



## RISK-BASED MEAT INSPECTION



*Madalena Vieira-Pinto*

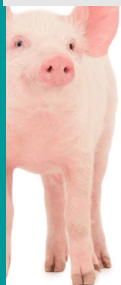
(DVM, MSc, PhD, Diplomate European College Veterinary Public Health)

15<sup>th</sup> May 2023

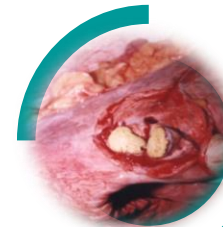
[mmvpinto@utad.pt](mailto:mmvpinto@utad.pt)



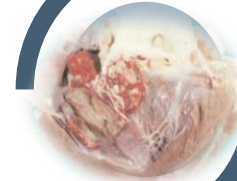
## Risk-based MI



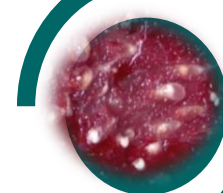
Meat inspection was originally designed in Europe in the late 19<sup>th</sup> century and was almost entirely **aimed** at protecting the public's health (Jacobs et al., 2023) from **zoonotic disease** causing distinct gross pathological lesions, identified by specific procedures during PMI



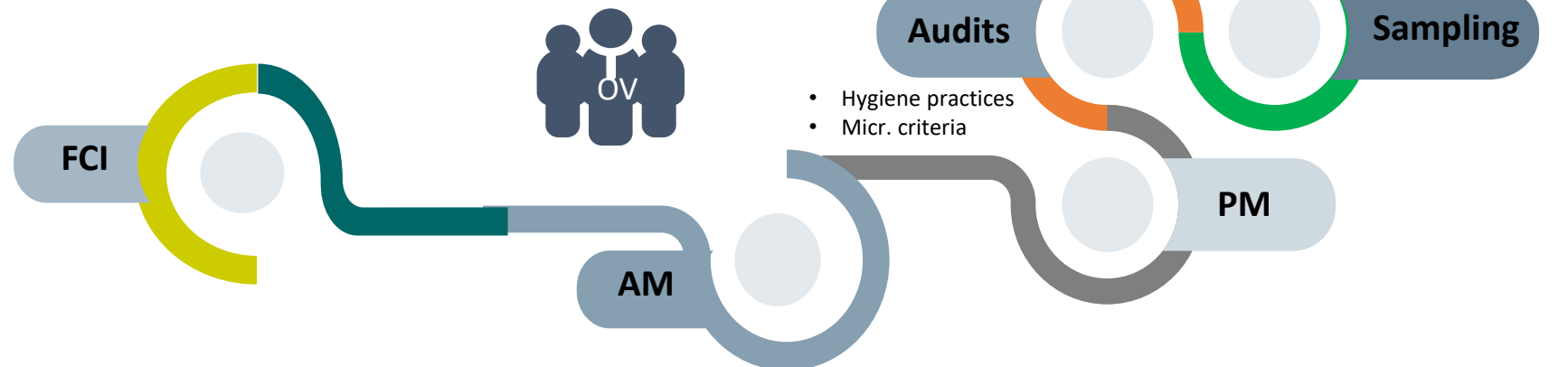
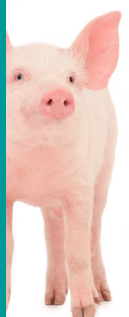
Tuberculosis  
e.g. Incision lungs Ln



Erysipela infection  
e.g. Opening heart



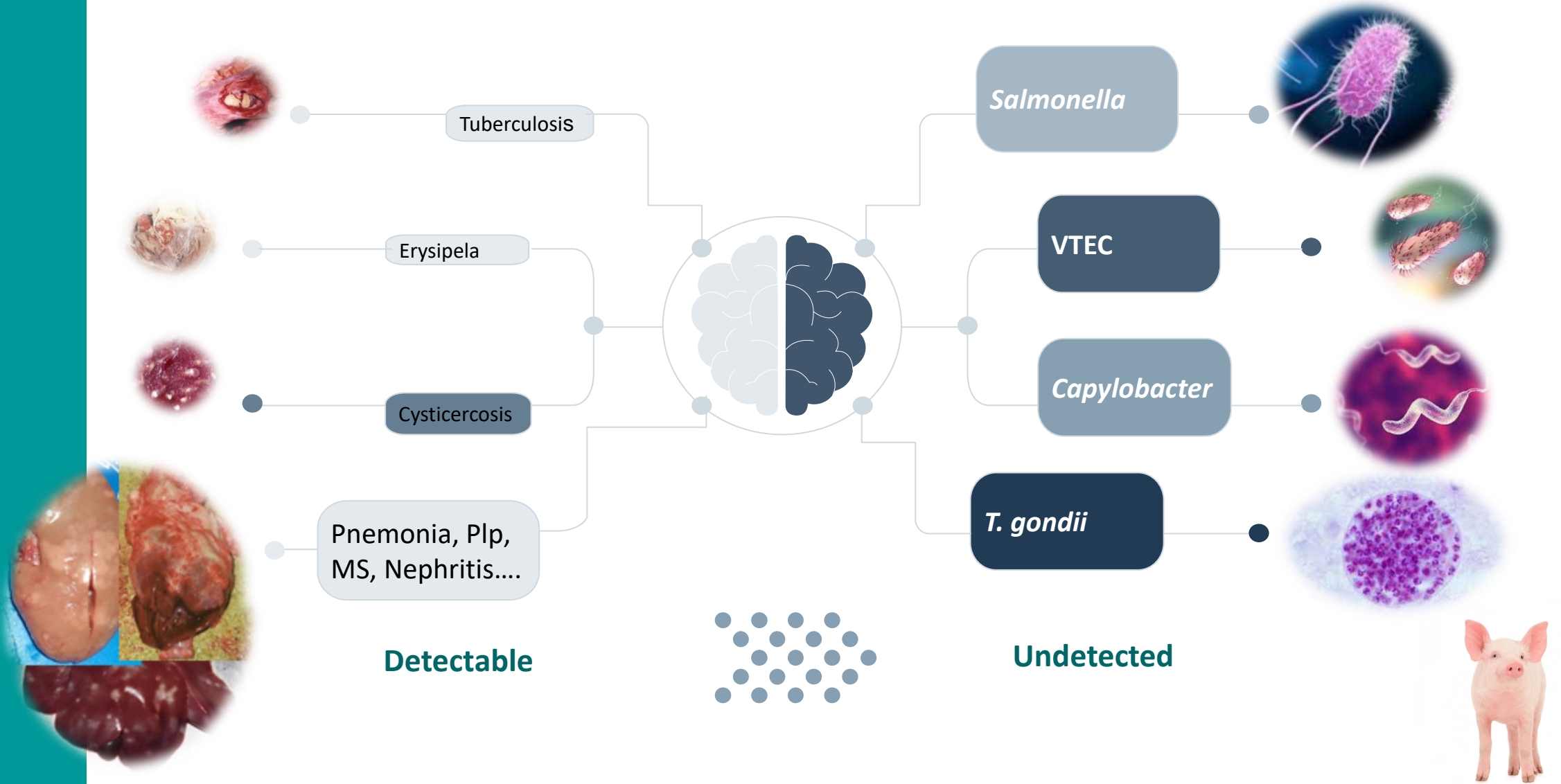
Cysticercus (*T. solium*)  
e.g. Incision  
heart/other muscles



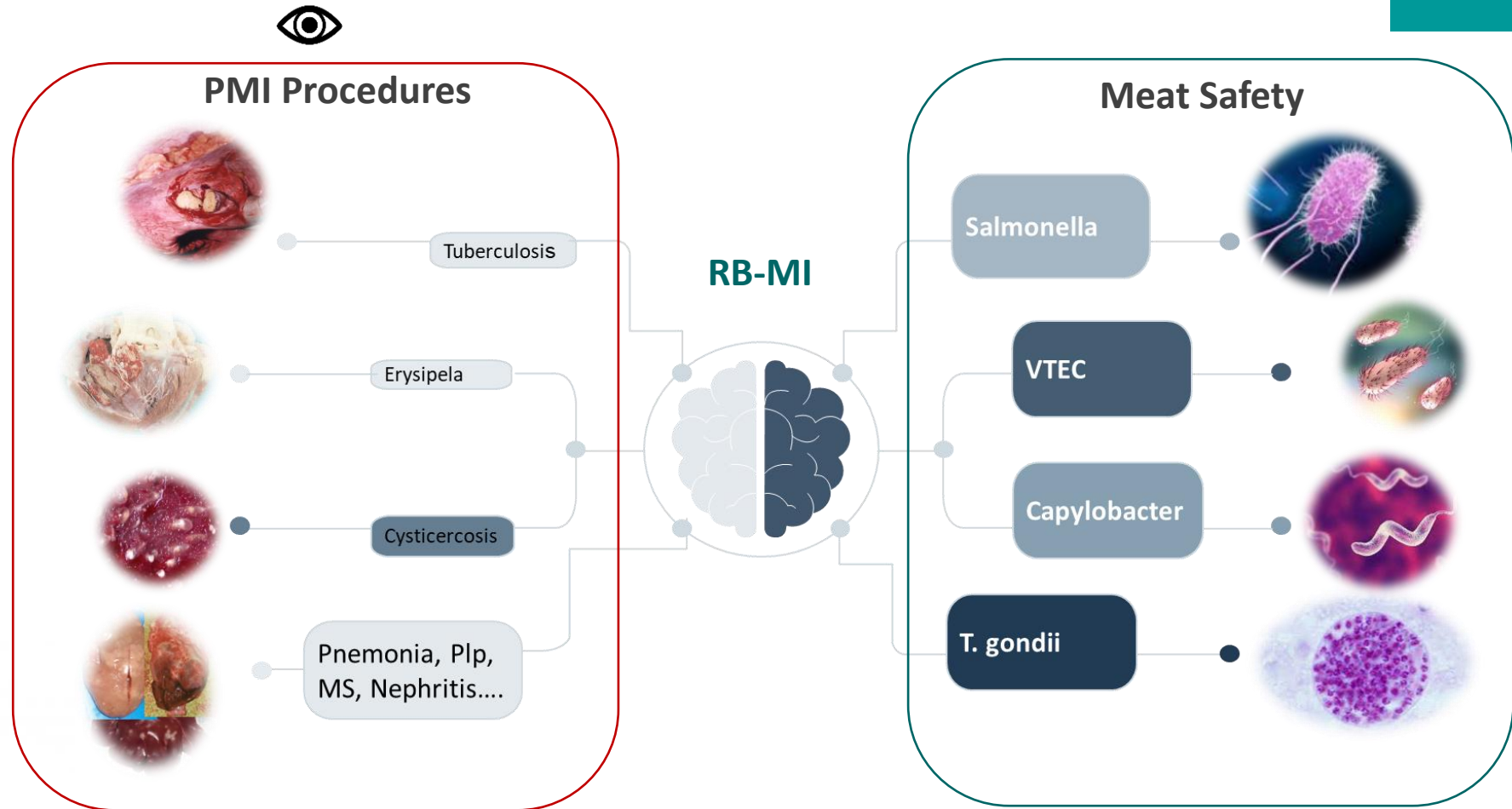
## TIME PASSED....

- Stills an official control that aims the protection of
  - Human health (meat safety)**BUT ALSO**
  - Animal health (monitoring diseases) and welfare (verification of compliance with standards rules)

- When most gross pathological findings during PMI are related to diseases of animal production rather than zoonotic diseases **AND** major foodborne hazards are not visually detectable (such as *Campylobacter*, *Salmonella* and virulent strains of *E. coli*, ....), **how does MI still have a risk-based approach?**



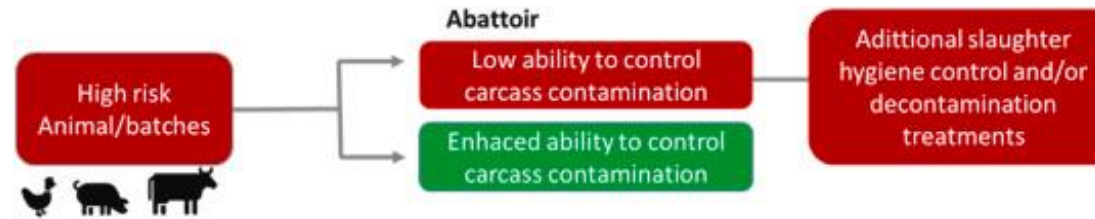
- TWO PERSPECTIVES OF Risk-based MI (RB-MI)



## Risk-based MI



- MEAT SAFETY | Risk-based MI
  - As part of MSAS



Tools/Daily activity



**BATCH RISK**

FCI | Retrospective data

**AMI**

Scoring dirty

**LOGISTIC SLAUGHTER**

Salm + | > Dirty Score

**REDUCE SPEED**

**REDUCE** /m

 **Hygiene**

**DECONTAMINATION**

Hot water

SLAUGHTER LINE | Reduce cross contamination



- Risk-based MI – Regarding PM procedures to detect if meat is unfit for human consumption |



- In EU by force of Regulation (IR 2019/627), swine post-mortem inspection is **visual**

**BUT**

- **Additional Procedures MI (APMI)**, such as palpation and incision of parts of the carcass and offal, **should be used** if, in the opinion of the official veterinarian, a **possible risk to human health, animal health or animal welfare is indicated**.



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## Risk-based MI

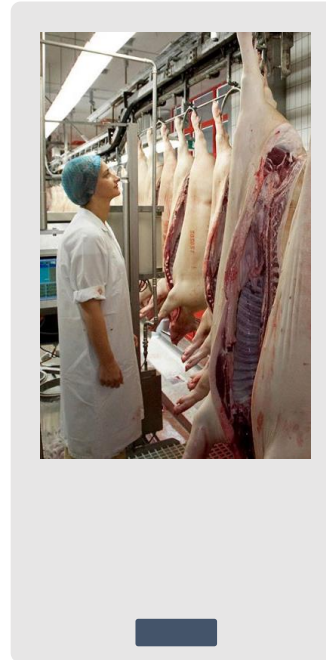




Based on Regulation. Indication of such a risk, (defined in Article 24), includes:

## How to evaluate the risk?

FCI



AMI Findings

DATA System



PMI Findings

Additional Procedures MI



Based on Regulation. Indication of such a risk, (defined in Article 24), includes:

## How to evaluate the risk?

### FCI



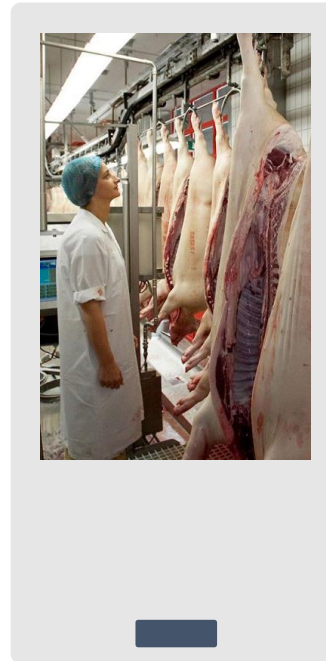
Relevant information

- Risk factors ( indoor/outdoor)
- Previous relevant PMI findings
- Treatments

### DATA System



- Other epidemiological data from the holding of provenance (e.g. *M. avium*)



### AMI Findings

- Cough => Lung
- Diarhea => TGI
- Tail lesions => Signs of pyaemia



### PMI Findings

- Milk spots => Liver | Lungs
- Kidney infarcts => Endocarditis
- *M. avium* lesion => Incision of mandibular and mesenteric lymph nodes

Additional Procedures MI





## PMI

Journal of Consumer Protection and Food Safety  
<https://doi.org/10.1007/s00003-022-01391-z>

Journal of Consumer Protection and Food Safety  
 Journal für Verbraucherschutz und Lebensmittelsicherheit

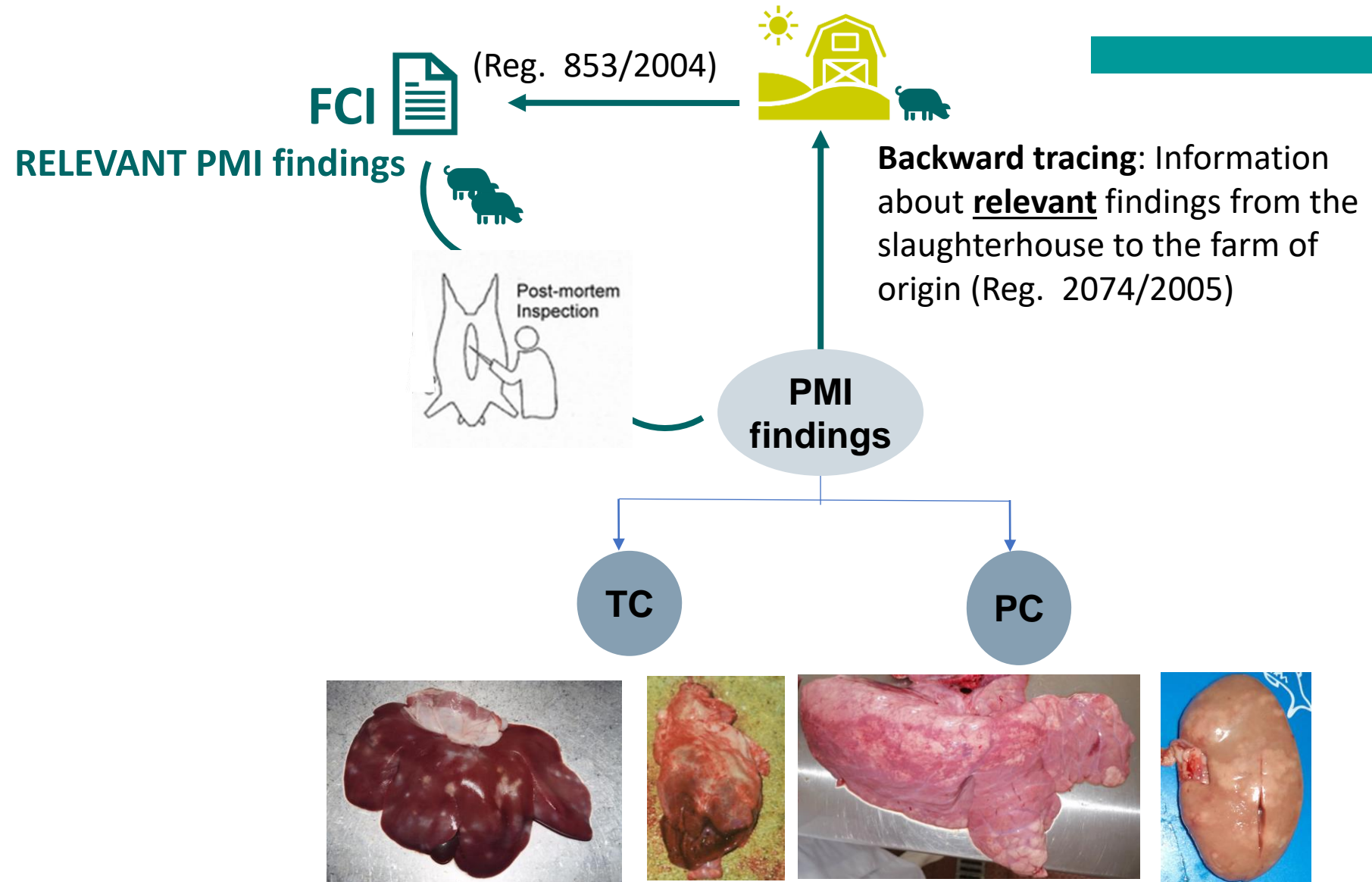
### RESEARCH ARTICLE

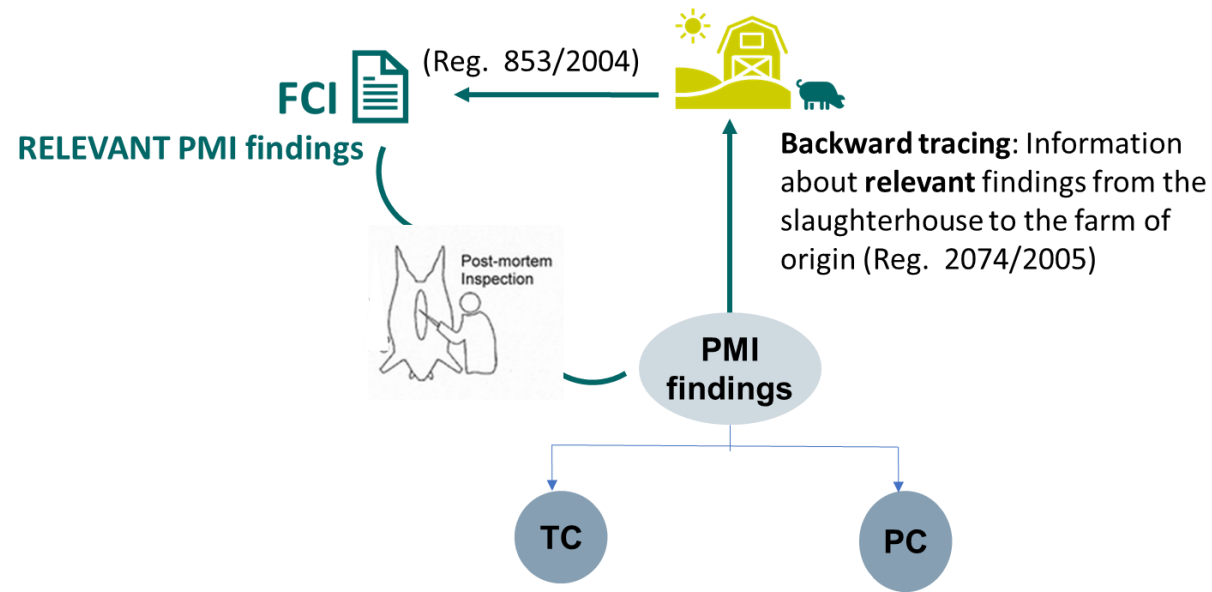


## Additional *post-mortem* inspection procedures and laboratory methods as supplements for visual meat inspection of finishing pigs in Europe—Use and variability

Riikka Laukkanen-Ninios<sup>1</sup> · Sergio Ghidini<sup>2</sup> · Jaime Gómez Laguna<sup>3</sup> · Nina Langkabel<sup>4</sup> · Susana Santos<sup>5</sup> · Patric Maurer<sup>6</sup> · Diana Meemken<sup>4</sup> · Lis Alban<sup>7,8</sup> · Ole Alvseike<sup>9</sup> · Madalena Vieira-Pinto<sup>10,11</sup>

- The most important reasons for applying Additional Procedures (APMI) in addition to visual inspection were findings detected in **ante- or post-mortem inspection**.
- For the same pathological finding (e.g. pneumonia, MLL), **VARIANCE on the number of APMI** procedures between the respondents, irrespective of work experience and country of origin
  - Requires science-based guidelines to support APMI





- BE AWARE, for the same gross pathological finding during PMI
  - Variation in the judgment condemnation criteria
  - Substantial differences Codes systems
    - in force in the seven countries countries

This variation made it a challenge to compare data

Food Control 132 (2022) 108394

Contents lists available at [ScienceDirect](#)



**Food Control**

journal homepage: [www.elsevier.com/locate/foodcont](http://www.elsevier.com/locate/foodcont)

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Differences in code terminology and frequency of findings in meat inspection of finishing pigs in seven European countries

Lis Alban<sup>a,b,\*</sup>, Madalena Vieira-Pinto<sup>c</sup>, Diana Meemken<sup>d</sup>, Patric Maurer<sup>e</sup>, Sergio Ghidini<sup>f</sup>, Susana Santos<sup>g</sup>, Jaime Gómez Laguna<sup>h</sup>, Riikka Laukkanen-Ninios<sup>i</sup>, Ole Alvseike<sup>j</sup>, Nina Langkabel<sup>d</sup>

Research in Veterinary Science 152 (2022) 72–82

Contents lists available at [ScienceDirect](#)



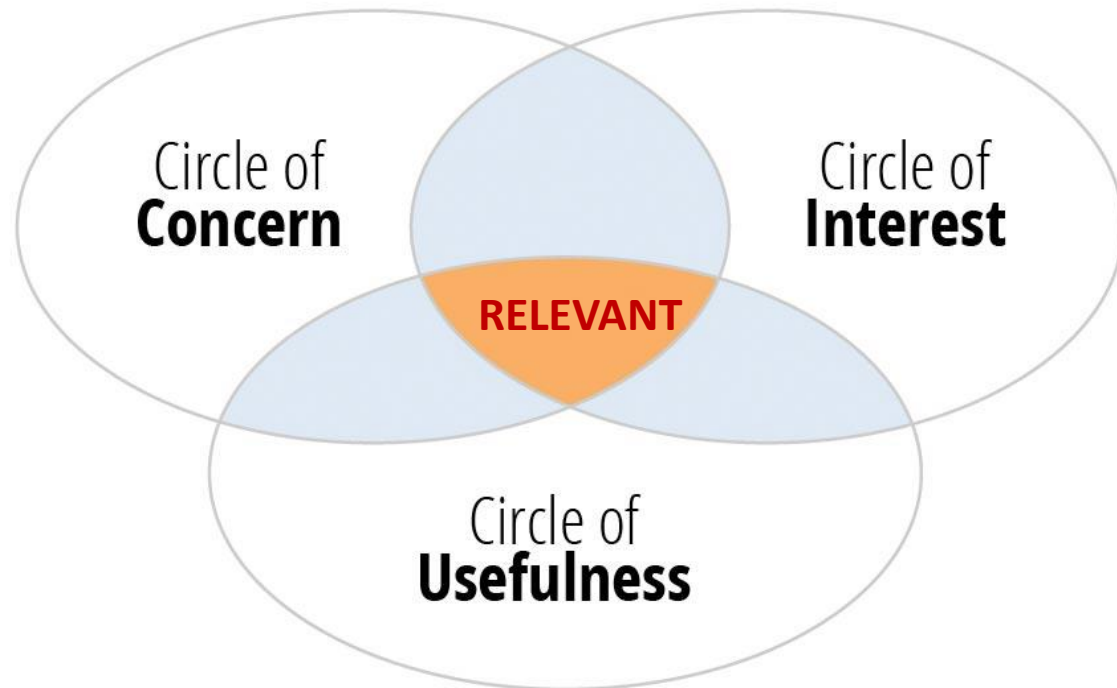
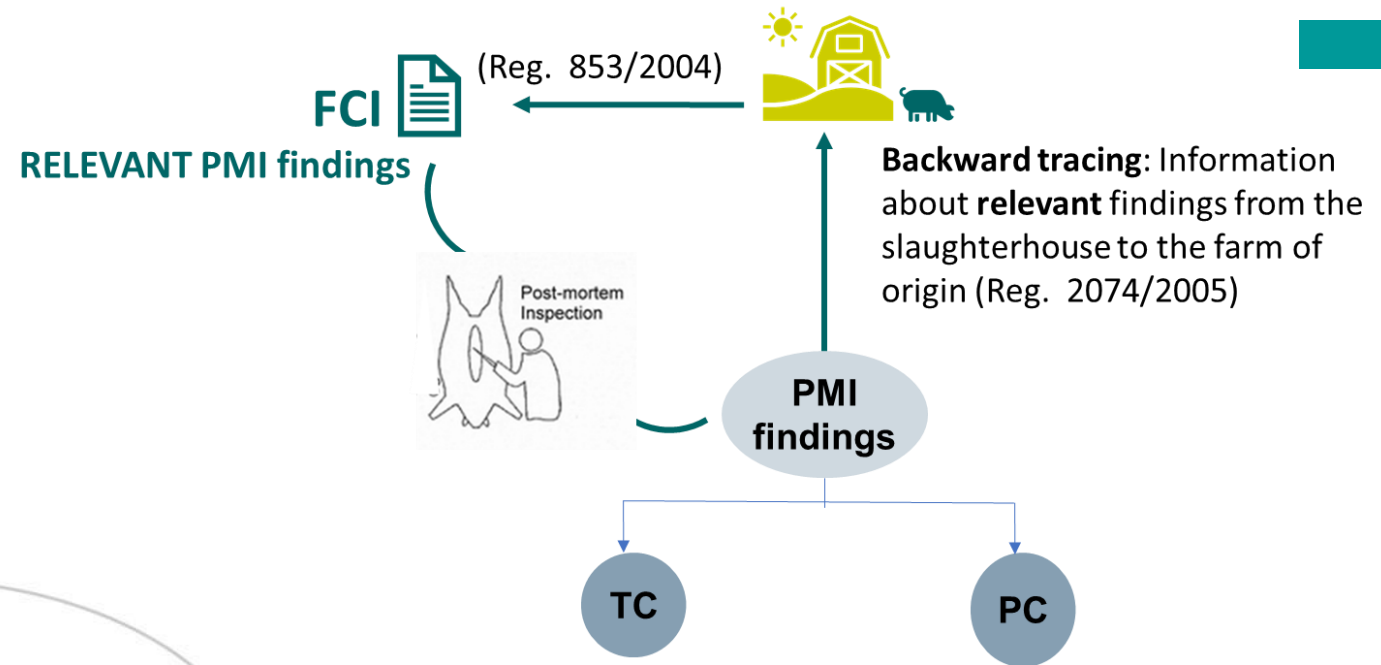
**Research in Veterinary Science**

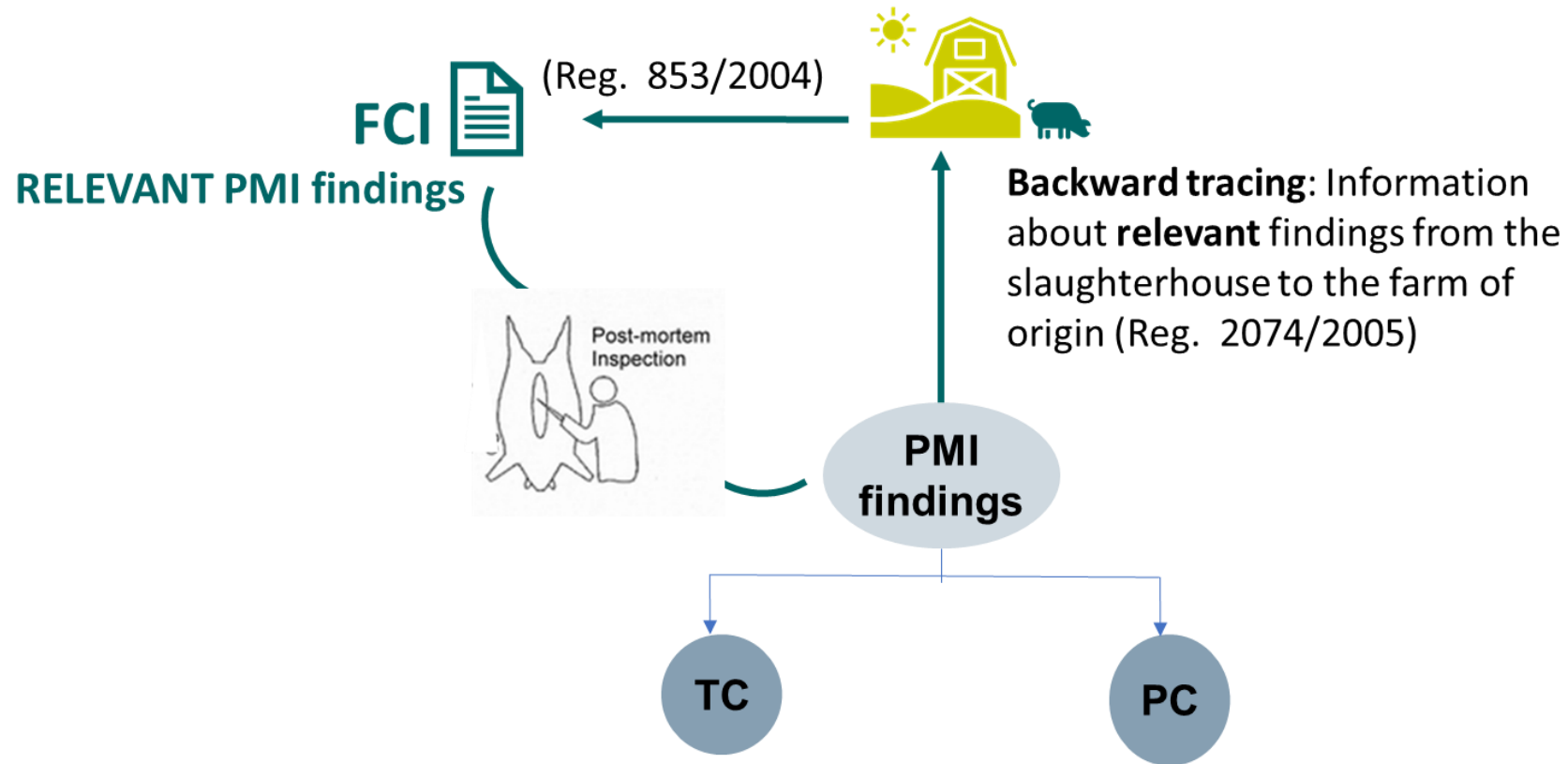
journal homepage: [www.elsevier.com/locate/rvsc](http://www.elsevier.com/locate/rvsc)

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A European survey on post-mortem inspection of finishing pigs: Total condemnation criteria to declare meat unfit for human consumption

Madalena Vieira-Pinto<sup>a,\*</sup>, Nina Langkabel<sup>b</sup>, Susana Santos<sup>c</sup>, Lis Alban<sup>d,e</sup>, Jaime Gómez Laguna<sup>f</sup>, Bojan Blagojevic<sup>g</sup>, Diana Meemken<sup>b</sup>, Silvia Bonardi<sup>h</sup>, Boris Antunović<sup>i</sup>, Sergio Ghidini<sup>j</sup>, Patric Maurer<sup>k</sup>, Ole Alvseike<sup>l</sup>, Riikka Laukkanen-Ninios<sup>m</sup>

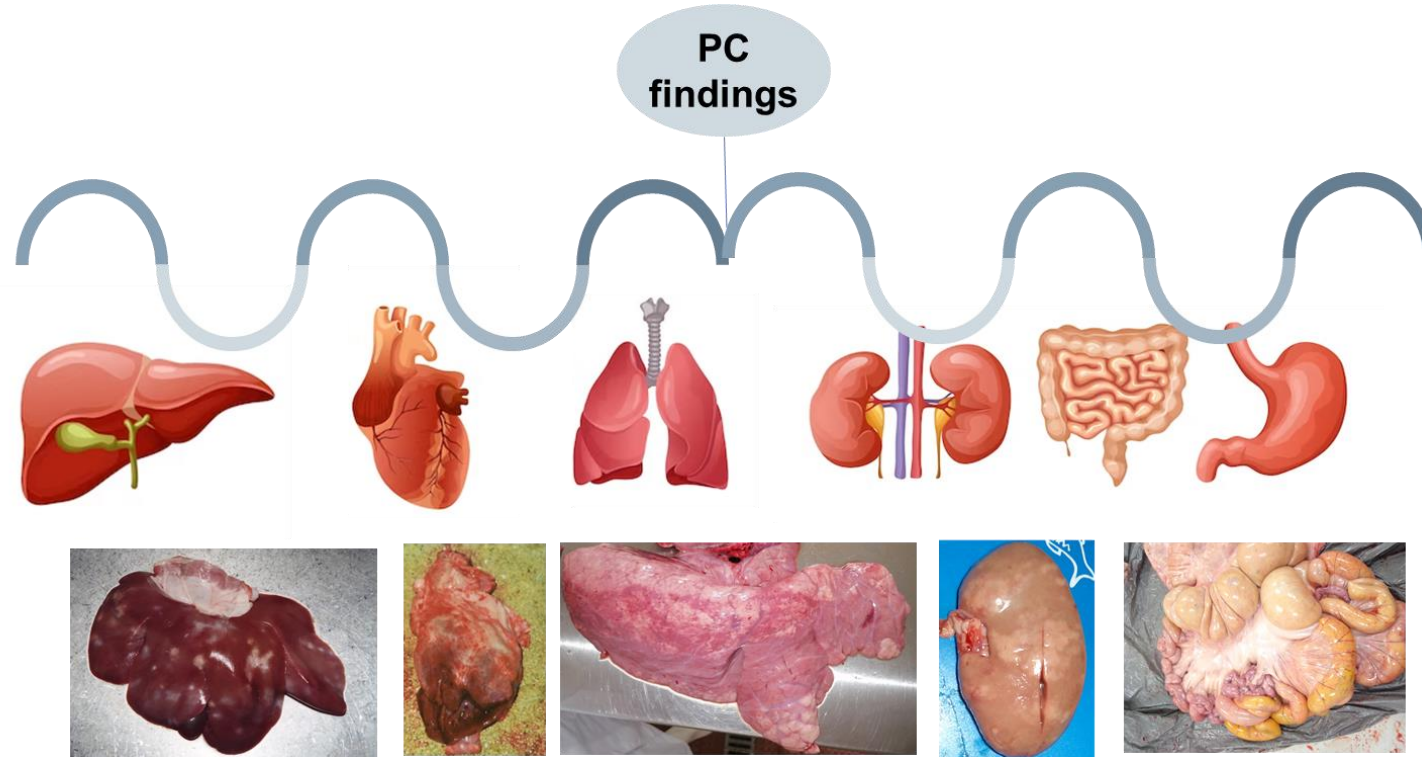




- More accessible data
- Mandatorily recorded by OV
- Mostly recorded in a database

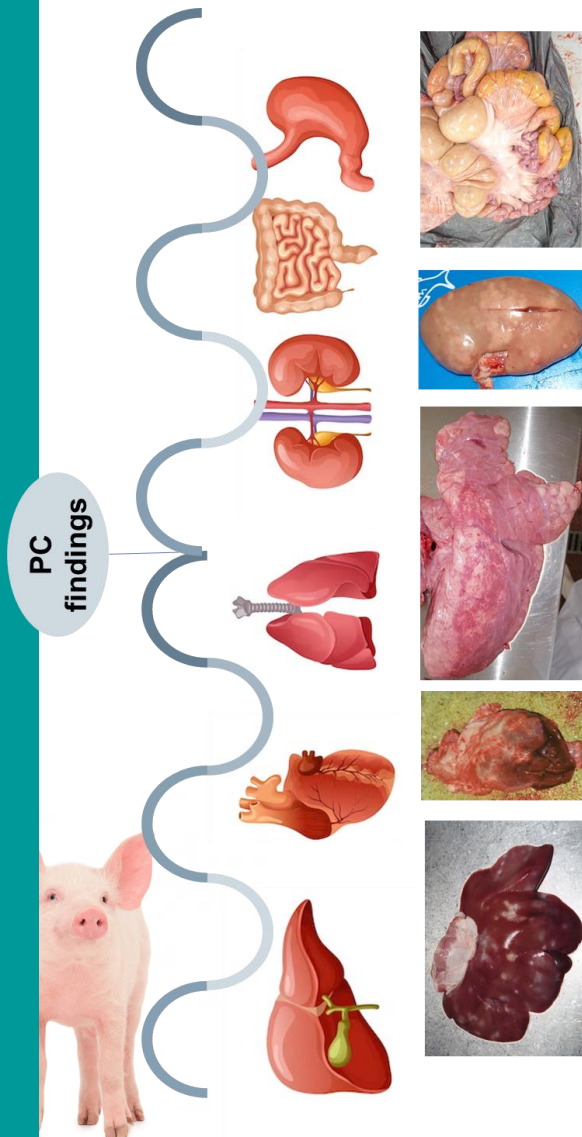
## Previous relevant PMI findings – Partial Condemnation – MORE RELEVANT

For assessing the "**health profile of the farm**" and **supporting an RB-MI**. Having access to these data (e.g. database or FCI), the VOB can have an idea of the main health problems related to the holding of provenance of the animals to be slaughtered and can adapt the PMI procedures in a risk-based approach in due time.





## Previous relevant PMI findings – Partial Condemnation – MORE RELEVANT



- Important to include relevant information in FCI for RB- MI
- Database for benchmarking purpose
- ? Collected by whom?
  - OV competence?
- ? Once collected how to define **relevant information** to include in FCI?
  - 20% of enzootic pneumonia
  - 20 % Pleuropneumonia
  - 20% Endocardites....

# PC DATA COLLECTION?

## MORE RESEARCH !



- Inspiration and Motivation
- Team Work
  - Multidisciplinar
- Supported
  - Academia | Farmers| FBO | Veterinarian Practicioners| OV
- Sucess for all!
  - **Together Everyone Achieves More**

# Thank you!



Questions?



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