6° meeting of the EU Sub-group on pig welfare

Animal Based Indicators

DIRECTORATE GENERAL FOR ANIMAL HEALTH AND VETERINARY MEDICINES
MINISTRY OF HEALTH, ROME, ITALY
Outline of this presentation

I. Definitions
II. Different types of indicators
III. Specificity, sensitivity and feasibility
IV. EU Commission objectives
V. What are the indicators used for
VI. Challenges when using animal bases indicators
VII. Animal based indicators at slaughter
VIII. Italian experience
• a sign that shows or suggests the condition or existence of something

• a sign is an objective evidence of an anatomic alteration detectable on the sick animal**

**Merriam webster medical dictionary
a term used by scientists to describe the way in which the welfare of an animal is measured

are used to help determine whether the animal welfare conditions are improving, remaining stable or worsening
Animal based indicator:
- It’s a response of an animal or an effect on an animal;
- Is taken directly from the animal or indirectly and includes the use of animal records;

EFSA 2012
Iceberg indicators

They are Animal based indicators that provide an overall assessment and a valid summary helping to identify one or more welfare consequences.

e.g. poultry:
- dead on arrivals, foot pad dermatitis, breast blisters.
Animal based indicators
Measured directly on the animal

Resourced based indicators
Measured in the environment

Management based indicators
Management procedures

Other general approach indicators

Other
different
types of indicators
Specificity

Specificity is calculated as the proportion of animals truly NOT affected by the welfare consequence that the ABM identifies as not affected.

Example:
in group housed sows, the ABM ‘Agonistic behaviour’ is considered specific for the welfare consequence ‘Group stress’, as a high percentage of NOT ‘Group stressed’ sows will also NOT show ‘Agonistic behaviour’. Therefore: the absence of group stress will be correctly identified by assessing aggression.

*From EFSA 2022, p.19*
Sensitivity

Sensitivity of the ABM is defined by the proportion of animals TRULY AFFECTED by the welfare consequence that are detected as affected by the indicator (i.e. equivalent to the diagnostic sensitivity of a test for a given disease).

Example:

in group-housed sows, the ABM that assesses presence or absence of ‘Agonistic behaviour’ is considered sensitive for the welfare consequence ‘Group stress’, as a high proportion of ‘Group stressed’ sows will show the presence of ‘Agonistic behaviour’. Therefore: the presence of group stress will be detected by assessing aggression.

From EFSA 2022
Feasible/Feasibility

capable of being done or carried out (successfully) ; suitable, practicable
ABMs for assessing ‘restriction of movement’: their Sensitivity and specificity and indication to which pig categories they apply. Efsa 2022, p.58, table 12, p.58-60

<table>
<thead>
<tr>
<th>ABM</th>
<th>Pig category</th>
<th>sensitivity</th>
<th>specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nest building behaviour</td>
<td>dry sows and gilts, immediately before farrowing</td>
<td>🌟</td>
<td>🙁</td>
</tr>
<tr>
<td>Locomotory behaviour</td>
<td>All pigs</td>
<td>🌟</td>
<td>🙁</td>
</tr>
<tr>
<td>Play fighting</td>
<td>Mainly in piglets</td>
<td>🌟</td>
<td>🙁</td>
</tr>
<tr>
<td>Lying behaviour</td>
<td>All pigs</td>
<td>🌟</td>
<td>🙁</td>
</tr>
<tr>
<td>Posture changes</td>
<td>All pigs</td>
<td>🙁</td>
<td>🙁</td>
</tr>
<tr>
<td>Atypical lying down</td>
<td>Mainly sows</td>
<td>🙁</td>
<td>🙁</td>
</tr>
<tr>
<td>Pressure injuries</td>
<td>Mainly sows</td>
<td>🙁</td>
<td>🙁</td>
</tr>
<tr>
<td>Dewclaw injuries</td>
<td>Gilts and sows</td>
<td>🙁</td>
<td>🙁</td>
</tr>
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</table>
In this opinion only a broad qualitative indication of sensitivity and specificity (Yes/No), based on expert opinion, is given as guidance to the usefulness of the ABMs to assess each welfare consequence. No attempt has been made to quantify this indication, but arguments are provided to explain the reasoning by the experts.

The ABMs described in the current opinion are the ones that are applicable to the farming conditions. However, it might be that no ABMs are sensitive enough or specific to a welfare consequence or that they are not feasible to use for some categories of pigs; in these cases, assessors should rely on resource-based measures.
16 Welfare consequences having high relevance were identified.
Restriction of movement

EFSA 2022, Table 11, of p. 56

<table>
<thead>
<tr>
<th>Pig category</th>
<th>Husbandry system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gilts and dry sows</td>
<td>Individual housing in stalls</td>
</tr>
<tr>
<td>Farrowing and lactating sows</td>
<td>Individual farrowing crates</td>
</tr>
<tr>
<td>Piglets</td>
<td>Artificial rearing systems</td>
</tr>
<tr>
<td>Rearing pigs</td>
<td>Indoor group housing</td>
</tr>
<tr>
<td>Boars</td>
<td>Indoor individual housing in pens</td>
</tr>
<tr>
<td>Main factor restricting movement</td>
<td>Effects on the animal</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Inadequate floor space allowance</td>
<td>inability or unwillingness to navigate other pigs, to walk freely or access resources in the pen; as pigs grow, the effects are greater</td>
</tr>
</tbody>
</table>
EU Commission March 2022 report on animal based indicators

To explore the possibility to include aw indicators within the current review of EU aw legislation with the objective of:

- Determining compliance trends and support enforcement efforts
- Provide feedback to farmers and help them improve their practices
- Gather data in order to inform policy making at national and EU level

European Commission
Overview report: The use of indicators for animal welfare at farm level
Ares(2022)1831236 - 12/03/2022
Animal based indicators may be intended to:

**Assess** the degree of impaired functioning associated with injury, disease, and malnutrition;

**Provide information** on animals’ needs and affective states such as hunger, pain and fear, often by measuring the strength of animals’ preferences, motivations and aversions;

**Assess** the physiological, behavioural and immunological changes or effects that animals show in response to various challenges;

EFSA, Abm to assess animal welfare on dairy cows, 2012, p. 80
Other general uses of Ab indicators

- Policymaking
- Scientific policy advice
- Operational farming
- On farm monitoring of animal welfare
- Measure compliance
- Quality schemes and labelling
Better assessment of the real state of the welfare of animals at the farm level.

Determining compliance trends

Support enforcement efforts
Official controls

provide feedback to farmers and help them improve their practices

gather macro level data on the state of welfare of farm animals

inform policy making at national and EU level
Lack of understanding by farmers and Official veterinarians
Productivity reasons, higher costs
independance
Time consuming
Diversity between animals
Diversity between different farms, geographical areas

Challenges using animal based indicators
Might not fully reflect the animal welfare status

Finding the most effective indicator
Animal based indicators collected in slaughterhouses
to monitor the level of welfare on pig farms

- “a list of ABMs that can be assessed and collected at slaughter and provide information on the overall welfare condition of a certain population in a herd, farm or region/country.” Efsa 2022

- recording ABMs at slaughter can provide information for assessment and benchmarking of pig welfare on farm and in the preslaughter stage (Stark et al., 2014; Lemos Teixeira et al., 2016).
Most appropriate slaughterhouse indicators for further development

Rearing pigs

• Tail lesions
• Carcass condemnation
• Lung lesions (pleuritis and pneumonia)

Cull sows

• Carcass condemnation
• Body condition
• Shoulder ulcers
• Vulva lesions

Efsa 2022, p.7.
As mentioned in the past by Regulation (EC) 854/2004 and now by Regulation (EU) 2017/625 on official controls:

It’s mandatory to:

• verify the correct implementation of the measures expected by the legislation on animal welfare referred to in Article 1, par. 2, letter f);
• carry out checks on rearing, transport and slaughtering phases as indicated in article 21, par. 1;
• pre and post mortem inspections must be done in accordance to article 17, letter c), letter d) point iii)

Commission implementing Regulation (EU) 2019/627 of March 15, 2019

• article 39 “Communication of inspection results and measures to be taken by competent authorities in cases of specific non-compliance with requirements for fresh meat and for animal welfare”. Actions to be taken by the Official veterinarian.
Use of Animal based indicators in Italy

- the evaluation of animal indicators has been included in risk analysis on pig farms in accordance with the 2018 National action plan on tail biting prevention
- Introduction in official controls
The Italian experience
indicators for different user groups and purposes

Abm’s used for official controls

Abm’s used by farm veterinarians
Animal based indicators for farm veterinarians

Fattening pigs

Animal cleanliness
Tail lesions
Ear lesions
Lameness
Rectal prolaps

Intestinal disorders
Body condition score
Type and access to enrichment material
Respiratory disorders
Hernias
Animal based indicators for farm veterinarians

Sows and gilts

- Cutaneous lesions
- Body condition score
- Persistent investigative behaviour and stereotypes
- Lameness
- Mastitis in farrowing sows
- Body cleanliness
- Shoulder ulcers
- Bursitis
- Dermatitis
Animal based indicators for farm veterinarians

From weaning to fattening

Tail lesions
Lameness
Body cleanliness
Respiratory disorders
Intestinal disorders
bcs
Rectal prolapses
Hernias
Bursitis
Body lesions
Negative social interactions
Exploratory behaviour

Human interactions
Levels of compliance

<table>
<thead>
<tr>
<th>Level</th>
<th>Icon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient</td>
<td>😞</td>
</tr>
<tr>
<td>Approved, ok</td>
<td>😐</td>
</tr>
<tr>
<td>Optimal</td>
<td>😊</td>
</tr>
</tbody>
</table>

The Italian experience
### Indicators for tail biting risk analysis check list for farm veterinarians

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Animal indicator</th>
<th>Evaluation</th>
<th>Results</th>
</tr>
</thead>
</table>
| Behaviour               | exploratory behavior of manipulable materials          | Observe the animals in the pen and divide them into two categories: 1. n. of animals exploring enrichment material; 2. n. interacting with other pigs and with pen accessories; then apply the formula A/(A+B)\*100                                                                 | 0-18% minimum expl. behav- - insuff  
18,1-86,3% - ok  
86,4-100% - optimal                                                                                           |
| Skin                    | animal cleanliness                                     | For each animal, consider one side and if dirtiness exceeds 50%;                                                                                                                                                                                                                                                                         | > 13% dirty animals - insuff.  
6-13% dirty animals - ok  
<6% - optimal                                                                                                       |
| Signs of disease        | enteric disorders                                      | Only consider the number of pens where there are liquid feces                                                                                                                                                                                                                                                                          | >15% - insuff  
6-15% - ok  
<6% - optimal                                                                                                       |
| Body lesions a          | ear lesions                                            | Visible bleeding and/or loss of tissue more or less extensive of the ear tips                                                                                                                                                                                                 | >5% of the animals lesions- insuff.  
1-5% - ok  
<1% - optimal                                                                                                       |
| Body lesions b          | tail lesions                                           | The following lesions are considered: visible bleeding; presence of swelling and infection; lack of tissue and the presence of a scab;                                                                                                                                                                                                 | >2% (>7% if intact) – insuff  
1-2% (4-7% if intact) – ok  
<1% (<4% if intact) – optimal                                                                                     |
Animal based indicators for Official veterinarians

Sows, weaners and fattening pigs

Tail lesions

Lameness

Body lesions

Body cleanliness

Exploratory behaviour
### Parameter

<table>
<thead>
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<th>Results</th>
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</thead>
</table>
| **Behaviour**    | exploratory behavior of manipulable materials | Observe the animals in the pen and divide them into two categories: 1. is n. of animals exploring enrichment material; 2. is n. interacting with other pigs and with pen accessories; then apply the formula \( A/(A+B) \times 100 \) | **Insuff:** 0-18% minimum expl. behav.  
**Ok:** 18.1-86.3% -  
**Optimal:** 86.4-100% - |
| **Skin**         | Body lesions | presence of body lesions, scratches etc | **Insuff:** >26% of animals with minor injuries and/or more than 17% with severe injuries;  
**Ok:** Between 12% and 26% of animals with minor injuries and/or between 8% and 17% with severe injuries;  
**Optimal:** <12% of animals with minor injuries and < than 8% of severe injuries. |
| **Signs of disease** | lameness | Consider only animals with evident lameness: 1 = The animal is limping visibly, minimal load on the affected limb, has an asymmetrical gait; 2 = Animal that does not support its weight on a limb or cannot walk. | **Insuff:** > 9% of animals with lameness 1 and/or more than 3% with lameness 2.  
**Ok:** between 4% and 9% of animals with lameness 1 and/or between 1% and 3% with lameness 2.  
**Optimal:** Less than 4% of animals with lameness 1 and less than 1% with lameness 2. |
| **Skin**         | skin cleanliness | Reproduction: 1. body dirtiness of 10% - 30%; 2. body dirtiness of > 30%. Weaning-Fattening: 1. body dirtiness of 20% - 50%; 2 body dirtiness >50% | **Insuff:** >46% with (1) and/or > 13% with (2)  
**Ok:** 20%-46% with (1) and/or between 6% and 13% with (2).  
**Optimal:** < 20% with (1) and < 6% (2) |
| **Lesions**      | tail lesions | The following lesions are considered: visible bleeding; presence of swelling and infection; lack of tissue and the presence of a scab; | **Insuff:** >2% (>7% if intact)  
**Ok:** 1-2% (4-7% if intact)  
**Optimal:** <1% (<4% if intact) |
Italian experience: using indicators during official controls

In Italy, evaluations of the animal based indicators do not influence directly the final conclusions of compliance. They are, however, essential in order to confirm suspicion of non compliance.
Italian experience: overall situation

Map of current aw indicators throughout Italian pig farms regarding tail docking compliance
Italian experience: farm level

Map of current aw tail docking on a single farm
National guidelines

How to evaluate animal based indicators during tail biting risk analysis and Official controls

For Official controls

Risk analysis
For farm veterinarians

Reproduction:
sow and gilts

From weaning to fattening
Thank you