

Epidemiological farm investigations

Subjectivity

HRP

K Depner
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Belgrade

The preconditions for a strategic approach for outbreak investigations and implementation of measures are based on the biology of ASF

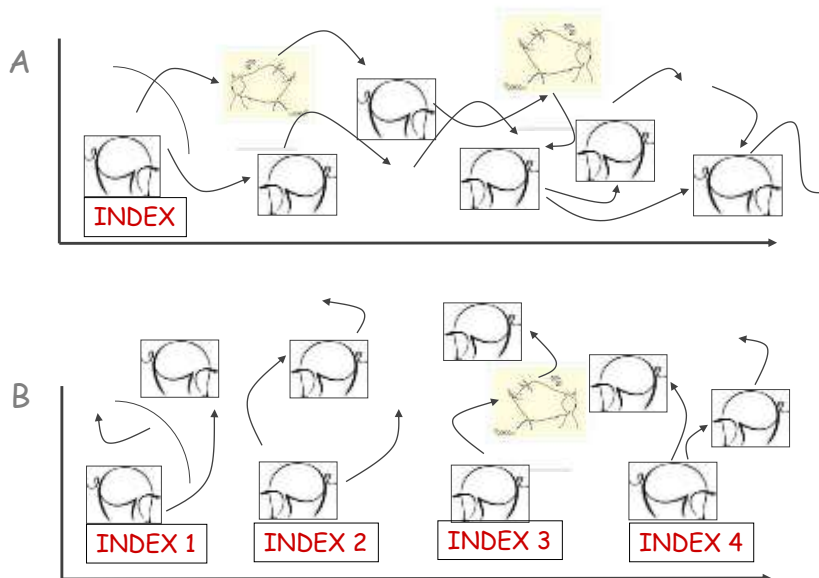
The following basic knowledge about ASF enables a strategic approach:

- Clinical disease (clinical course and clinical signs)
- Mortality/lethality
- Contagiousity
- Tenacity of the virus
- Ways of transmissions
- Human factors

Epidemiological enquiry

(AHL, Art. 57)

1. The competent authority shall carry out an epidemiological enquiry in the event of the confirmation of a listed disease.
2. The epidemiological enquiry shall aim to:
 - a) identify the **likely origin** of the disease and the means of its spread;
 - b) calculate the **likely length** of time that the disease has been present (**High Risk Period**);
 - c) identify **establishments and epidemiological units** therein, food and feed businesses or animal by-products establishments, or other locations....;
 - d) obtain **information on the movements** of animals, persons, products, vehicles, etc. which could have spread the disease agent during the relevant period preceding the notification (**High Risk Period**);
 - e) obtain information on the likely spread of the disease in the **surrounding environment**, including the presence and distribution of **disease vectors**.



Aim of the epidemiological work

Tracing backward

- **How, where, when did the pathogen has been introduced into the holding**
- Reconstruct the spread of the disease within the holding
- Estimate the HRP

Tracing forward

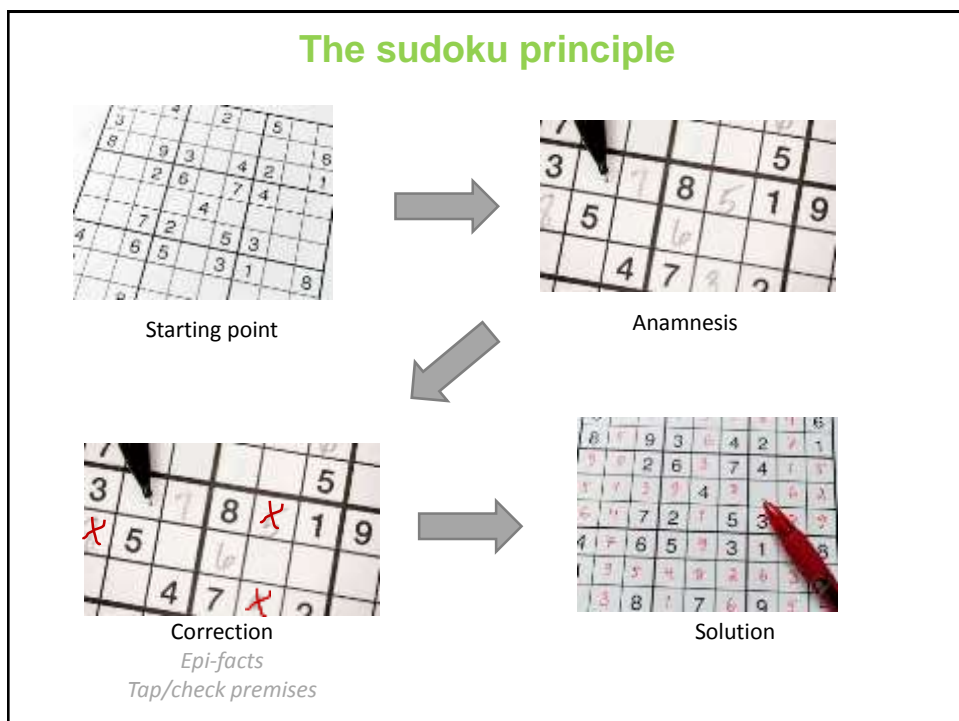
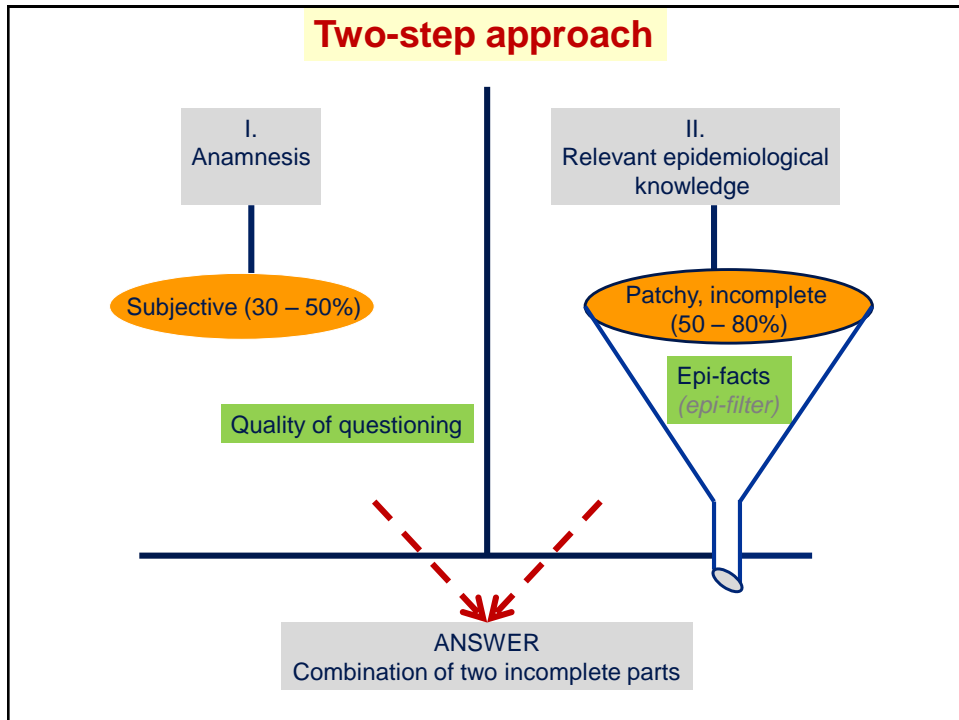
- Where did the pathogen escaped,
- Identifying of contacts...

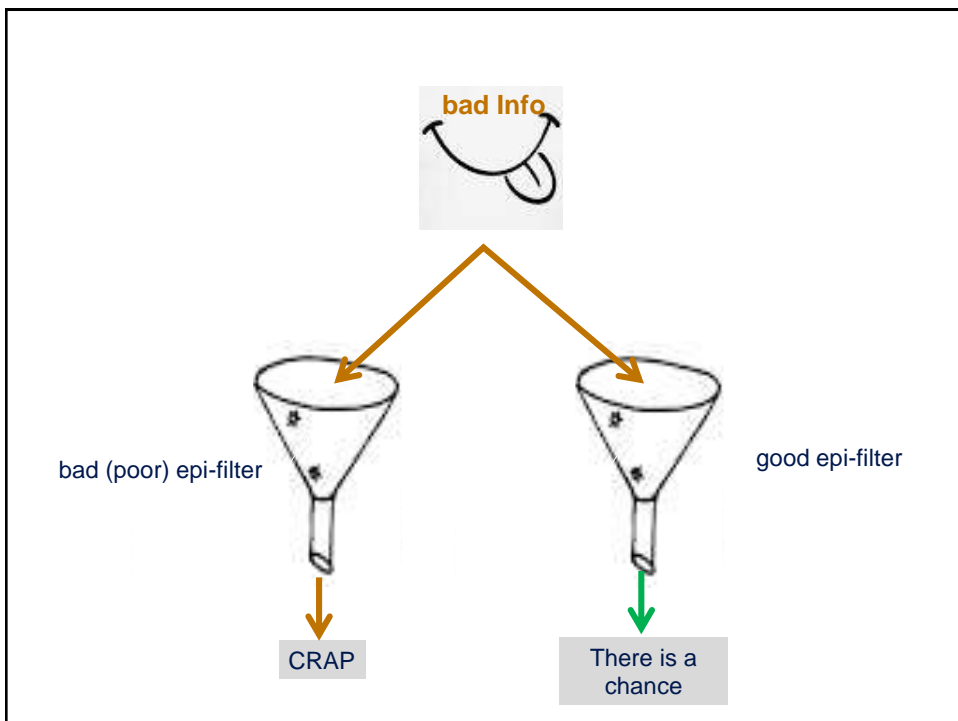
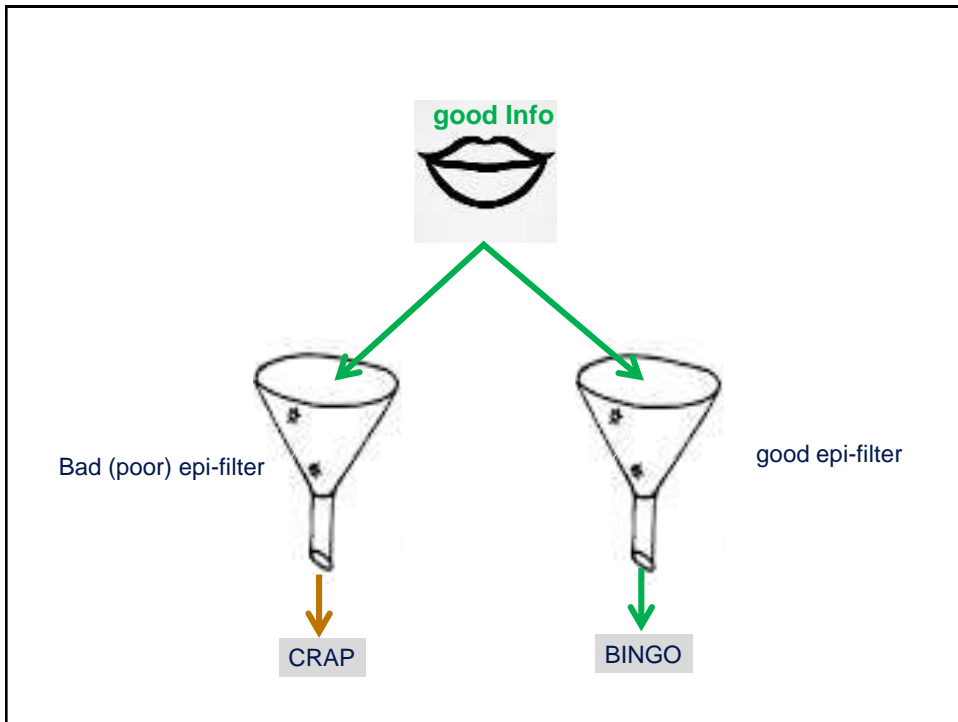
(not scope of this ppt.)

How did the pathogen entered the holding?

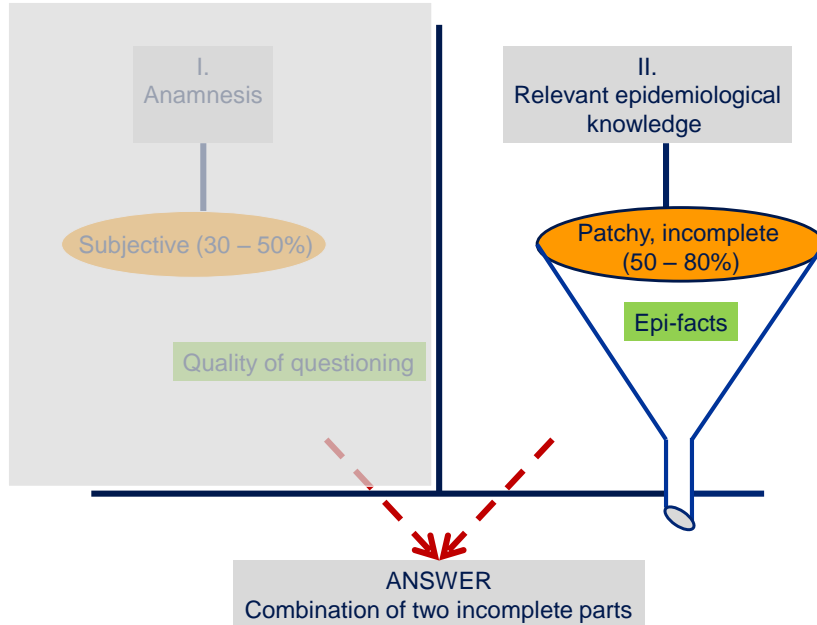


A hypothesis-based practical guide for „tracing backward“





Two-step approach



Epi-facts

- 1) Tenacity
- 2) Routes of infection
- 3) Susceptibility
- 4) Contagiousity
- 5) Excretion,
- 6) Immunity (individual/heard)
- 7) Clinical course (individual/heard)
- 8) Case fatality, mortality, morbidity
- 9) Latency, persistence, carriers
- 10) Diagnostic information
- 11)



- A) Postulate different hypothesis
- B) Address each hypothesis separately
- C) Exclude hypothesis one by one

Hypothesis for:

- **Way of entrance:** How (by which ways) did the pathogen entered the holding
 - **Biosecurity check**
- **HRP:** When did the pathogen entered the holding (date of entrance)

Epidemiological road map

Hypothesis

Likely origin - way of entrance

- H1: Trade of pigs
- H2: Contact with wild boar environment
- H3: Swill, contaminated food
- H4: Others (people, vehicles, instruments...)
- H5: Vectors (ticks, insects, ???)
- H6 ...

Toolbox

- Map of farm (village)
- Laboratory results
- Timeline of clinical events (Vet activities)
- Mortality /morbidity data
- Record of movements (animal, persons, vehicles, equipment...)
- Etc...

Likely escape (secondary infections)

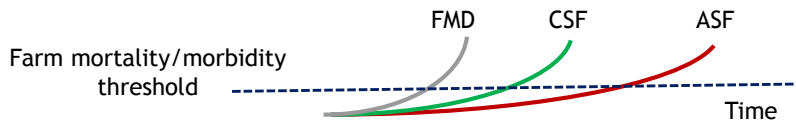
HRP Date of entrance

- H1: <50: 1w
- H2: <150: 2-3w
- H3: >150: >4w
- H4...

Biosecurity check

- Hardware
 - Buildings
 - Filters
 - Fences
 - ...
- Software
 - Management
 - Awareness
 - ...

High Risk Period (HRP)



Low contagiousity => low (initial) mortality
ASF remains undetected in large pig farms (below the normal mortality threshold)

HRP -> farm size

- *back yard: rather short*
- *large farm: rather long*

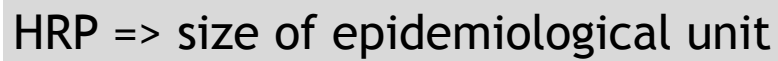
Magic of 150

Sociologists have found out that the magical upper limit of natural organizational ability of humans is at maximum 150 people.

It is difficult to oversee and control more than 150 individuals. For "units" larger than 150 you need a good functioning operational system...

In analogy, farms with over 150 animals are more difficult to be controlled... a good functioning farm management is needed.

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FLI
Bundesforschungsinstitut für Tiergesundheit
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Farm size	HRP
Small/back yard (<50)	1 week
Medium/small commercial (<150)	2-3 weeks
Large /industrial (>150)	> 4 weeks

Lab results can be used for indicating the duration of infection

<i>PCR</i>	<i>Ab-Test</i>	<i>duration of infection (estimates)</i>
pos	neg	<12d (or the animal died/sampled before 12d)
pos	pos	>12d (or the animal died/sampled after 12d)
neg	pos	>24d (or the animals was sampled after 24d)

Likely origin - way of entrance

H1: Trade of pigs
H2: Contact with "wild boar"
H3: Swill, contaminated food
H4: others (vehicles, instruments...)
H5 vectors
H6 ...



Biosecurity check

- Hardware
 - Buildings
 - Filters
 - Fences
- Software
 - Management
 - Awareness

Hypothesis	Biosecurity check		Findings	Likelihood
	Hardware	Software		
Wild boar	Building Fence Gates Sanitary filters Disinfectants etc	Personnel Human activities Management Work flow etc	No contacts with wild boar	excluded
Contaminated food			Swill feeding	+++
Trade			No trade	excluded
Fomites			No sanitary filters	++
Vectors (ticks)			No vectors	excluded

