CA18105

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Risk-based meat inspection and integrated meat safety assurance

Risk-based handling in relation to meat inspection

Lis Alban | 16-Jun-23 | Virtual training school

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Detection and handling

We cannot find all that there might be in a carcass

- Unless we slice every carcass in thin pieces

We should aim at detecting

- Issues of relevance for food safety, animal health and welfare, notifiable infections
- And satisfy trade partners' requirements

All this in a risk-based way

Handling should also be risk-based

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Risk-based approach
= based on likelihood and consequences

Food safety
- Salmonella => faecal contamination

Animal health
- Lesions indicating septicaemia

Animal welfare
- Lesions indicating assault

Notifiable infections
- FMD

Trade partners' requirements
- Trichinella testing

Three examples of risk-based handling will be given in the presentation
- Prior septicaemia
- Bile of carcasses
- Residues of antimicrobials

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Legal basis for risk-based handling

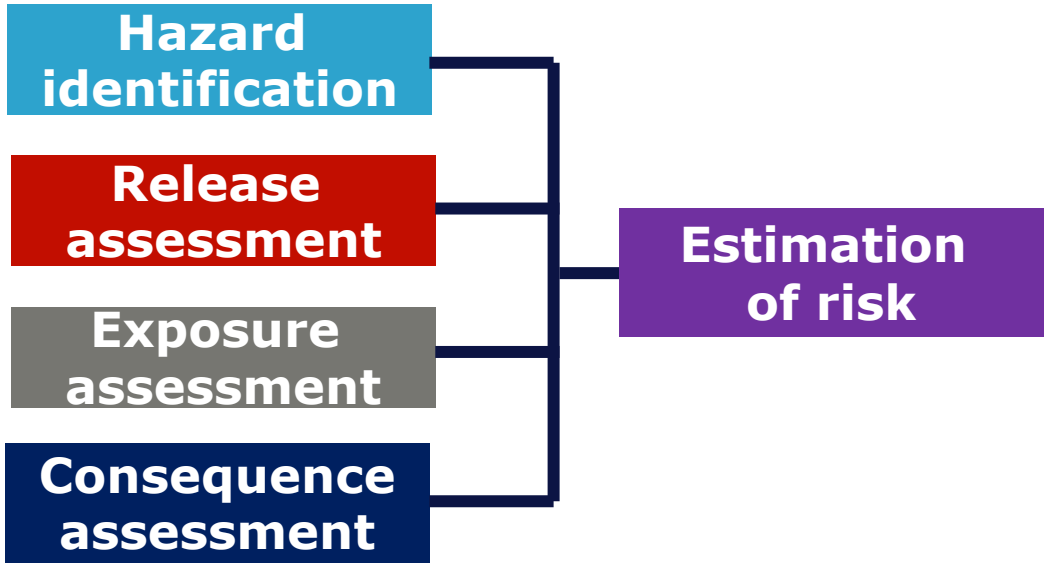
The EU General Food Law (Reg. 178/2002) specifies

- Decisions regarding food safety should be **based upon risk assessment** and
- Correcting handling should be **proportionate to the risk represented by the finding**

However, the EU Food Inspection Regulation (Reg. 2019/627) prescribes specific handling in relation to findings

May create confusion

- My take is to combine the two approaches



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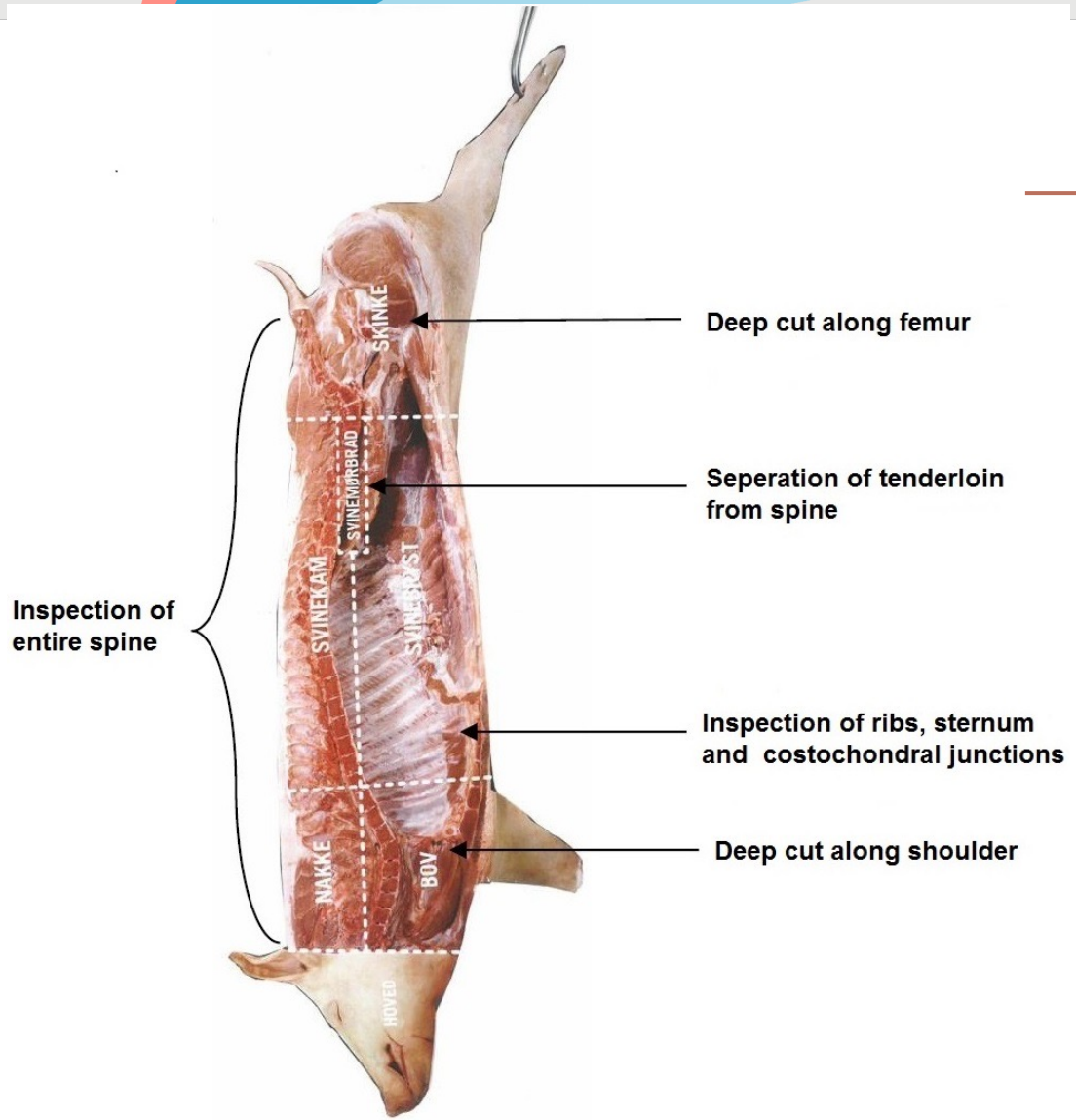
Risk-based handling of septicaemia – Example 1



Presence of lesions indicative of septicaemia

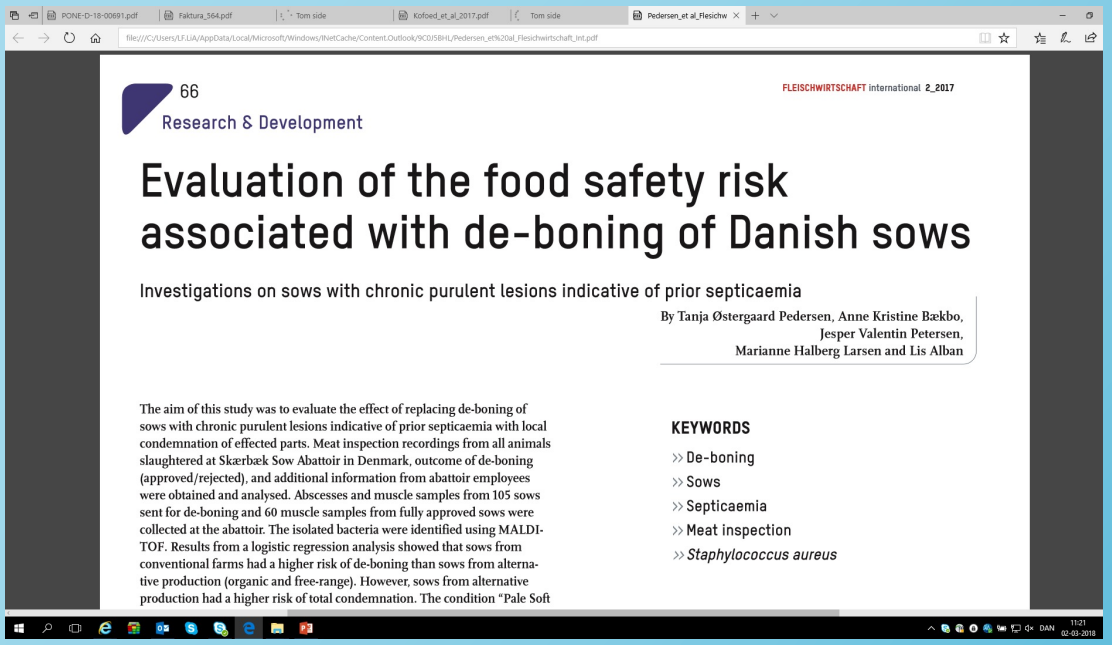
- Needs careful evaluation

In Denmark, so-called "pyaemia" investigation undertaken in rework area

- Acute cases → Total condemnation
- Chronic cases → De-boning

Lesions probably caused by tail bite, which occurred months earlier

- In many cases, lesions are in healing
- Deboning will ensure that abscesses are detected and removed
- Expensive approach and extremely few findings of relevance for food safety



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Research & Development

FLEISCHWIRTSCHAFT international 2_2017

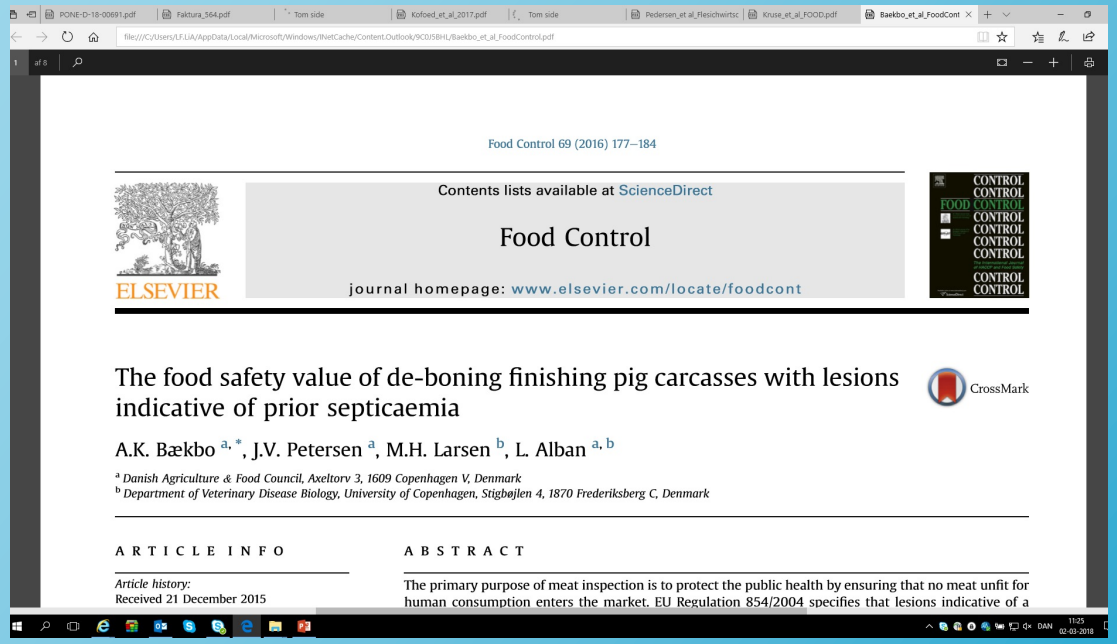
Evaluation of the food safety risk associated with de-boning of Danish sows

Investigations on sows with chronic purulent lesions indicative of prior septicaemia

By Tanja Østergaard Pedersen, Anne Kristine Bækbo, Jesper Valentin Petersen, Marianne Halberg Larsen and Lis Alban

The aim of this study was to evaluate the effect of replacing de-boning of sows with chronic purulent lesions indicative of prior septicaemia with local condemnation of effected parts. Meat inspection recordings from all animals slaughtered at Skærbæk Sow Abattoir in Denmark, outcome of de-boning (approved/rejected), and additional information from abattoir employees were obtained and analysed. Abscesses and muscle samples from 105 sows sent for de-boning and 60 muscle samples from fully approved sows were collected at the abattoir. The isolated bacteria were identified using MALDI-TOF. Results from a logistic regression analysis showed that sows from conventional farms had a higher risk of de-boning than sows from alternative production (organic and free-range). However, sows from alternative production had a higher risk of total condemnation. The condition "Pale Soft

KEYWORDS
- De-boning
- Sows
- Septicaemia
- Meat inspection
- *Staphylococcus aureus*



Food Control 69 (2016) 177–184

Contents lists available at ScienceDirect

Food Control

journal homepage: www.elsevier.com/locate/foodcont

The food safety value of de-boning finishing pig carcasses with lesions indicative of prior septicaemia

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ABSTRACT

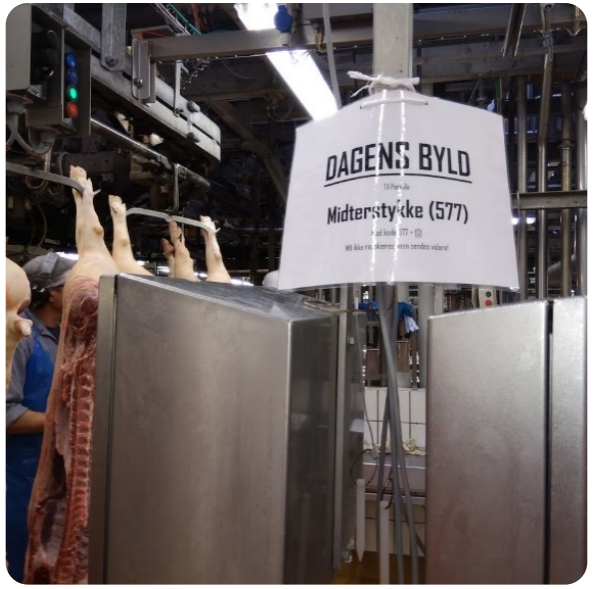
The primary purpose of meat inspection is to protect the public health by ensuring that no meat unfit for human consumption enters the market. EU Regulation 854/2004 specifies that lesions indicative of a

Studies and risk assessment undertaken

Aim: to identify feasible alternatives to de-boning of chronic cases

- Studies done separately in sows and finishers
- Showed that some abscesses were overlooked in specific areas

All work published in peer-reviewed journals



Legislative outcome

New legislation in Denmark – no need to de-bone pig carcasses

- Finishers: 2018, sows/boars: 2019

Pyaemia investigation updated

Targeted cutting described for own control used by abattoirs

- Will result in lower costs because
  1. no need for de-boning
  2. higher value of meat
  3. no cat. 2 animal by-products (bones were considered cat. 2)

Handling of bile-contamination - Example 2

In 2020, Danish Competent Authority changed the handling in relation to presence of bile contamination on a carcass

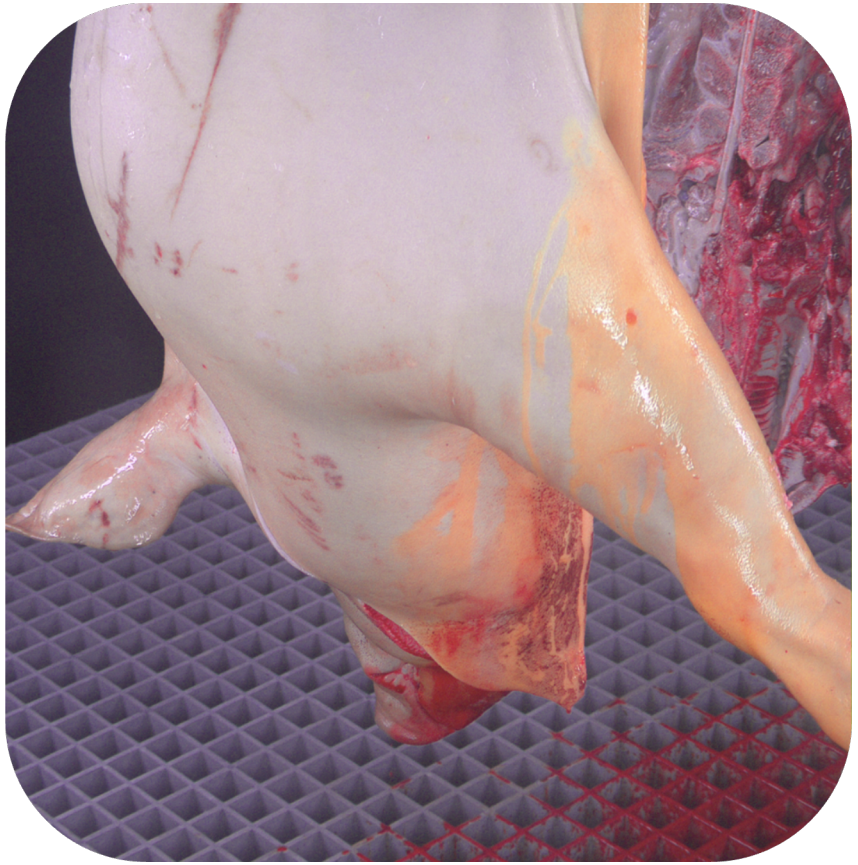
- Based on litterature review made by Danish Technological University pointing to potential presence of Salmonella

Hence:

Bile contamination = fecal contamination

Danish abattoirs questionned this decision

- Risk assessment undertaken



Source: Jeppe Seidelin Dam
Danish Technological institute

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Risk assessment

Risk question:

- Is *Salmonella* in bile from pigs a health risk for consumers of pork?
- Separate evaluation wanted for finishing pigs and sows

Sub-questions:

1. How are carcasses contaminated with bile and at which frequency?
2. If there is *Salmonella* in bile, at which concentrations does it occur?
3. **What is the number of carcasses leaving the abattoir with *Salmonella* due to bile-contaminated carcasses?**
4. How to deal with bile contamination?

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Risk assessment made

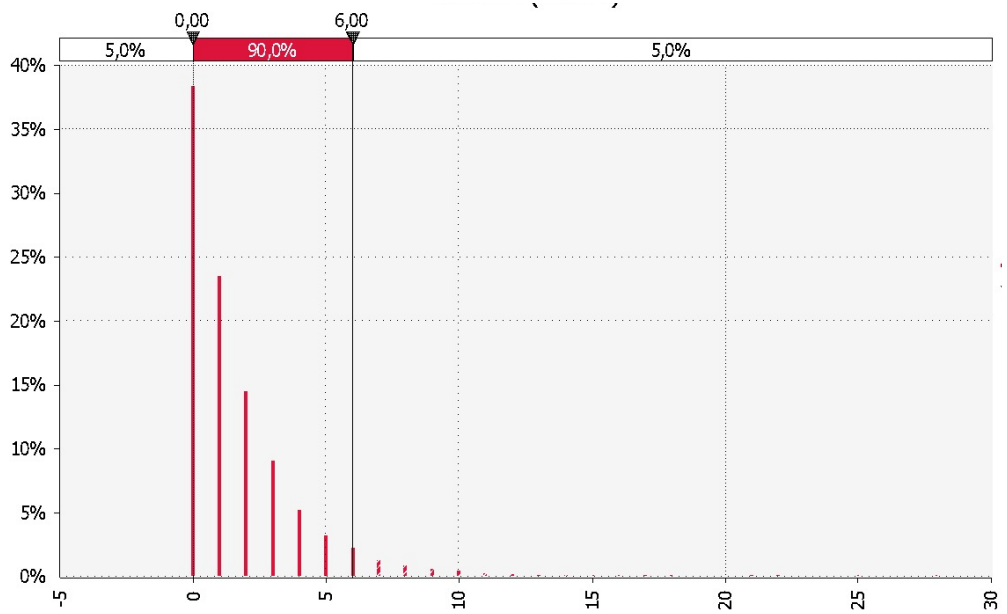
Bile samples collected

- 299 from finishers
- 300 from sows

None of them were Salmonella-positive

Simulation modeling done

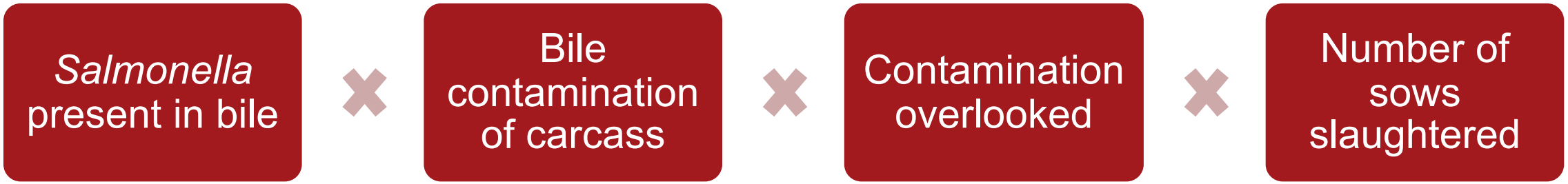
- To estimate number of carcasses leaving abattoir with Salmonella
- Due to bile-contamination overlooked by abattoir, if they would have the responsibility for carcass cleaning



Materials and methods

Simulation model built to reflect exposure risk

- Consists of 4 variables, with each their probability distribution



@Risk software used

- Add-on to Excel

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Estimated number of carcassess overlooked in 1 year

Finishing pig study*

- FBO scenario: **9 carcasses** (90% C.I. 0 – 53)
- CA scenario: **103 carcasses** (90% C.I. 7- 544)

Out of a production of **16 million** finishing pigs

Sow study**

- FBO scenario: **2 carcasses** (90% C.I. 0 – 6)
- CA scenario: **12 carcasses** (90% C.I. 0 - 57)

Out of a production of **281,000** sows

Prevalence of Salmonella in DK national pig population =1%

⇒ 160,000 positive carcasses

Minute contribution from bile

- if any at all

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*Alban et al., Food Control, 2021, ** Just et al., Prev Vet Med, 2023

Bile contamination should be prevented

Actions should be taken to reduce prevalence of bile contamination

- To reduce food waste

670 tonnes of meat were cut-off during a 5-month period in 2

- because of bile contamination

Learn how to reduce prevalence of bile contamination

- Essential to provide proper training to employees handling removal of gallbladder

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Residues of antimicrobials – Example 3

Withdrawal periods after treatment with antimicrobials are set

- To minimise frequency and concentration of residues in meat
- Still, by mistake, animals can be sent for slaughter too early

How should abattoir respond when pig producer contacts abattoir to inform about mistake?

To address this, two RIBMINS questionnaire surveys undertaken, spring of 2022

- Targeting competent authority (CA) and food business operator (FBO)

Results cover answers from 78 respondents from 27 countries

- Most countries have procedures in place, but various ways of responding

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Description of where suspect pig may be, when pig producer contacts abattoir – the later, the more complicated

- **Not yet slaughtered and can be identified**
- **Not yet slaughtered, but can only be identified at batch-level**
- **Carcass and by-products can be identified**
- **Carcass can be identified, and associated by-products can be delimited to a batch**
- **Carcass can be delimited to a group and by-products to a batch**
- **Carcass has been cut and by-products can be delimited to a batch**

Could we, in RIBMINS WG1, develop a best practice model for handling?

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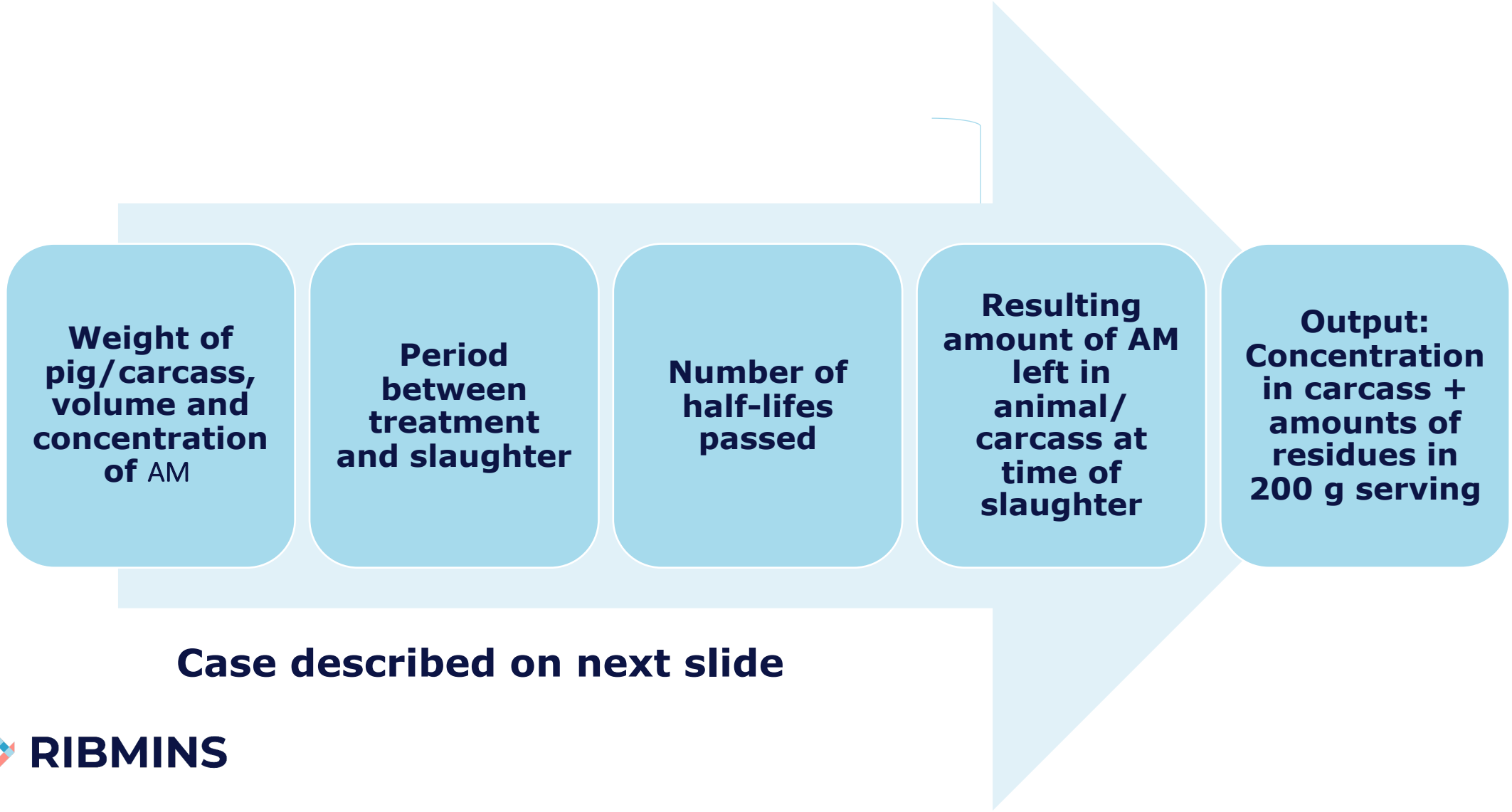
Best practice model: Focus on exposure risk



Case described on next slide

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Variable	Noromylin® Vet (Lincomycin)	Penovet®
Treatment dose	10 ml of 100 mg/ml	8 ml of 300 mg/ml
Time between treatment and slaughter	2.0 days*	2.0 days*
Halflife (worst case)	6 hours	2.7 hours
Number of half-lifes	2*24 hours / 6 hours = 8	2*24 hours / 2.7 hours = 17.7
Reduction factor	$(0.5)^{8}$	$(0.5)^{17,7}$
Reduction factor multiplied with the treatment dose	$(0.5)^{8}$ * 10 ml * 100 mg/ml = 3.906 mg	$(0.5)^{17,7}$ * 8 ml * 300 mg/ml = 0.011 mg
Resulting amounts of residues (µg) at time of slaughter	3,906 µg	11 µg
Residual amounts (µg) in 200 g serving	3,906µg*200g/(73.4*1000g) = 10.6 µg	11µg*200g/(73.4*1000g) = 0.029 µg
ADI (Acceptable Daily Intake)	< 600 µg	< 30 µg
MRL (µg/kg)	100 µg/kg	50 µg/kg

*Withdrawal period: 6 days for lincomycin 5 days for peniciilin

Wide variation in withdrawal periods for oxytetracycline 100 mg/ml, IM use in pigs

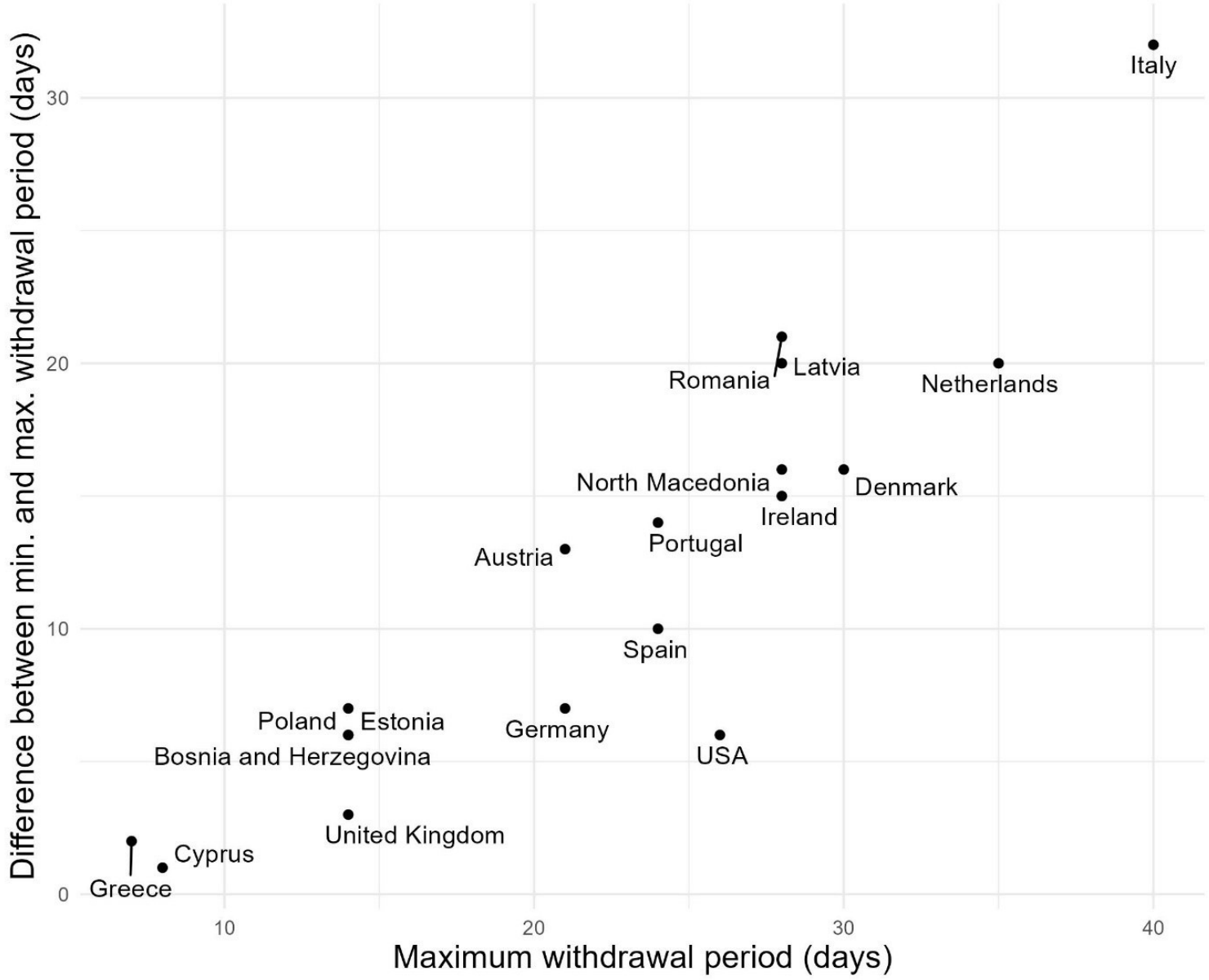
RIBMINS WG1 data collection, 2023

- 68 products from 29 countries

Withdrawal period

- Min 4 days
- Max 40 days

Hjort et al., in pipeline



Discussion

The world is developing

- So is our understanding of the world

Therefore, legislation should not be static regarding the details

- But maybe static regarding the principles

One principle is that evidence-based research is needed to bring us forward

- The presentation has given three examples of this

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Conclusion

- Detection should focus on what matters for humans, animals and the environment = One Health
- Handling should be proportionate to the risk represented by the findings
- Constant need for updating our understanding and making use of new technologies and ways of doing
- Evidence-based research needed

Thank you for the attention.

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