

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

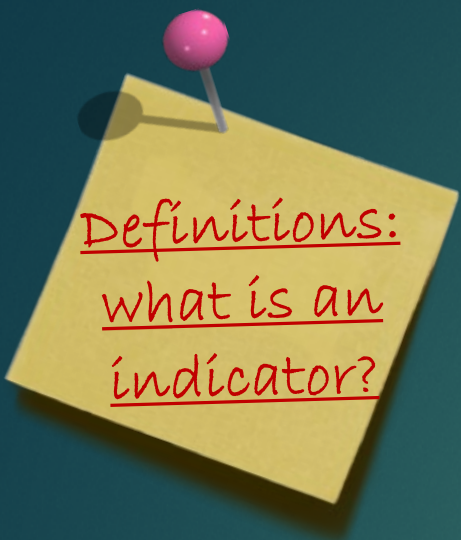
Animal Based Indicators

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 based indicators
- VII. Animal based indicators at slaughter
- VIII. Italian experience



Definitions:  
what is an  
indicator?

- 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 dictionary*

*\*\*Merriam webster medical dictionary*



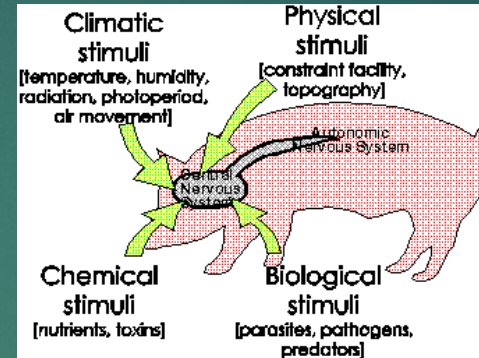
Definitions:

what is an  
animal based  
indicator?

- 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;

Entry No.	Date of Administration	Name and Quantity of Animal Remedy Administered per Animal		Identity of Animal Given the Remedy (Including the lot no. or a clear reference to 2) State Number of Animals if each Treatment	Date of Start of Withdrawal Period if Any	Name of Person Administering the Remedy	Name of Practising Veterinary Surgeon (if applicable)	Comment (Optional)
		Remedy Name	Purchase No. (Optional)					
01	01/07/16	Ivomec Super	6-8ml	All weanlings (10)	05/07/16	Joe Fawcett		All weanlings on farm
02	03/07/16	Pen and Shep	10ml	EX717277C0163	24/07/16	Joe Fawcett	Tom Vet	Individual treatment
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								

\*The Purchase Number (from the Purchase Record) can be used in its own instead of the name of the product.

EFSA 2012

What is an indicator?  
Other definitions of ab indicators

What is an  
indicator?

Other  
definitions of  
ab indicators

## 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.



Other  
different  
types of  
indicators



Animal  
based  
indicators

Measured directly  
on the animal



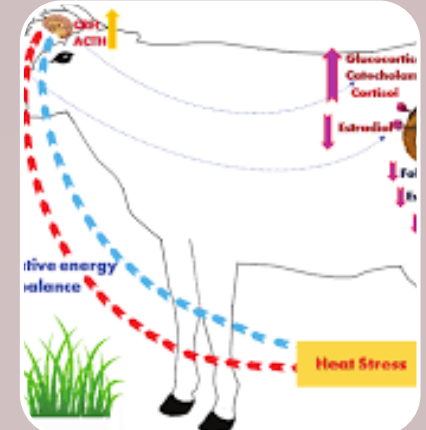
Resourced  
based  
indicators

Measured in the  
environment



Management  
based  
indicators

Management  
procedures



Other  
general  
approach  
indicators

Ab

indicators:  
Important  
elements to  
consider

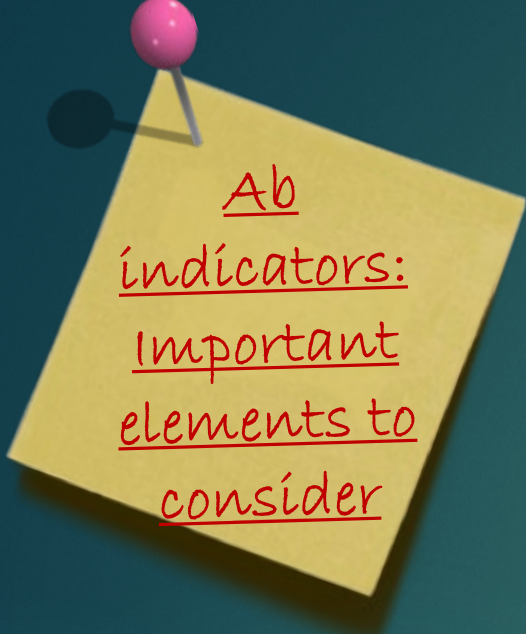
## Specificity

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.





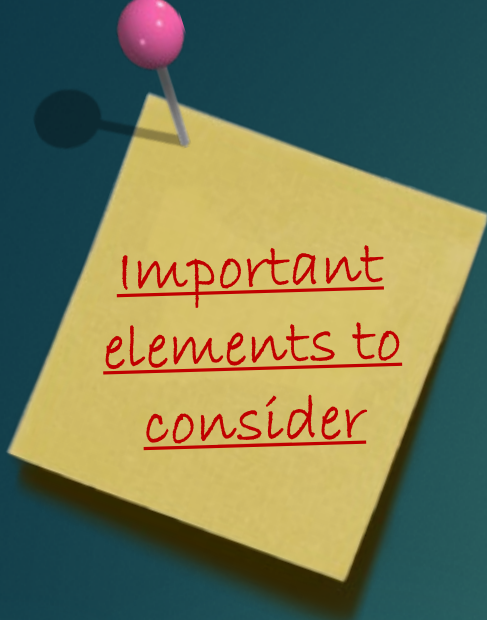
Ab  
indicators:  
Important  
elements to  
consider

## 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.



















Important  
elements to  
consider

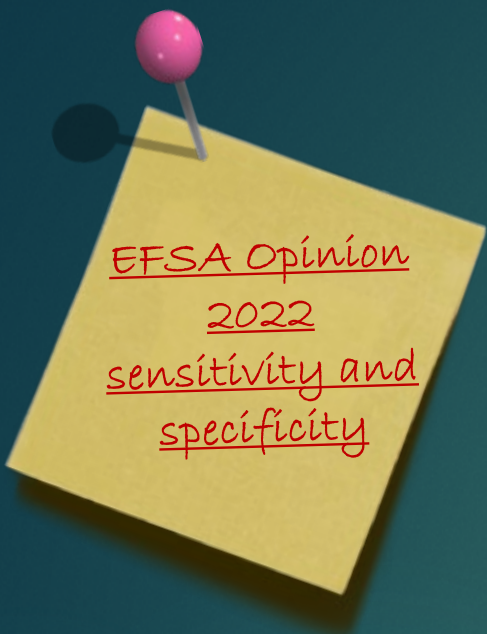
## Feasible/Feasibility

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

Examples of sensitivity and specificity

ABM	Pig category	sensitivity	specificity
Nest building behaviour	dry sows and gilts, immediately before farrowing		
Locomotor behaviour	All pigs		
Play fighting	Mainly in piglets		
Lying behaviour	All pigs		
Posture changes	All pigs		
Atypical lying down	Mainly sows		
Pressure injuries	Mainly sows		
Dewclaw injuries	Gilts and sows		



EFSA Opinion  
2022  
sensitivity and  
specificity

## EFSA 2022

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.**

EFSA  
Opinion  
2022

16 Welfare consequences having high relevance were identified

Welfare consequences	Pig husbandry systems																
	Gilts + dry sows			Farrowing and lactating sows			Piglets				Weaners		Rearing pigs		Boars		
	Individual stalls	Indoor group	Outdoor paddock	Individual crates	Individual pens	Outdoor paddock	Individual crates	Individual pens	Artificial rearing systems	Outdoor paddock	Indoor group	Indoor with access to outdoor area	Outdoor paddock	Indoor group	Indoor with access to outdoor area	Outdoor paddock	Indoor individual pens
Restriction of movement	x			x					x				x				x
Resting problems	x			x									x				
Group stress	x	x	x	x			x	x	x	x	x	x	x	x			
Isolation stress																	x
Separation stress									x								
Inability to perform exploratory or foraging behaviour	x	x		x			x		x		x	x		x	x		x
Inability to express maternal behaviour				x													
Inability to perform sucking behaviour									x								
Prolonged hunger	x	x	x				x	x	x	x							x
Prolonged thirst							x	x		x							
Heat stress				x													
Cold stress										x			x				
Locomotoratory disorders (including lameness)		x											x	x			x
Soft tissue lesions and integument damage		x		x			x	x		x	x	x		x	x		
Respiratory disorders													x	x			
Gastro-enteric disorders											x	x	x				



# Restriction of movement

EFSA 2022, Table 11, of p. 56

**Table 11:** Pig categories and husbandry systems for which 'restriction of movement' was identified by experts as a highly relevant welfare consequence

<b>Pig category</b>	<b>Husbandry system</b>
Gilts and dry sows	Individual housing in stalls
Farrowing and lactating sows	Individual farrowing crates
Piglets	Artificial rearing systems
Rearing pigs	Indoor group housing
Boars	Indoor individual housing in pens


WELFARE  
CONSEQUENCES

for rearing pigs

Example:  
restriction of  
movement

Efsa 2022, p57



Main factor restricting movement	Effects on the animal	Interpretation	signs	Non specific Animal based measure
<p>Inadequate floor space allowance</p> 	<p>inability or unwillingness to navigate other pigs, to walk freely or access resources in the pen; as pigs grow, the effects are greater</p>	<p>&gt; difficulty for pigs to maintain separate dunging and resting areas</p> <p>&lt; ability of pigs to escape aggressive interaction;</p> <p>&lt;inability to lie laterally;</p>	<p>&gt; difficulty for pigs to maintain separate dunging areas;</p>	<p>Skin cleanliness</p>
			<p>&gt;aggression related injuries in slaughter weight pigs;</p>	<p>&gt;tail lesions because of tail biting;</p>
			<p>&lt; health and welfare;</p>	<p>Lesions at slaughter</p>
			<p>&lt;thermoregulation;</p>	<p>Panting, shivering</p>

## 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:

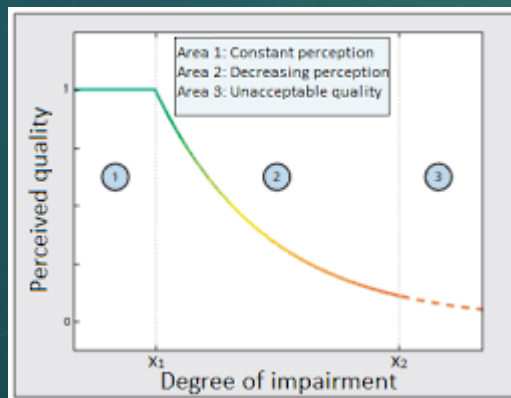
- Determining compliance trends and support enforcement efforts
- Provide feedback to farmers and help them improve their practices
- Gather data in order to inform policy making at national and EU level



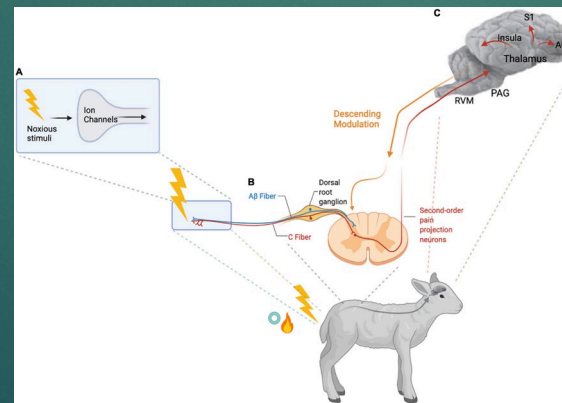
What is an animal based indicator used for?

# Animal based indicators may be intended to:

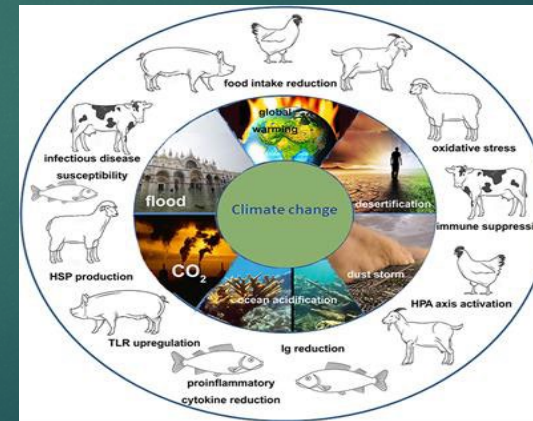
assess the degree of impaired functioning associated with injury, disease, and malnutrition;



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**;



# Other general uses of Ab indicators



policymaking



Scientific  
policy advice



Operational  
farming



On farm  
monitoring of  
animal  
welfare



Measure  
compliance



Quality  
schemes and  
labelling

# Official controls

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



Challenges  
using animal  
based  
indicators



Lack of understanding  
by farmers and Official  
veterinarians



Productivity reasons,  
higher costs



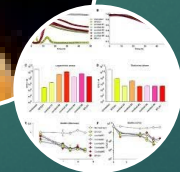
independance



Time consuming

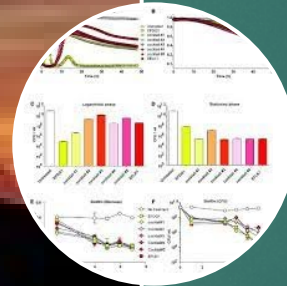


Diversity between  
animals



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

*Efsa 2022, p.7.*

## Rearing pigs

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

## Cull sows

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





# Legal reference

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

The Italian  
experience

# Animal based indicators for farm veterinarians

## Fattening pigs



Animal cleanliness



Tail lesions



Ear lesions



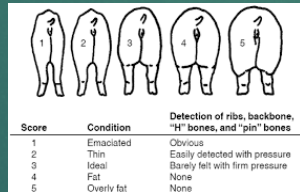
lameness



Rectal prolaps



Intestinal disorders



Body condition score



Type and access to enrichment material



Respiratory disorders



hernias

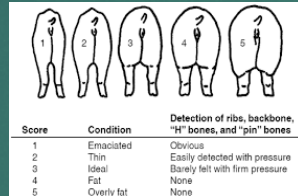
The Italian  
experience

# 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

The Italian  
experience

# Animal based indicators for farm veterinarians

## From weaning to fattening



Tail lesions



lameness



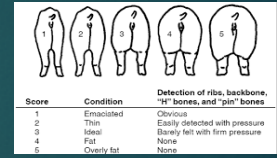
Body cleanliness



Respiratory disorders



Intestinal disorders



bcs



Rectal prolaps



hernias



bursitis



Body lesions



Negative social interactions



Exploratory behaviour



Human interactions

# Levels of compliance

The Italian  
experience

Insufficient



Approved, ok



Optimal



# Indicators for tail biting risk analysis check list for farm veterinarians

Parameter	Animal indicator	Evaluation	Results
<b>Behaviour</b>	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 $A/(A+B) \times 100$	0-18% minimum expl. behav- - <b>insuff</b> 18,1-86,3% - <b>ok</b> 86,4-100% - <b>optimal</b>
<b>Skin</b>	animal cleanliness	For each animal, consider one side and if dirtiness exceeds 50%;	> 13% dirty animals - <b>insuff.</b> 6-13% dirty animals - <b>ok</b> <6% - <b>optimal</b>
<b>Signs of disease</b>	enteric disorders	Only consider the number of pens where there are liquid feces	>15% - <b>insuff</b> 6-15% - <b>ok</b> <6% - <b>optimal</b>
<b>Body lesions a</b>	ear lesions	Visible bleeding and/or loss of tissue more or less extensive of the ear tips	>5% of the animals lesions- <b>insuff.</b> 1-5% - <b>ok</b> <1% - <b>optimal</b>
<b>Body lesions b</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) – <b>insuff</b> 1-2% (4-7% if intact) – <b>ok</b> <1% (<4% if intact) – <b>optimal</b>



The Italian  
experience

# Animal based indicators for Official veterinarians

Sows, weaners and fattening pigs



Tail lesions



lameness



Body lesions



Body  
cleanliness



Exploratory  
behaviour

# Check list for Official veterinary inspections

Parameter	Animal indicator	Evaluation	Results
<b>Behaviour</b>	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 $A/(A+B) \times 100$	<b>insuff:</b> 0-18% minimum expl. behav <b>Ok:</b> 18,1-86,3% - <b>optimal:</b> 86,4-100% -
<b>Skin</b>	Body lesions	presence of body lesions, scratches etc	<b>Insuff:</b> >26% of animals with minor injuries and/or more than 17% with severe injuries; <b>Ok:</b> Between 12% and 26% of animals with minor injuries and/or between/n 8% and 17% with severe injuries; <b>Optimal;</b> <12% of animals with minor injuries and <than 8% of severe injuries.
<b>Signs of disease</b>	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.	<b>Insuff:</b> > 9% of animals with lameness 1 and/or more than 3% with lameness 2. <b>Ok:</b> between 4% and 9% of animals with lameness 1 and/or between 1% and 3% with lameness 2. <b>OPTIMAL:</b> Less than 4% of animals with lameness 1 and less than 1% with lameness 2
<b>Skin</b>	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%	<b>Insuff:</b> >46% with (1) and/or > 13% with (2) <b>Ok:</b> 20%-46% with (1) and/or between 6%-13% with (2). <b>OPTIMAL:</b> < 20% with (1) and < 6% (2)
<b>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;	<b>Insuff:</b> >2% (>7% if intact) <b>Ok:</b> 1-2% (4-7% if intact) <b>Optimal:</b> <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



Check-List Ministeriale - Valutazione del rischio morsicatura code (Svezzamento - Ingrassio)

ANAGRAFICA E INFORMAZIONI GENERALI			
Codice Allevamento	113BS005-CA		
Ragione Sociale	SOC. AGR. PORRI DI BULGARI E C. SS		
Tipologia Produzione	CICLO APERTO		

DATI AZIENDALI			
Numero Animali	4180		
Mortalità	2,00		
Genetica	INGROCIO		

TIPOLOGIA BOX E DISTRIBUZIONE ANIMALI				
SVEZZAMENTO			INGRASSO	
Numero Box	Tipologia	Numero Animali	Numero Box	Numero Animali
1	Grigliato plastica metallo	1000	3	Fessurato 1580
2	Letteria	600		
3	Fessurato	1000		

TAGLIO CODA: SI (TUTTI I GRUPPI) Parziale

VALUTAZIONE COMPLESSIVA	LIVELLO GENERALE DI RISCHIO PER AREE	
	Punteggio Azienda	Media CLASSYFARM
AREA A (Management aziendale)	72,44	78,20
AREA B (Strutture ed attrezzature)	63,49	83,42
AREA C (Animal-based measures)	57,22	67,73
	91,93	87,09

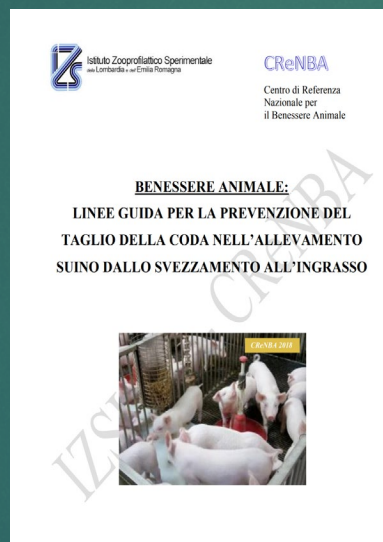
	SINTESI DEI CRITERI		
	Livello Migliorabile	Livello Ottimale	Totale
ABMs	4	20	24
Management	6	2	7
Strutture	24	5	29
Totale	33	27	60

# National guidelines

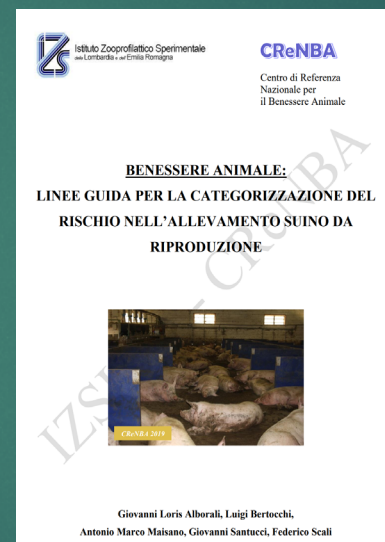
How to evaluate animal based indicators during tail biting risk analysis and Official controls



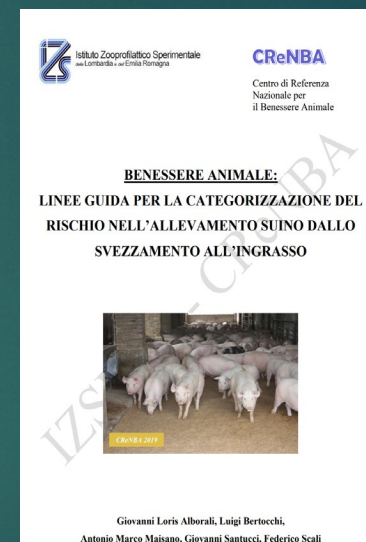
For Official controls



Risk analysis  
For farm veterinarians



Reproduction:  
sow and gilts



From weaning to fattening

Thank you