Challenges of cross-border cooperation in wild boar management

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GF-TADs
GLOBAL FRAMEWORK FOR THE PROGRESSIVE CONTROL OF TRANSBOUNDARY ANIMAL DISEASES

Food and Agriculture Organization of the United Nations

World Organisation for Animal Health

Funded by the European Union

Standing Group of Experts on African swine fever in Europe
under the GF-TADs umbrella

Twenty-third Meeting of the Standing Group of Experts on African swine fever in Europe (SGE ASF23)

Transboundary cooperation in African swine fever control

Transboundary cooperation in ASF control

Have same strategy on both sides of the border

If approach is unsuccessful,
it can be corrected

If approach is successful,
it can be continued

What matters is the level of coordination, rather than how you do and what you do.

Characteristics of epidemics in wildlife populations

Complex situation: interaction of many factors
(infected animals, animal density, hunting activities, agriculture, etc.)

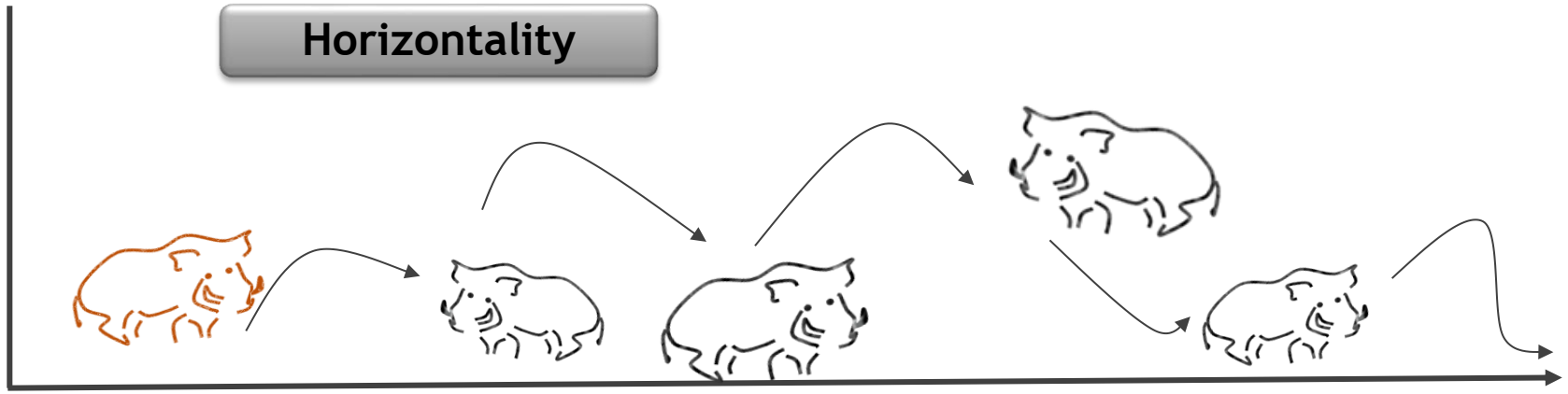
Obscure situation: not all important parameters are known *(e.g. animal density, animal movements, etc…)*

Dynamic situation: *permanent change of parameters (e.g. seasonal influences, fluctuation in animal number)*

Influencing one factor can cause unpredicted side-effects

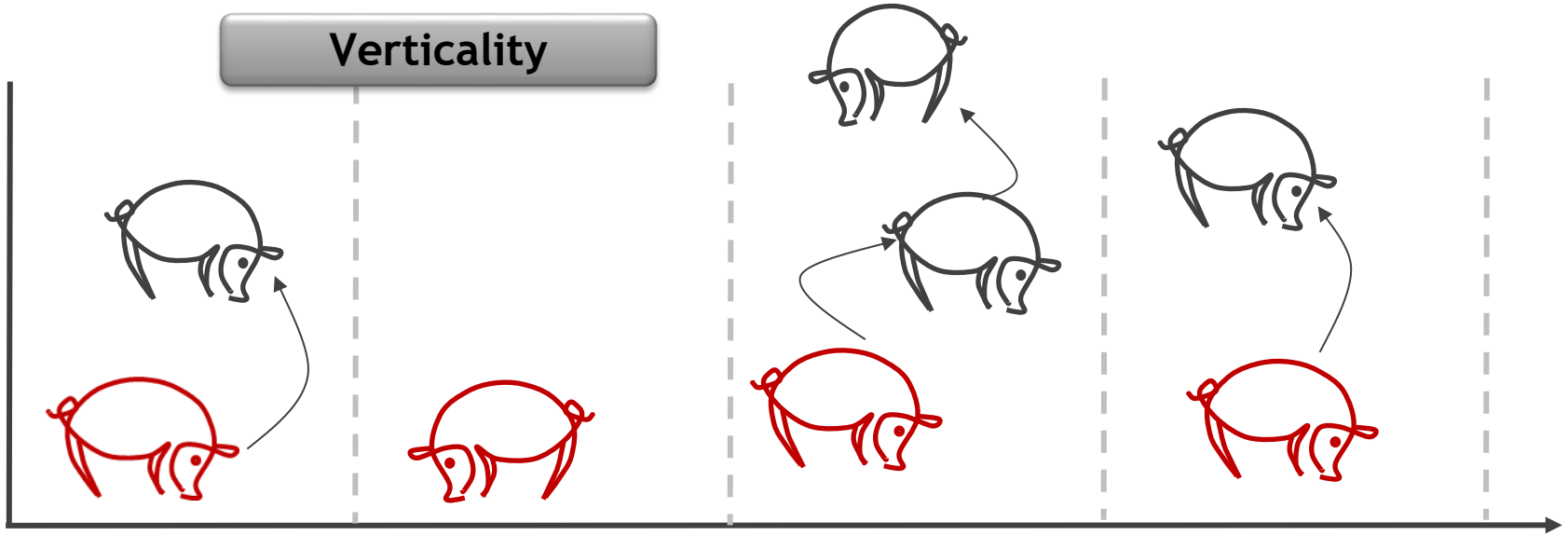
Features of epidemics

A



Interrupting the chain of infection

B



Avoiding the introduction of ASF virus

The 4 phases of a transmissible disease

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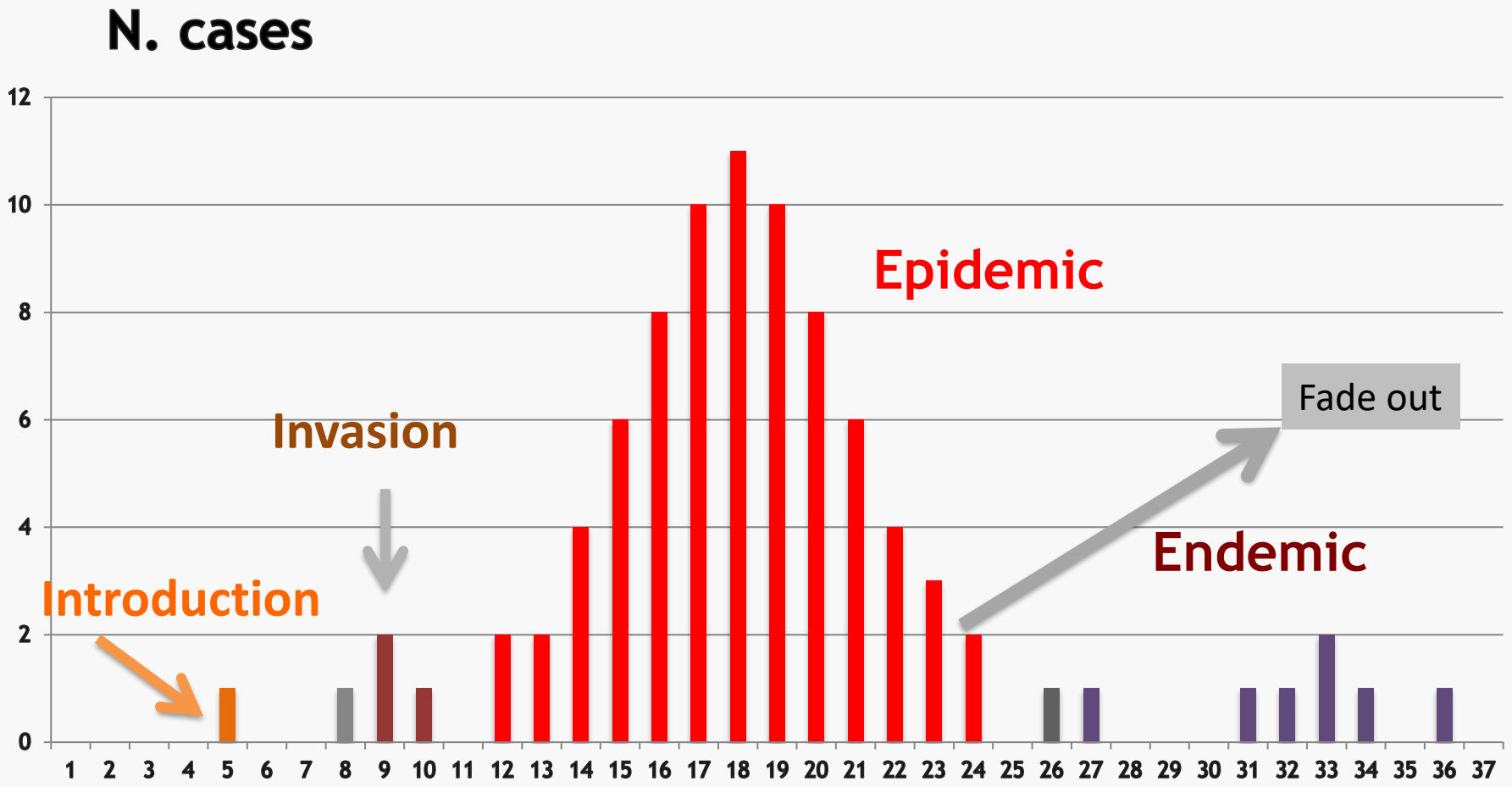
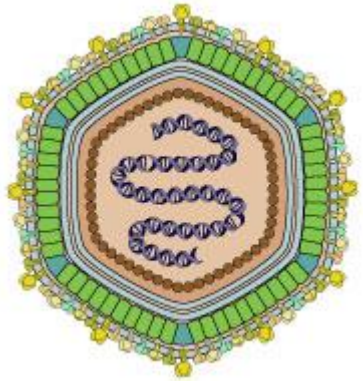
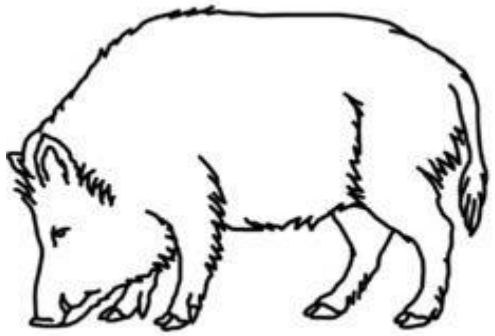


Guberti et al (2018): Handbook on African Swine Fever in wild boar and biosecurity during hunting; OIE/FAO (GF-TADs)

Which traits (main characteristics) of ASF can be influenced by disease control measures?



- An attempt to understand the epidemic from the side of the virus and the infection.
- An attempt to identify certain characteristics of the pathogen that could be used in disease control.
- **To think out of the box**
- A proposal for disease control in endemic areas



Persistency triangle

Three virological traits

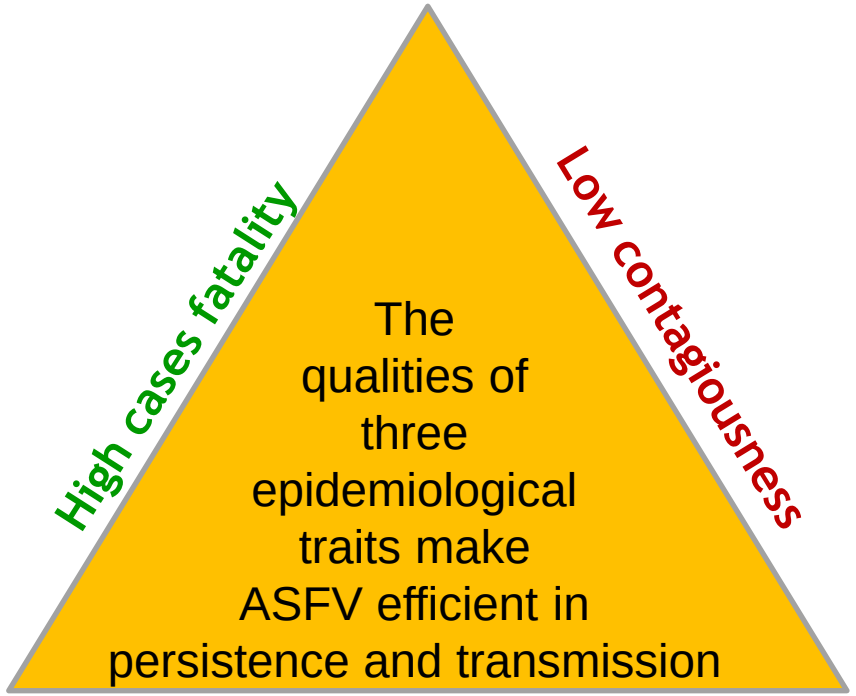
Low contagiousness: prevents fast and complete depletion of the host population

High case fatality: makes the virus available in the form of carcasses

High tenacity: ensures long term virus persistence in the environment

The interaction of these three parameters maximize local persistence and limits fast geographical spread

Chenais E, Depner K et al. 2019



Which are the traits that can be influenced by disease control measures?

Virological traits	Epidemiological consequences	Influenceable through control measures
High case fatality *(High virulence)*	**High virus load in carcasses**	**NO**
Low contagiousness *(Low infectiousness)*	**Low transmission rate** *10%... 20%... 30%... ???*	**NO**
High tenacity	**Long exposure time** *(carcasses)*	**YES/NO**
	Contact rates *(within groups & between groups)*	**YES/NO**

With which adjusting screws, one can optimize the system?

- *Time*
- *Space*

ASF control and eradication

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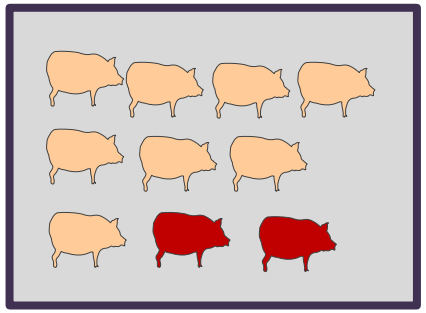
Key characteristics of ASF:

- low contagiousness, slow spread, few secondary infections
- no transmission by wind or insects, **(???)**
- **site fidelity** (stable disease / habitat disease),

DP: stable disease

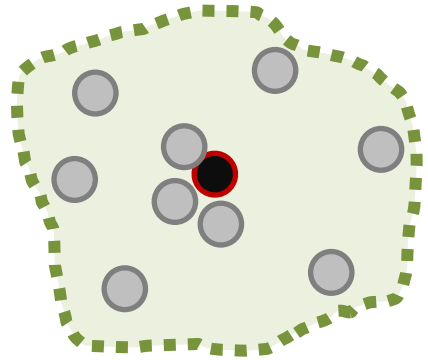


Measures:

1. Standstill
2. Culling
3. C&D

Successful approach!!

WB: habitat disease



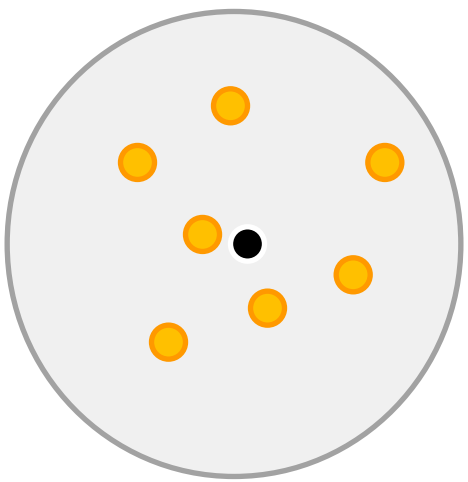
Measures:

1. Standstill (no disturbance of WB, no hunting, electrical fence, (feeding)
2. (Trapping)
3. Disposal of carcasses

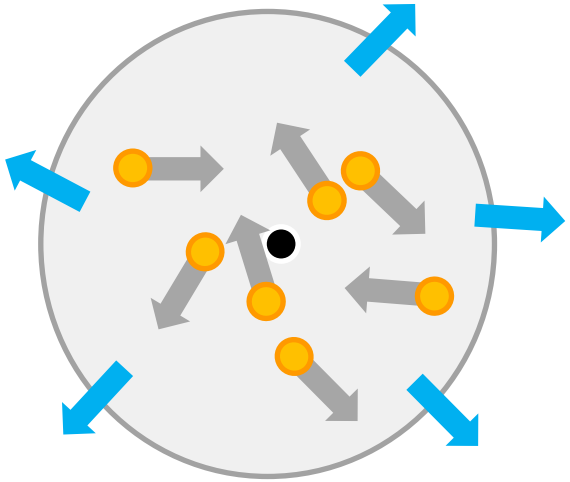
"Virtual stable" in forest

Exposure opportunity

Marbles in motion



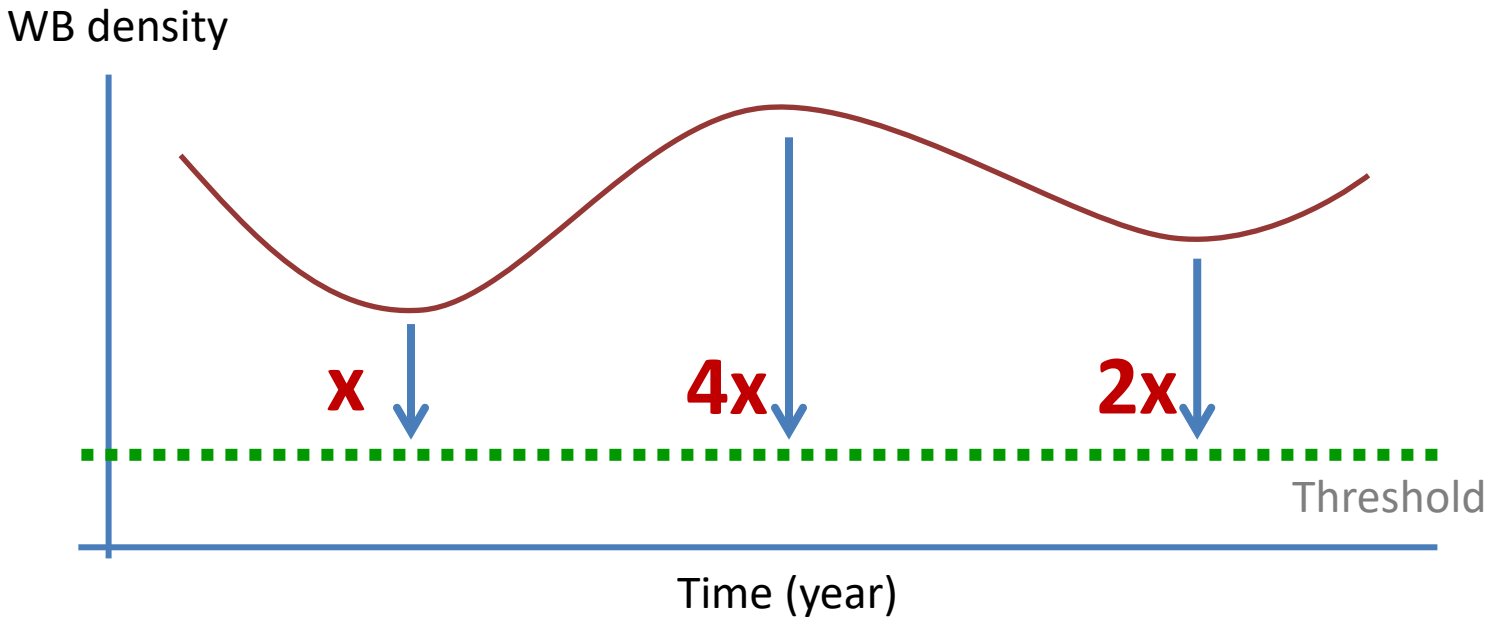
Contact rate +



Contact rate +++

Challenge: Speed up virus perpetuation in the population without promoting the spread of disease

Sesonality



- **Estimating the threshold:** ***easy to come up with a theoretical figure***
- **Reaching the desired threshold:** ***difficult (impossible???)***

- ***The total number of wild boar is unknown and all estimates are wrong***
- ***Best is, do not disturb the animals***

Threshold elasticity

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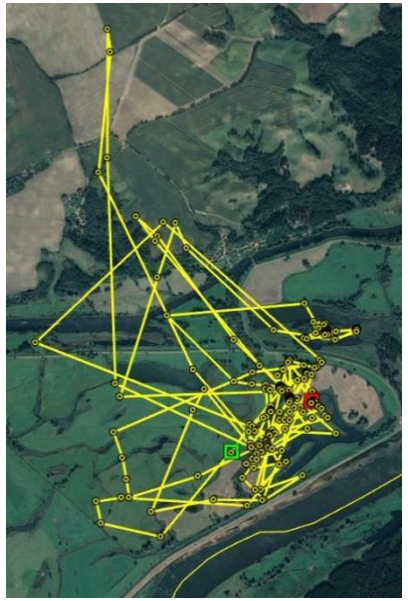
The threshold is not a fixed parameter



Dynamic habitat
lots of disturbance (e.g. hunting)
more contacts between WB and ASFV

Quiet habitat
no disturbance
few contacts between WB and ASFV

Influenced by several factors: e.g. season, hunting, food availability, biology, etc…

Susceptible population & threshold

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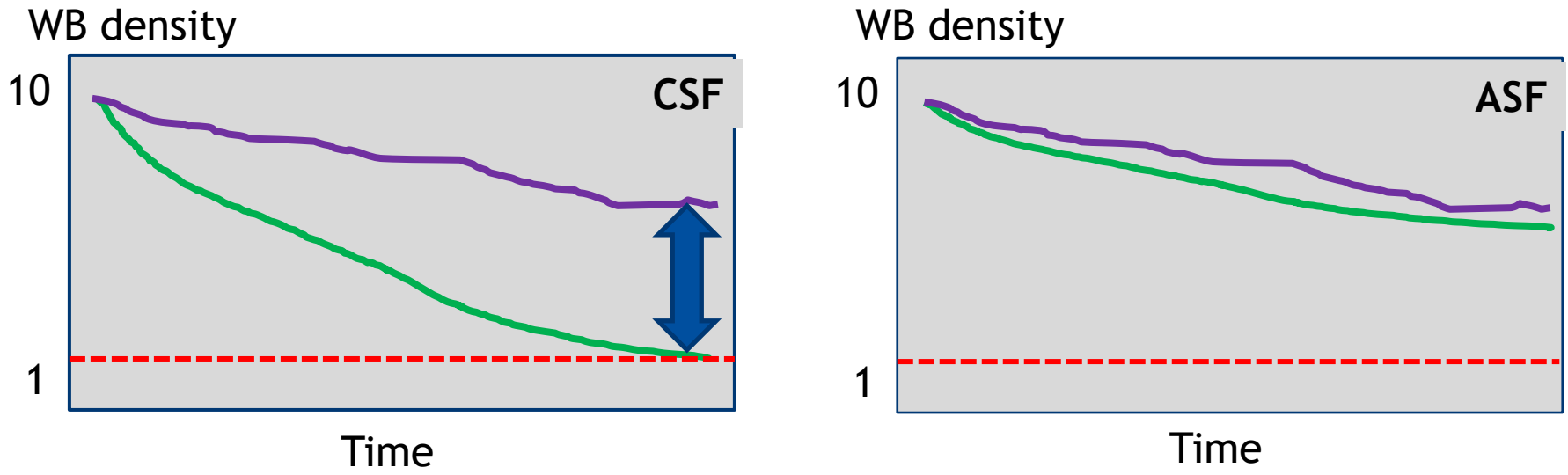
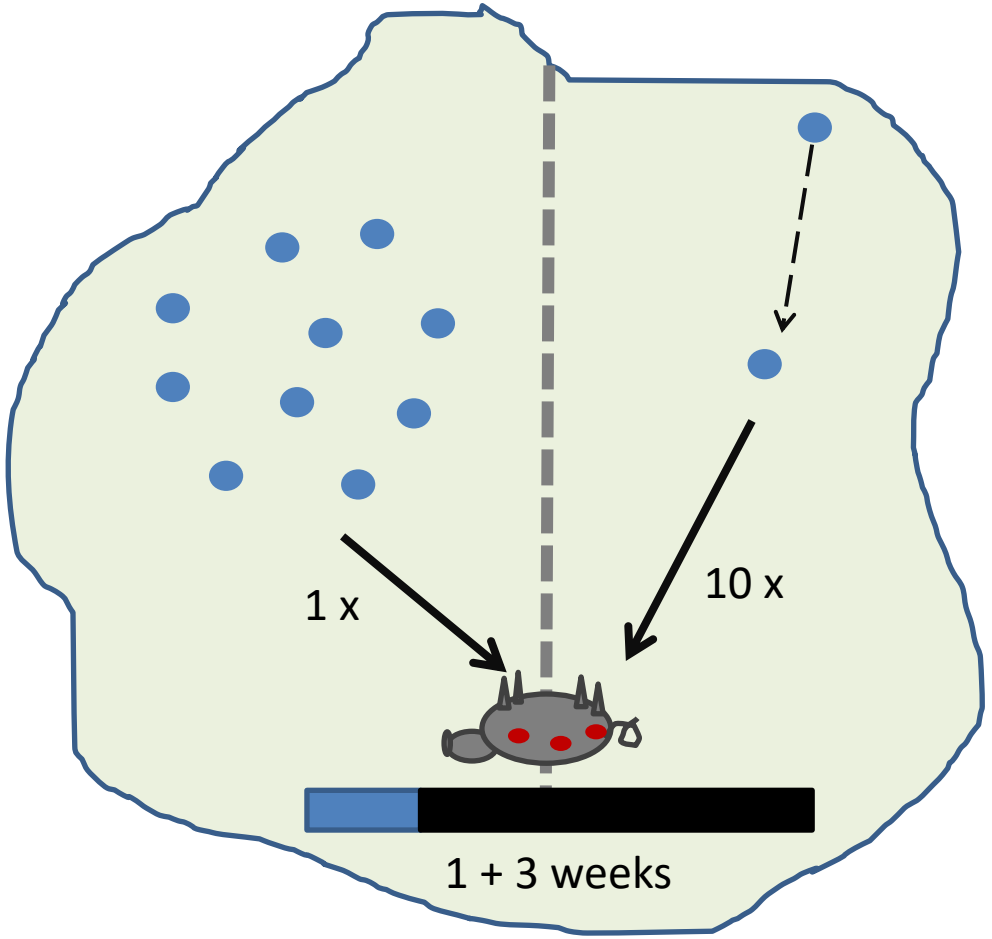


Total population
Susceptible population
Extinction

Oral vaccination

No vaccination

Exposure opportunity

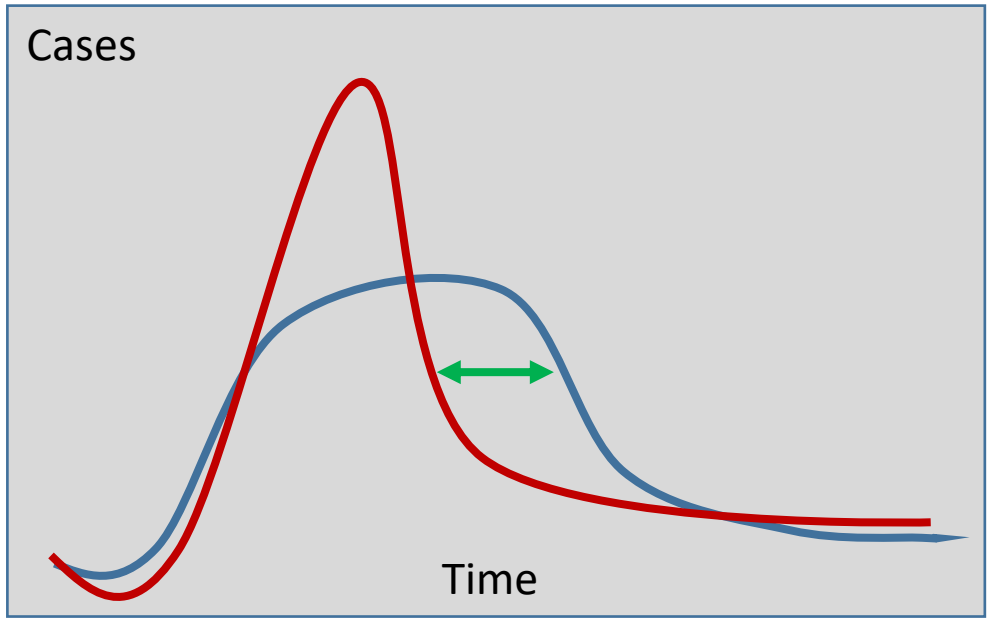


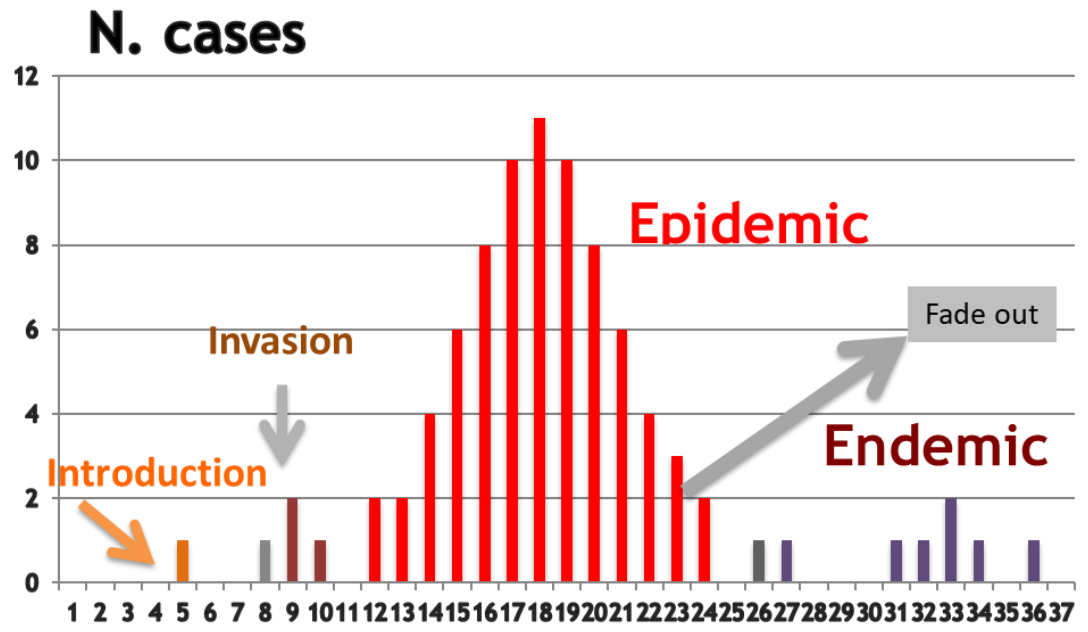
?

Carcass removal

- If carcasses will be timely removed, exposure opportunity will decrease -> less contacts
- If carcasses will NOT be removed, exposure opportunity will increase -> more contacts

Can we have two distinct epidemic curves that differ in time and can be influenced by our disease control measures?





Speeding up the epidemic without spreading the virus and increasing the infected area!

My conclusions

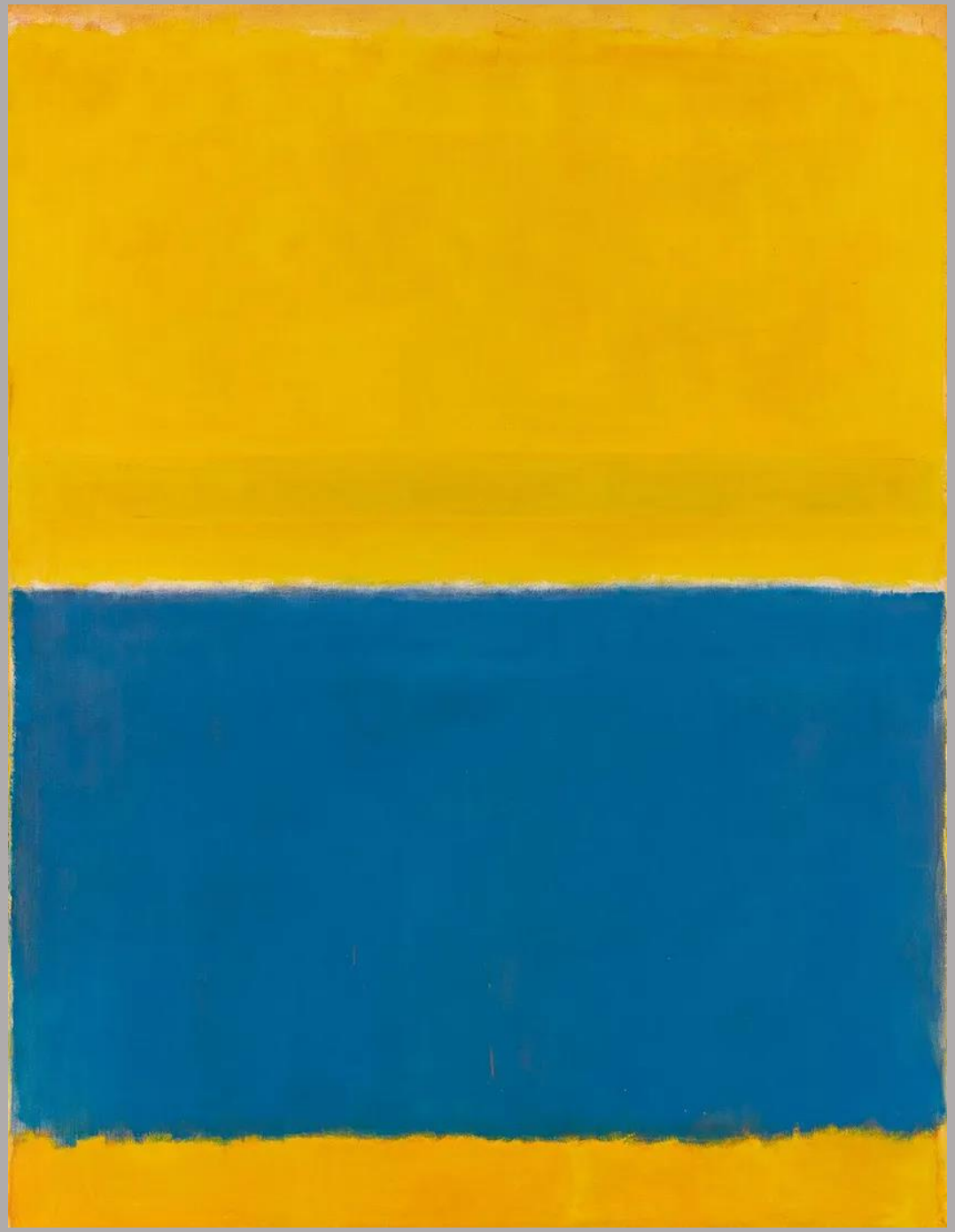
A) We must choose strategies that do not lead to the spread of disease out of infected areas but speeds up virus perpetuation within endemic areas.

B) We need a good early detection strategy for areas at risk (*enhanced passive surveillance*)

Fighting fire with fire without setting new fires

Handling an epizootic

- Acting under time pressure without analysing the situation
- Overdosing the measures without considering side-effects
- Underestimating the exponential course of the disease within a (breeding) herd or region
- Believing to know the right measures because no negative effects are (so far) evident
- Hiding behind the planning of projects
- Developing cynical reactions



Rothko captures the "MOMENTUM“ at the edges.... this is where everything happens and is decided.

In these tiny variations where the transitions of colors take place, lives a world of expressivity…

You may now also see some parallels with ASF.... tiny variations at the edges between host, environment and virus, for example, lead to significant changes in the epidemiology of the disease.

ASF is not a “disease”, it is a symptom of a more complex problem