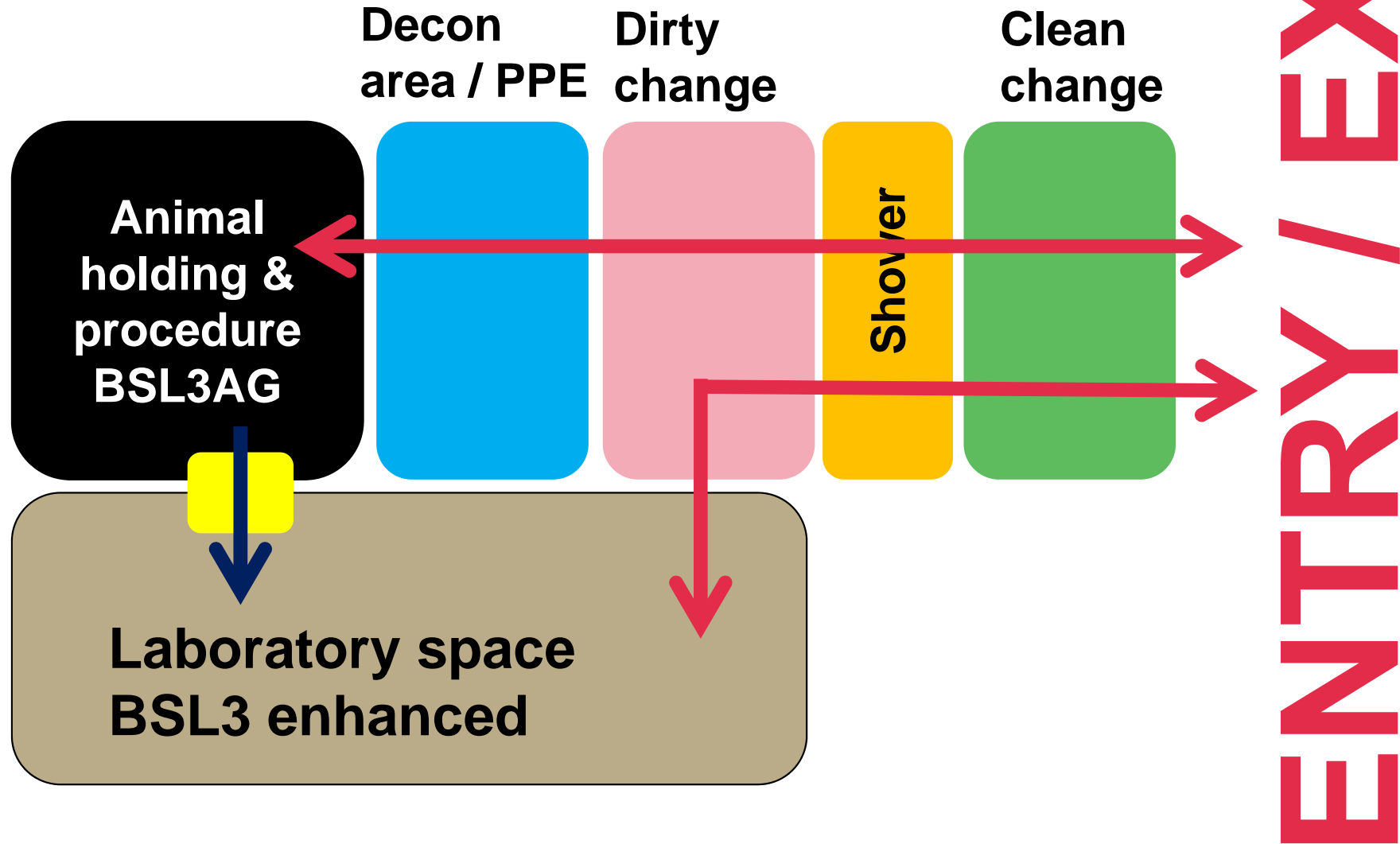


EXIT

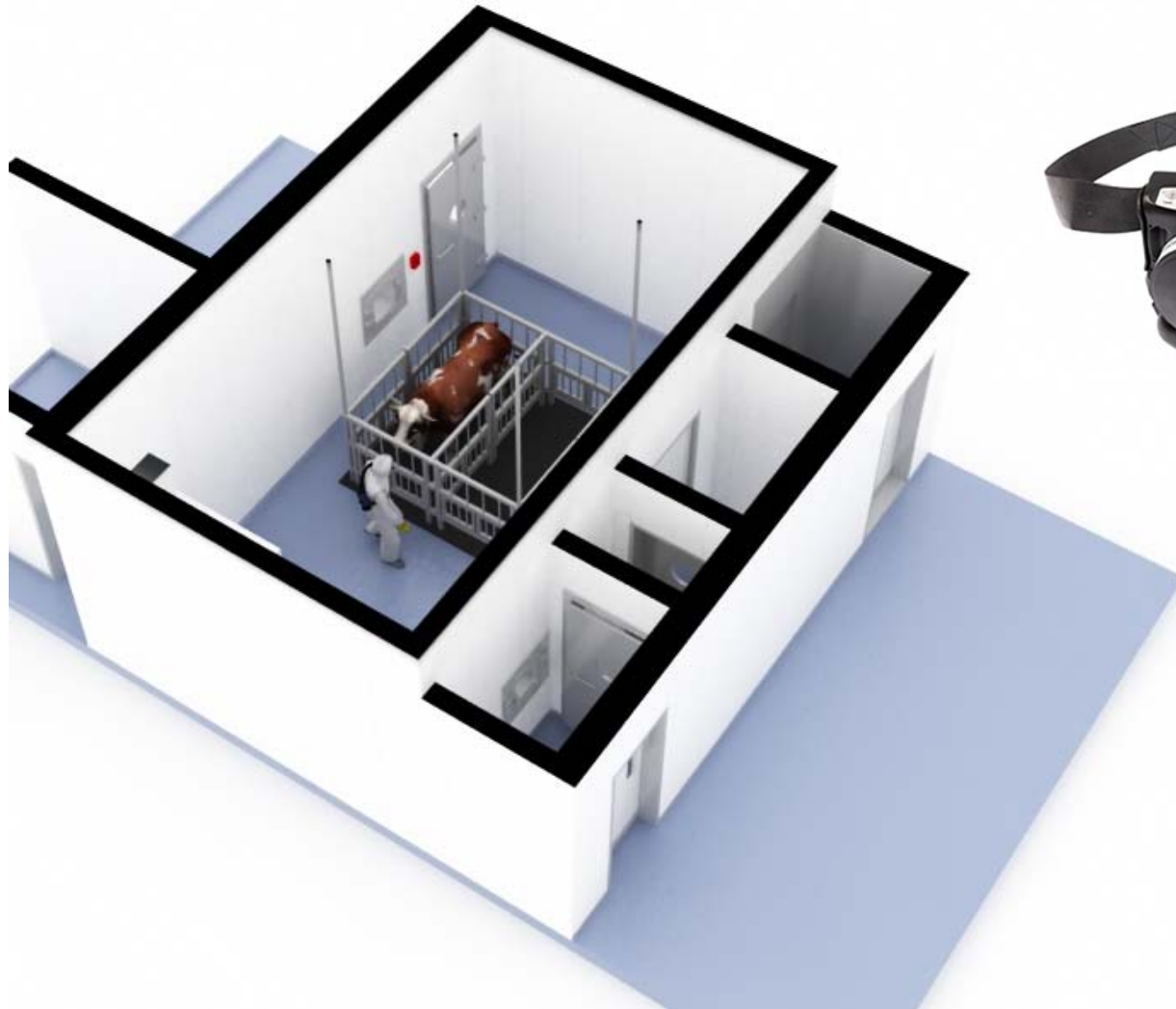


Challenges

Principle functional relation diagram



Reference facilities – large animal rooms – primary containment



Reference facilities **animal welfare** Cage systems vs loose housed animals



Summing up Pros and Cons

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	Space need	Ergonomics	Welfare	PPE	Entry/Exit	Workflow & operations
Primary containment caging	●	●	●	?	?	●
primary barrier facility design	●	●	●	?	?	●

Summary & Conclusions

Keeping them in or out?

- It has been essential to perform a thorough, holistic risk evaluation of all relevant parameters (worker safety, PPE, animal welfare, work operations)
- A high number of single caged / isolated ferrets tend to be a challenge in work load and time consumption – and the animal welfare requirements in Europe are not really compatible with the system
- In cases with a high number of research animals a primary barrier facility approach may be a more transparent principle
- However – it may consequently require a more extensive level of PPE – depending on the country specific regulations and the interpretations of them



Thank you for your attention!



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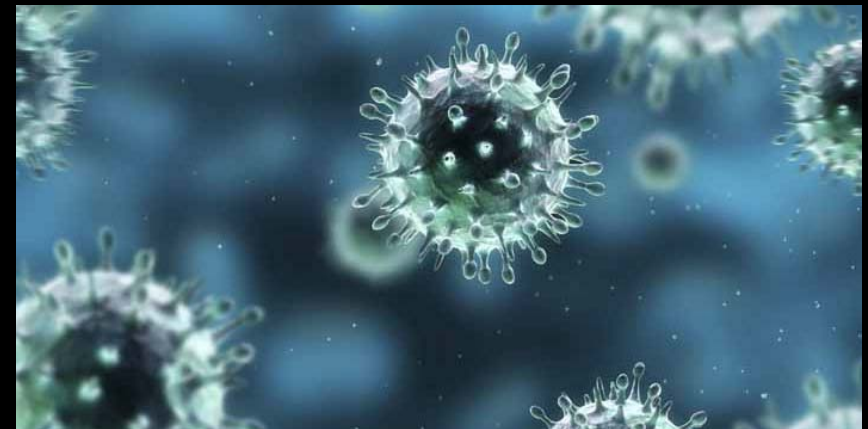
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