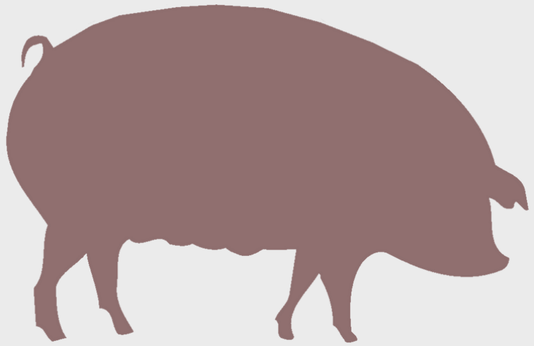
UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO DI MEDICINA VETERINARIA
E SCIENZE ANIMALI

divas



Abattoir inspection as early warning system to improve pig welfare at farm level

Marta Comin, Gaia Pesenti Rossi, Marzia Borciani, Elisabetta Canali, Emanuela Dalla Costa, Alessandro Gastaldo, Ambra Motta, Sara Barbieri, Eugenio Scanziani

HSA International Conference 2022
Livestock Welfare during Transport, Marketing and Slaughter

Humane Slaughter Association

The role of meat inspection

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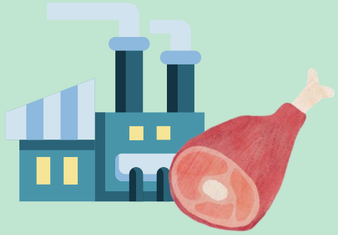
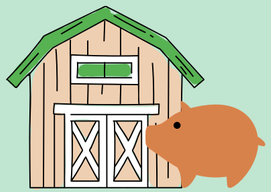


First level screening >>> reducing food-borne risk to public health

monitoring animal health
collecting epidemiological data



Feedback system >>> taking actions to improve animal health and welfare on-farm

information to the farmer

Merialdi et al., 2011; Harley et al., 2012; Neumann et al., 2014; van Staarveren et al., 2017; Bottacini et al., 2018; Ghidini et al., 2018

The role of Iceberg Indicators

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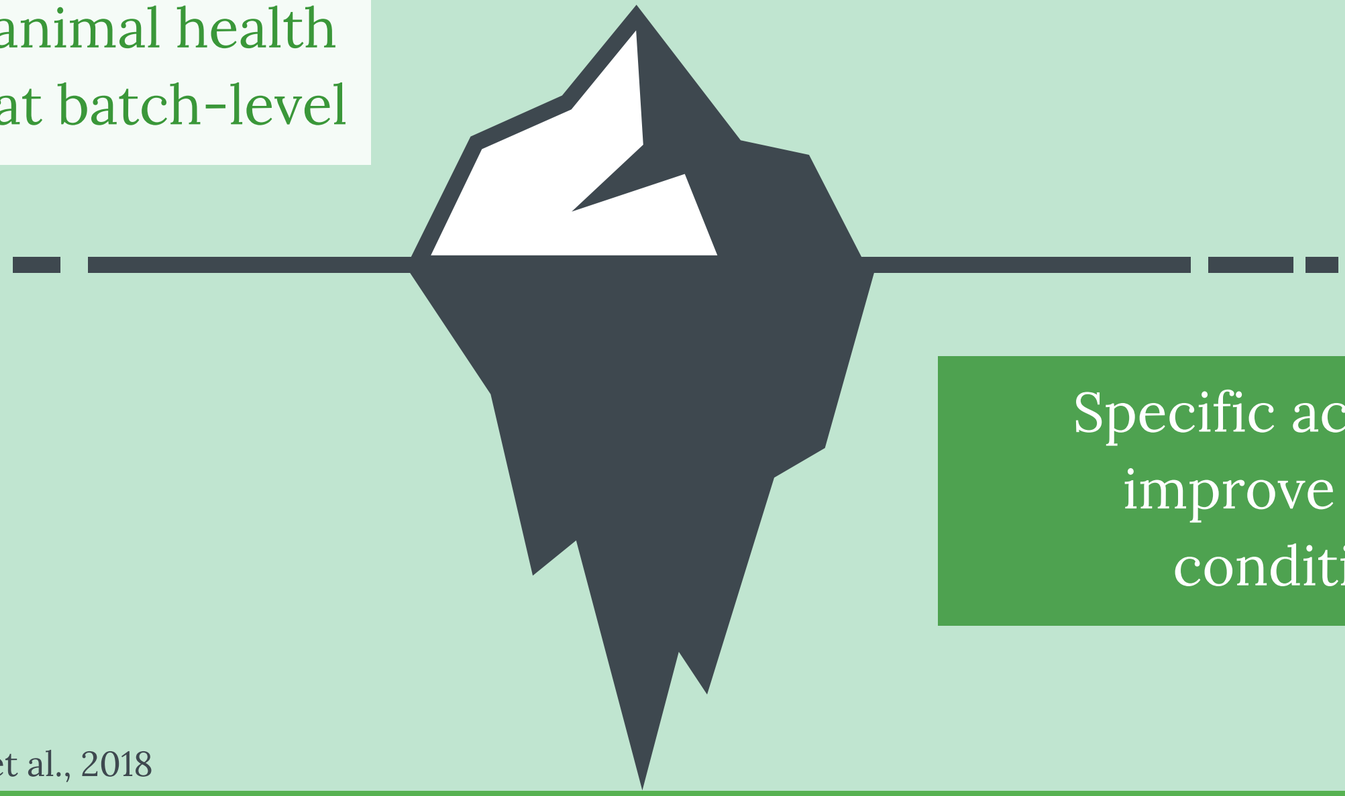
Iceberg indicators - key welfare indicators that can reflect, or are closely correlated with, a range of other welfare indicators.

(FAWC, 2009)

Surveillance tool in monitoring animal health and welfare at batch-level



Specific action to improve herd condition

van Staarveren et al., 2017; Bottacini et al., 2018

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Sustainable pigmeat supply chain

Rural Development Program
2014/2020

High quality animal product
in the North of Italy

Humane Slaughter Association

The aim of this study was to evaluate whether the abattoir inspection can be used as an early warning of welfare issues at farm level

Materials & Methods

1. Definition of visual-only meat inspection protocol

2. Training assessors

3. Data collection at slaughter

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1 Definition of visual-only meat inspection protocol

- A SET OF **VALID** AND **FEASIBLE** INDICATORS APPLICABLE DURING THE ROUTINARY MEAT INSPECTION

- SELECTED INDICATORS SHOULD BE **RELEVANT** FOR ANIMAL WELFARE, **FEASIBILE** AND **DETECTABILE** ON CARCASS AND VISCERA AT THE SLAUGHTERLINE

Carcass indicators

Humane Slaughter Association

CHRONIC TRAUMATIC WOUNDS

WOUNDS INVOLVING SUBCUTANEOUS TISSUES (OR MUSCLE), GRANULATION TISSUE, FIBROUS CONNECTIVE TISSUE AND/OR INFLAMMATORY COMPLICATIONS

DALMAU ET AL., 2009, MODIFIED

EAR LESIONS

PRESENCE OF WOUNDS OR LACK OF EXTENDED PART OF THE AURICLE OR MORE THAN THREE BLEEDING LESIONS

WELFARE QUALITY®, 2009, MODIFIED
BOTTACINI ET AL., 2018, MODIFIED

TAIL LESIONS

EVIDENT BLEEDING ON THE TAIL WITH SWELLING AND INFECTION. PART OF THE TISSUE IS MISSING OR AN ESCHAR HAS FORMED

WELFARE QUALITY®, 2009

BURSITIS

PRESENCE OF FLUID-FILLED SACS OF SYNOVIAL FLUID OF A SIZE GREATER THAN 5 CM (EXTREMELY LARGE BURSA)

WELFARE QUALITY®, 2009

BONE DEFORMITY

PRESENCE OF EVIDENT BONE SWELLING

KONGSTED AND SORENSEN, 2017

Internal organs indicators

Humane Slaughter Association

PERICARDITIS

PERICARDITIS IS DEFINED AS ADHESIONS BETWEEN THE HEART AND THE PERICARDIUM AS AN OUTCOME OF A PREVIOUS FIBRINOUS PERICARDITIS

WELFARE QUALITY®, 2009

WHITE LIVER SPOTS

PRESENCE OF WHITE SPOTS IN THE LIVER, INDICATIVE OF THE TRANSHEPATIC MIGRATION OF THE LARVAE OF ASCARIS SUUM

WELFARE QUALITY®, 2009

PLEURITIS

PLEURITIS IS DEFINED AS AN INFLAMMATION OF THE PLEURAE. IT CAN LEAD TO ADHESIONS OF THE LUNGS WITH THE PLEURA AS AN OUTCOME OF A PREVIOUS FIBRINOUS PLEURISY

WELFARE QUALITY®, 2009

ENZOOTIC PNEUMONIA

PNEUMONIA IS DEFINED AS LUNGS WITH INFLAMMATORY PROCESSES AND WITH CONSOLIDATION OF THE LUNGS

WELFARE QUALITY®, 2009

Possibly "iceberg" indicators for...

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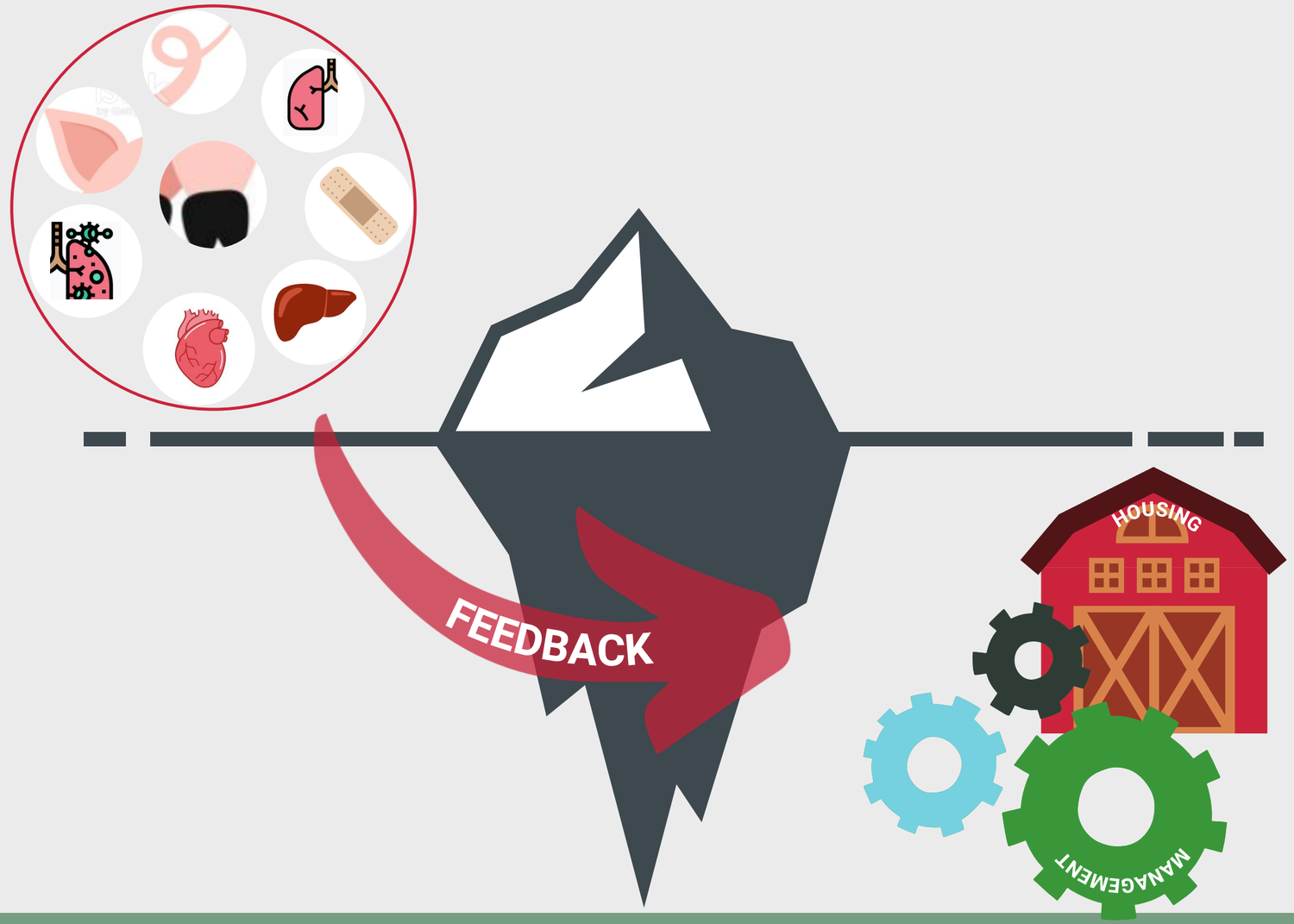

Materials and Methods

Inclusion criteria for farms

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	INDICATOR	REFERENCES	
CARCASS	Chronic traumatic wounds	Dalmau et al., 2016	5%
	Tail lesions	Kongsted and Sorensen, 2017; Bottacini et al., 2018	7.1% 0%
	Ear lesions	Bottacini et al., 2018	10%
	Bursitis	Kongsted and Sorensen, 2017; Bottacini et al., 2018	30.9% 1%
	Bone deformity	Kongsted and Sorensen, 2017	5.1%
INTERNAL ORGANS	Pericarditis	Dalmau et al., 2016; Ghidini et al., 2018	0% 3.22%
	Pleurisy	Dalmau et al., 2016; Ghidini et al., 2018	5% 15.46%
	Enzootic pneumonia	Dalmau et al., 2016; Ghidini et al., 2018	15% 6.43%
	White liver spots	Dalmau et al., 2016	14.5%

Inclusion criteria for farms

Humane Slaughter Association

	INDICATOR	REFERENCES		WARNING THRESHOLD
CARCASS	Chronic traumatic wounds	Dalmau et al., 2016	5%	5%
	Tail lesions	Kongsted and Sorensen, 2017; Bottacini et al., 2018	7.1% 0%	1%
	Ear lesions	Bottacini et al., 2018	10%	10%
	Bursitis	Kongsted and Sorensen, 2017; Bottacini et al., 2018	30.9% 1%	3%
	Bone deformity	Kongsted and Sorensen, 2017	5.1%	0,5%
INTERNAL ORGANS	Pericarditis	Dalmau et al., 2016; Ghidini et al., 2018	0% 3.22%	3%
	Pleurisy	Dalmau et al., 2016; Ghidini et al., 2018	5% 15.46%	15%
	Enzootic pneumonia	Dalmau et al., 2016; Ghidini et al., 2018	15% 6.43%	6,5%
	White liver spots	Dalmau et al., 2016	14.5%	10%

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2 Training Assessors

- THREE WELFARE OFFICERS WERE TRAINED TO ASSESS ALL THE INDICATORS THROUGH ONE-DAY TRAINING
(Reg 2009/1099/CE; Reg 2004/854/CE; Reg 2014/219/CE)

- TEST FOR PROTOCOL LEARNING (minimum: 70% of correct answers)

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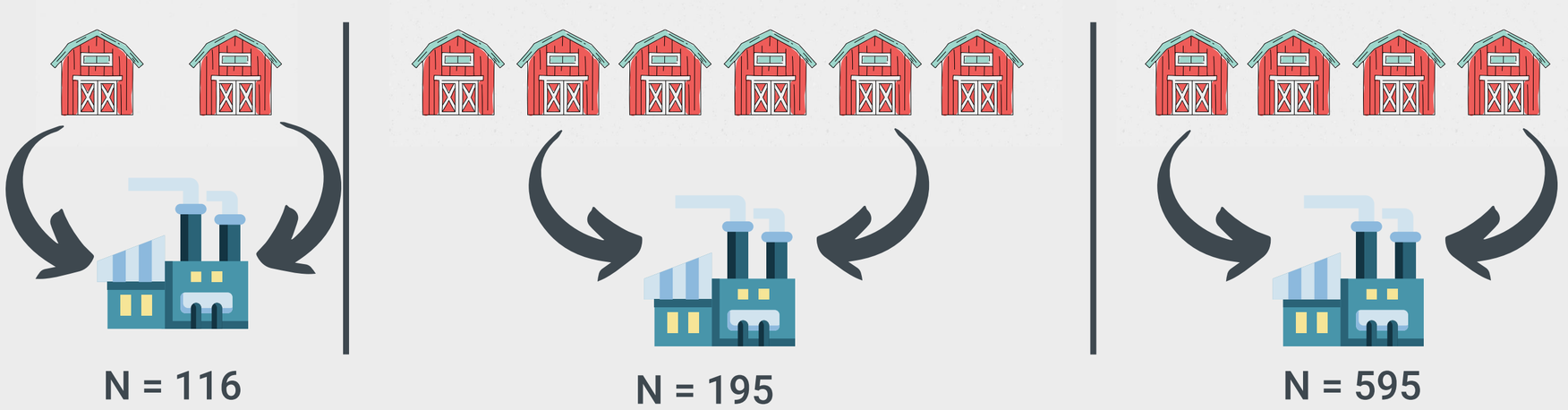
3 Data Collection at slaughter

- OCTOBER 2019 - MAY 2020

12 INTENSIVE COMMERCIAL FARMS

3 ABATTOIRS



a total of 906 carcasses

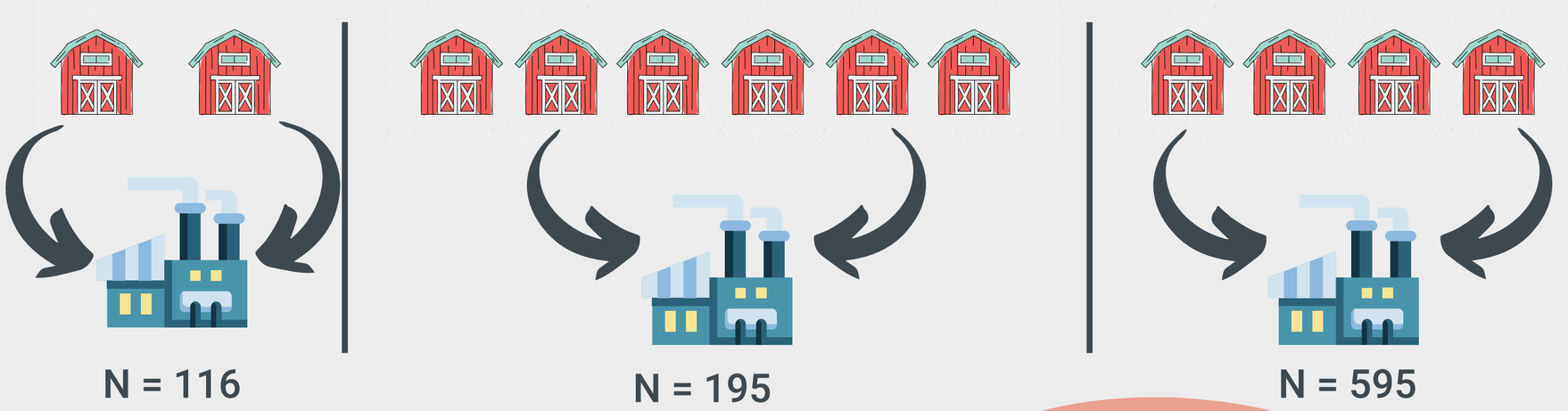
Humane Slaughter Association

3 Data Collection at slaughter

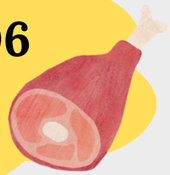
- OCTOBER 2019 - MAY 2020

12 INTENSIVE COMMERCIAL FARMS

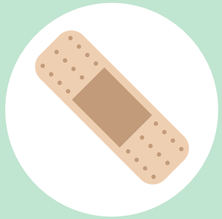
3 ABATTOIRS



a total of 906 carcasses

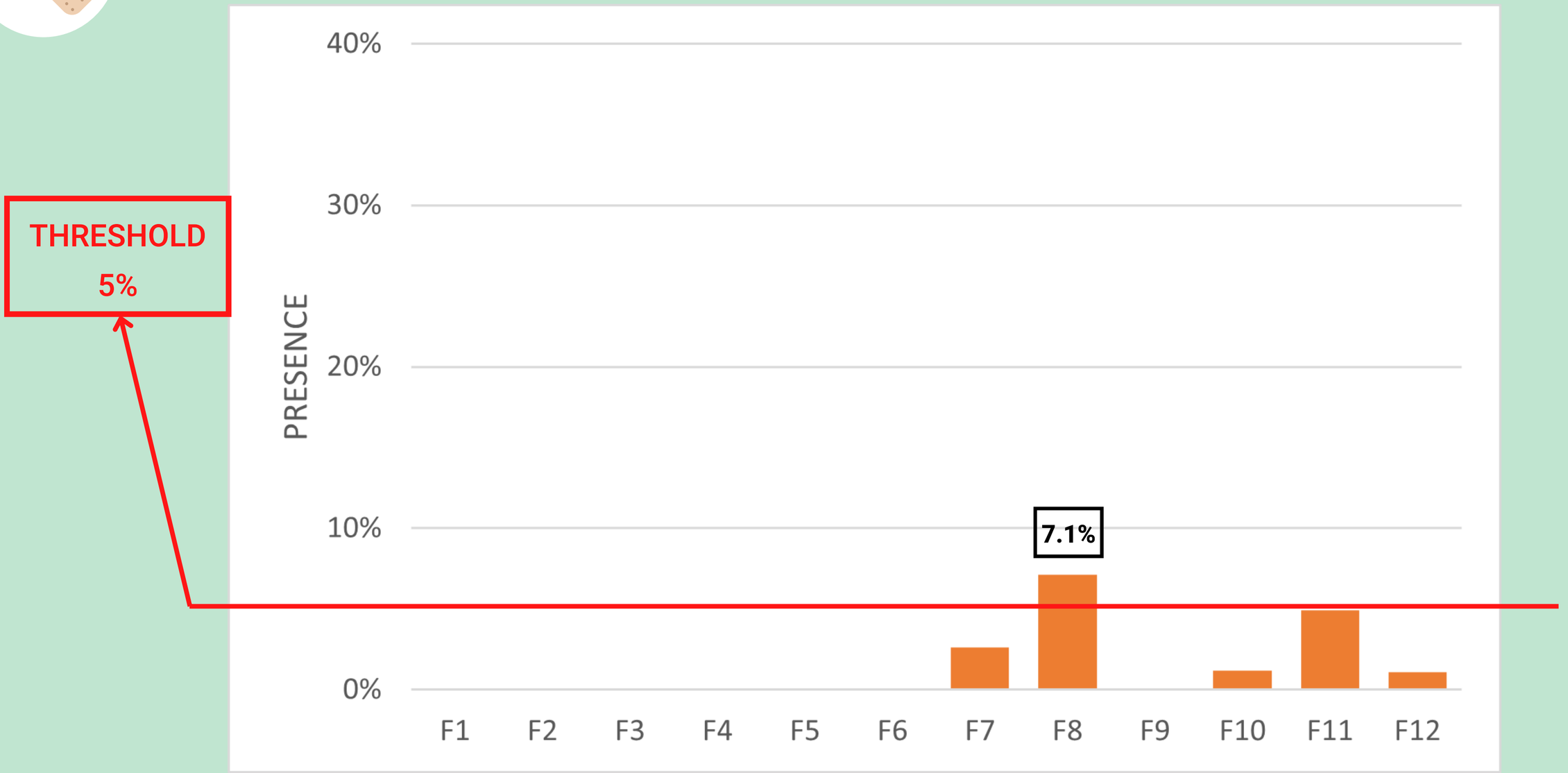


10% of pig slaughtered each day from each batch from each farm



CHRONIC TRAUMATIC WOUNDS

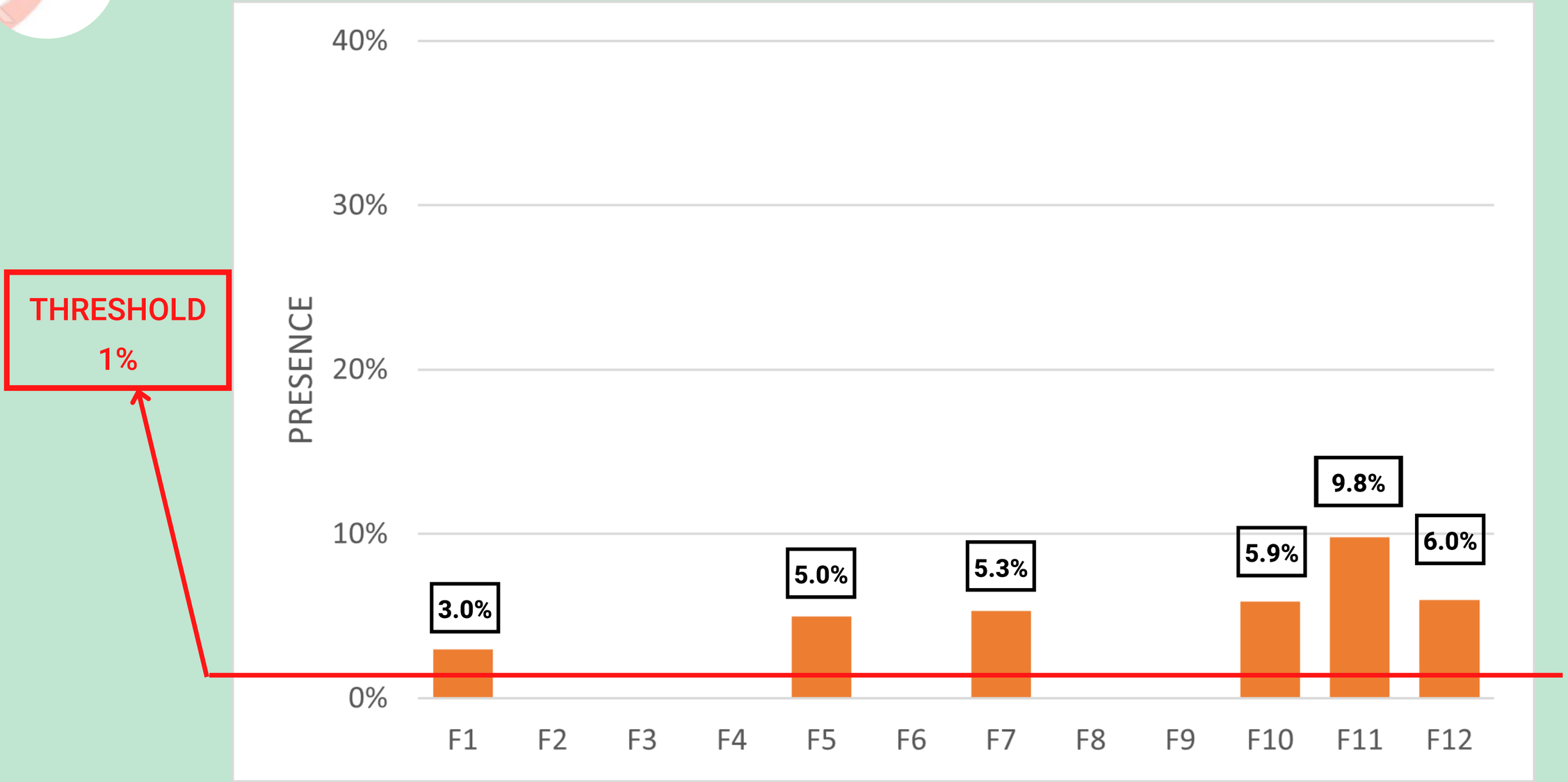
Humane Slaughter Association



Results and Discussion

TAIL LESIONS

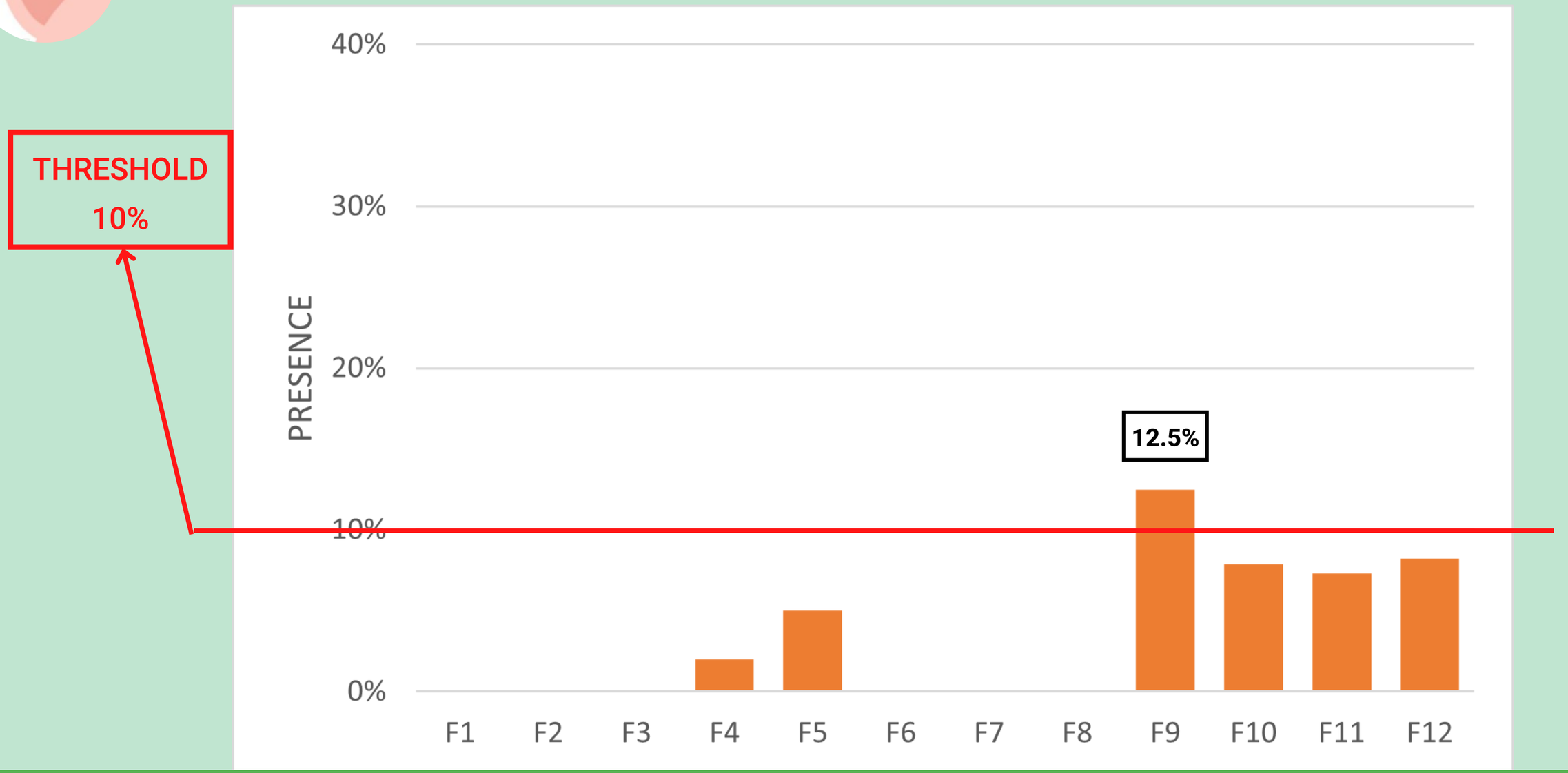
Humane Slaughter Association



Results and Discussion

EAR LESIONS

Humane Slaughter Association

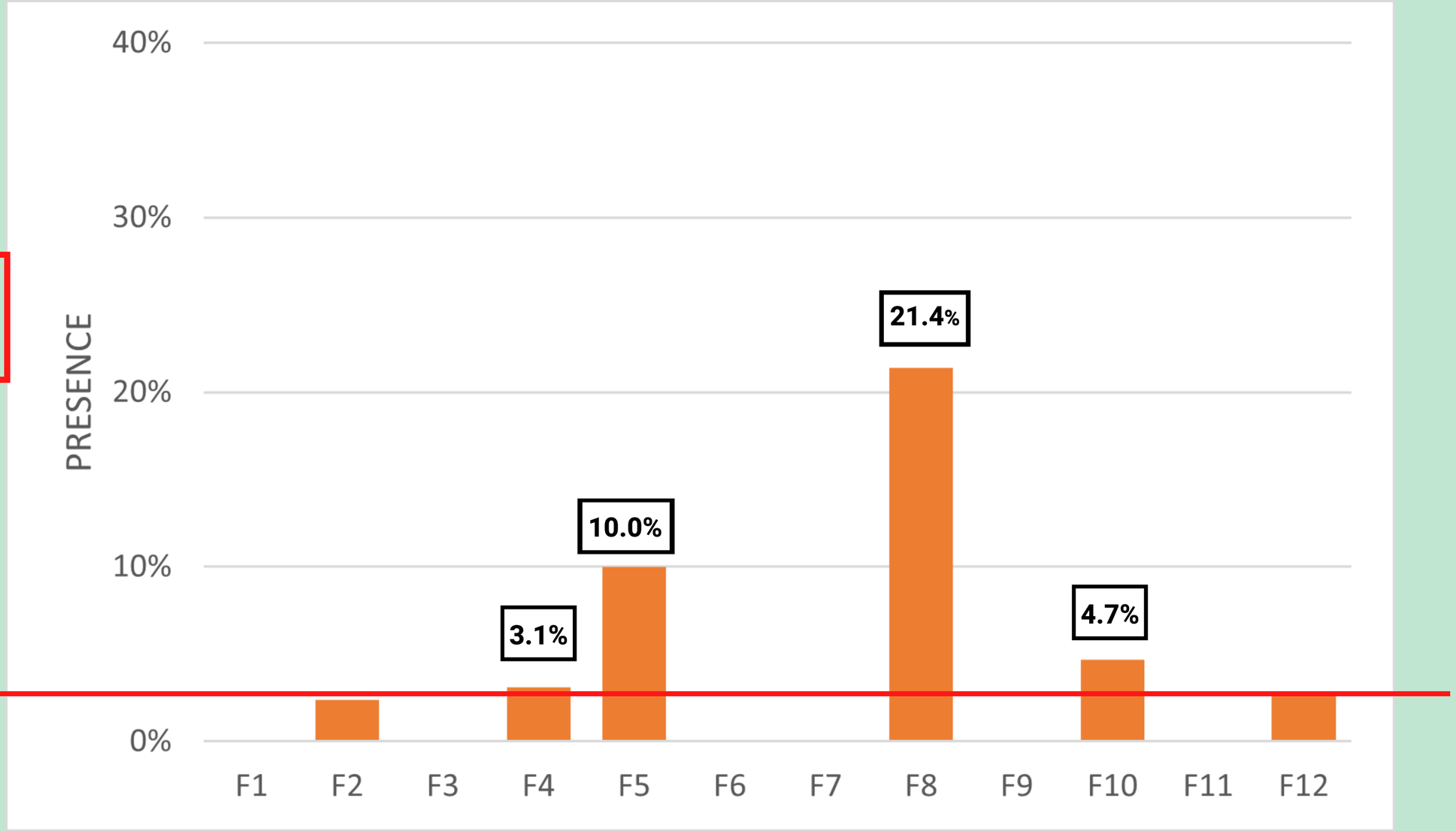


Results and Discussion

BURSITIS

Humane Slaughter Association

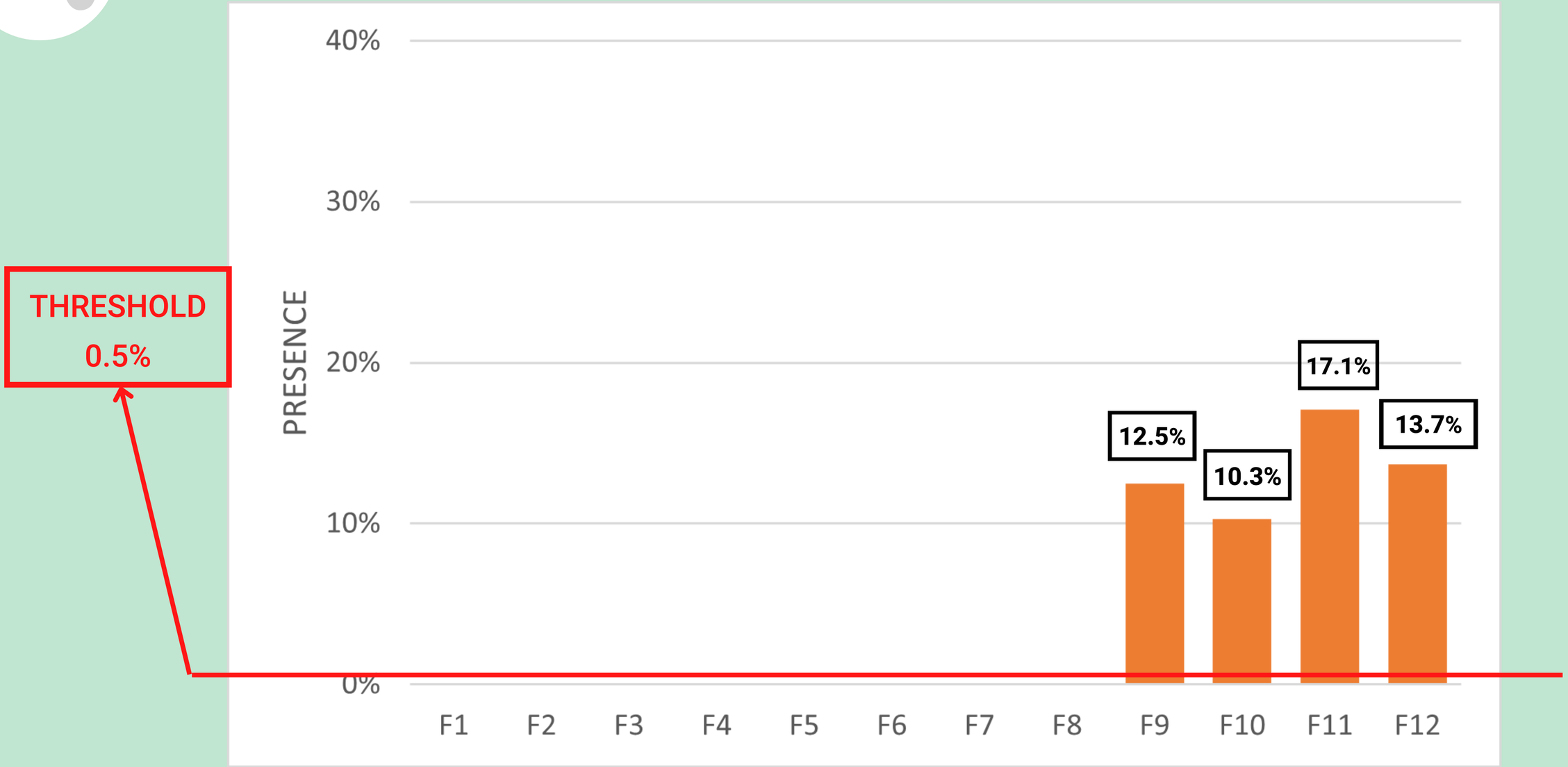
THRESHOLD
3%



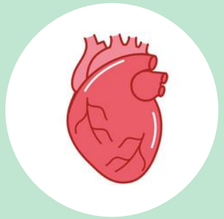
Results and Discussion

BONE DEFORMITY

Humane Slaughter Association

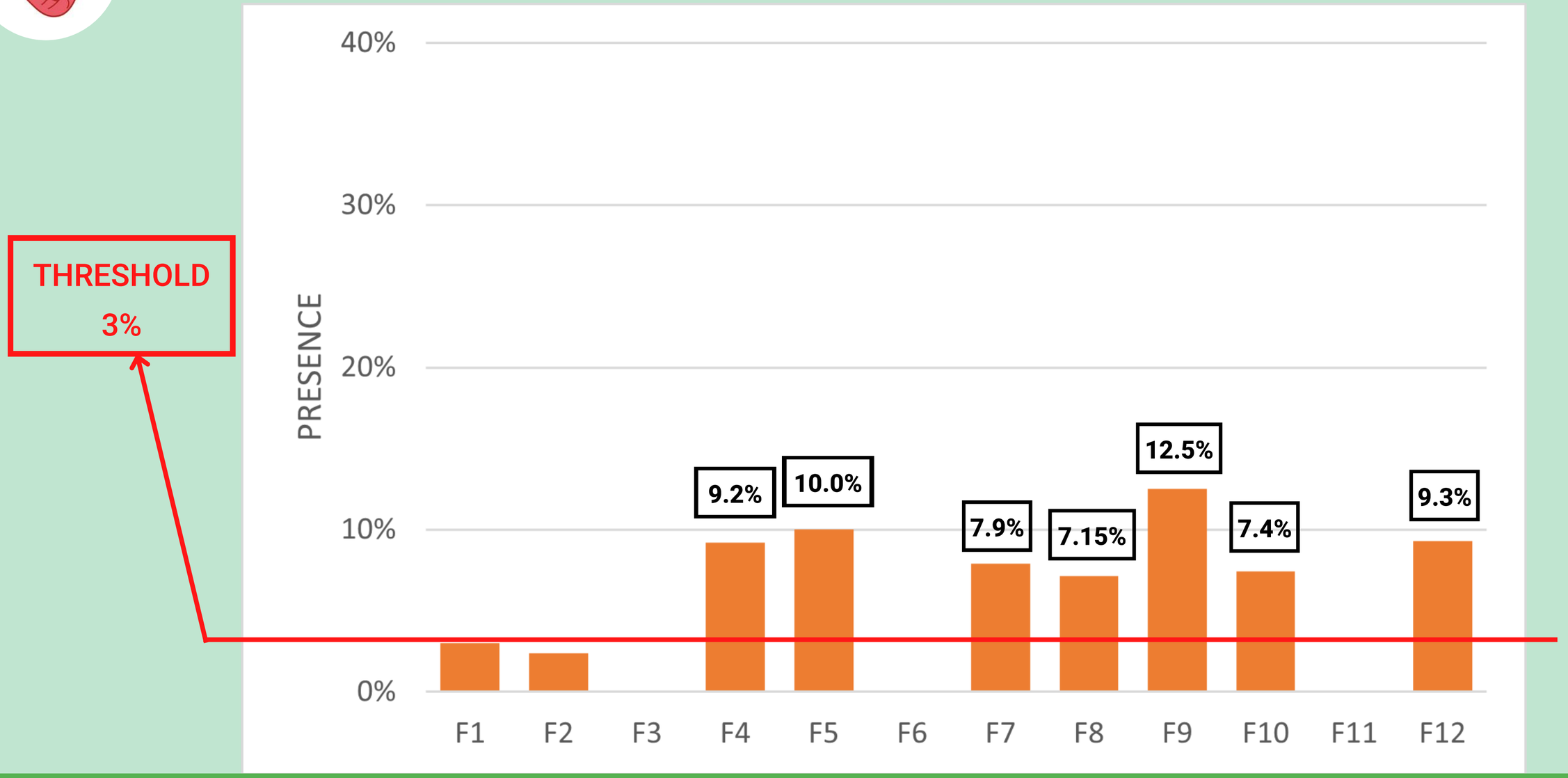


Results and Discussion



PERICARDITIS

Humane Slaughter Association

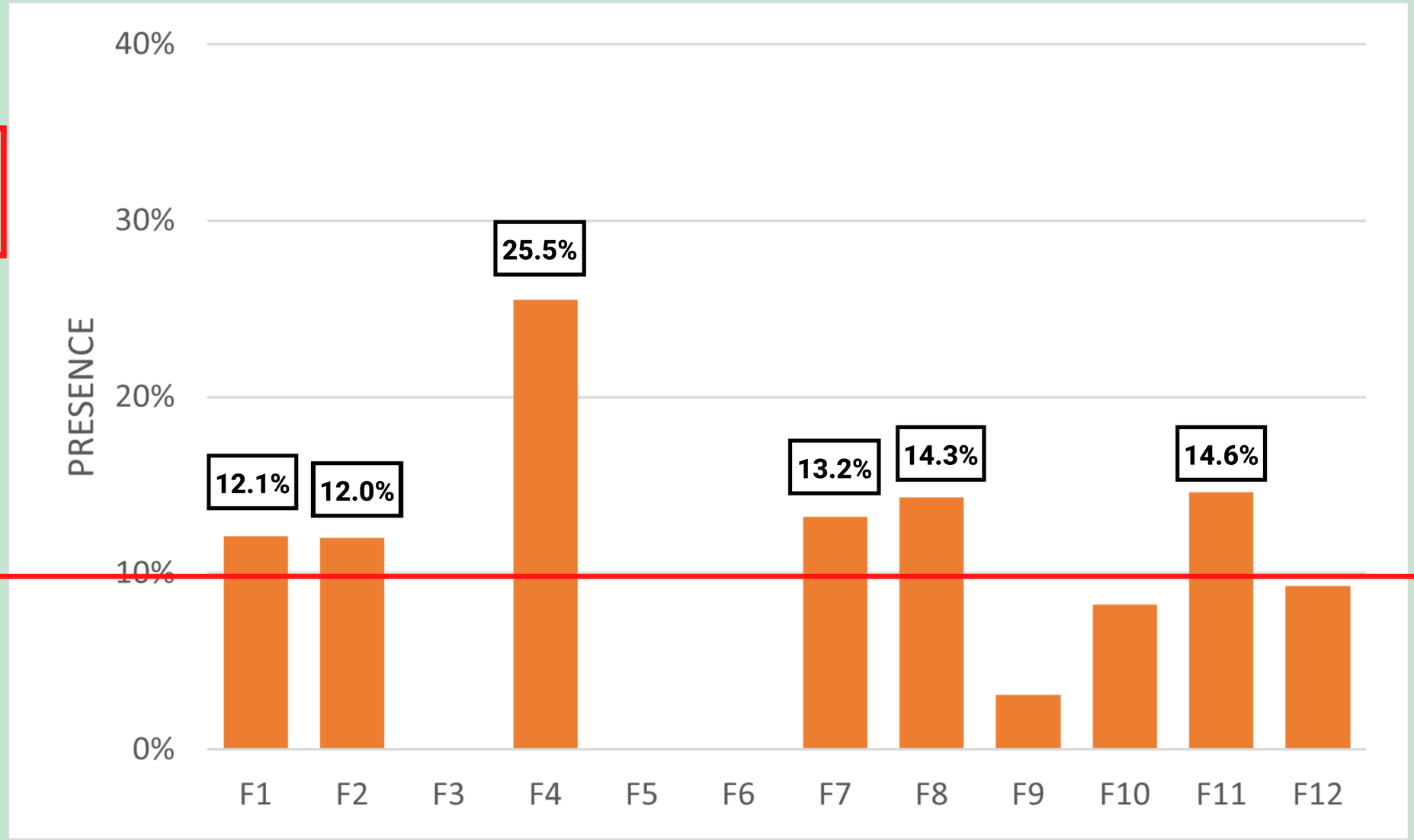


Results and Discussion

WHITE LIVER SPOTS

Humane Slaughter Association

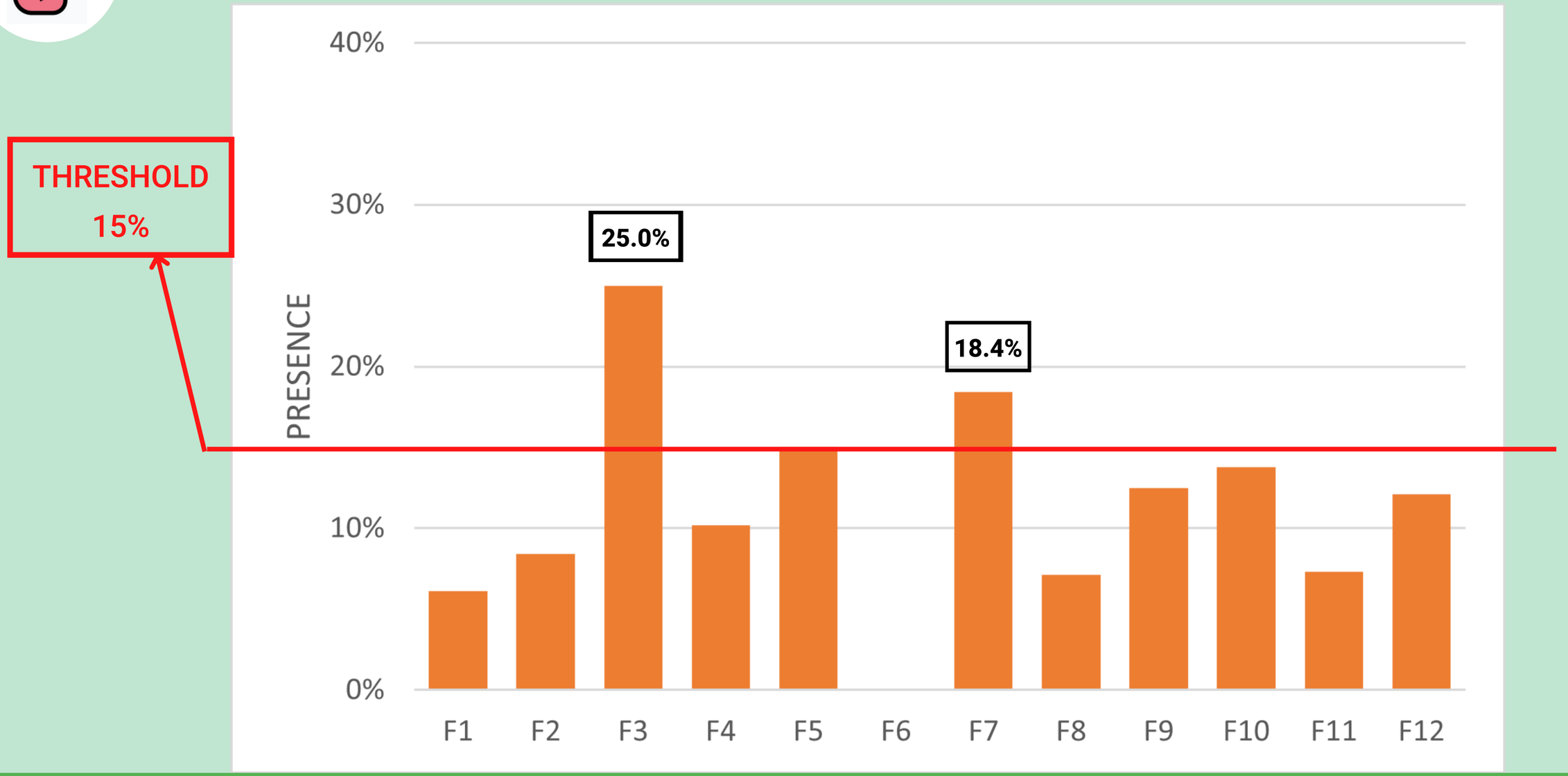
THRESHOLD
10%



Results and Discussion

PLEURITIS

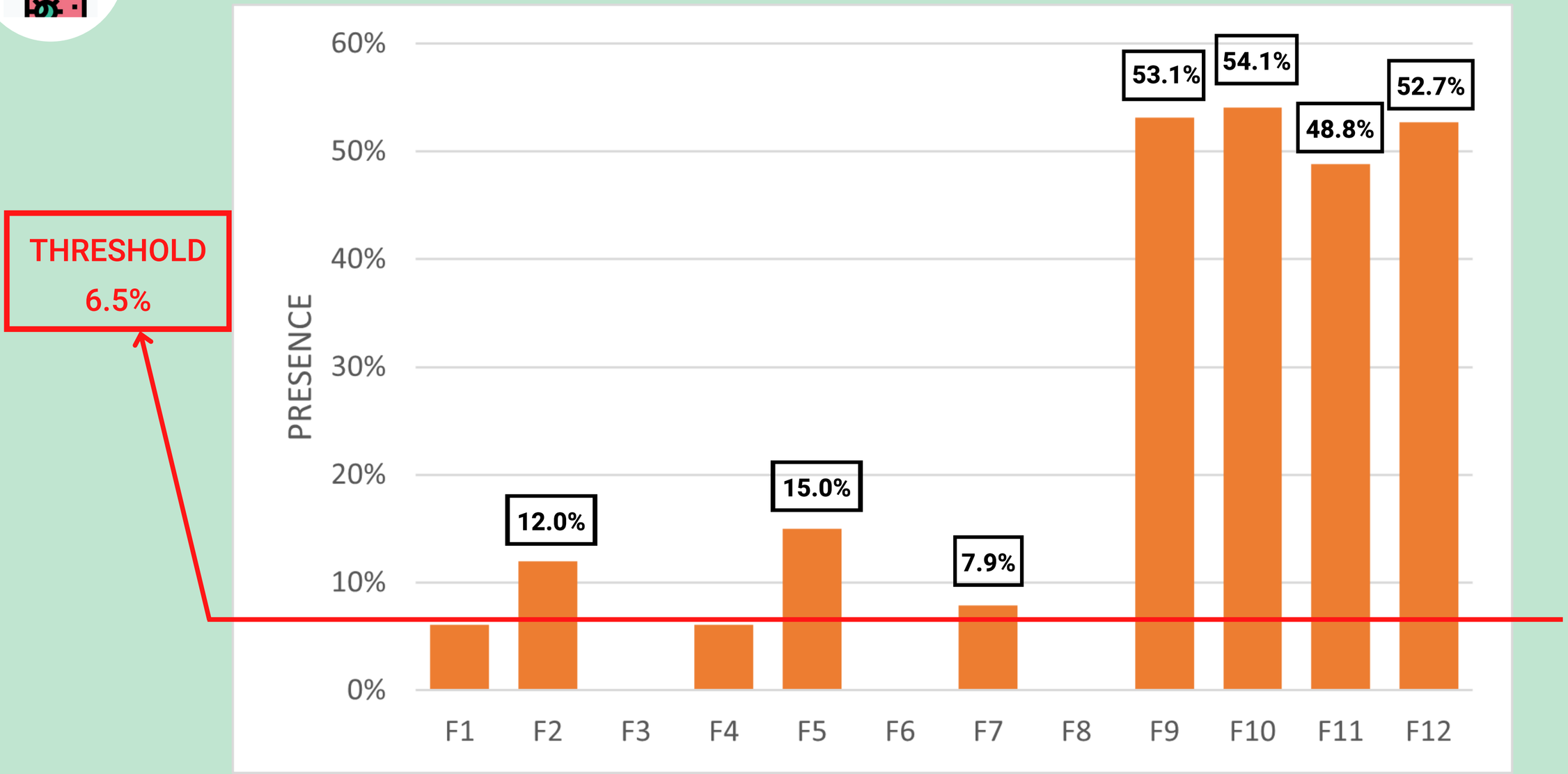
Humane Slaughter Association



Results and Discussion

ENZOOTIC PNEUMONIA

Humane Slaughter Association



Results and Discussion

Humane Slaughter Association

- **Only in one farm presented no animals with iceberg indicators**

	Sample size	Chronic traumatic wound	Tail lesion	Ear lesion	Bursitis	Bone deformity	Pericarditis	Pleurisy	Enzootic pneumonia	White liver spots
Threshold		5	1	10	3	0,5	3	15	6,5	10
Farm 6	21	0	0	0	0	0	0	0	0	0

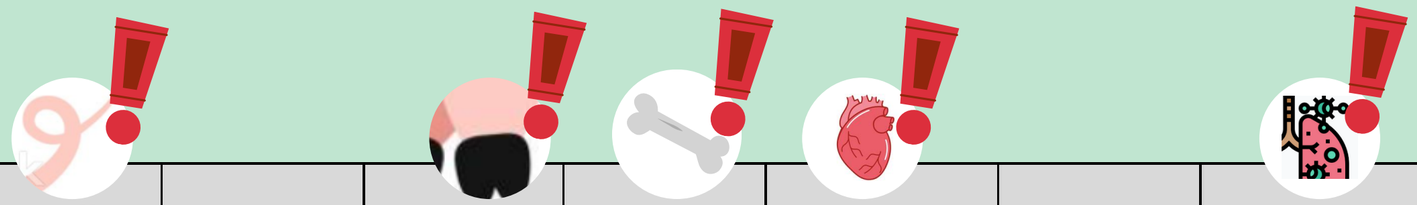
Humane Slaughter Association

- **The worst two farms overpassed the thresholds of 4 and 5 iceberg indicators**

	Sample size	Chronic traumatic wound	Tail lesion	Ear lesion	Bursitis	Bone deformity	Pericarditis	Pleurisy	Enzootic pneumonia	White liver spots
Threshold		5	1	10	3	0,5	3	15	6,5	10
Farm 10	340	1,2	5,9	7,9	4,7	10,3	7,4	13,8	54,1	8,2
Farm 12	182	1,1	6	8,2	2,7	12,7	9,3	12,1	52,7	9,3

Humane Slaughter Association

The worst two farms overpassed the thresholds of 4 and 5 iceberg indicators



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Humane Slaughter Association

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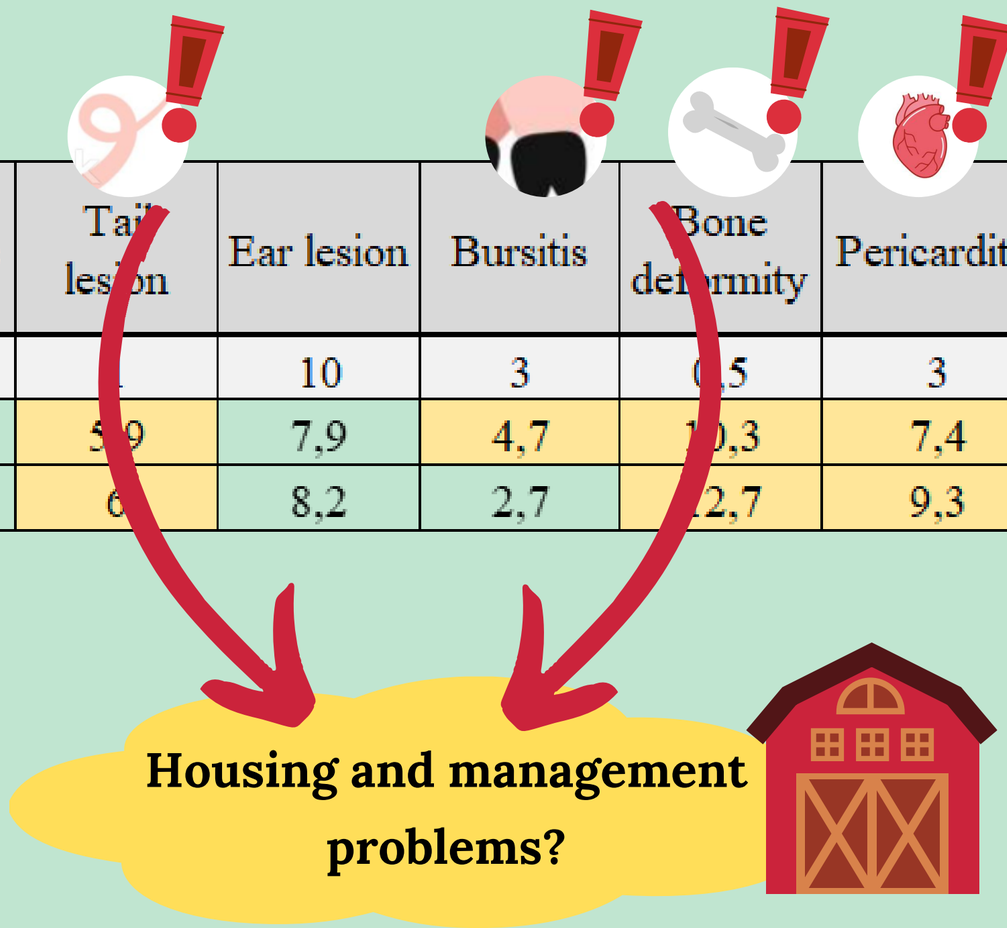
Farm 12	182	1,1	6	8,2	2,7	12,7	9,3	12,1	52,7	9,3

inadequate health plan?

Humane Slaughter Association

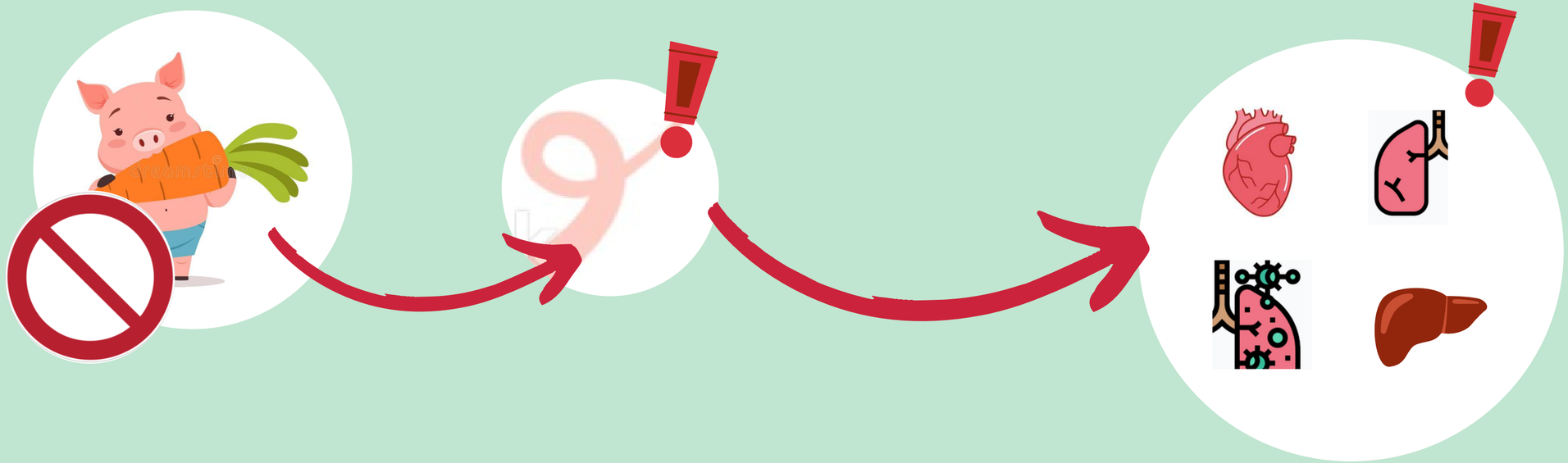
- **Two farms have extremely overpassed 4 and 5 threshold and presented at least one problem for each indicator**

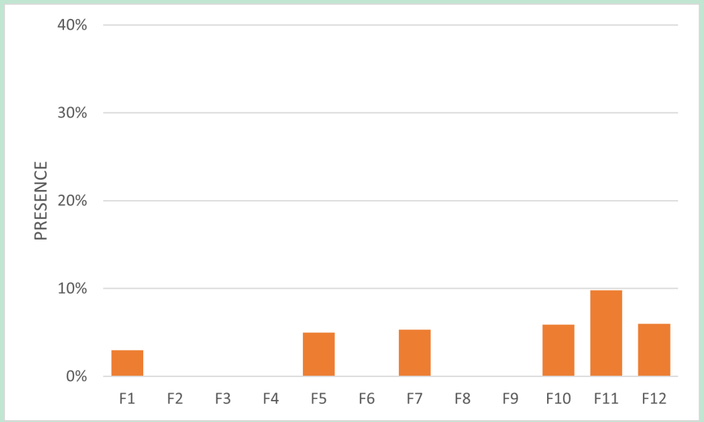
	Sample size	Chronic traumatic wound	Tail lesion	Ear lesion	Bursitis	Bone deformity	Pericarditis	Pleurisy	Enzootic pneumonia	White liver spots
Threshold		5		10	3	6,5	3	15	6,5	10
Farm 10	340	1,2	5,9	7,9	4,7	10,3	7,4	13,8	54,1	8,2
Farm 12	182	1,1	6	8,2	2,7	12,7	9,3	12,1	52,7	9,3



TAIL LESIONS

Humane Slaughter Association





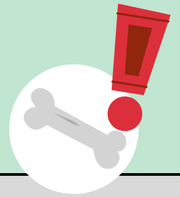
Damage resulting from tail biting provides a route of entry for pathogens which can then be disseminating through the blood to different organs

van Staarveren et al., 2017

Results and Discussion

Humane Slaughter Association

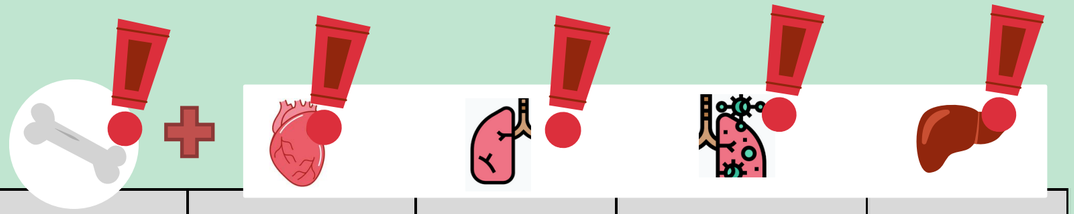
Possible correlation of different indicators



	Sample size	Chronic traumatic wound	Tail lesion	Ear lesion	Bursitis	Bone deformity	Pericarditis	Pleurisy	Enzootic pneumonia	White liver spots
Threshold		5	1	10	3	0,5	3	15	6,5	10
Farm 9	32	0	0	12,5	0	12,5	12,5	12,5	53,1	3,1
Farm 11	41	4,9	9,8	7,3	0	17,1	0	7,3	48,8	14,6

Humane Slaughter Association

Possible correlation of different indicators



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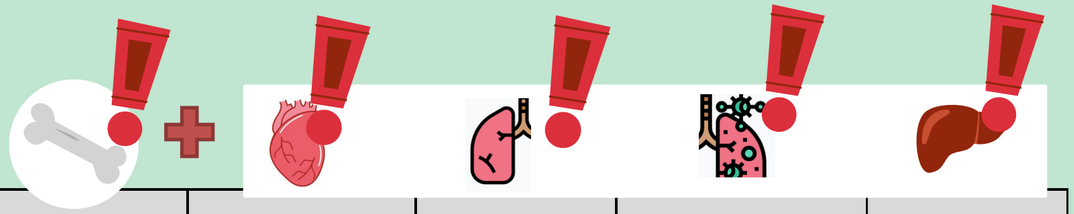
Humane Slaughter Association

Possible correlation of different indicators



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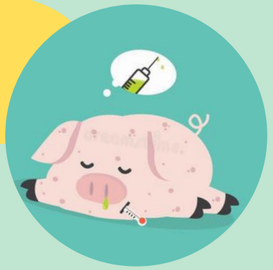
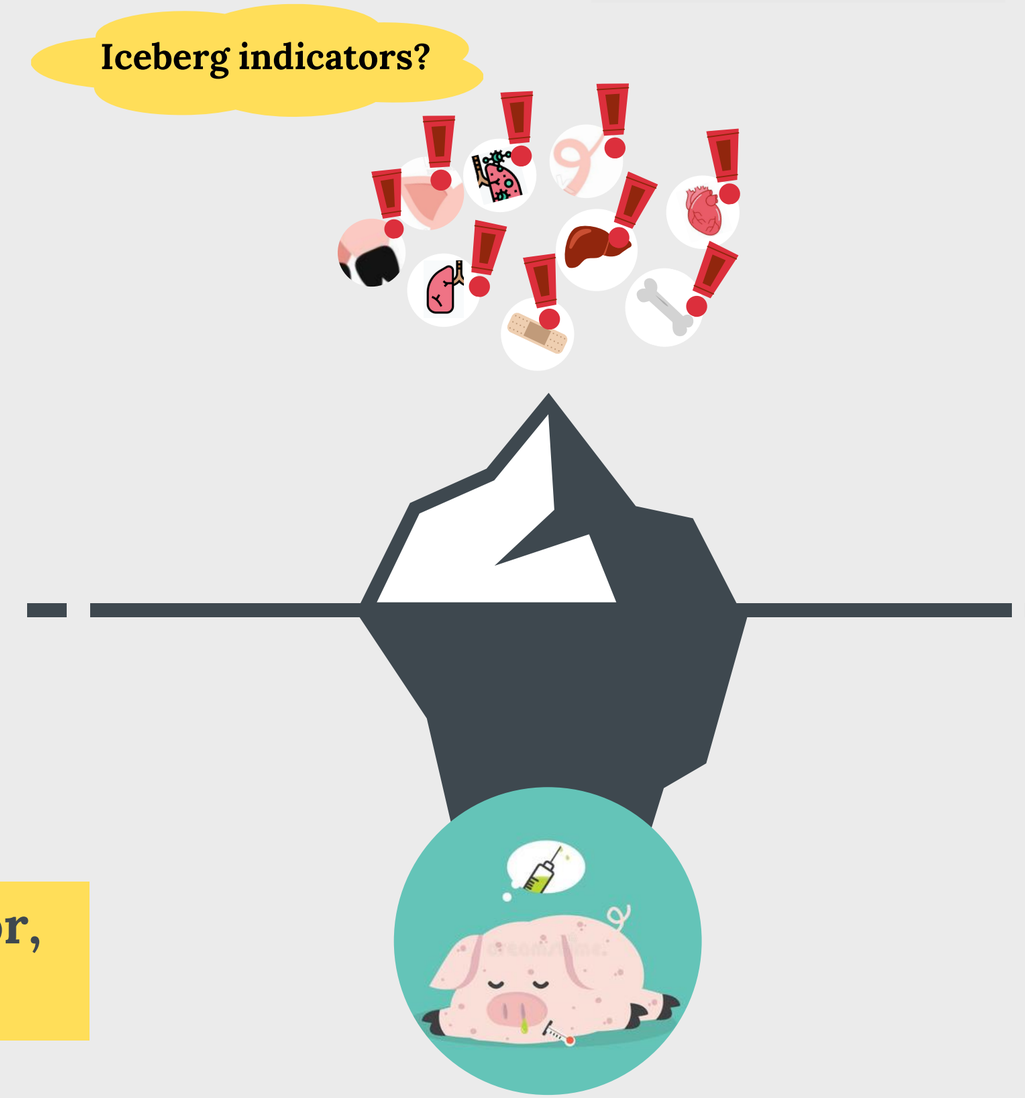
Farm 11	41	4,9	9,8	7,3	0	17,1	0	7,3	48,8	14,6

non-traumatic origin?



… in conclusion

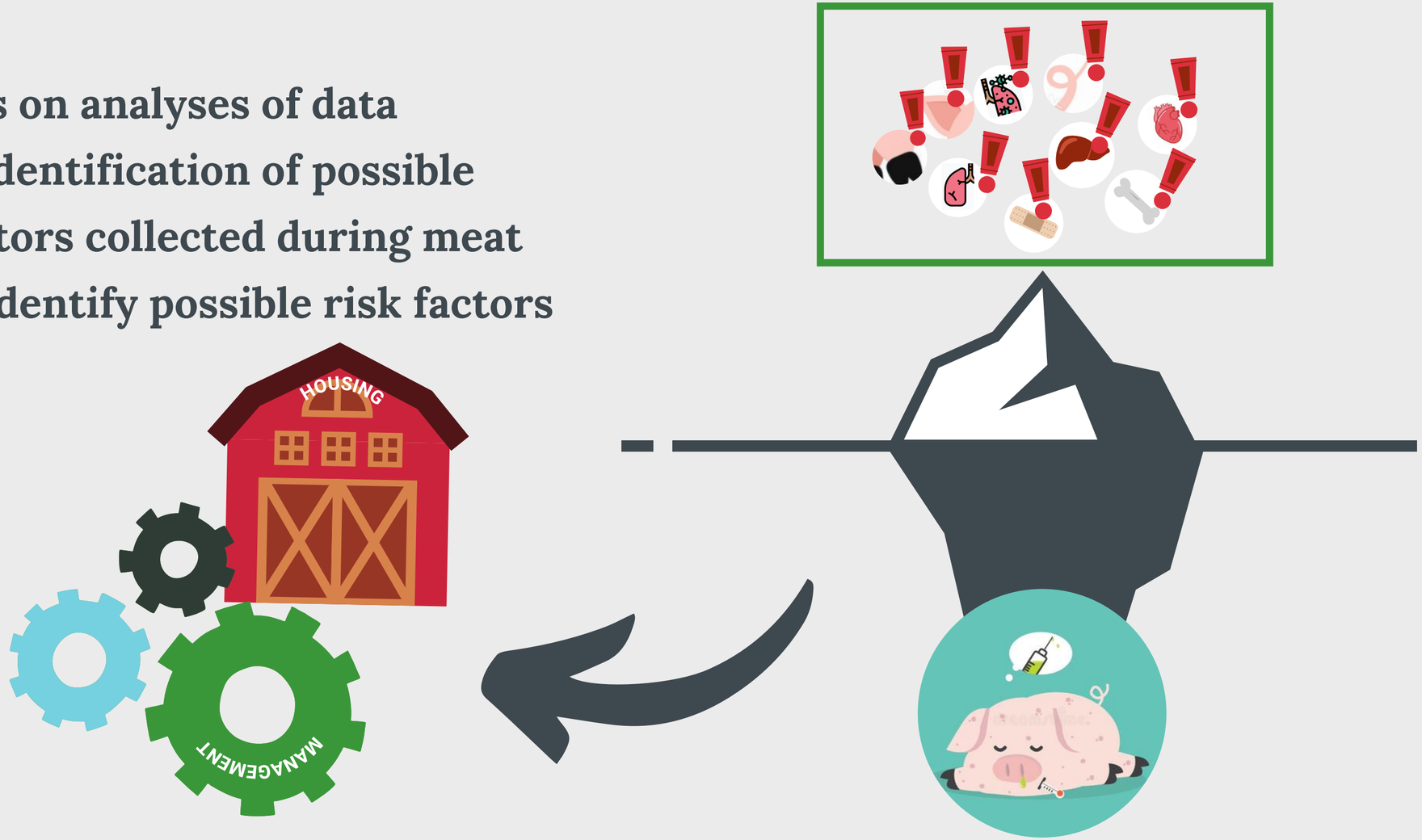
- Selected indicators were:
  - feasible to assess at the abattoir with a visual-only inspection
  - useful to identify health and welfare issues that can be linked to possible management, housing and health plan issues at farm-level



It is important to focus not only on the single indicator, but also on the correlation between indicators

… in conclusion

- The next step will focus on analyses of data collected on farm and identification of possible correlation with indicators collected during meat inspection in order to identify possible risk factors at farm level



in collaboration with:

Thank you for your attention!

marta.comin@unimi.it