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Risk-based meat inspection and integrated meat safety assurance

# Risk categorisation of abattoirs: how can we move forward?

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# Introduction

- **Meat safety depends on:**
  - **the initial pathogen load of the incoming animals**

    But the relevant biological hazards – either by incidence or disease severity – causing the top-four most commonly reported meat borne human diseases in Europe are 'invisible' hazards present in the intestinal tract and/or on the hide/skin of healthy slaughter animals.

    ➔ Limited ability of traditional meat safety system to control the currently most important meat-borne hazards.

  - **the prevention and the reduction of cross-contamination incidences during slaughter and carcass dressing**

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# Introduction

- **Risk-based meat safety assurance system:** combination of a range of preventive and control measures, applied at farms and abattoirs and integrated longitudinally, where official meat inspection is incorporated with producers' food safety management systems

- One essential component of the risk-based meat safety assurance system:
  - **risk categorisation of farms** based on **food chain information** and **harmonised epidemiological indicators**
  - **risk categorisation of abattoirs** based on the **performance of their food safety management system** and **harmonised epidemiological indicators**

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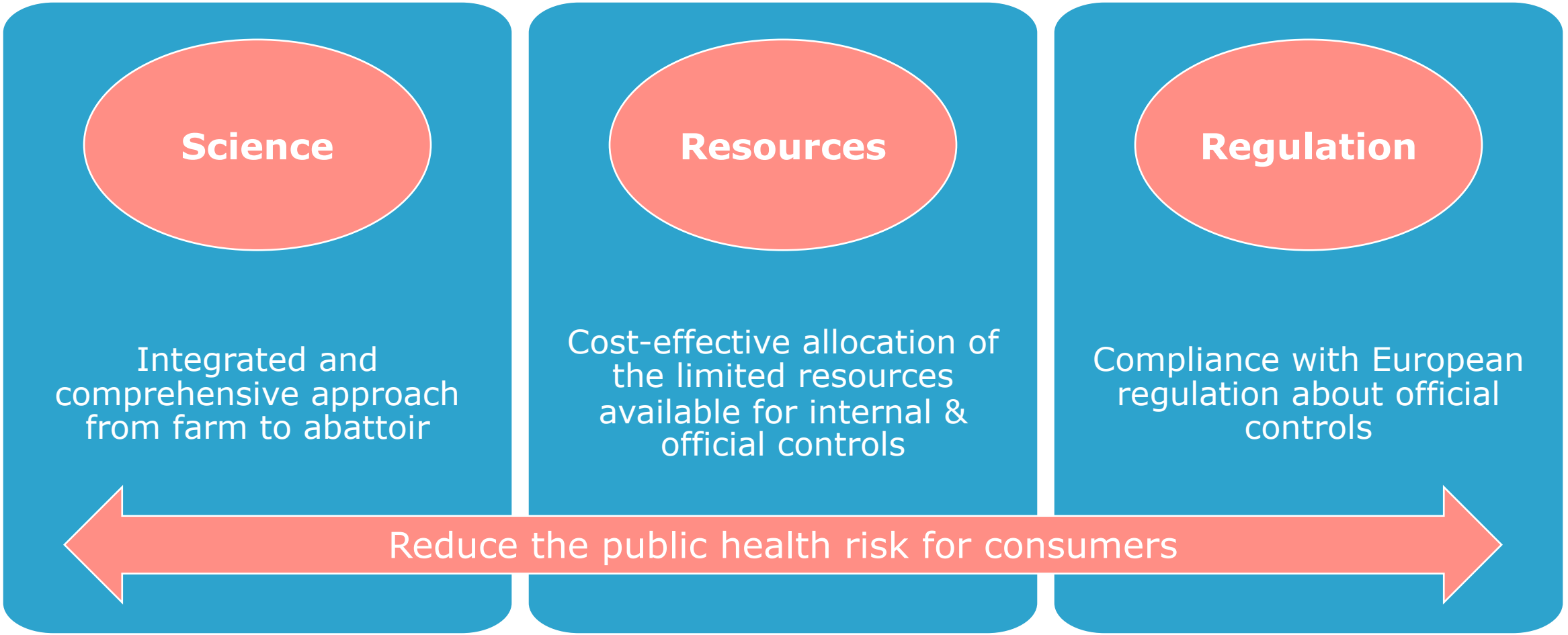
# Introduction

- **An epidemiological indicator is defined as the prevalence or incidence of the hazard at a certain stage of the food chain or an indirect measure of the hazards that correlates to human health risk caused by the hazard.**
- The indicators can be used by the European Commission and the Member States to help categorise farms/herds and slaughterhouses according to the risk related to the hazards as well as setting appropriate targets for final chilled carcases. Depending on the purpose and the epidemiological situation risk managers should decide on the most appropriate indicator(s) to use, either alone or in combinations, at national, regional, slaughterhouse or farm/herd level.

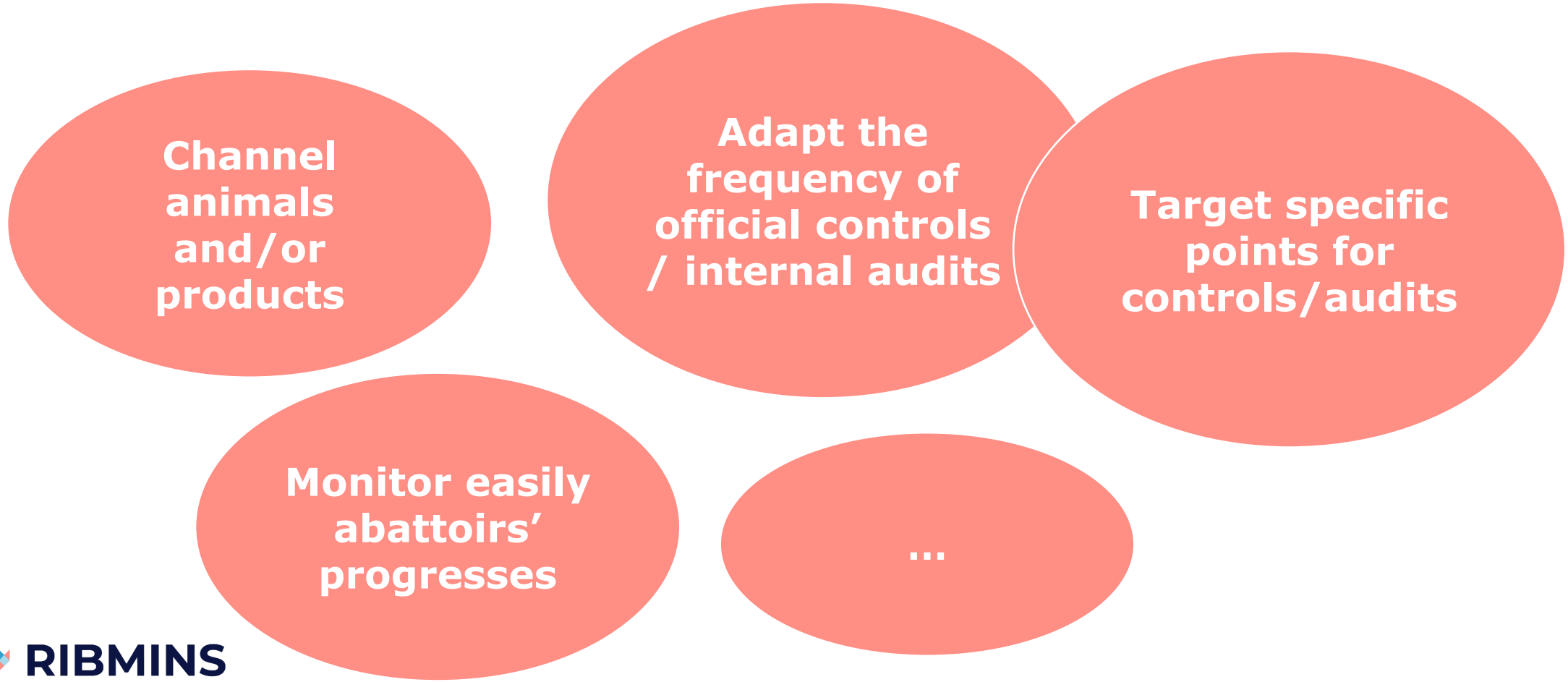
# Introduction

- Why do we really need risk categorisation of abattoirs?



# Introduction

- What can we do with risk categorisation?

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# Introduction

- Limited number of papers investigating abattoir risk categorisation (Nastasijevic *et al.*, 2016; Alvseike *et al.*, 2019; Cegar *et al.*, 2022; Hauge *et al.*, 2023)

  ➔ Need for a multifactorial approach to abattoir risk categorisation, rather than one that is based on risk categorisation components used separately.

- But:
  - no published state of play about risk categorisation of abattoirs in Europe.
  - no holistic and practical framework proposed to categorise abattoirs.

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# Part 1
## A survey-based approach

# A survey-based approach

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## Risk categorisation of abattoirs in Europe: Current state of play

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# Objectives of the study

➔ Contribute to the development of risk categorisation of abattoirs in Europe and discuss a science-based approach for this risk categorisation by:

- providing an overview of the use of risk categorisation systems in abattoirs
- discussing the criteria, relevance and applicability of risk categorisation systems for competent authorities

# Materials and methods – questionnaire design

## Objectives:

- to investigate the extent of the use of risk categorisation systems for abattoirs in Europe (or proposals for their development, if no such system has been implemented)
- to explore the relevance and the applicability of risk categorisation approaches by competent authorities

## Targeted abattoirs:

Poultry, pig, bovine and small ruminant abattoirs

## Targeted respondents:

Competent authorities from European countries

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# Materials and methods – questionnaire structure

- Level of implementation of risk categorisation of abattoirs
  Purpose and method for risk categorisation
- Data availability
- Needs for methodological developments

36 questions
20 min

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# Material and methods – data collection and analysis

Online survey (Google Form)

Dissemination to 35 competent authorities through the NCP network

Data collection from 28th April to 5th June 2022

Quantitative analysis

Comprehensive description of the systems, when provided

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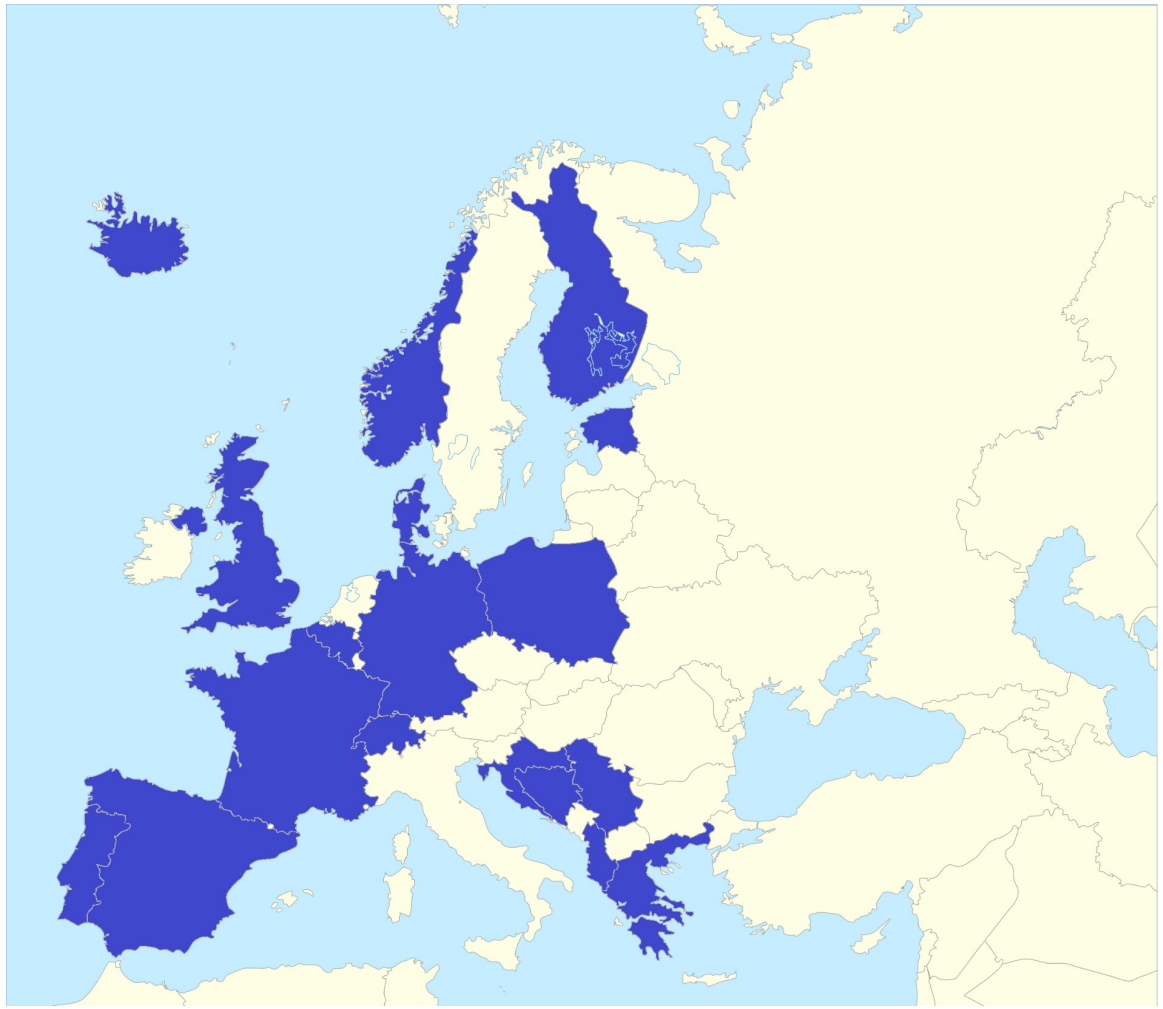
# Results – participants



18 respondents

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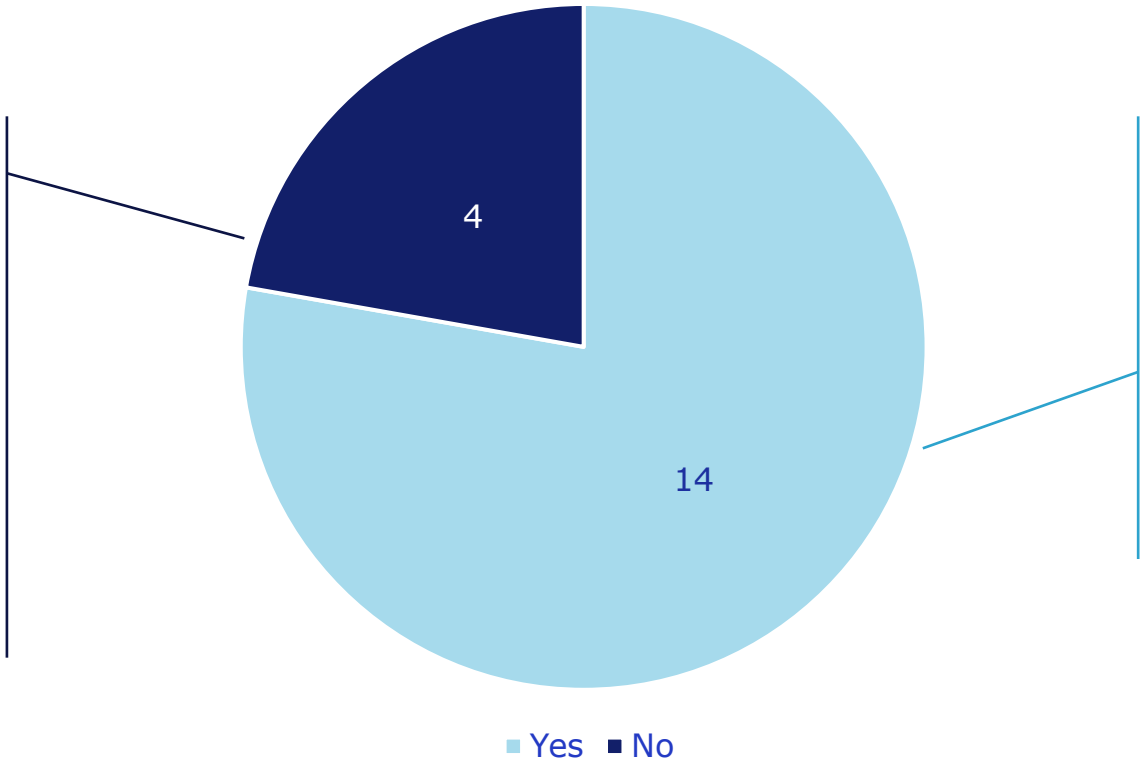
# Results – use of risk categorisation

## Risk categorisation implementation

3 countries plan to implement risk categorisation in the future (poultry abattoirs first)
The other one indicated having no experience in this area




All 4 types of abattoirs

Nationwide categorisation method in 11 countries; region-specific method in the 3 other ones

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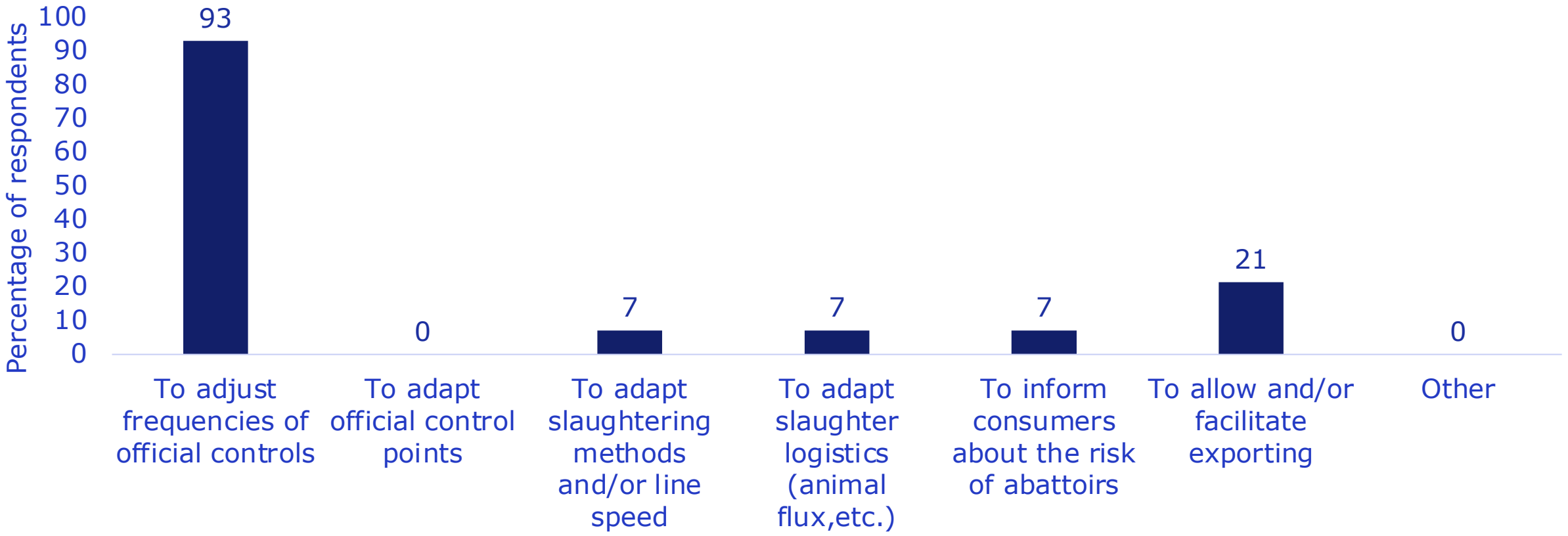
# Results – purpose of risk categorisation

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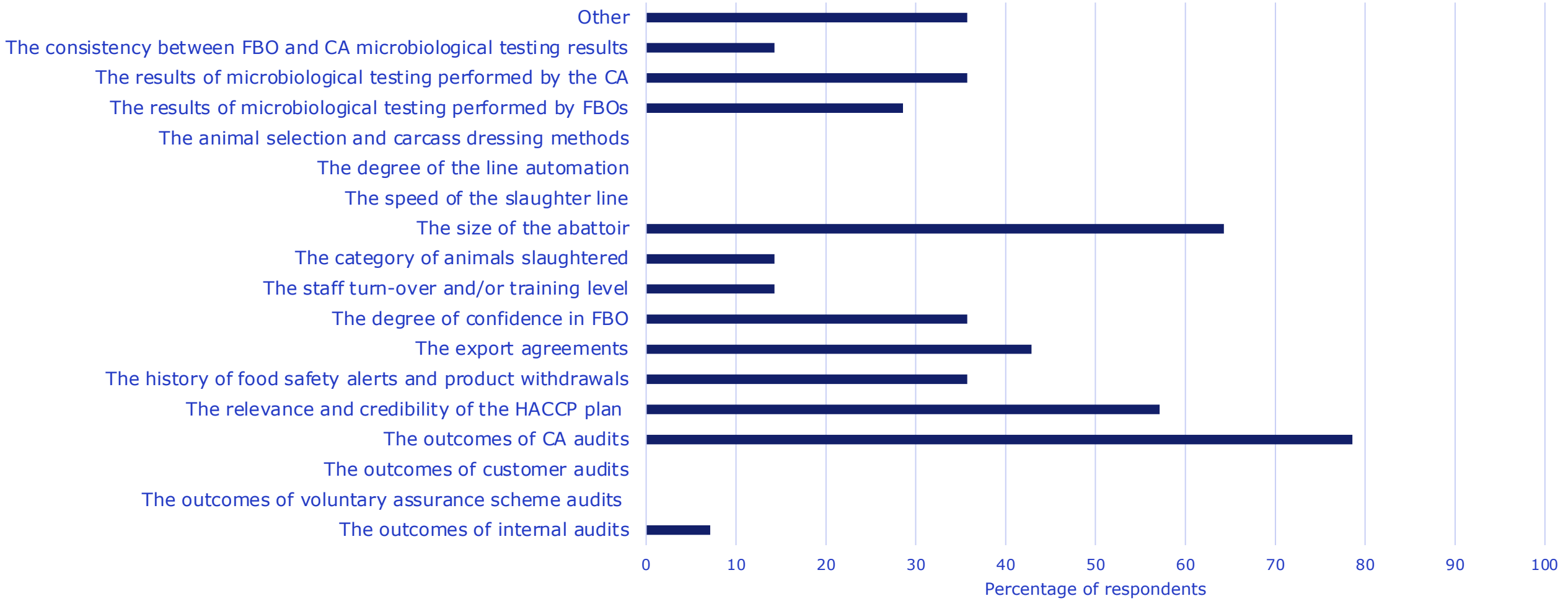
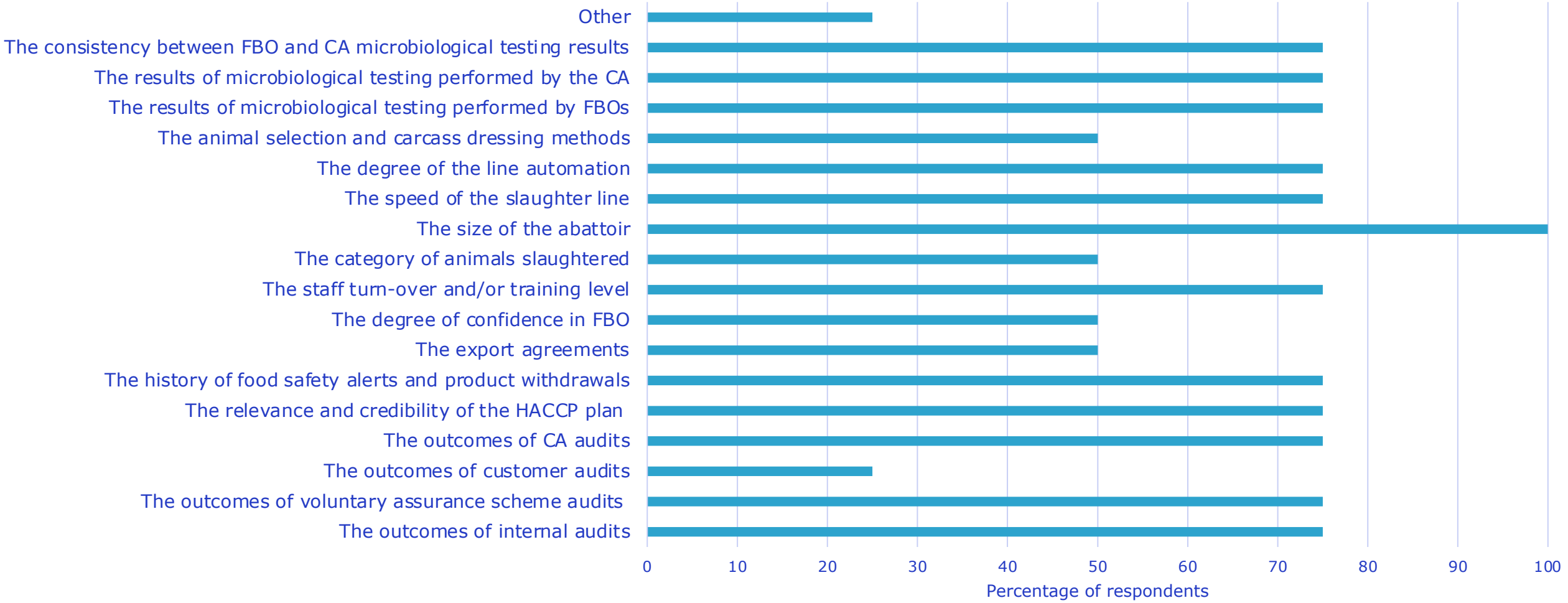
# Results – parameters for risk categorisation (1)

## Parameters included in risk categorisation



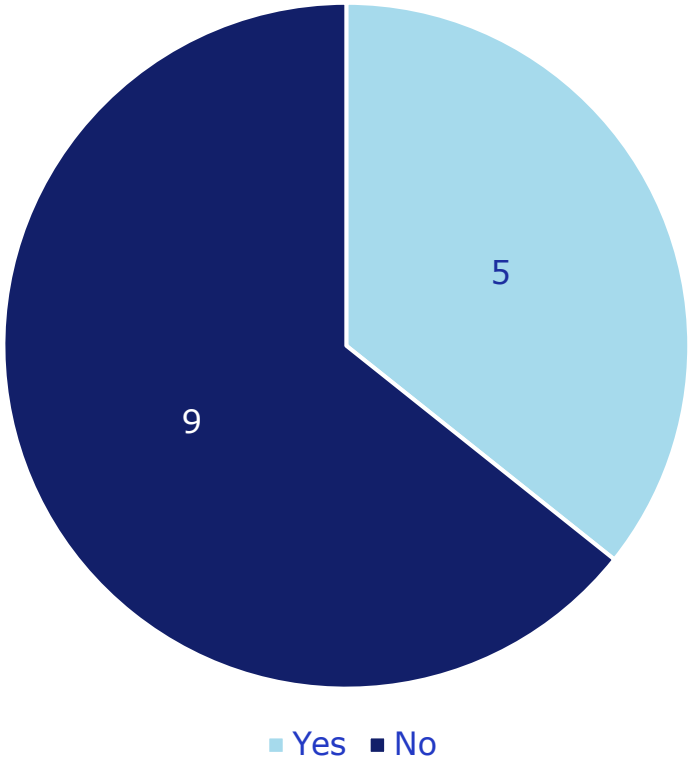
# Results – parameters for risk categorisation (2)

## Parameters likely to be included in risk categorisation



# Results – effectiveness of risk categorisation

## Assessment of the effectiveness of risk categorisation




Unformal assessment on the occasion of audits, either from official control staff at abattoirs, the central competent authority, third countries or the European Commission (DG SANTE)

Satisfactory outcome

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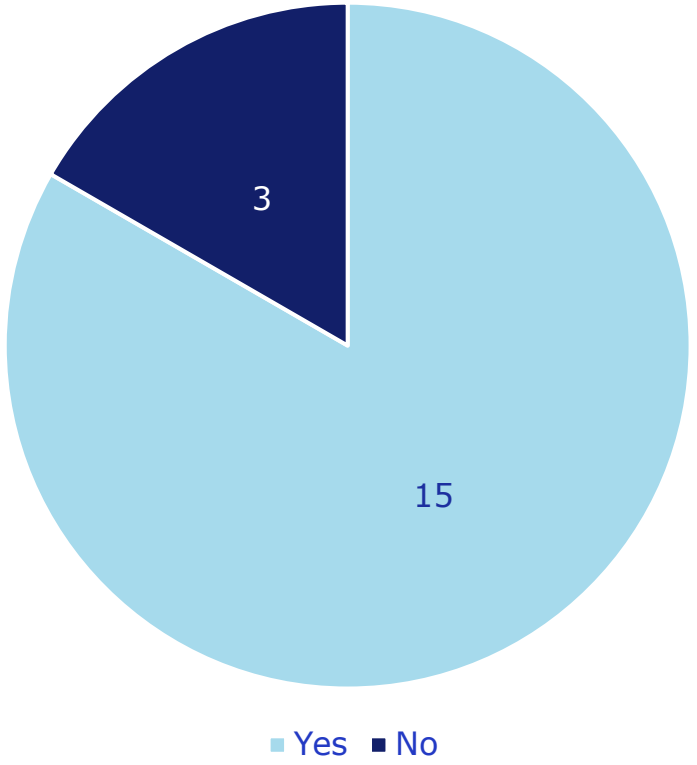
# Results – capacity-building activities

## Needs for methodological developments




Need for a flexible method that could be adapted to the national context and/or for a method common to all European countries

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# Take-home messages

- The majority of the respondents have already implemented some form of abattoir risk categorisation, and those that have not intend to do so.
- The way in which abattoir risk categorisation is conducted differs widely.
- The main included parameters are the outcomes of the CA's official audits, production figures of abattoirs, the relevance and credibility of HACCP plans and export agreements of abattoirs.
- Less than a third of the surveyed countries indicated to use results of microbiological testing as a basis for risk categorisation of abattoirs.
- No country has formally included HEIs in its risk categorisation approach.
- All respondents reported the absence of combining farm and abattoir risk categorisation systems.

# Next steps

More than 80% of respondents expressed their wish to be provided with a practical method for categorising abattoirs according to their pertained food safety risks.

Need to develop a fit-for-purpose and science-based framework for risk categorisation of abattoirs in Europe

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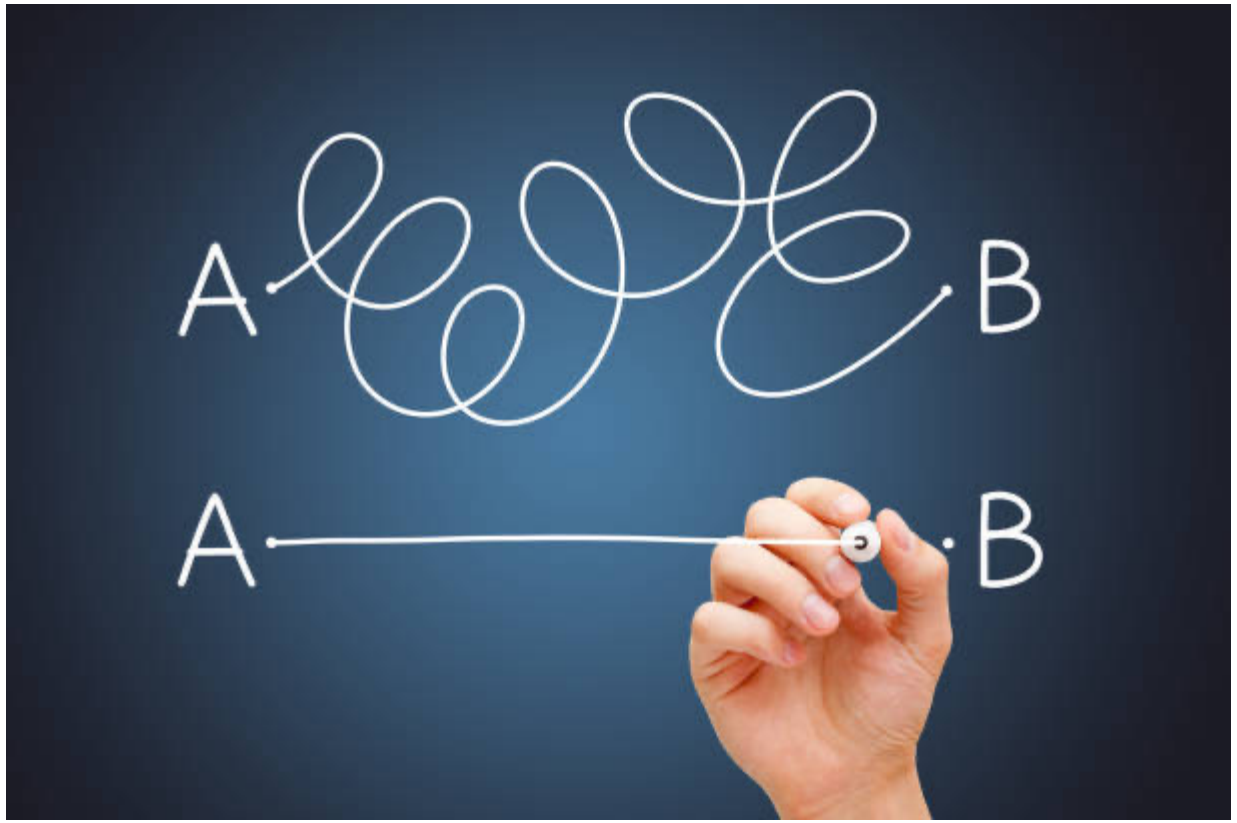
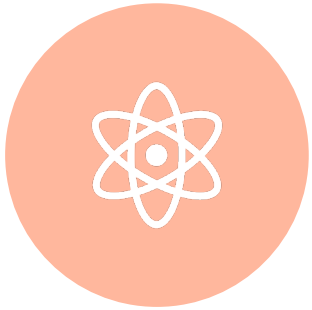



# Part 2

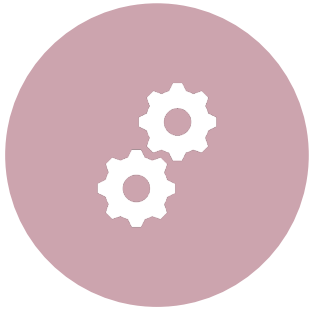
## Towards a risk-based categorisation framework

# What should the risk categorisation system look like?



Should be science-based, fit-for-purpose, and as objective as possible

Should provide a practical tool, based on a sound methodology



Should be designed for both FBOs *(e.g. as a tool to for control & internal benchmarking)* and CAs *(e.g. as a tool to adapt the frequency of official audits based on the risk level of the establishments)*

Should focus on the main public health risks

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# Priority-setting: a challenging task

- How to compare seemingly incomparable issues?
  - ‘comparing apples to oranges’
  - Essentially a priority setting issue: distinguish ‘low’ from ‘high’ (no absolute risk assessment)
- Priority setting involves integration of aspects that are essentially different
  - Different dimensions (time, place, functionality)
  - Different scales and units (minutes, km, counts)
  - Objective versus subjective (normative) aspects
- We do it everyday
  - When going shopping
  - When deciding on a place to live
  - Getting a job vs. continuing education

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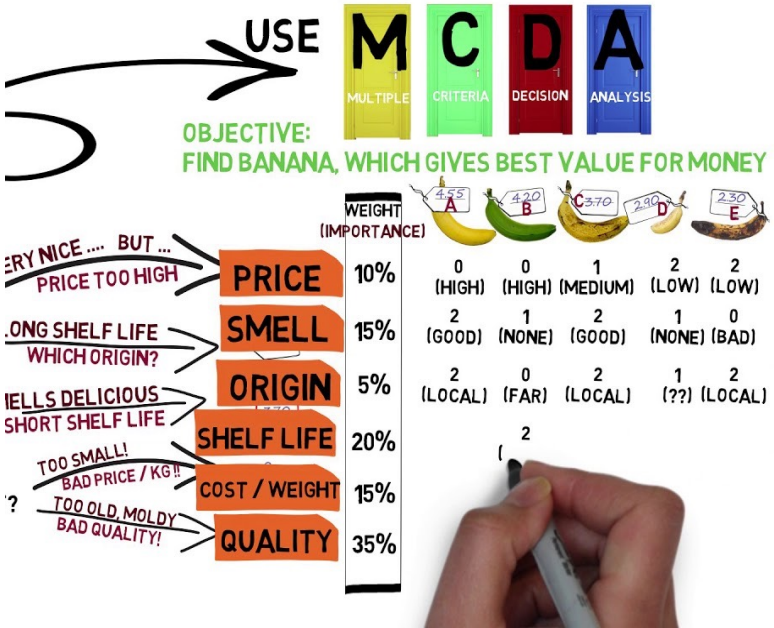
# What are the methodological options?

- Qualitative assessment?
- Quantitative ranking?
- Ideally, such prioritisation is based on quantitative models and data that allow direct comparisons. However, important aspects for prioritisation may not always be tangible and data are often lacking or of  limited quality.
- An alternative approach to purely quantitative prioritisation is multi-criteria decision analyses (MCDA), a flexible method that enables risk ranking to be based on multiple aspects that compose the risk.

# Multicriteria decision analysis (MCDA)

- Systematic approach consisting of four steps
  - Disaggregation into common attributes (e.g., ‘price’, ‘taste’ when comparing apples to oranges)
  - Normative valuation of attributes (e.g., ‘lower is better’, ‘sweeter is better’)
  - Descriptive valuation of attributes (e.g., ‘which is cheaper’, ‘which is sweeter’)
  - Aggregation of the descriptive valuation to reach a conclusion
- Preferably make the decision model explicit
  - By translating attributes into criteria
  - By developing appropriate, ordinal levels per criterion
  - Provide decision rules to facilitate objective assessments
  - Determine criteria weights to account for relative importance

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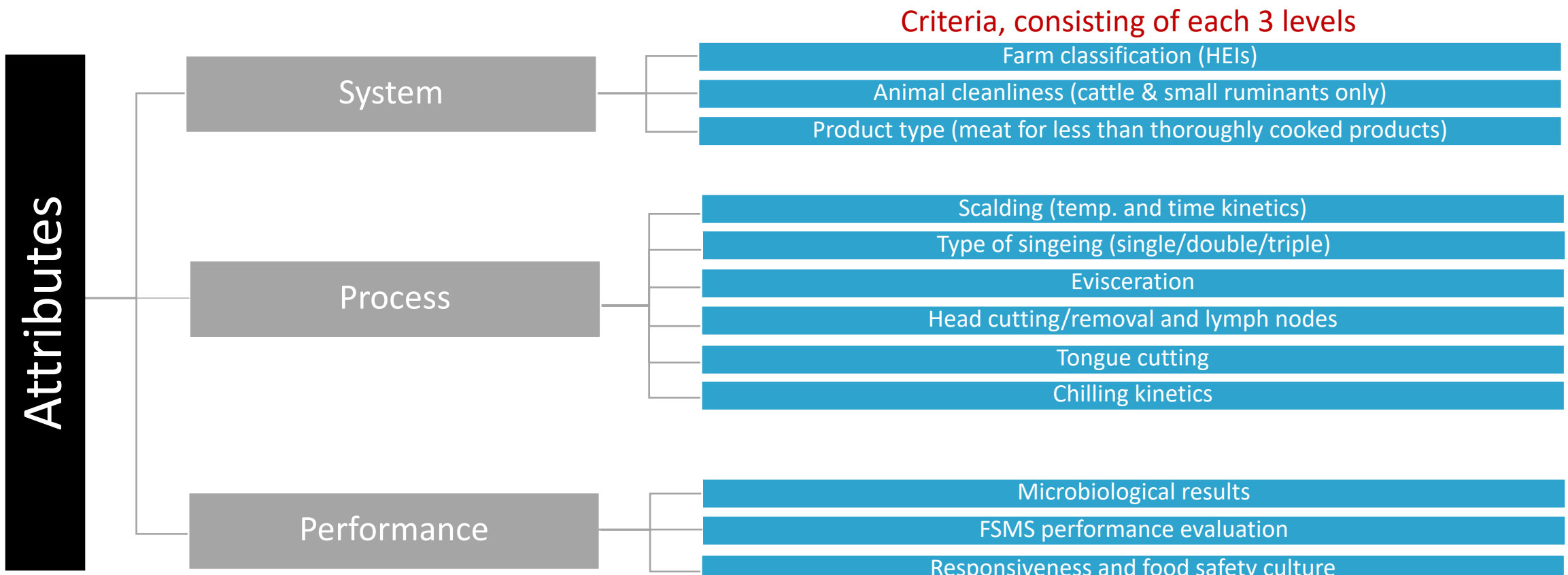
# General build-up of the risk-based categorisation

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# Prototype Excel-tool for easy implementation

| Theme | | | |
|---|---|---|---|
| System | C1. Farm-related data (input | | |
| | C2. Type of product produce (output) | | |
| | C3. Scalding | | |
| | C4. Singeing | | |
| Process | C5. Evisceration | Is evisceration conducted in a way that faecal contamination is controlled? | contamination monitoring is in place for 100% of carcasses and follow-up is demonstrably in place. |
| | C6. Head cutting/removal | To what extent is the head-related contamination controlled? | Head is removed prior to deboning and lymph nodes are not at risk of being cut during slaughter. |
| | C7. Tongue cutting | To what extent is the tonsil-related contamination controlled? | Tongues are cut out in-line with proper cleaning and disinfection of knifes. |
| | C8. Chilling | How effective is the chilling kinetics to control the main hazards? | The time for carcasses to reach 7°C since singeing is less than 18 hours but the abattoir does not monitor the chilling kinetics properly nor take corrective actions. |
| Performance | C9. Microbiological results | To what extent does the hygienic way of working limit the risks of microbiological contamination in practice? | Between 1% and 10% of daily average enterobacteriaceae counts are >2 Log. |
| | C10. FSMS performance | To what extent is the Food Safety Management System properly designed and implemented to address the relevant hazards? | The outcome of the FSMS performance evaluation is higher than 67% of the maximum score. |
| | C11. Food safety culture and responsiveness | To what extent is the food safety culture and responsiveness of the quality assurance team satisfactory? | The quality assurance team detects non-conformities and have appropriate follow-up actions. It responds to the non-compliances detected by Veterinary Services or other external auditors in a diligent and appropriate manner. |

| | | |
|---|---|---|
| Outcome | On a scale ranging from 0 (lower risk) to 100 (higher risk), the overall ranking score is: | 13.9 |
| | Meaning that the abattoir is considered as: | lower risk |

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# Take home messages

- Risk-based categorisation based on science and key drivers of food safety
  - Avoid ‘gut-feelings’ and opinions
- Multi-criteria decision analysis (MCDA) useful tool for such aims
  - Which is to differentiate between lower and higher risk abattoirs
  - Not to assess the absolute risk
- Independent criteria and criteria levels are key in the functionality
- Prototype MS Excel tool created for pigs, which is available during the pig-case studies

# Thank you for your attention.

# Any question?

We thank the representatives from European Competent Authorities for the time they devoted to the survey.

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