Current and future welfare issues of the beef cattle industry

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CEN CAN
CENTRAL CANADIAN VETERINARY CONFERENCE

UNIVERSITY OF SASKATCHEWAN
Western College of Veterinary Medicine
USASK.CA/WCVM

- What does “welfare” mean?
- One Welfare
- Gut-Brain axis
- Relationship health-welfare
- Live animal transportation
- Stocking density
- Painful procedures
- Affective states

The rise of the citizen

End World War II: Intensification of animal production as a way of providing food security

1945

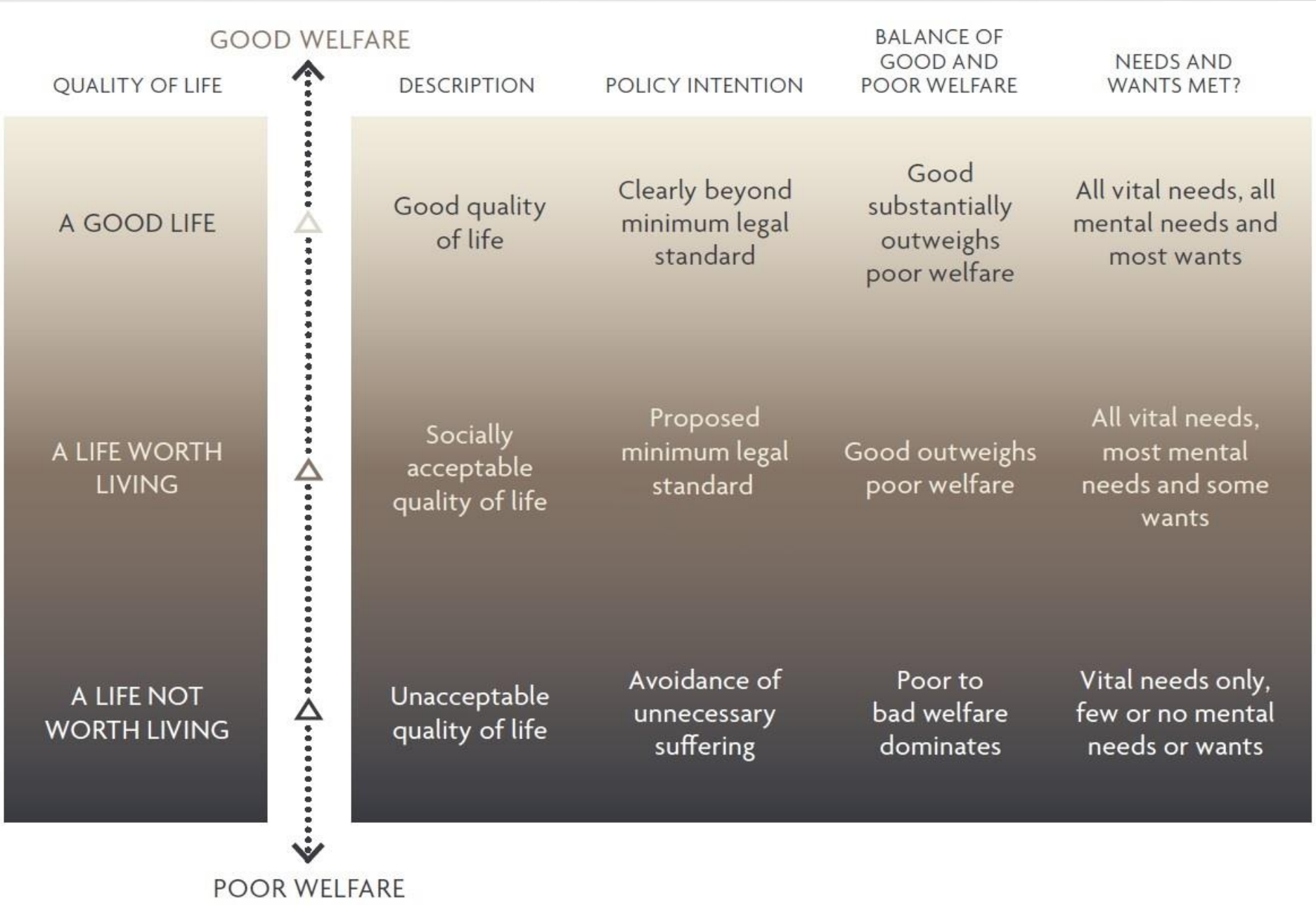
1965

Brambell Committee (UK) concludes that animals should be afforded the Five Freedoms

1. Freedom from thirst, hunger and malnutrition
2. Freedom from discomfort and exposure
3. Freedom from pain, injury and disease
4. Freedom from fear and distress
5. Freedom to express normal behaviour

2019

Goal of animal production:	Subsistence
Individual seen as:	Subject



FAWC (2009) Farm Animal Welfare in Great Britain: Past, Present and Future.

Definitions of animal welfare

Broom: Animal welfare is its state as regards to its attempts to cope with its environment.

Animal welfare **varies on a continuum** from good to poor.

Approaches to define and address animal welfare

1. **A biological functioning approach.** Animals should be capable of normal growth and reproduction, and reasonably free from disease, injury, malnutrition, and abnormalities of behavior and physiology.

2. **A natural living approach.** Animals should be kept in reasonably natural environments and be allowed to develop and use their nature adaptations and capabilities.

3. **A feelings based approach.** Affective states of animals ("feelings" or "emotions") are the key elements in quality of life. Thus a high level of welfare requires that animals experience comfort, contentment, and pleasure.

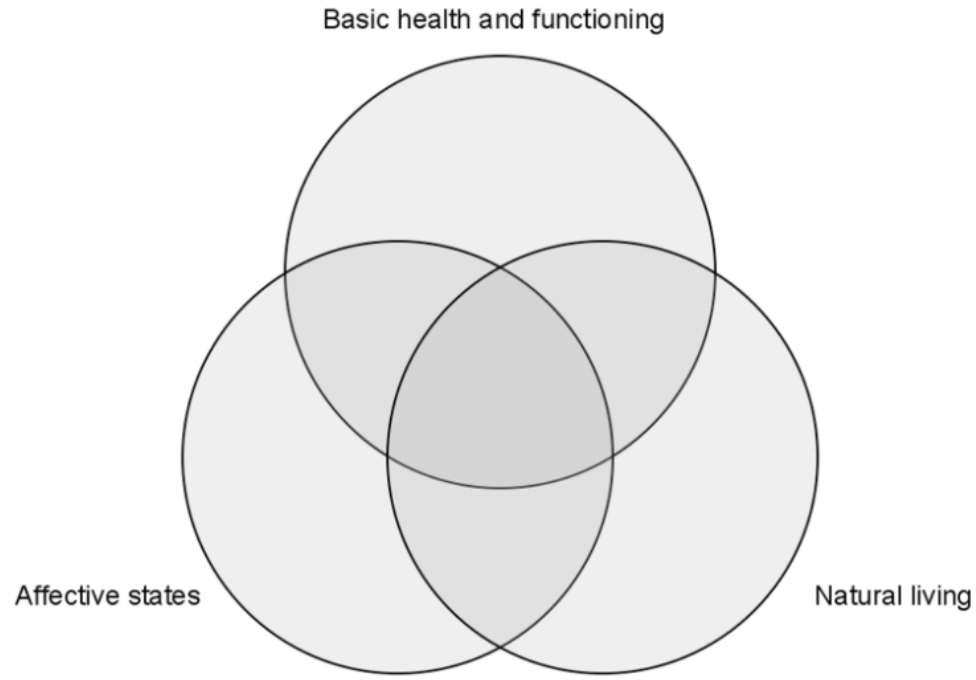


Figure 1
Three conceptions of animal welfare, adapted from Michael Appleby [21] and Vonne Lund [21].

Performance
(Average daily gain, feed efficiency, body condition score,…)

Morbidity and mortality rates

Thermal comfort
(Respiration rates, panting scores, temperature,…)

Blood titers
(Substance P, Acute phase protein, immune function,…)

Behaviour
(Stereotypic, aggressive, depressive,…)

Handling response
(chute behavior score, vocalizations, exit speed, prod use,…)

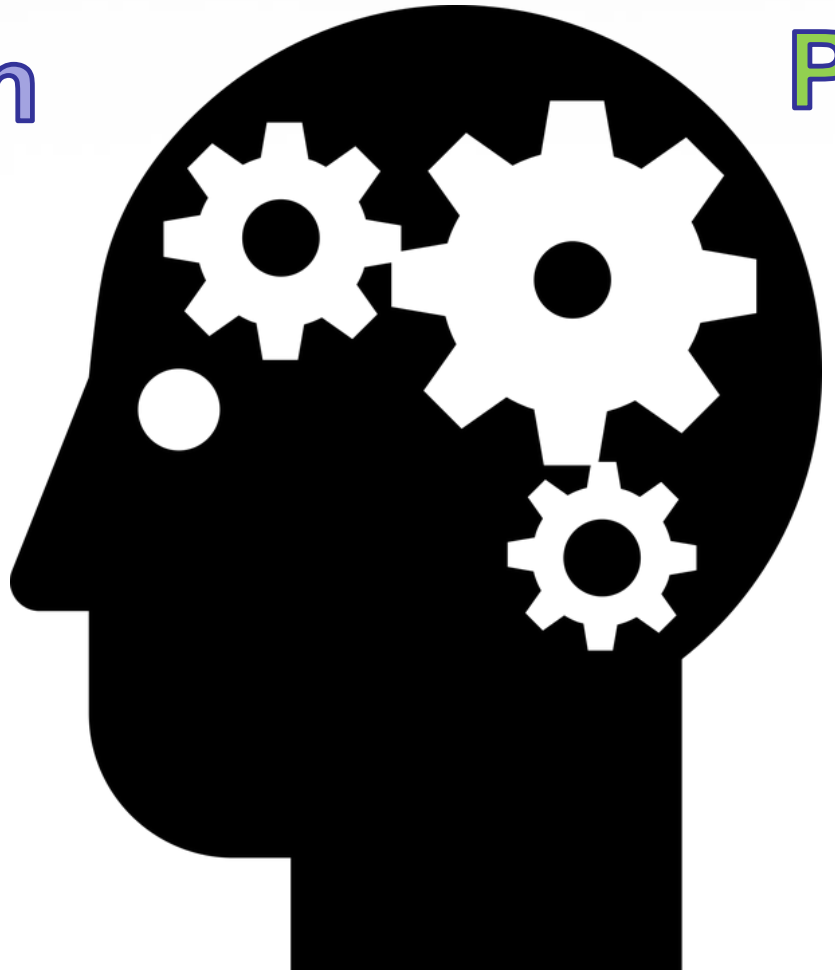
Brain function
(Cognitive ability, affective state, temperament, judgment bias,…)

Hormonal activity
(Glucocorticoids, catecholamines, ACTH,…)

Personal views on animal welfare

Education

Professionalism



Ethical values

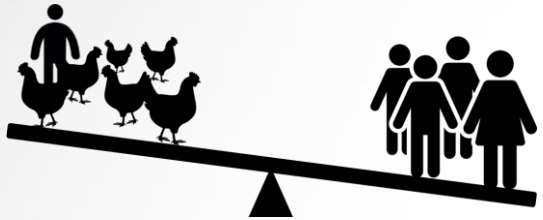
Experiences

Traditions

Economic level

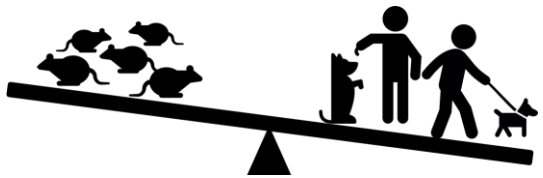
Types of citizens

Contractarians: "We should care about animal welfare, because consumers demand it and we want to sell products."



Utilitarians: "Modern animal production is problematic because there is a negative effect on animal welfare which is not counterbalanced by the human benefits.

Relationals: "A dog is a man's best friend, so it should be treated better than animals on farms and in laboratories."



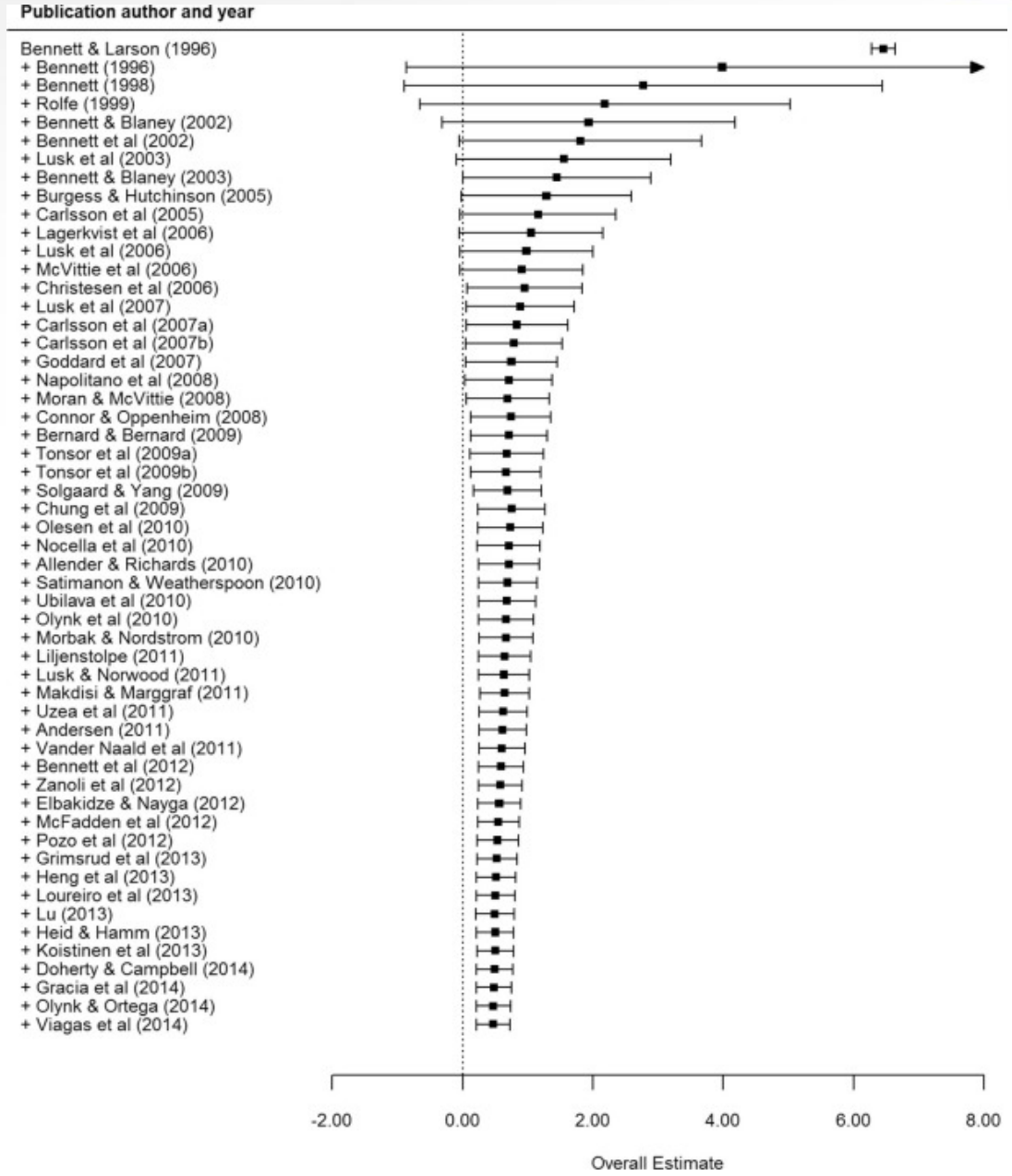
Animal rights: "All animals have inherent value, and this should be respected."

Importance of public perceptions

- A key part of sustainability is **acceptability**
- **Incorporating public perceptions and concerns** into communication and policy making is an important part of maintaining public trust

Cumulative meta-analysis of the public willingness-to-pay (WTP) for farm animal welfare.

- A small, positive premium was found for higher welfare products
  - Different by location: lower where consumers assume animal welfare is high (e.g. Northern Europe).
  - Different by species: Beef cattle > dairy cattle > layer hens.
  - Young > old people, women > men, high income/education > low income/education

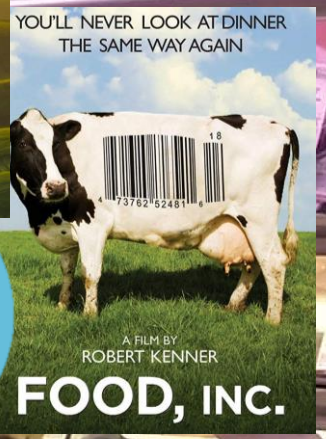


Clark et al., 2017. Food policy 68, pp 112-127

Consumers' expectations on cattle welfare

- Animal welfare is an important issue for many consumers, although **sales** of welfare friendly products are much lower than the reported **levels of concern**.
- Perceptions and attitudes **vary in time and space**. Observing changing trends is important.
- Citizen views should only act as a "proxy" for **conceptualizations of an ideal world** when these are not further confirmed through consumer behaviours.

Consumer disconnection from livestock practices



PETA

CCA
CANADIAN CATTLEMEN'S ASSOCIATION
National Voice Of Cattle Producers

NAMI
NORTH AMERICAN MEAT INSTITUTE

BCRC
BEEF CATTLE RESEARCH COUNCIL

Farm assurance schemes

- As interest on animal welfare increases, **raise of assurance schemes** (often based on 5 Freedoms, but few of them comply 100%).

- There is a failure of market mechanisms to differentiate higher welfare animal products and limits the ability of citizens to make informed choices: **assurance labels are poorly understood**.

Please note that this list of the BVA's welfare priorities is not exhaustive and these priorities will be addressed and assessed differently across the different schemes. The level of welfare achieved across the different schemes may vary. For more detailed information about the different standards and requirements used by farm assurance schemes please visit their respective websites.	Farm Assured Welsh Livestock	Lion Eggs Code of Practice	Northern Ireland Beef and Lamb Farm Quality Assurance Scheme	Quality Meat Scotland	Red Tractor	RSPCA Assured	Soil Association
Animals are stunned before slaughter	Assurance does not cover slaughter	Assurance does not cover slaughter	Assurance does not cover slaughter	✓	✓	✓	✓
Veterinary involvement Veterinary professionals are involved in livestock health planning and review	✓	✓	✓	✓	✓	✓	✓
Prohibit environments that substantially reduce behavioural opportunity Cages for laying hens Farrowing crates for sows (pre-birth until weaning)	N/A – Scheme only applies to beef and lamb	✗	N/A – Scheme only applies to beef and lamb	✗	✗	✓	✓
Support responsible use of antimicrobials	✓	✓	✓	✓	✓	✓	✓
Animal health and biosecurity Measures to protect animal health and prevent the spread of disease	✓	✓	✓	✓	✓	✓	✓

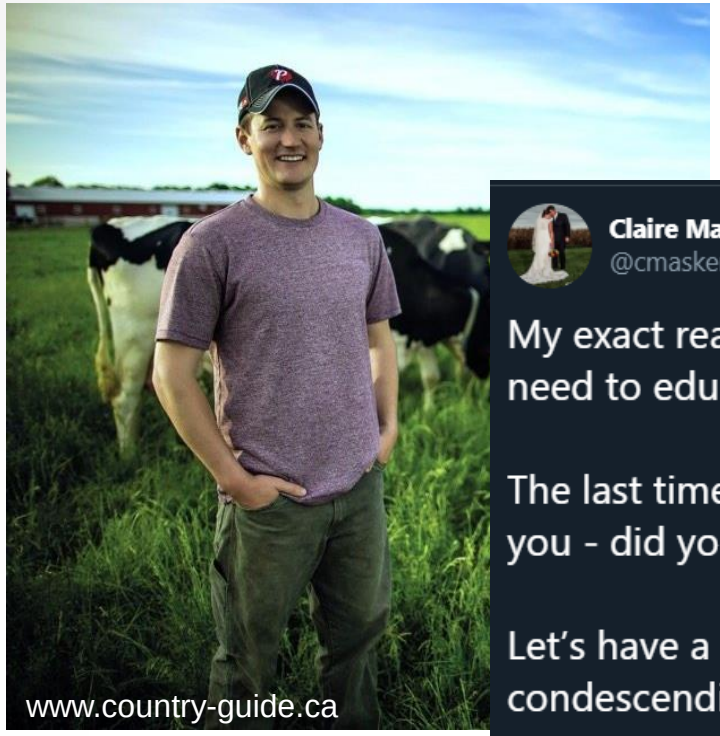
Steak

Communication!

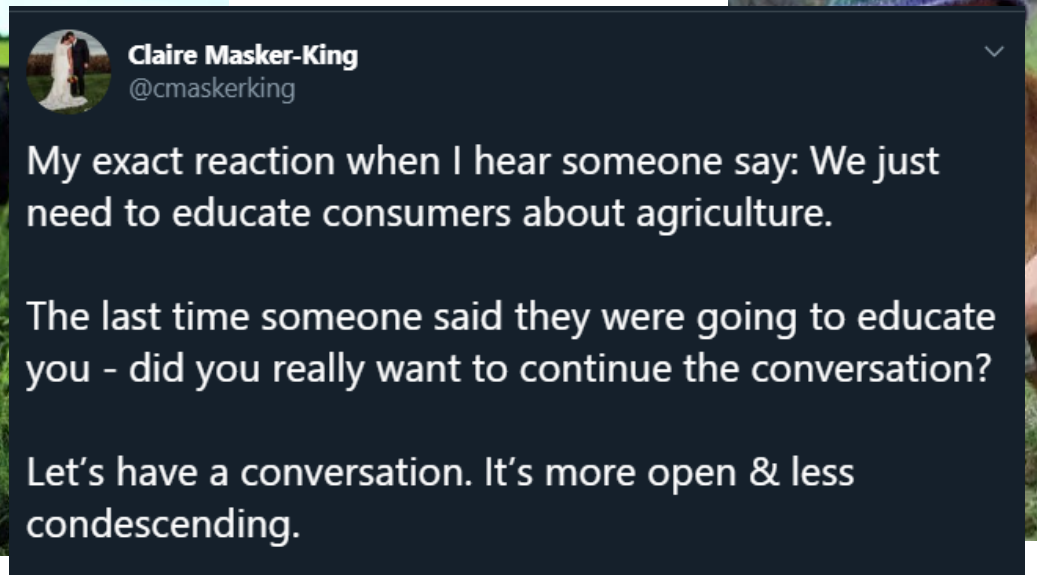
Educating the consumer on cattle practices

If we increased the number of consumers visiting the farm would it:

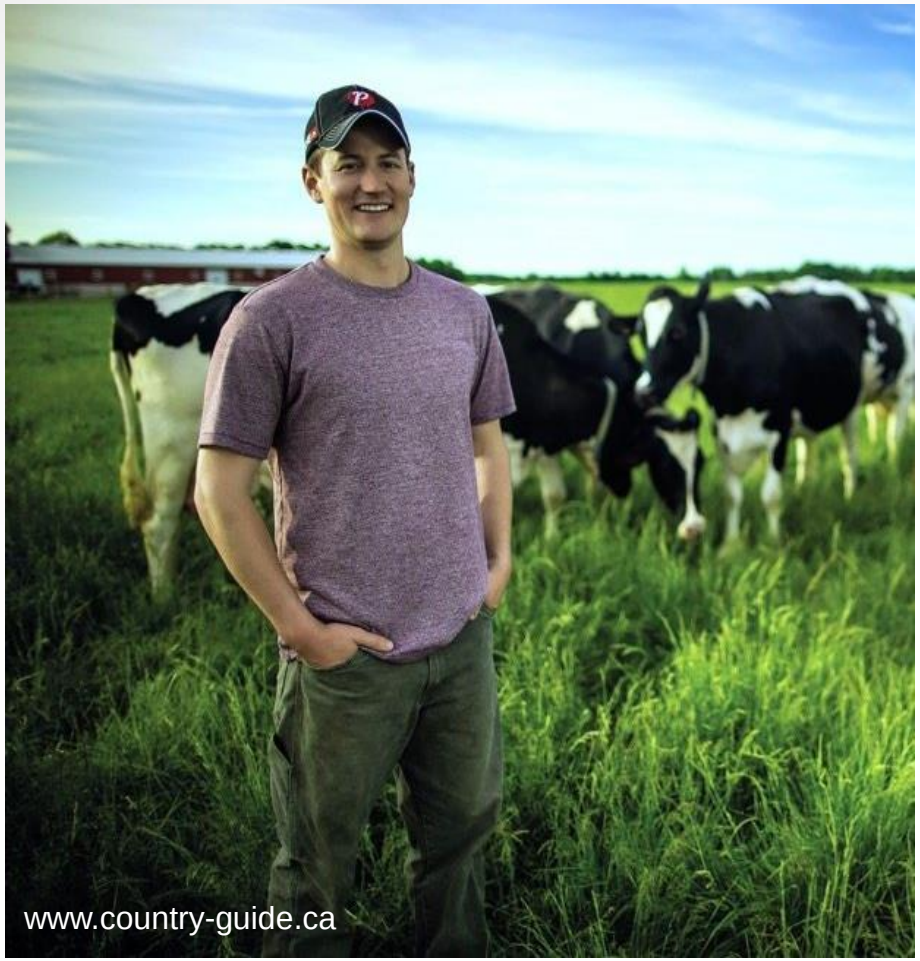
Increase the sympathy and allegiance consumers feel for the farmer?



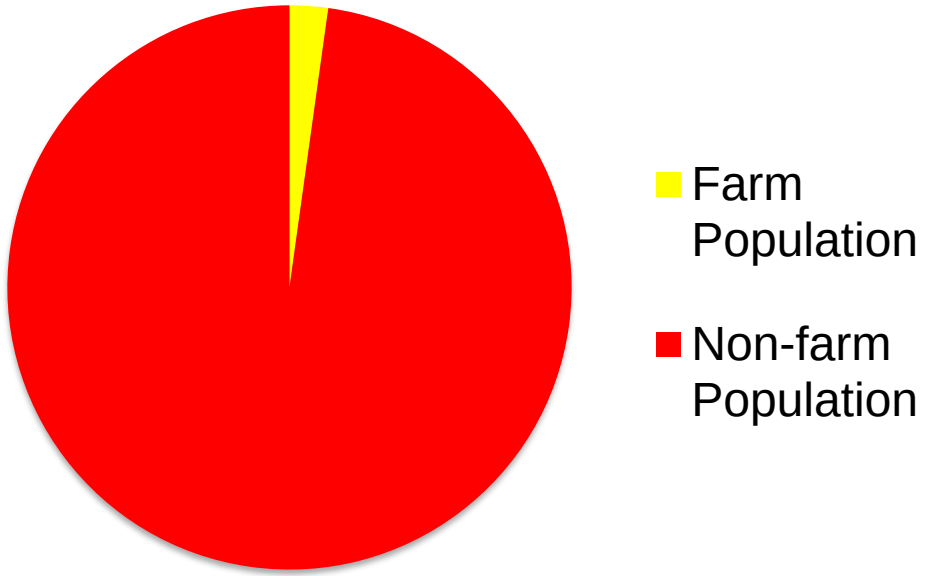
Increase the sympathy and empathy consumers feel for animals?



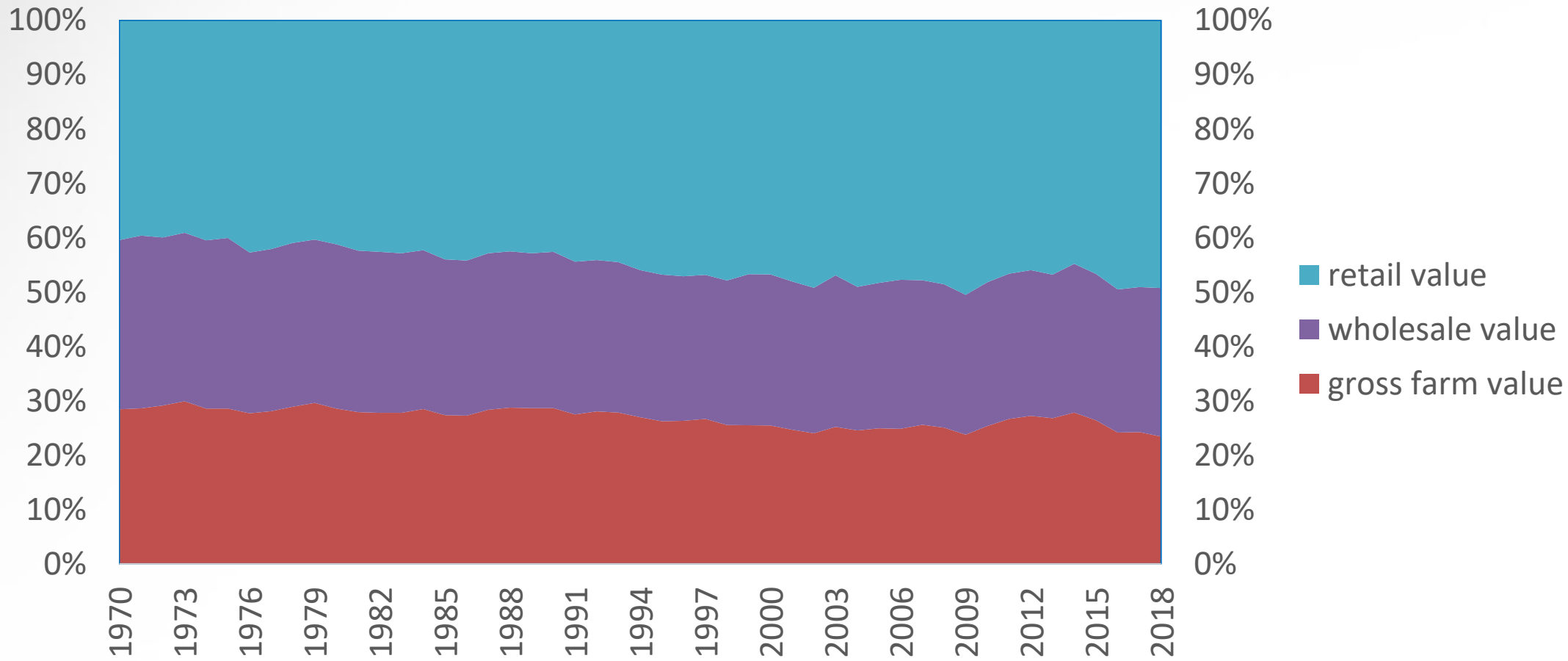
Producers' understanding of cattle welfare



What if we introduce productivity into the equation? And efficiency, managing resources, economy,…

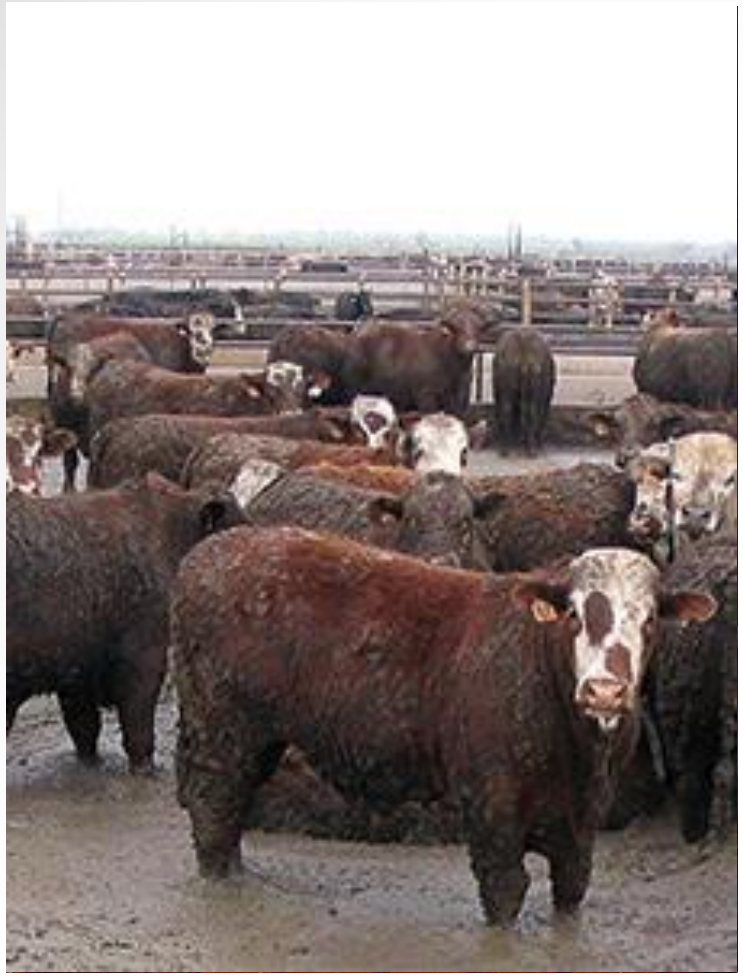


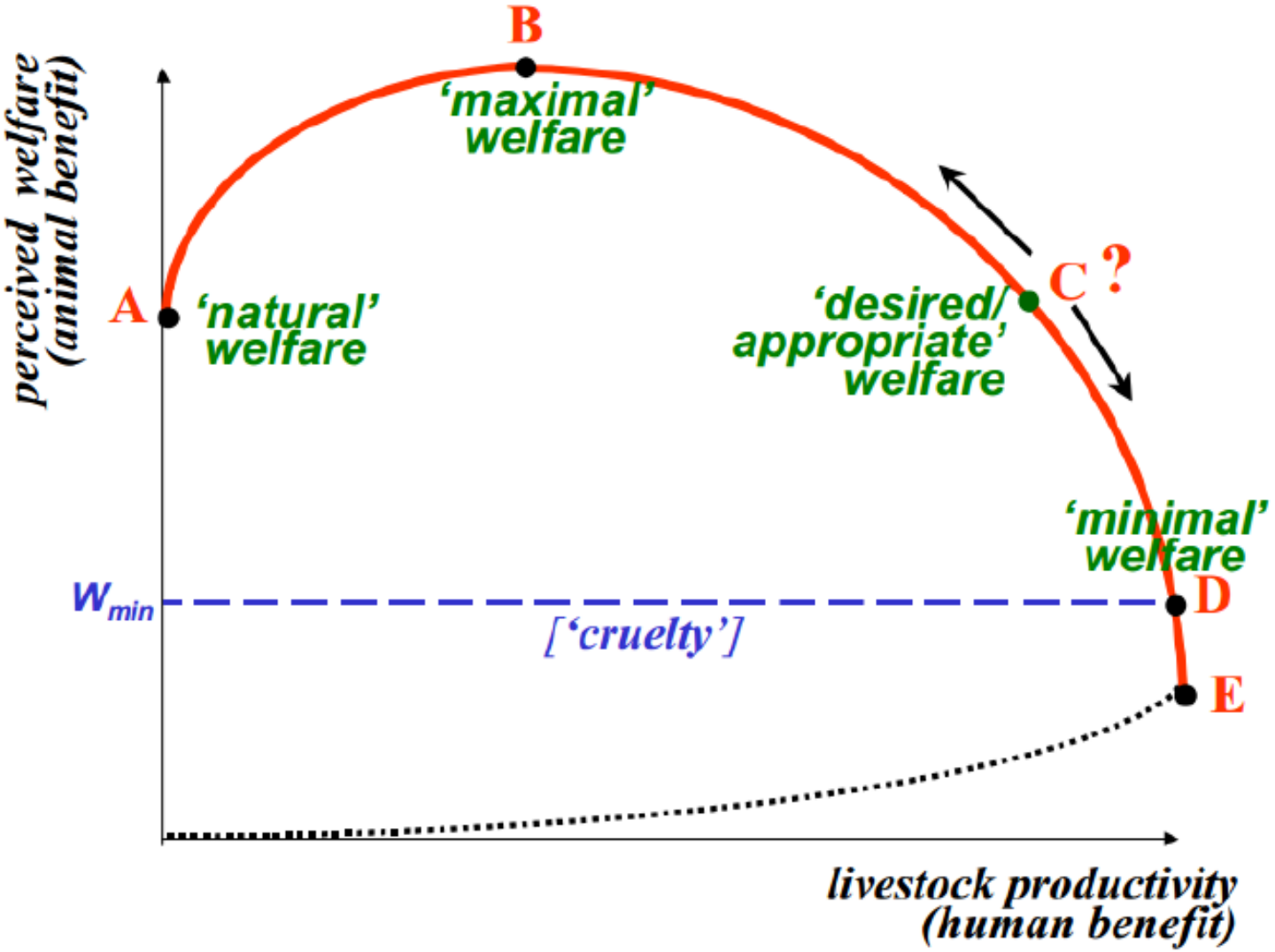
Historical price spread data for beef



Source: USDA

How much welfare are we willing to sacrifice for the sake of profitability?



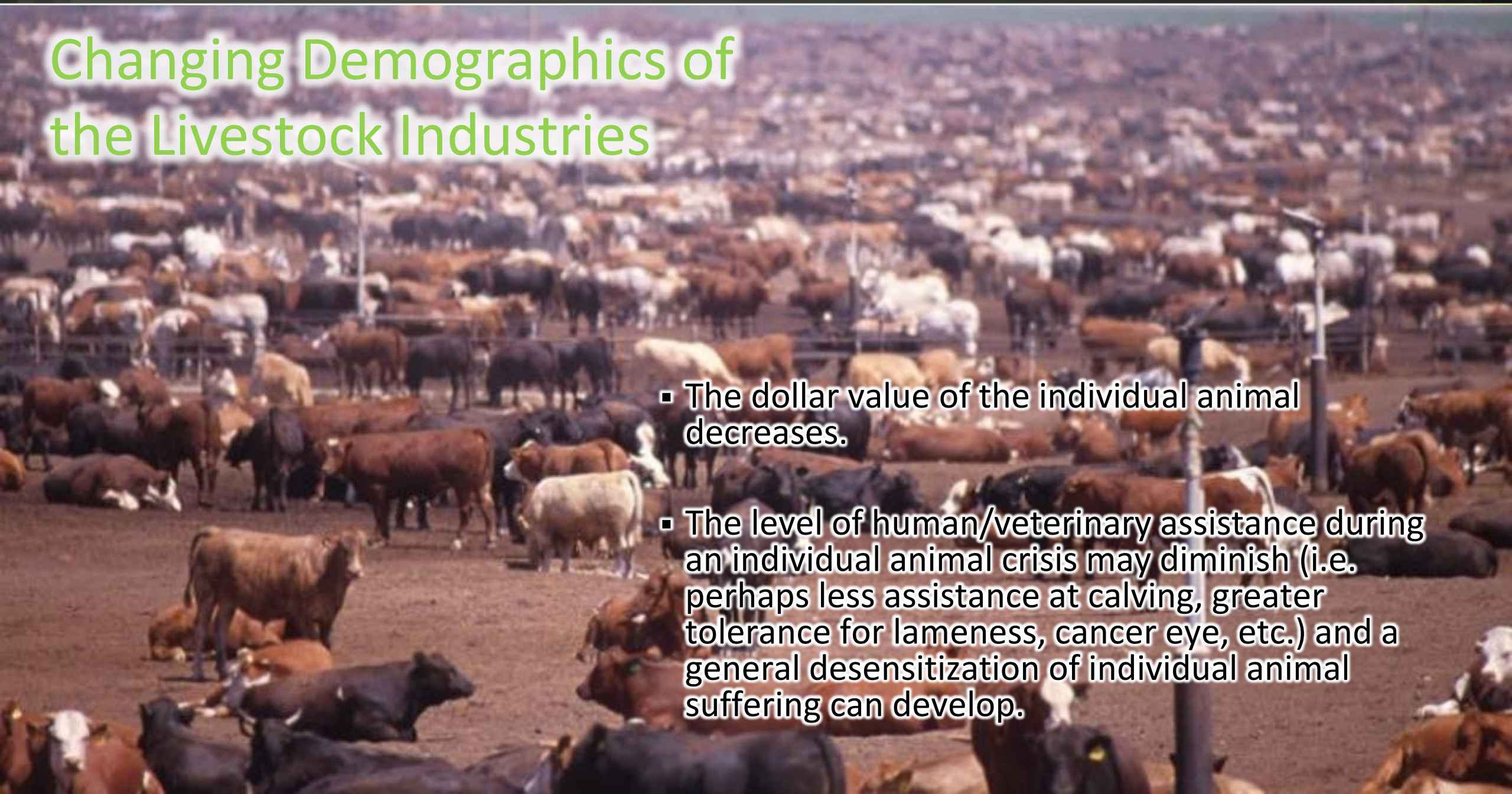


Conflicts between animal welfare and productivity (McInerney, 2004)

Changing Demographics of the Livestock Industries

- As margins get tighter, operations get larger with more animal units per farm.
- Animal welfare on the herd basis may improve (i.e. better vaccination protocols, SOPs for euthanasia, more reliance on nutritional and animal health consultants, better health records).

Changing Demographics of the Livestock Industries



- The dollar value of the individual animal decreases.
- The level of human/veterinary assistance during an individual animal crisis may diminish (i.e. perhaps less assistance at calving, greater tolerance for lameness, cancer eye, etc.) and a general desensitization of individual animal suffering can develop.

What should veterinarians do to help address animal welfare issues?

- As a veterinarian you have the responsibility and the opportunity to educate and work with your clients on animal welfare issues (i.e when to cull, when to euthanize, ways to mitigate pain and reduce suffering, etc.).

- The attitude that you have towards these issues will set the standards that your clients will follow.

- What does “welfare” mean?
- One Welfare
- Gut-Brain axis
- Relationship health-welfare
- Live animal transportation
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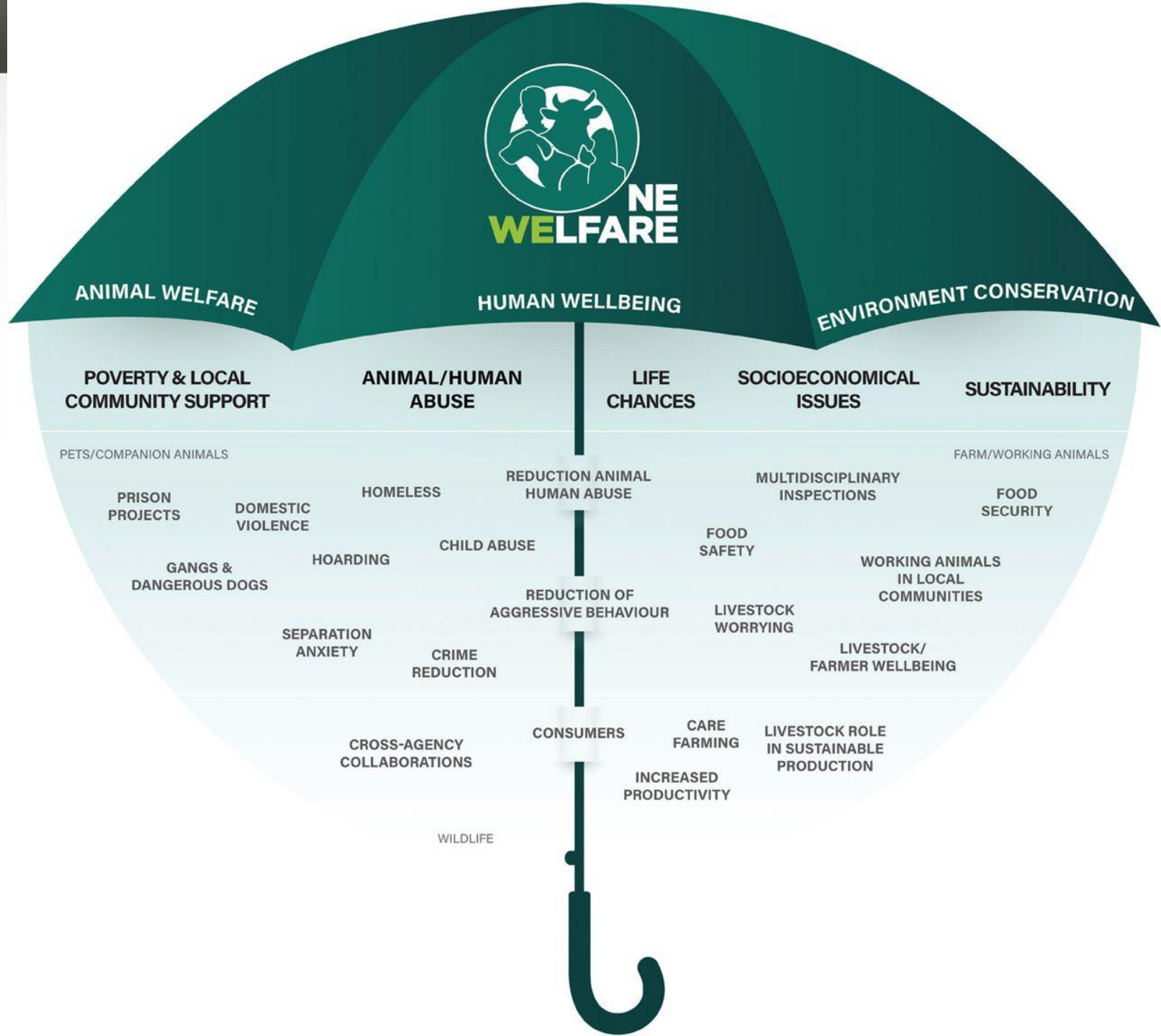
- Painful procedures
- Affective states

One Welfare

It builds on the One Health concept, and is a way to recognize the many social interconnections between human welfare, animal welfare and the integrity of the environment



One Welfare

In practice, it is a call for a coordinated program of action:

- to improve animal welfare in order to improve human welfare (and vice versa)
- to coordinate actions between animal protection and other services, and
- to protect the environment as a fundamental step for both human and animal welfare.

Improved welfare of farm animals may provide paths out of poverty via increased production efficiency

Improved welfare of food animals leads to more meat, milk and eggs, and also to improved product quality, so decreasing food losses and wastes

Good welfare in animals increases their immuno-competence and resistance to zoonotic diseases, allowing decreases in the use of antimicrobials, and so reducing the risk for multi resistance.

Appropriate animal handling, adapted to the nature and behavior of the animals, reduces animal's stress as well as risks and occupational hazards for workers.

Animal Welfare and the United Nations Sustainable Development Goals. Keeling et al., 2019. Front. Vet. Sci

Farmers Mental Health

Perceived stress, anxiety, depression and resilience in Canadian farmers:

- 1132 participants: 22% beef cattle; 4.5% Saskatchewan
- 61.9% in psychological distress
- 33.2% probable cases of anxiety
- 14.6% Probable cases of depression
- 71.1 resilience score (average population in US 75.7-83.0)

The People Speak! via flickr

Jones-Bitton et al., 2019. Social Psychiatry and Psychiatric Epidemiology

Human-Livestock welfare connection

It is a known fact that the health and welfare of farmed animals is closely linked to the well-being of agricultural producers and other animal care givers.

- Cases of animal neglect are often precipitated by the development of farmer mental health issues.
- Animal disease events (e.g. depopulation) have a significant impact on the well-being of producers, their families, veterinarians and responders.

NFAHW COUNCIL
National Farmed Animal Health and Welfare Council

Positive consequences of good farmer welfare

- Even the farmer's intention of taking care of their own wellbeing is positively linked with animal welfare indicators (Kauppinen et al., 2013).
- Practical evidence demonstrates that improved farm animal welfare results in superior meat yields (e.g. minimize carcass weight loss due to trimming of bruising and dark-cutting).

Pinillos et al., 2016. One Welfare – a platform for improving human and animal welfare. Vet. Rec.

Human-Livestock interactions

The stockperson

- Skills
- Experience
- Beliefs
- (Lack of) training
- Ext. pressure

Use of aversive handling

The animal

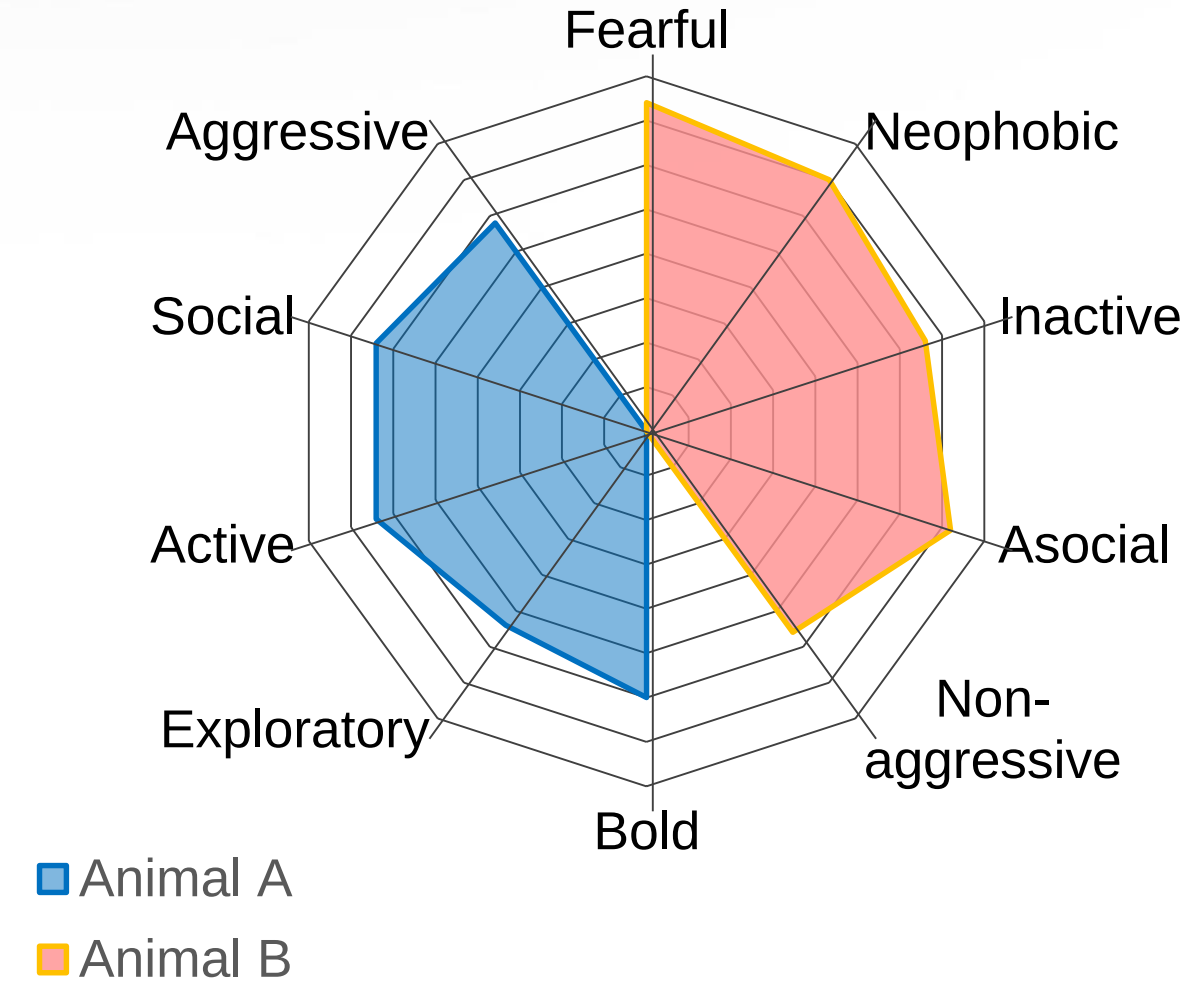
- Negative experience
- Chronic fear
- Stress

Reduced welfare, health and productivity

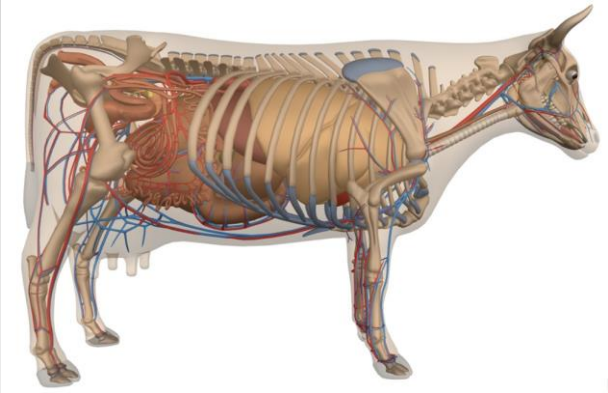
Hemsworth and Coleman, 2011. Human-Livestock interactions

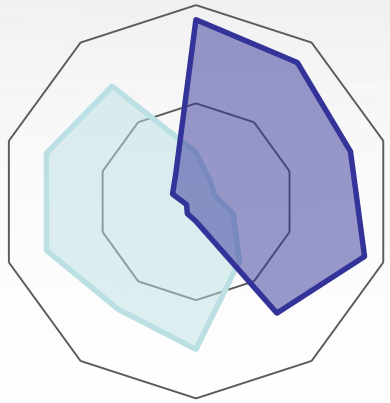
Animal temperament

- The quality of this relationship can be assessed by measuring the behavioural response of the animal in different scenarios: temperament traits
- Every animal's unique temperament profile will be determined by a mixture of genetic factors and its experiences



Hemsworth and Coleman, 2011. Human-Livestock interactions





Coping style

Proactive/Active

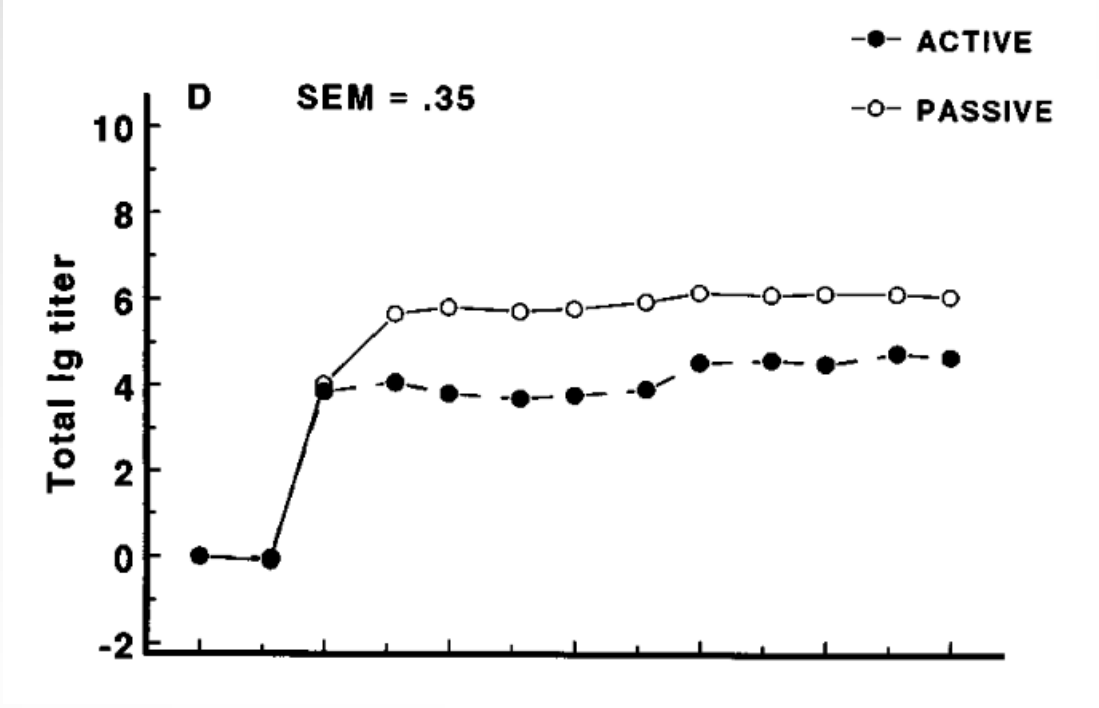
- ✓ Higher behavioural activity (aggressive).
- ✓ Elevated reactivity of the Sympathetic Autonomic Nervous System (catecholamines, fight-flight response).
- ✓ Higher sensitivity to the dopaminergic reward system.

Reactive/Passive

- ✓ Lower behavioural activity (freezing).
- ✓ Elevated reactivity of the Parasympathetic Autonomic Nervous System (cardiac vagal tone)
- ✓ Higher reactivity of the hypothalamic-pituitary-adrenal (HPA) axis (cortisol).

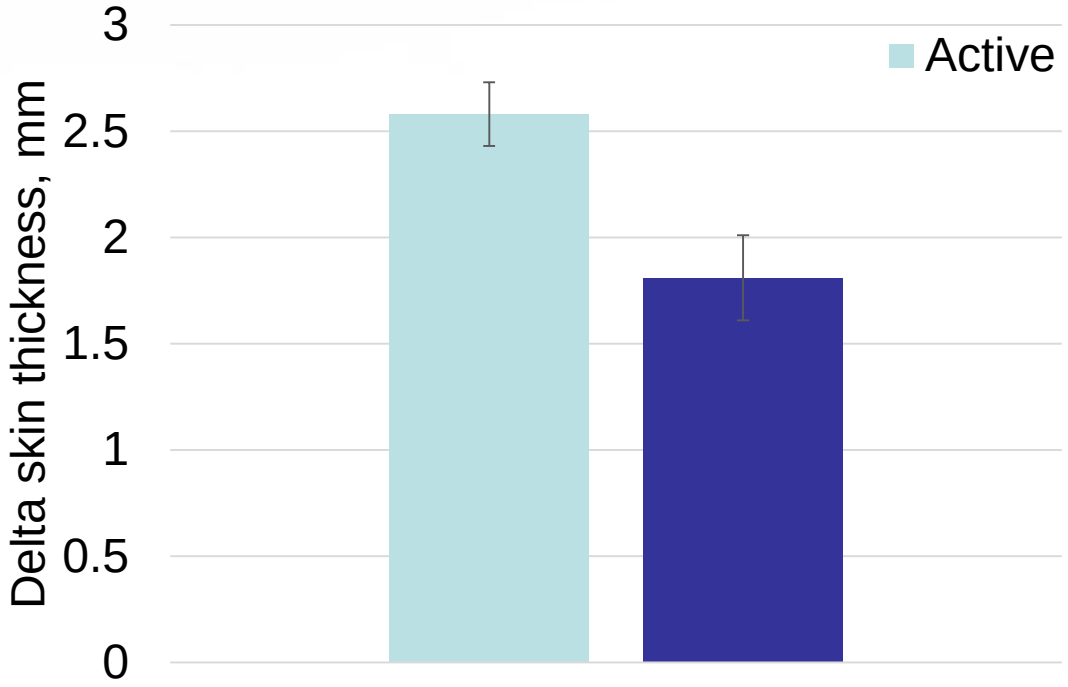
Coping style on immune response

Humoral mediated response to KLH



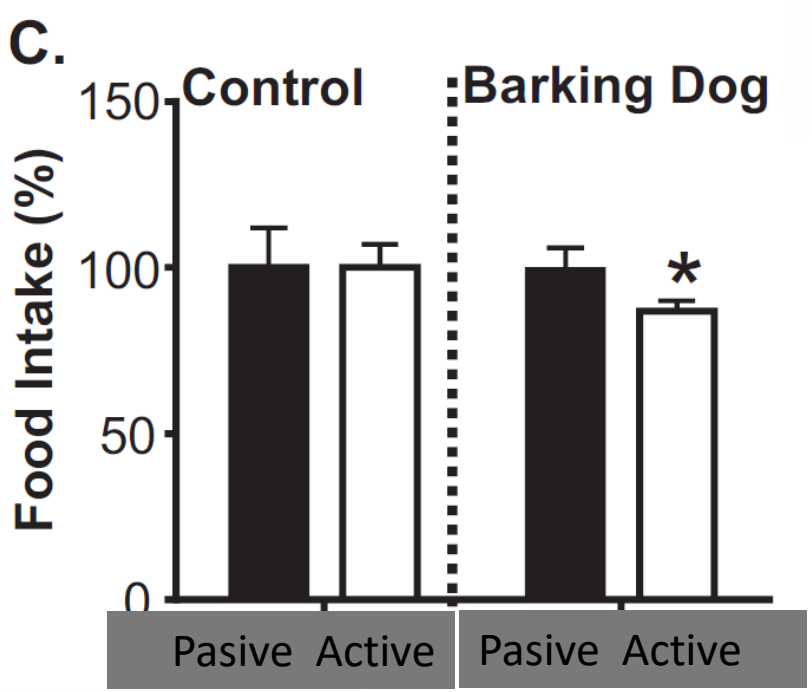
Hessing et al., 1995

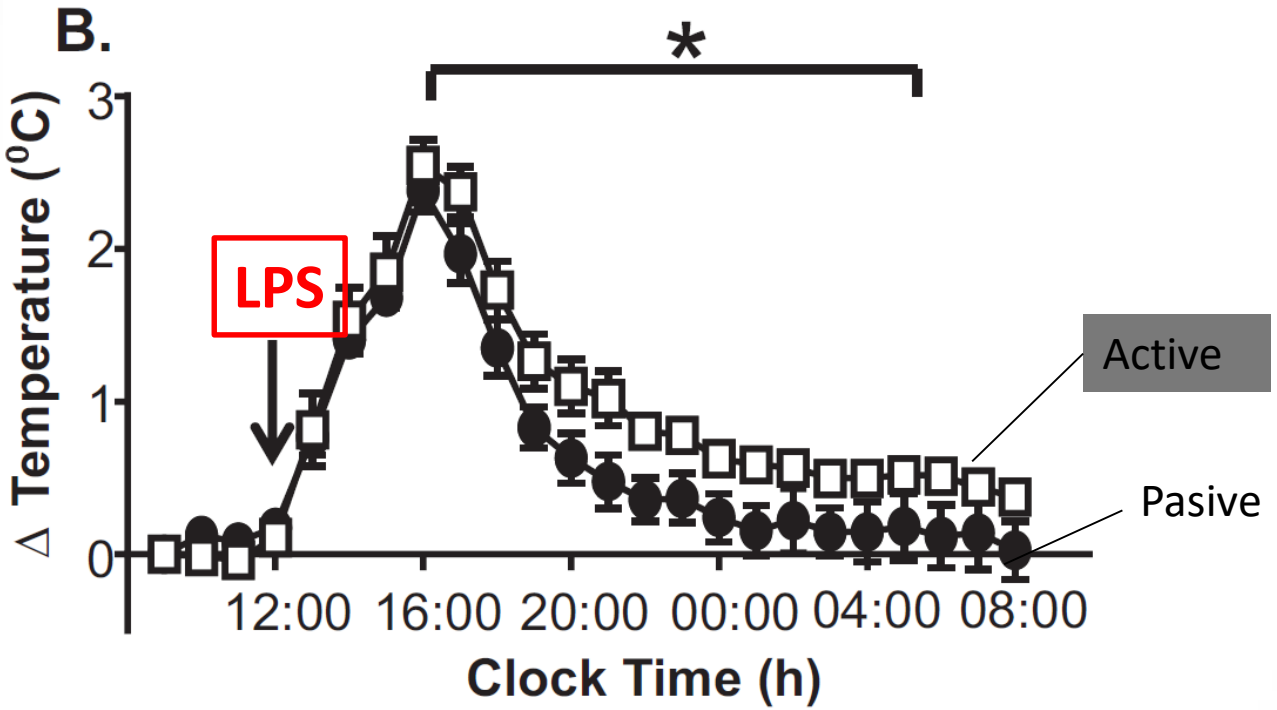
Cell mediated response to KLH



Schrama et al., 1997)

Coping style on growth performance





LPS = Immune challenge with lipopolysaccharide injection

Lee et al., 2014

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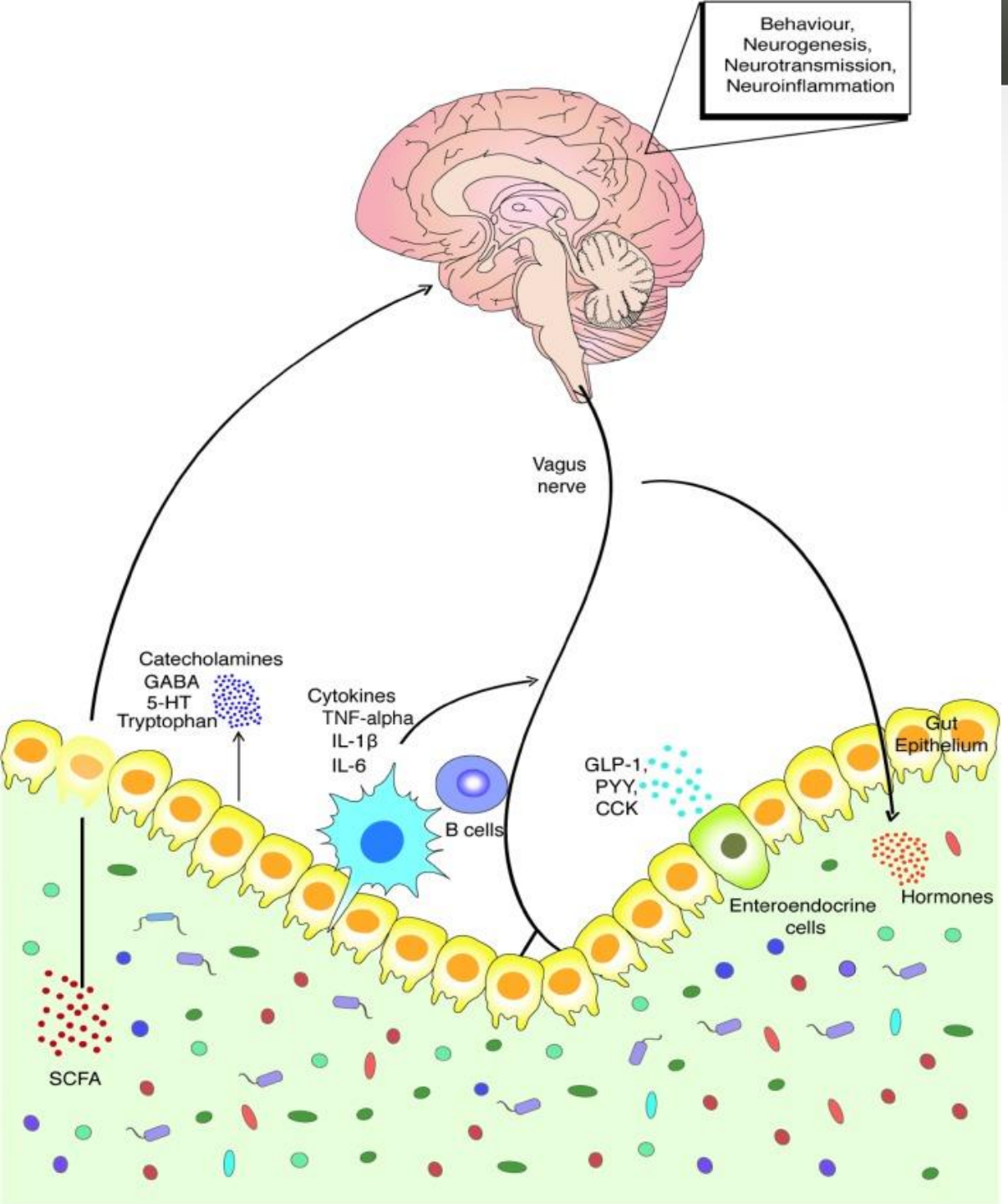


Cross-comunication host-microbes

Vagus nerve activation
Immune mediators
Microbial metabolites (SCFA)
Enteroendocrine cell signalling

Neurotransmission
Neurogenesis
Neuroinflammation
Neuroendocrine
signalling

Gut microbes produce brain influencing chemicals

Neurotrasmitters

GABA: *Lactobacillus* and *Bifidobacteria*

Noradrenalin: *E. coli*, *Bacillus* and yeasts

Serotonin: *Streptococcus*, *E. coli* and fungi

Dopamine: *Bacillus*

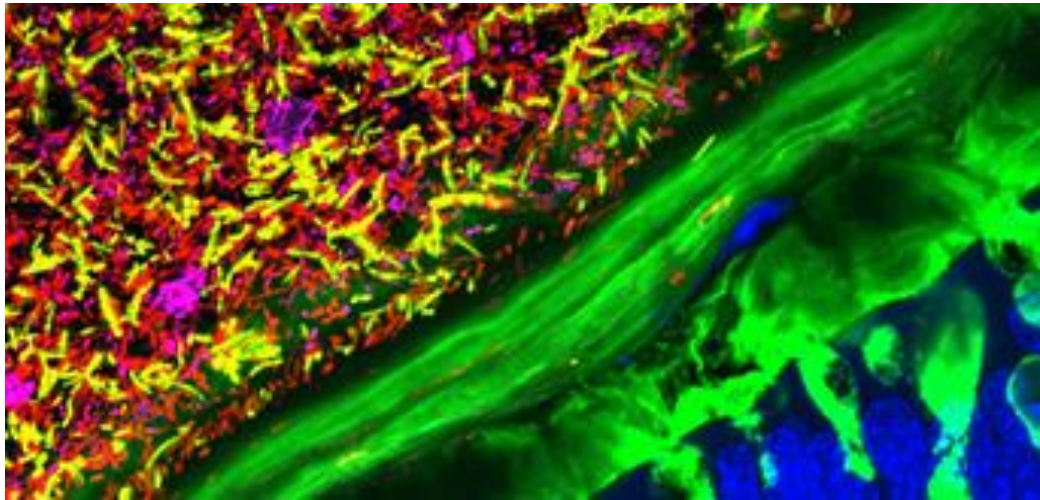
Acetylcholine: *Lactobacillus*

Hormones

Mimics of hunger & satiety hormones:

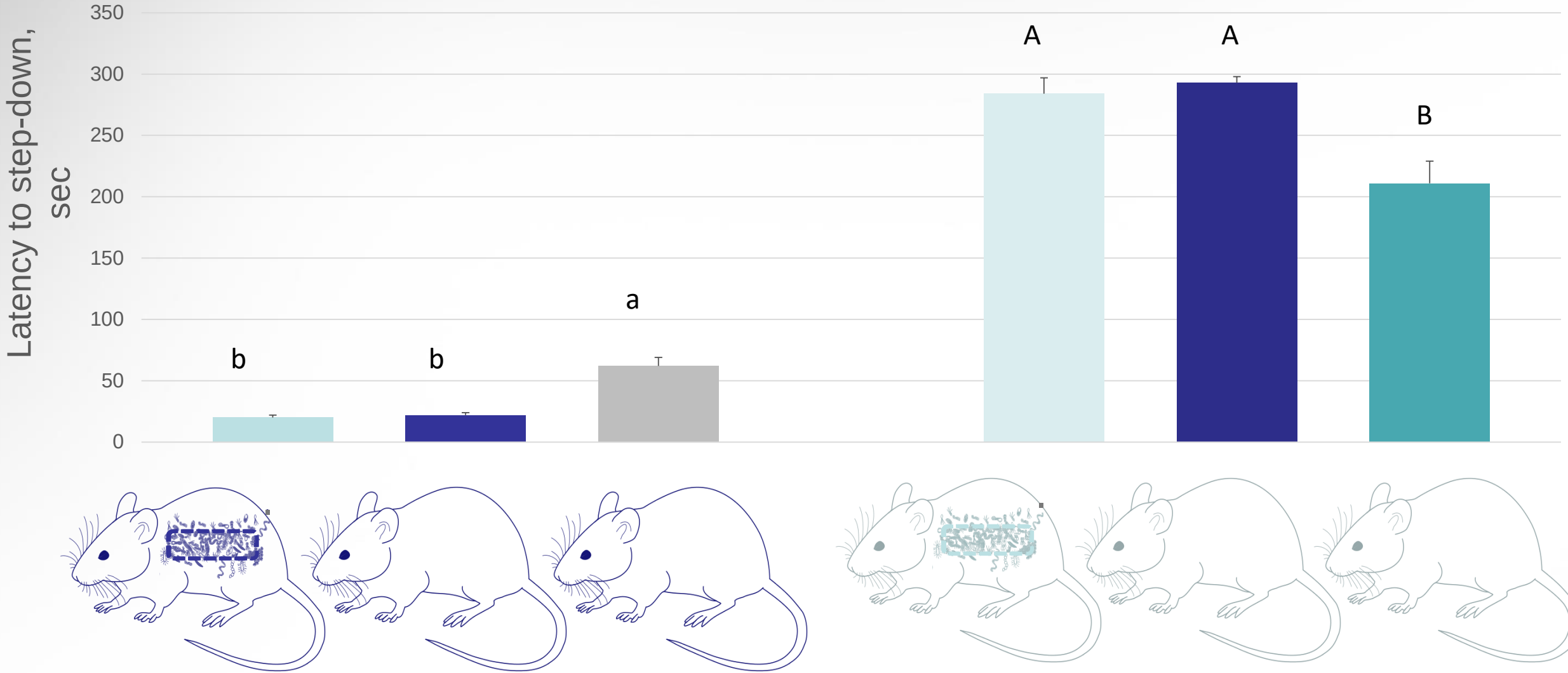
Lactobacillus and *E. coli*

Androgens: Clostridium



Proc Natl Acad Sci USA 106:3698-3703; Sci Rep 2:233; J Proteome Res 10:4208-4218 & 5512-5522; J Lipid Res 54:2437; Front Physiol 3:113

Microbiota Transplantation Modifies Host Behaviour



Bercik et al., 2011. Gastroenterology 141:599-609

NIH Swiss (Sociable/exploratory)

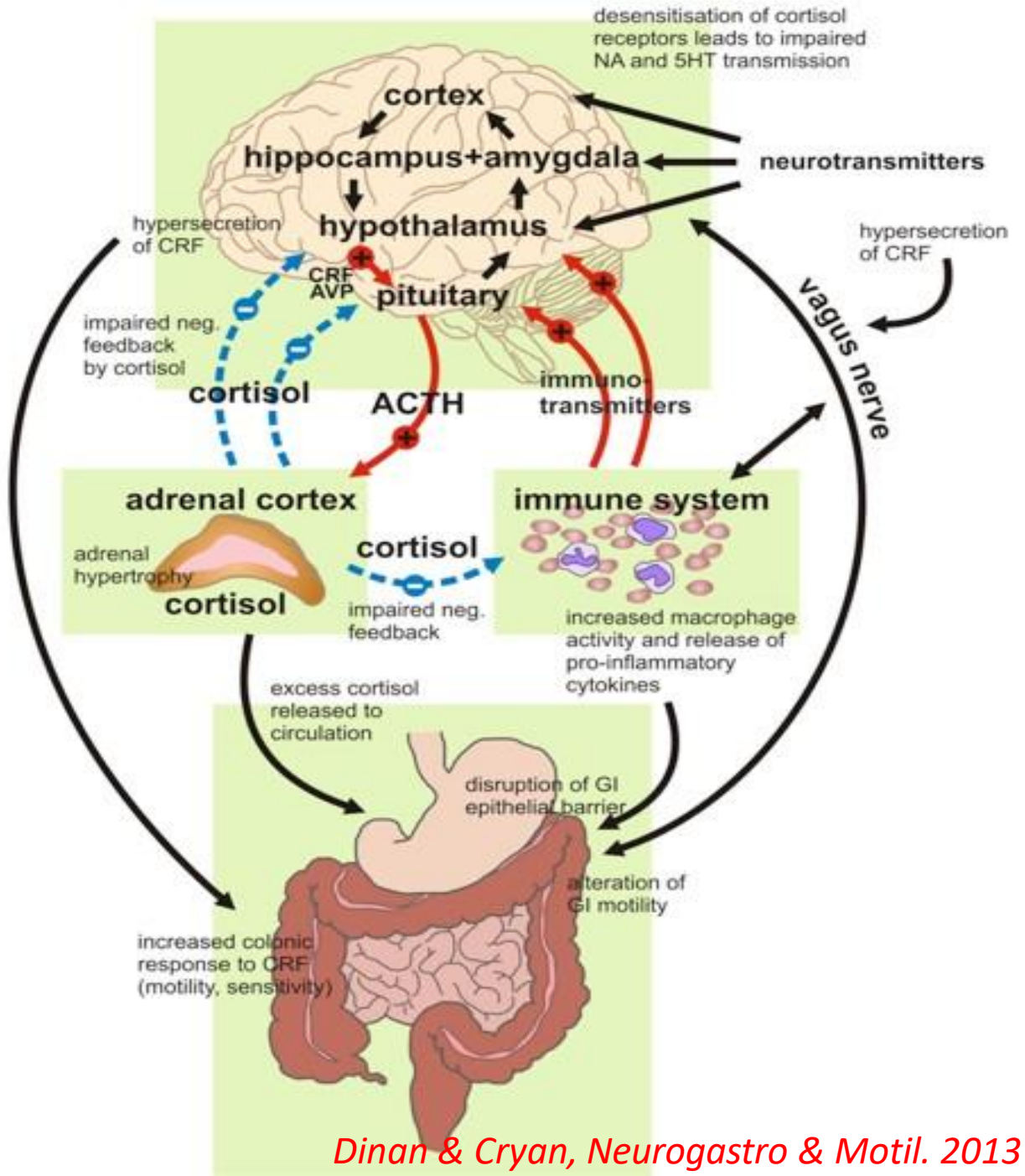
BALB/c (anxious/timid)

The other way around: The brain modulating gut microbiome

Proteins and hormones from the host have an impact on bacterial growth, principally gram-negatives like *E. coli.*
Also:

- Disruption of GI epithelial barrier
- Alteration of GI motility

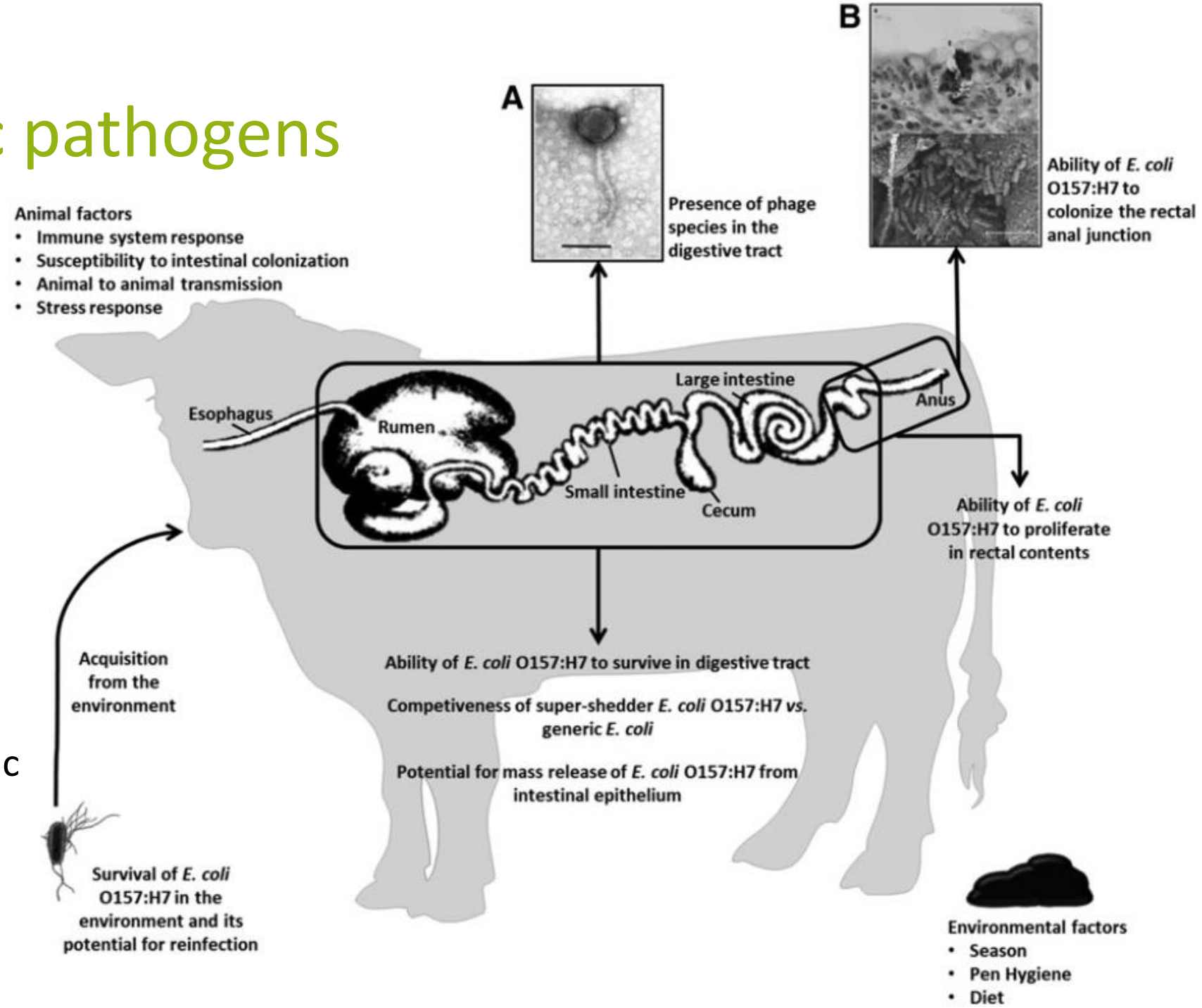
Lyte et al., 1996



Dinan & Cryan, Neurogastro & Motil. 2013

Stress & enteric pathogens

- Routine handling stress can modulate GI microflora & increase infection susceptibility
- Pathogens respond most strongly to stress hormones
- Stress promotes faecal shedding *Salmonella* & *E. coli* O157:H7
- Enteric pathogens problematic for meat industries



"activate the gustatory receptors, reinforcing the feed intake behavior"

Lucta

Diamond V

"to maintain a balanced gut microbiota"

Elanco™

"The tool to promote performance and well-being across many animal species"

"support of a positive gut microflora"

DUPONT

"plays an important role in microflora balance, intestinal system maturity"

LALLEMAND

"to optimize animal performance and well-being with specific, natural microbial product"

pancosma

Towards Psychobiotics

OPEN

Citation: Transl Psychiatry (2016) 6, e939; doi:10.1038/tp.2016.191
www.nature.com/tp

ORIGINAL ARTICLE

Bifidobacterium longum 1714 as a translational psychobiotic: modulation of stress, electrophysiology and neurocognition in healthy volunteers

AP Allen[1,2], W Hutch[3,4], YE Borre[1], PJ Kennedy[1,2], A Temko[5], G Boylan[3,4], E Murphy[6], JF Cryan[1,7,8], TG Dinan[1,2] and G Clarke[1,2]

Contents lists available at ScienceDirect

Brain, Behavior, and Immunity

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

Full-length Article

Lost in translation? The potential psychobiotic *Lactobacillus rhamnosus* (JB-1) fails to modulate stress or cognitive performance in healthy male subjects

John R. Kelly[a,b], Andrew P. Allen[a,b], Andriy Temko[c], William Hutch[d], Paul J. Kennedy[a], Niloufar Farid[b], Eileen Murphy[e], Geraldine Boylan[d], John Bienenstock[f], John F. Cryan[a,g], Gerard Clarke[a,b], Timothy G. Dinan[a,b,*]

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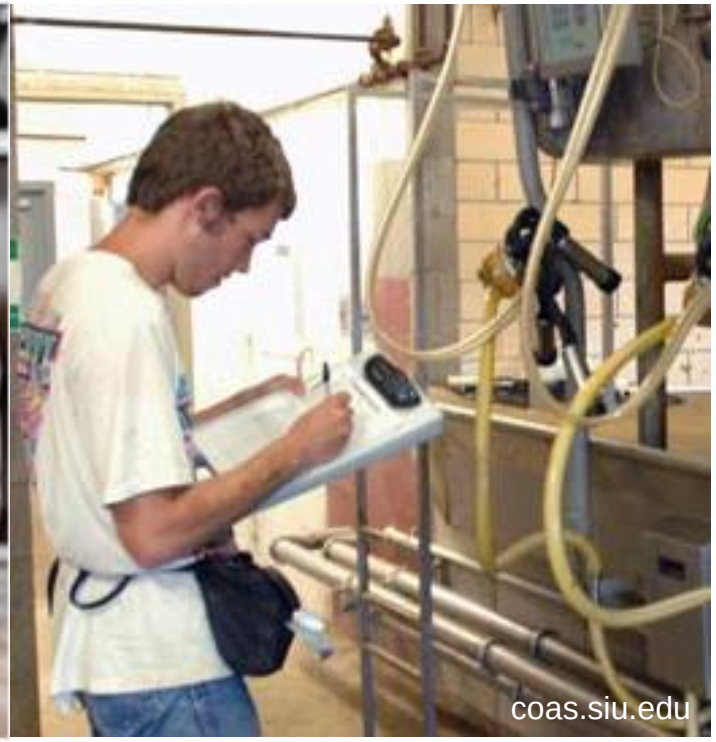
Link between animal welfare and animal health

By default animal welfare is strongly bound to the veterinarian's role, since an animal's health has an inherent link to its well being.


veterinaryspecialtycare.com

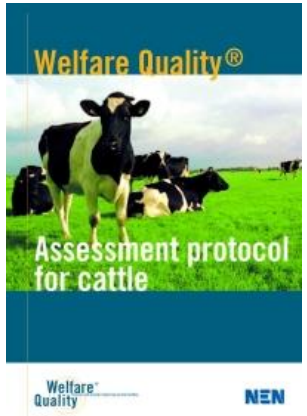

www.inspection.gc.ca


coas.siu.edu

Antimicrobial resistance and animal welfare: two sides of the same coin?

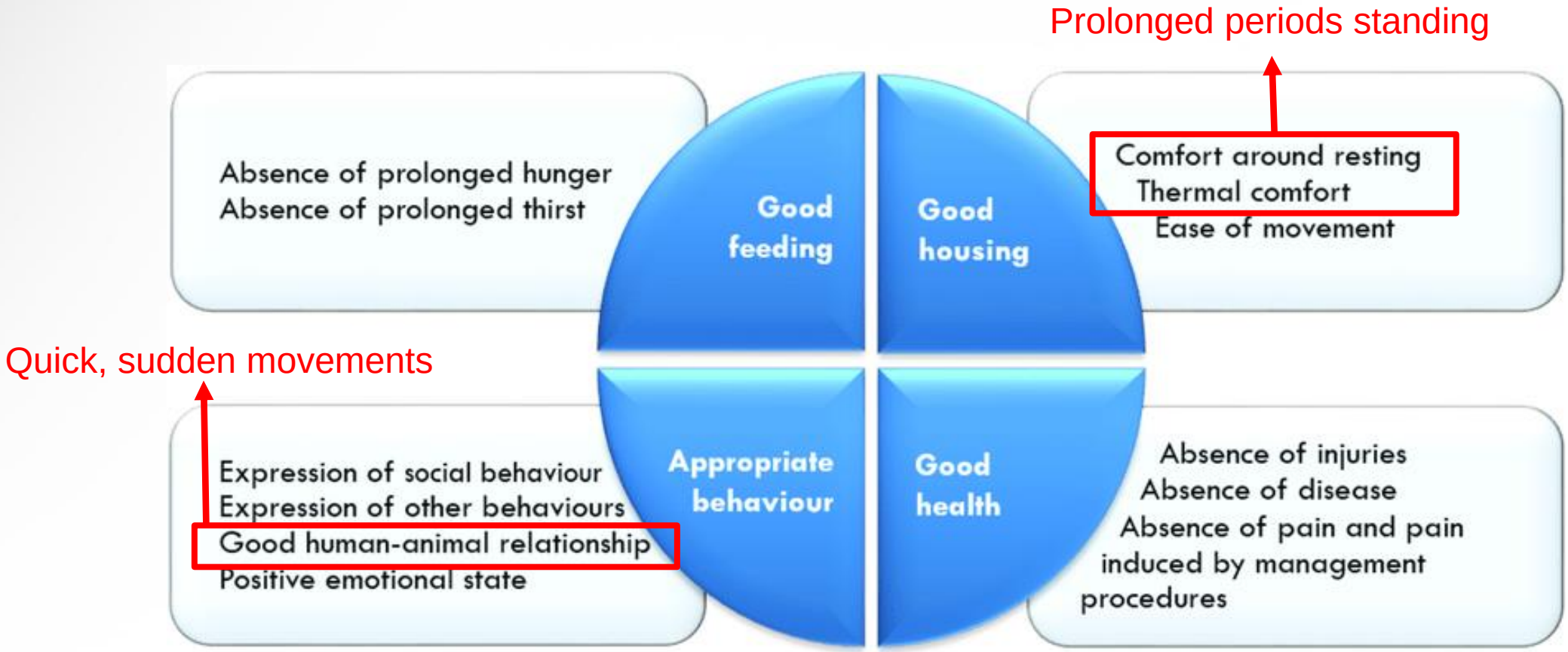
- Antimicrobial resistance (AMR) is a major health challenge.
- Inadequate massive use of antimicrobials contributes to AMR, and inadequate **use on-farm is part of the problem**.
- Part of a strategy for better use of antimicrobials is to improve husbandry and **management procedures for disease prevention** and control (inherently connected to a better animal welfare).
- Hence, improving farm animal welfare can help reduce incidence of diseases and antimicrobial use by at least three different mechanisms.

Welfare® Quality
Science and society improving animal welfare



Relationship welfare-health I

- Many welfare problems (not directly related to health) **are risk factors** for several diseases (e.g. lameness in dairy cows)



Relationship welfare-health II

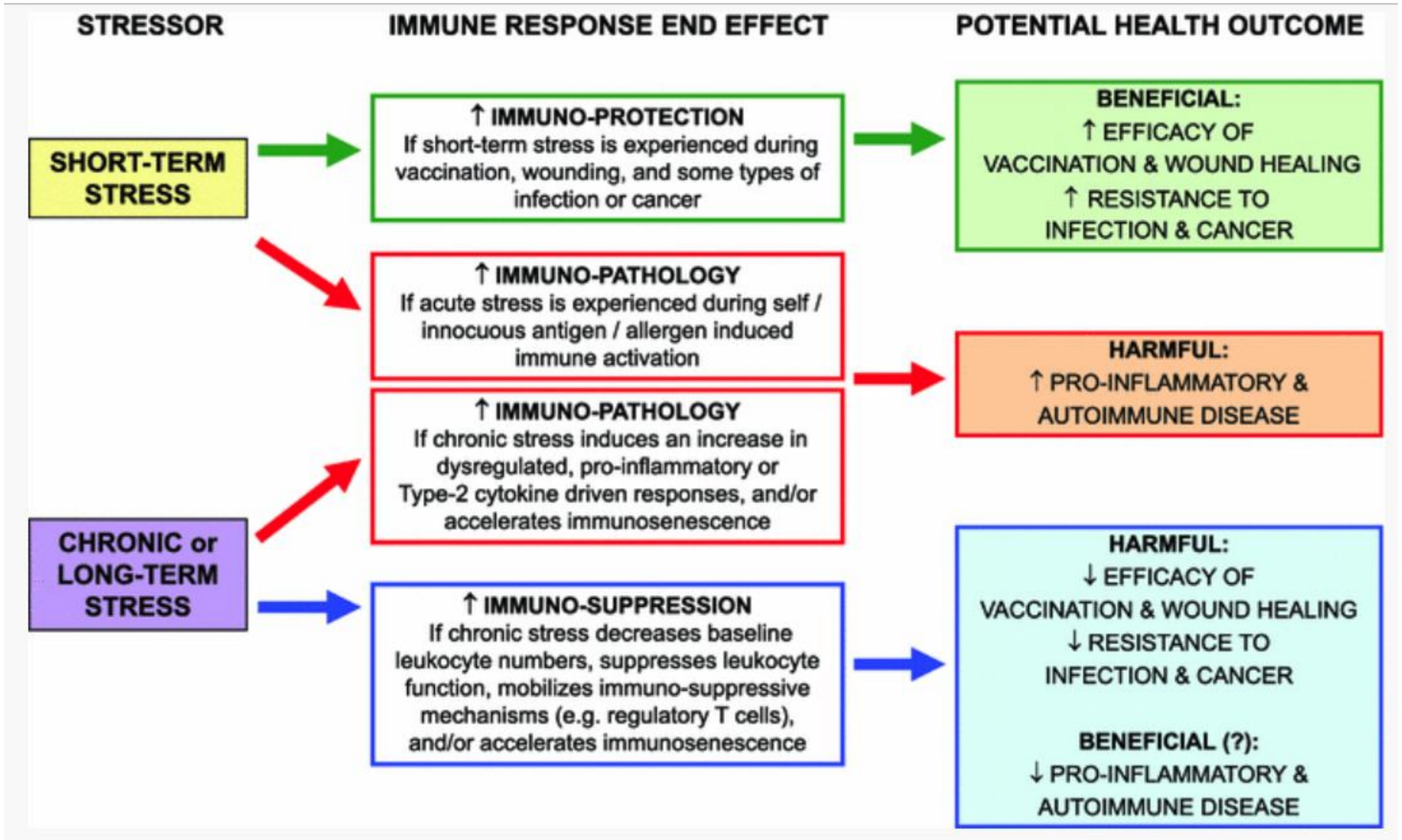
- Many welfare problems are associated to a **stress response**, which increases the risk of disease.
  - Increases gut permeability
  - Alters expression of neutrophil genes (antibacterial function)
  - Challenges immune system

Transportation stress in young bulls alters expression of neutrophil genes important for the regulation of apoptosis, tissue remodeling, margination, and anti-bacterial function

K.R. Buckham Sporer [a,b,c], J.L. Burton [c,*], B. Earley [b], M.A. Crowe [a]

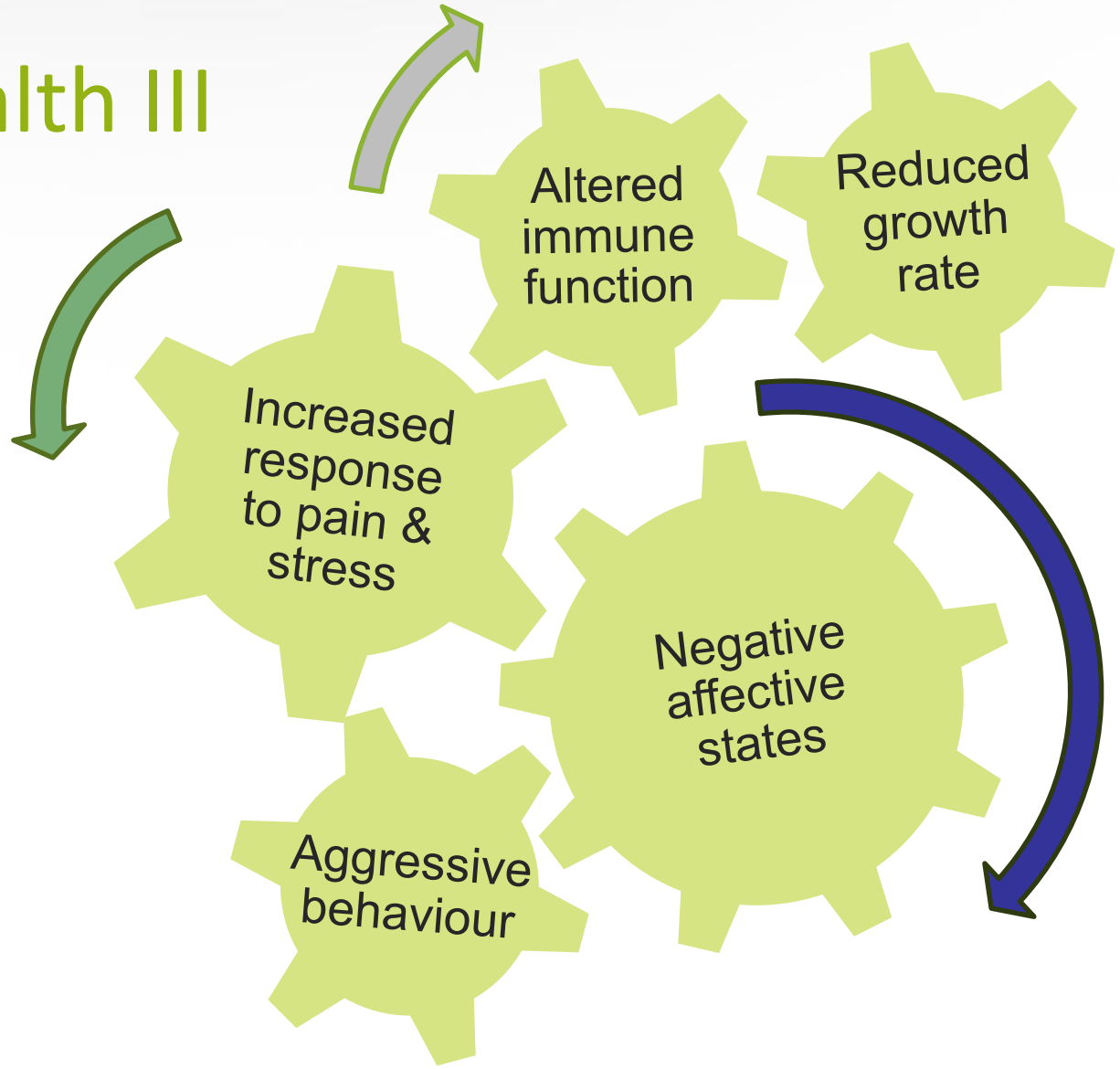
[a] *School of Agriculture, Food Science and Veterinary Medicine, University College Dublin, Belfield, Dublin 4, Ireland*
[b] *Teagasc, Grange Beef Research Centre, Dunsany, County Meath, Ireland*
[c] *Immunogenetics Laboratory, Department of Animal Science, Michigan State University, East Lansing, MI 48824, United States*

Received 8 January 2007; received in revised form 22 March 2007; accepted 5 April 2007


STRESSOR
IMMUNE RESPONSE END EFFECT
POTENTIAL HEALTH OUTCOME
SHORT-TERM STRESS
↑ IMMUNO-PROTECTION
If short-term stress is experienced during vaccination, wounding, and some types of infection or cancer
BENEFICIAL:
↑ EFFICACY OF VACCINATION & WOUND HEALING
↑ RESISTANCE TO INFECTION & CANCER
↑ IMMUNO-PATHOLOGY
If acute stress is experienced during self / innocuous antigen / allergen induced immune activation
HARMFUL:
↑ PRO-INFLAMMATORY & AUTOIMMUNE DISEASE
CHRONIC or LONG-TERM STRESS
↑ IMMUNO-PATHOLOGY
If chronic stress induces an increase in dysregulated, pro-inflammatory or Type-2 cytokine driven responses, and/or accelerates immunosenescence
↑ IMMUNO-SUPPRESSION
If chronic stress decreases baseline leukocyte numbers, suppresses leukocyte function, mobilizes immuno-suppressive mechanisms (e.g. regulatory T cells), and/or accelerates immunosenescence
HARMFUL:
↓ EFFICACY OF VACCINATION & WOUND HEALING
↓ RESISTANCE TO INFECTION & CANCER
BENEFICIAL (?):
↓ PRO-INFLAMMATORY & AUTOIMMUNE DISEASE

Relationship welfare-health III

- Positive welfare (positive emotional state) increases immune function
- A lot of evidence from humans. Not so much in animals, as difficult to assess these states, but there is indirect evidence.



- What does “welfare” mean?
- One Welfare
- Gut-Brain axis
- Relationship health-welfare
- Live animal transportation
- Stocking density
- Painful procedures
- Affective states

Transportation of Livestock

- Perceived to be one of the most stressful events
  a) Unfamiliar sounds
  b) Unpredictable motions (start-stop, turns)
  c) Temperature,
  d) Lack of water and feed
  e) Handling during loading and loadout
  f) Crowding
  g) Issues related to cull cows
  h) Etc.
- Important public and trade concerns worldwide (Harris, 2015)

Legislation on live animal transportation

- Code of Practice
  a) Transportation – Currently under review (Projected completion: Spring 2023).
  b) Beef Code of Practice (2013)
- Health of Animals Regulations (CFIA)
  - People/companies involved in ownership, production, buyers, exporters, importers, transporters, handlers, processors, assembly centres, feed/water/rest stations
- Transport regulations (HAR Part XII) are 40 years old

THE WESTERN PRODUCER

Feds pressed on new animal transportation regulations

By Barb Glen
FOLLOW

Published February 14, 2019
Livestock, News
0 comments

In a letter dated Feb. 6, a bevy of humane societies from Montreal to Vancouver, along with animal welfare and animal rights groups including Mercy for Animals, Toronto Pig Save, Animal Alliance of Canada and the Save Movement, asked MacAulay to release updates to the Health of Animals Regulations — Humane Transportation, which has been in the works for years. | File photo

Thirty signatories in a letter to federal Agriculture Minister Lawrence MacAulay have asked for immediate release of new rules governing livestock transport.

Government of Canada announces changes to humane transport requirements under the Health of Animals Regulations

From: Canadian Food Inspection Agency

News release

February 20, 2019, Ottawa, ON

The Canadian Food Inspection Agency (CFIA) understands the importance of the health and wellbeing of animals to Canadians and the Canadian economy. Today marks an important achievement with the publication of amendments to the Health of Animals Regulations (Part XII) on animal transportation.

CANADIAN CATTLEMEN'S ASSOCIATION

National Voice Of Cattle Producers

Statement

CCA concerned new Animal Transport Regulations will undermine cattle welfare rather than enhance it

February 20, 2019

Calgary, AB – Proper cattle care and welfare are paramount in the Canadian beef industry. The cattle industry's objective is for animals under transport to arrive successfully at their destination in good health and condition, without injury and while minimizing stress. Agriculture and Agri-Food Canada (AAFC) research shows that 99.95 per cent of cattle on long-haul journeys reach their destination in good condition.

While the intent of the revised Health of Animals – Transport Regulations published today is presumably to seek improvements in the remaining 0.05 per cent, the Canadian Cattlemen's Association (CCA) anticipates the revisions will likely increase stress to cattle and opportunity for injury. This is mostly due to the changes in regulations requiring more loading and unloading for rest stops.

The CCA questions why the revised regulations ignore the Government of Canada's own research and why they were released prior to the completion of ongoing research that would inform a decision on how to change the regulations to ensure the best outcomes for animal care. This research, funded in part by AAFC, will collect data through 2021 and is being conducted using commercial cattle, transport trailers, and drivers under typical commercial distances and conditions in Canada, as it is important to base regulations on directly relatable conditions and scenarios. This research will inform science-based industry best practices to ensure animal welfare is safeguarded during transport.

Changes to existing regulations

- Maximum duration
  a) 12 h for young calves – single transport event (from 18h).
  b) 36 h for bovines with functioning rumen (from 48h).
  c) 12 h for compromised cattle (from no specification).
- Longer routes requires unloading and provision for feed, water, and 8-h rest (from 5 hours)

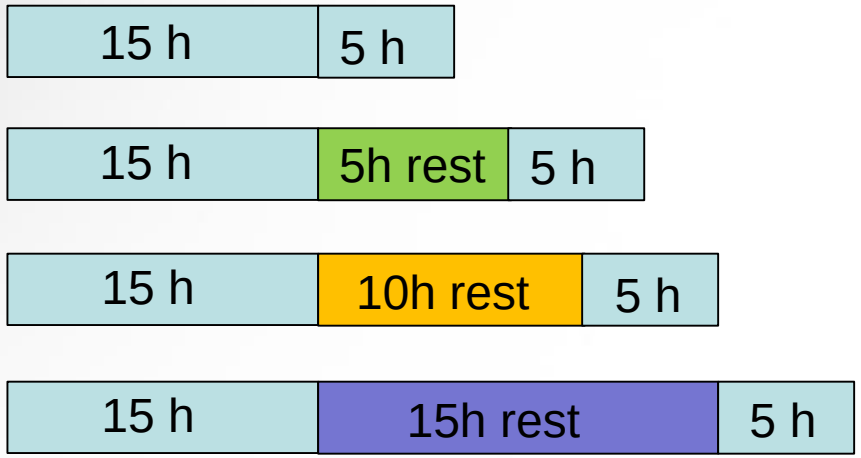
Changes come into force February 20, 2020

Two year transition period.

CFIA will focus its activities for feed water and rest times on compliance promotion through education and awareness measures for the first two years.

Effect of rest stop duration during long-distance transport on welfare indicators in recently weaned beef calves

40 newly weaned beef calves
(260 ± 32.6 kg BW)



Body weight	Time lying	Hapto-globin	Subst. P	NEFA	Cort. – Saliva	Cort. – Hair
=	↓	↑	=	↓	↑	↑
=	↑	↓	=	↑	↓	↓
=	↑	↓	=	↑	↓	↑
=	↑	↓	=	↓	↑	↑

Rest stop periods ≥10 h did not prevent short- and long-term stress after transport

Marti et al., 2017

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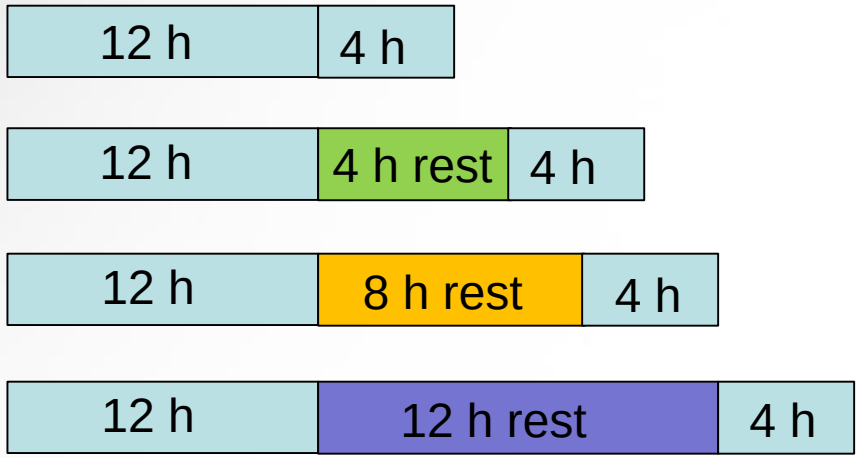

Body weight	Temp.	Hapto-globin	WBC	NEFA	Cort. – Saliva	Cort. – Hair
↓	=	=	=	=	=	=
↓	=	=	=	=	=	=
↑	=	=	=	=	=	=
↑	=	=	=	=	=	=

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Melendez et al., in prep.

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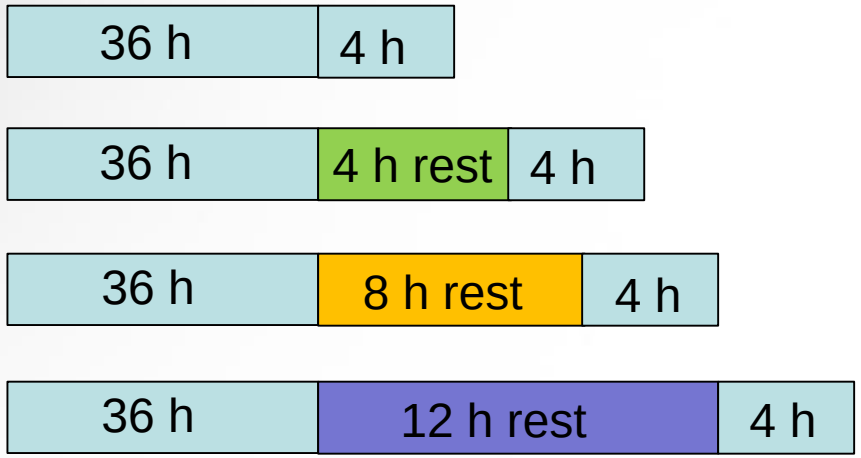


Body weight	Time lying	Hapto-globin	Subst. P	NEFA	Cort. – Saliva	Cort. – Hair
↓	=	=	=	↑	=	=
↓	=	=	=	↓	=	=
↑	=	=	=	↓	=	=
↑	=	=	=	↑	=	=

Rest stop periods ≥10 h did not prevent short- and long-term stress after transport

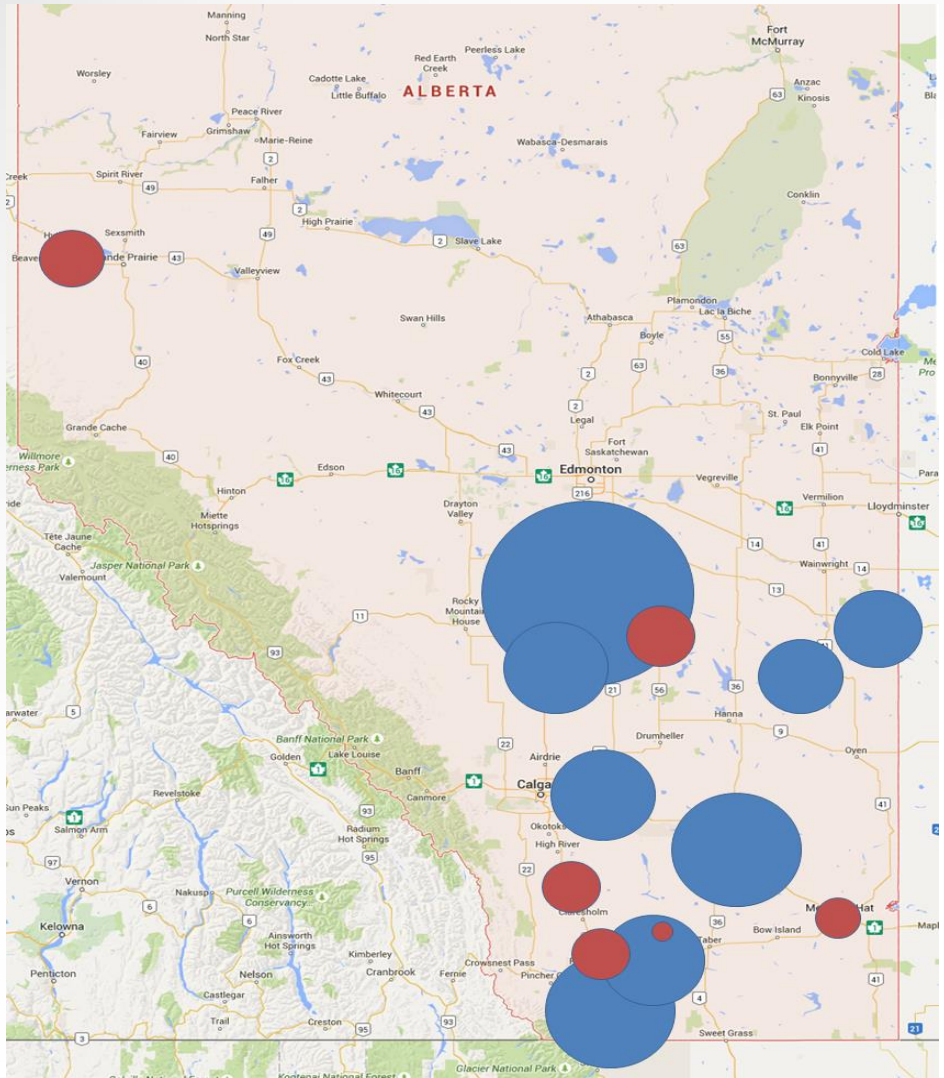
Melendez et al., in prep.

Health of animals regulations

- Animal must be fit for transport before the journey begins and monitored at a reasonable frequency to ensure it remains fit
- Must assess ability of cattle to tolerate transportation at time of **first loading**
- **Compromised**: Animals with reduced capacity to withstand the stress of transportation, may only be transported with special provisions for care, euthanasia or slaughter.
- **Unfit**: Animals with high risk of undue suffering during transportation, should not be transported except for veterinary treatment.

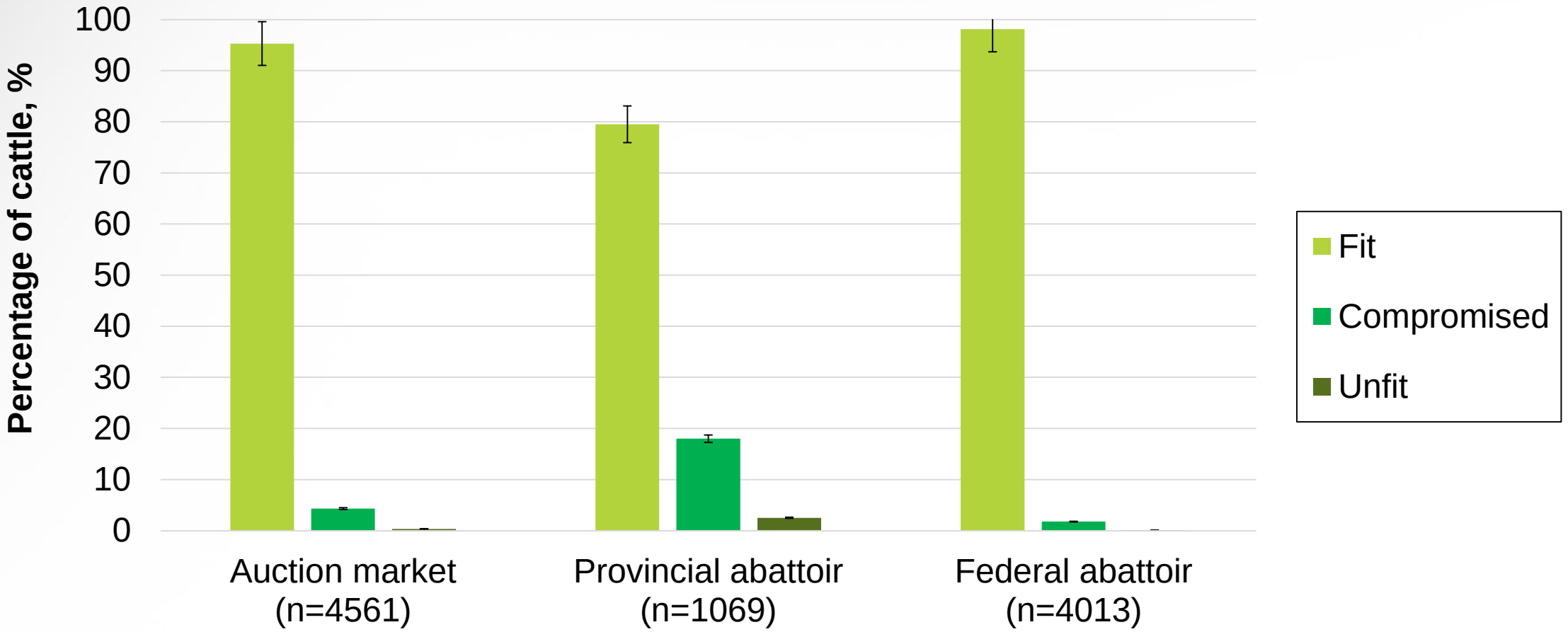
If there is debate between unfit and compromised, the default is unfit.

Benchmarking indicators of cattle transport fitness on arrival to Alberta auctions and abattoirs



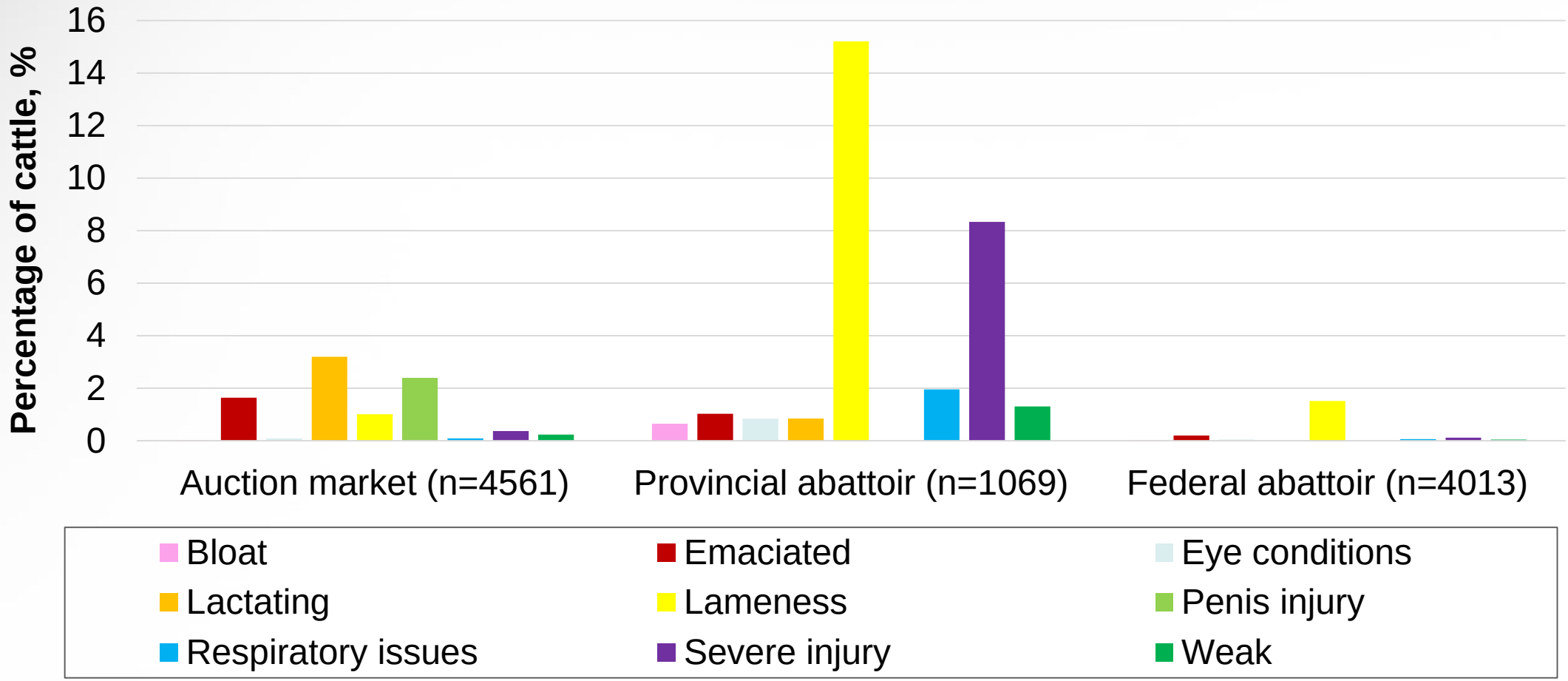
- A total of 8 out of 22 auction markets, and 11 out of 43 provincial abattoirs.
- Visited monthly to assess indicators of compromised condition in a representative proportion of cattle
- Characterizing the indicators of compromised conditions in this benchmarking study allows for the identification of important conditions to aid in the development of intervention strategies

Benchmarking indicators of cattle transport fitness on arrival to Alberta auctions and abattoirs



Heuston et al., 2018

Benchmarking indicators of cattle transport fitness on arrival to Alberta auctions and abattoirs



Heuston et al., 2018

- What does “welfare” mean?
- One Welfare
- Gut-Brain axis
- Relationship health-welfare
- Live animal transportation
- Stocking density
- Painful procedures
- Affective states

Intensive feedlot operations are perceived by the general public as a less “natural” production system and therefore, more harmful to the animals.

The feedlot industry will probably need to address this perception at some point in the future. In doing so it will require more than just the evidence that feedlots provide adequate resources for cattle and that this is reflected in their productivity. This evidence, whilst helpful, is unlikely to completely resolve these negative perceptions.

NATIONAL FARM ANIMAL CARE COUNCIL
CONSEIL NATIONAL POUR LES SOINS AUX ANIMAUX D'ÉLEVAGE

FOR THE CARE AND HANDLING OF

BEEF CATTLE

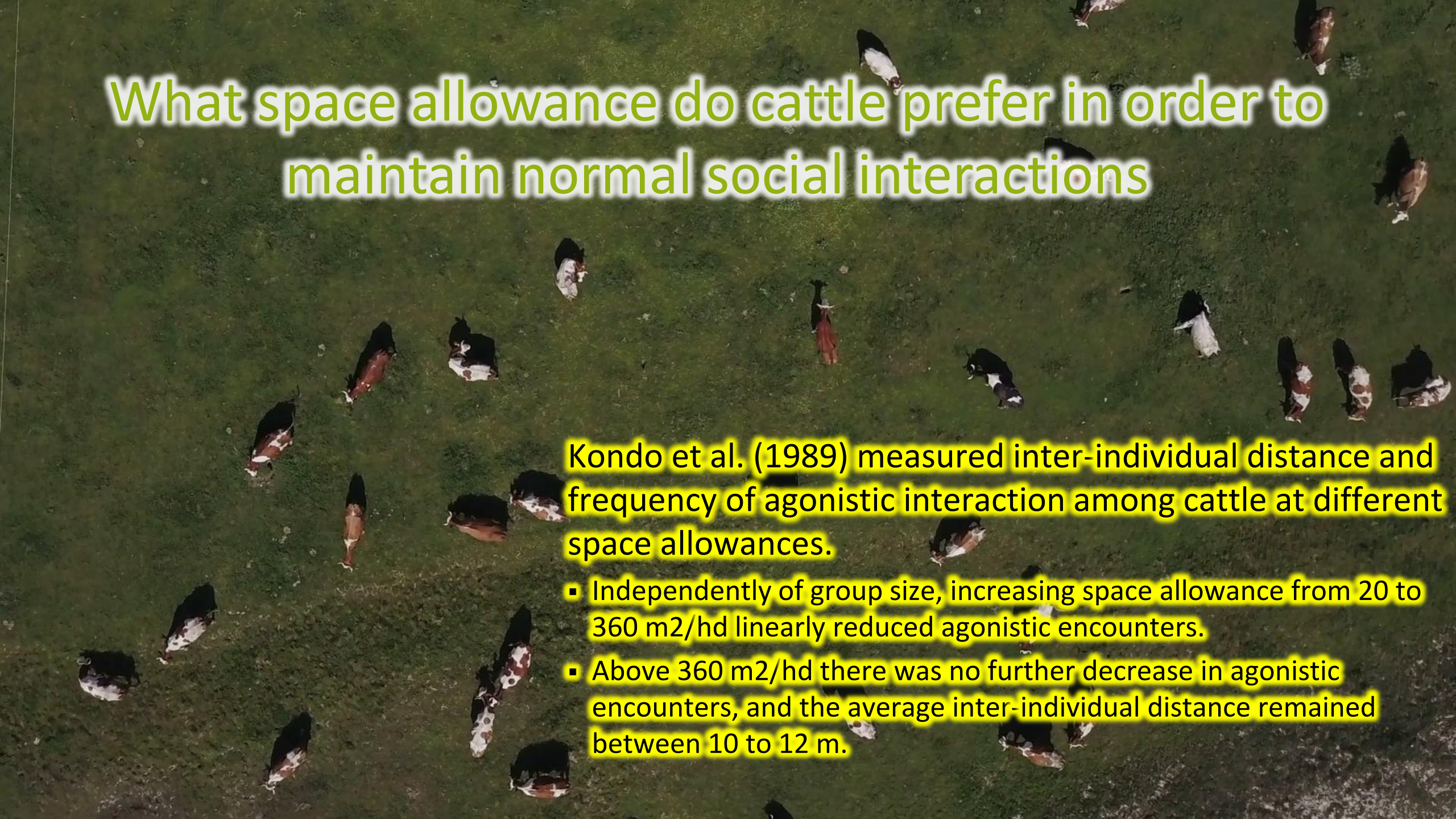
CODE OF PRACTICE

CCA CANADIAN CATTLEMEN'S ASSOCIATION

VBP+ VERIFIED BEEF PRODUCTION PLUS

- All cattle in a group must have sufficient space to adopt **normal resting postures** at the same time.
- Cattle kept in groups must be able to **move freely around** the pen and access feed and water.
- Stocking density must be managed such that weight gain and duration of time spent lying is **not adversely affected** by crowding.

What space allowance do cattle prefer in order to maintain normal social interactions



Kondo et al. (1989) measured inter-individual distance and frequency of agonistic interaction among cattle at different space allowances.

- Independently of group size, increasing space allowance from 20 to 360 m2/hd linearly reduced agonistic encounters.
- Above 360 m2/hd there was no further decrease in agonistic encounters, and the average inter-individual distance remained between 10 to 12 m.

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Outcome-based measures that the livestock producer can use for assessing the suitability of housing and stocking density include:

- Changes in normal cattle behaviour (bulling/riding)
- Morbidity and mortality rates for lameness and injuries
- Poor performance (e.g. body weight, average daily gain, feed efficiency, daily dry matter intake)
- Abnormal physical appearance.

CRSB and PAACO Canadian Feedlot Animal Care Assessment program

When assessing stocking density, it is important for the auditor to ensure that there is sufficient effective area for the animals to lie down. For example, if the pen has a water hole in the back two-thirds of the pen, the cattle cannot lie down in this area so the pen area that is available to lie down is reduced accordingly.

ANIMAL HEALTH AND WELFARE

Feeding areas and pastures allow cattle to express normal behaviours including resting postures.	
Goal:	*Cattle shall be kept in an environment conducive to normal behaviour in feeding areas and pastures.*
No **(Score: 0)**	**Achievement** **(Score: 1)**
Entry Threshold.	Adequate space shall be provided for cattle to express normal behaviour (i.e. all cattle are able to lay down at the same time; cattle can move freely and access feed and water).

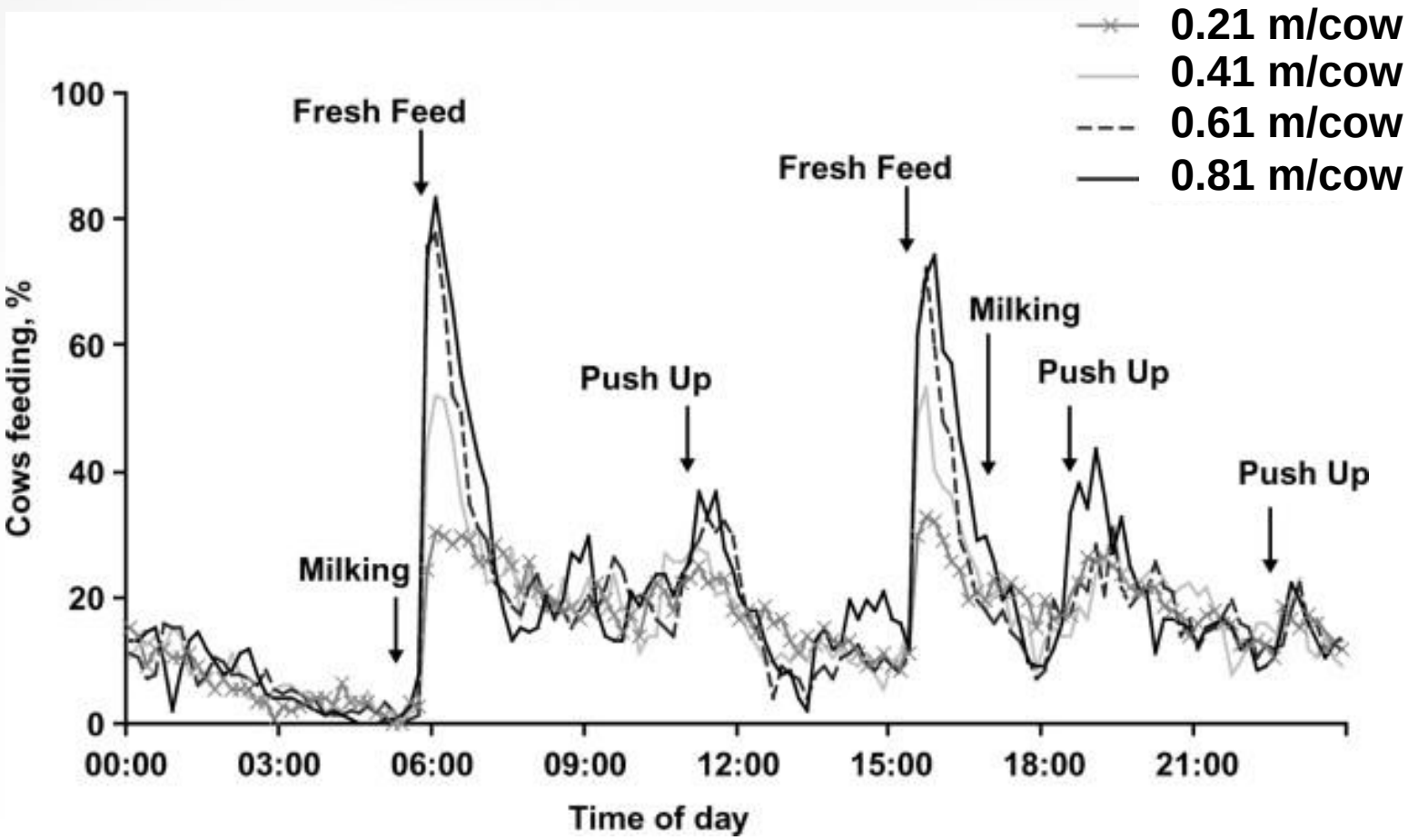
- Close proximity to other animals, human infrastructure and human handling may **increase the incidence of stress-mediated diseases (e.g. BRD)**, particularly in animals that have been transported directly from free-ranging conditions and therefore have not been acclimatized to highly human-modified environments.

- Social dynamics within highly populated pens may impact feed consumption patterns, with potential implications on **gut health (e.g. acidosis)**, **feed efficiency**, **growth performance**, and **carcass value** (e.g. marbling score and liver abscesses).

There is reasonable body of published data that examines the impact on space allowance on behaviour, health and productivity. However, very little of this research has direct relevance to the feedlot sector.

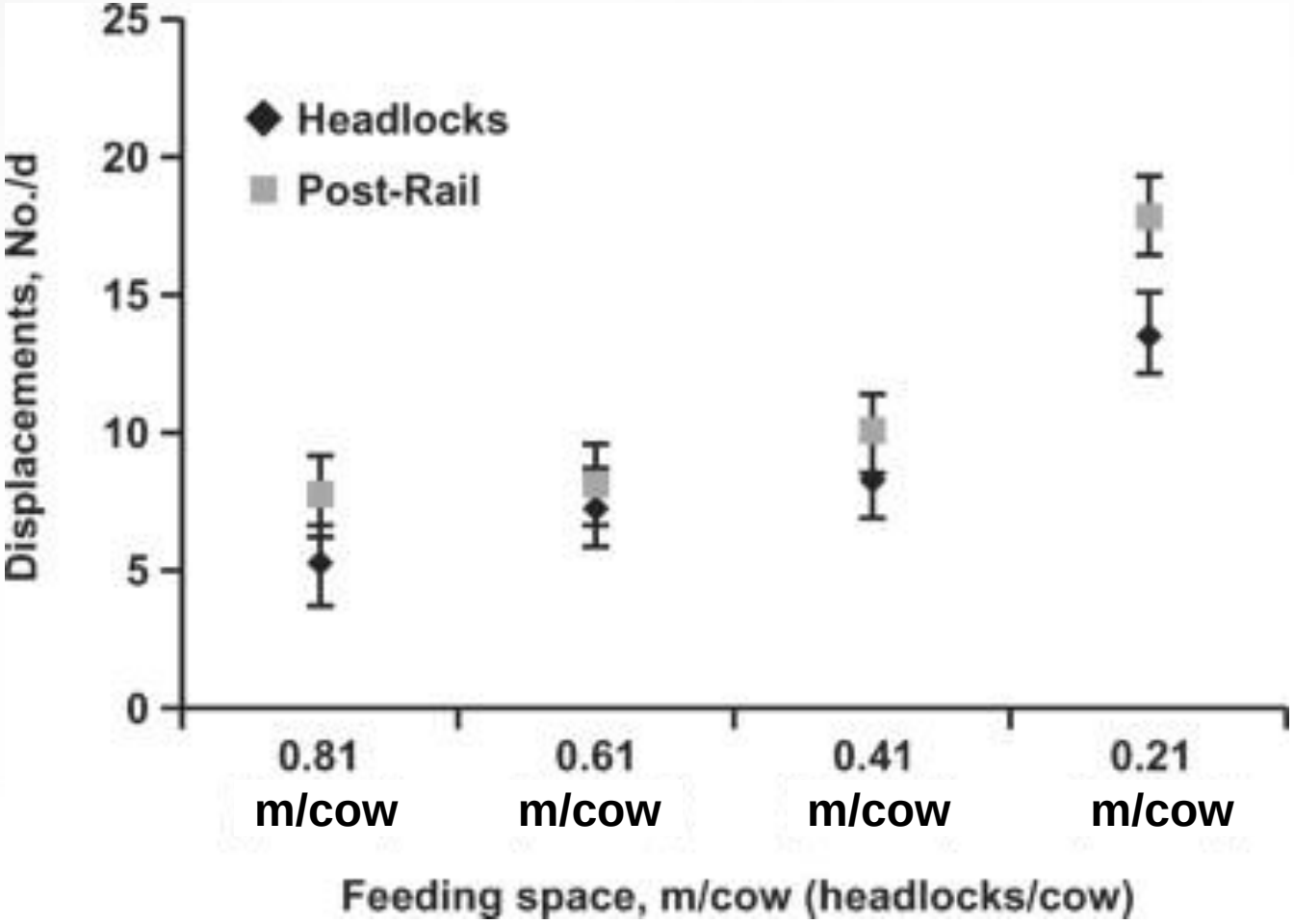
Alberta Farmer Express

Lower feed bunk space = Altered eating patterns



Huzzey et al., 2006

Lower feed bunk space = Altered social behaviour



Huzzey et al., 2006

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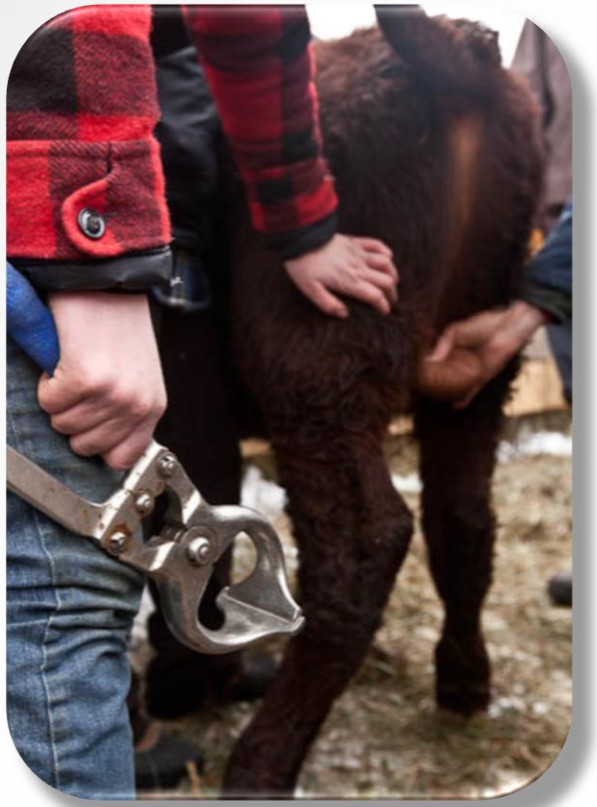
Painful procedures



- ***Animal Protection Act, 2017***

  "No person shall cause or permit the animal to be in distress"

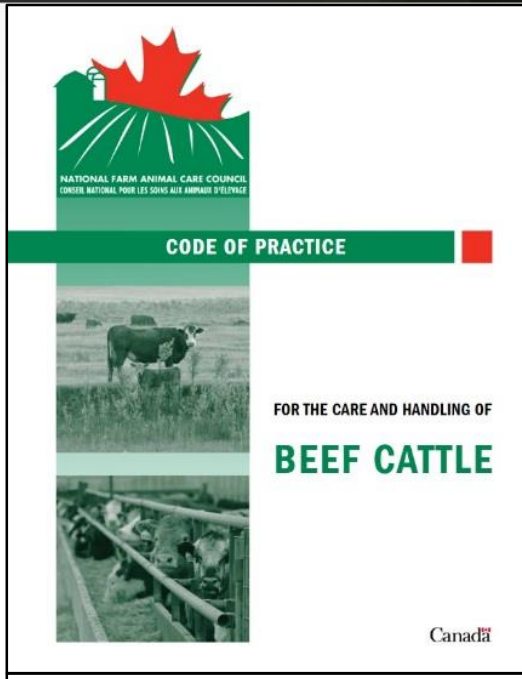
  "An animal is not considered to be in distress if it is handled in accordance with generally accepted practices of animal management"

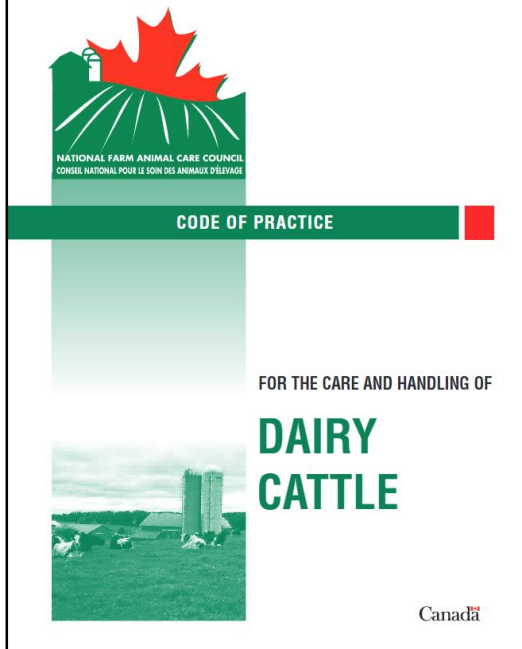
- ***The Animal Protection Regulations, 2000 (SR 32/2015)***

  "Code of Practices developed by the NAFCC for the care and handling of farm animals are prescribed as acceptable"

- ***Criminal Code Of Canada 1985 (2008, c. 12, s. 1)***

  "Every one who wilfully wounds or injures cattle is guilty of an offence punishable on summary conviction and liable to a fine not exceeding ten thousand dollars or to imprisonment for a term of not more than eighteen months or to both."





CASTRATION OF CATTLE, SHEEP, AND GOATS– POSITION STATEMENT

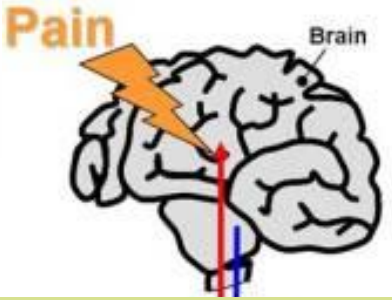
"Although not all National Farm Animal Care Council (NFACC) Codes of Practice currently require the use of anaesthesia and analgesia for castration of all ages of ruminants, the CVMA holds that economic considerations (…) should not influence the use of pain control for castration."

"The CVMA encourages veterinarians to:

a) ensure that their clients are trained in the appropriate methods to use for castration, how to provide pain control, and how to recognize acute and chronic pain; and
b) make appropriate pain control drugs available for their clients to use when they themselves are castrating animals."

Definitions

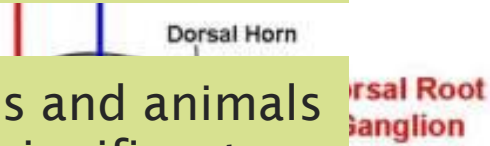
- ***Anatomical, physiological and biochemical mechanisms involved in pain***



1. **Transduction** of physical energy (noxious stimuli) into electric activity at the peripheral nociceptor (thermal, mechanical or chemical)

There is general agreement that all vertebrates are capable of experiencing pain.

the nervous system.



The assumption of similarities in pain between humans and animals is a useful rule of thumb. However there might be significant differences between species and procedures

4. **Interpretation** at the cerebral cortex to achieve the final conscious and emotional experience of pain.

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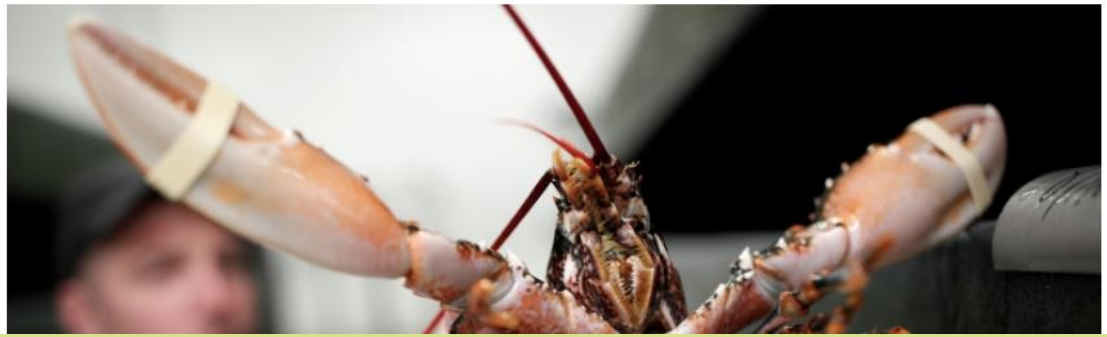
PEI

« This page is a work in progress. Follow this link to return to the CBCNews.ca you know

Lobsters 'very likely' feel pain when boiled alive, researcher says

Robert Elwood admits his research has been met with mixed reaction

Nicole Williams · CBC News
January 17, 2018



"Different animals have very different nervous systems that have evolved to do the same thing. You can't discount pain simply because the brains are different". Dr. Elwood, Queen's University, Belfast

Response to pain

Animals vary greatly in the way they respond to pain:

- Horses quite excitable.
- Cattle are fairly stoic.
- Prey animals may disguise the fact they are in pain

to avoid attracting attention of predators.

Responses include changes in behavior, retarded growth, impaired breeding, stress, and disregard of body care

It can be measured!

Pain indicators

- **No gold standard to assess pain** in animals.
- Often studies look at multiple outcomes, **which are the good ones?**
  - Validated
  - Appropriate based on sample size, collection method, biologically relevant,…
  - Repeatable/Reproducible

Behavioral outcomes
Vocalisation – call duration
Vocalisation – call rate
Vocalisation – main frequency
Vocalisation – peak amplitude
Vocalisation – peak frequency
Activity event – defecation
Activity event – escape attempts
Activity event – urination
Activity event – other
Activity state – lying
Activity state – playing
Activity state – running
Activity state – sitting
Aggression event
Avoidance event
Body movement event – ear flicking
Body movement event – head shaking
Body movement event – rear end movement
Body movement event – other
Feeding event – suckling/nursing
Feeding event – teat seeking/udder mouthing
Feeding event – teeth champing/chewing
Feeding state – suckling/nursing
Feeding state – teat seeking/udder mouthing

Non-behavioral/physiological outcomes
β-endorphins[1]
Body temperature
Cortisol[1]
Electrocardiography (ECG)
Electroencephalography (EEG)
Heart rate
Respiratory rate
Norepinephrine[1]
Adrenocorticotrophic hormone (ACTH)
Epinephrine
Haptoglobin
Substance *P*

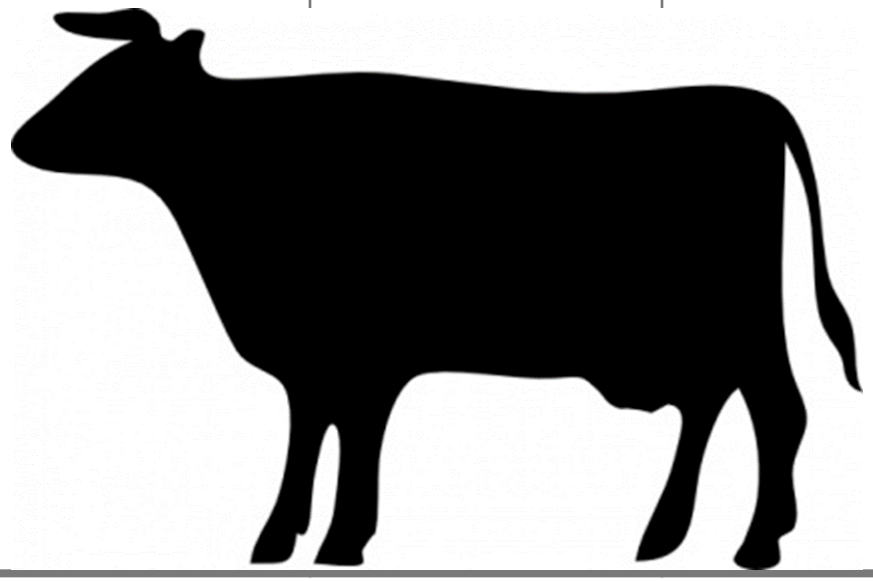
List of outcomes extracted (36) as required by the protocol (Dzikamunhenga et al., 2014)

Signs of pain - Observation

- First assessment tool available for you on meeting an animal
- Minimally intrusive
- When skilled, it's a powerful and reliable indicator of well-being

Signs of pain - Observation

Posture	Temperament	Vocalization	Locomotion	Other
• Standing on 3 legs • Recumbent • Arched back • Tail tucked • Abnormal position of feet & legs • Weight shifting • Dropped ears • Standing with head lowered	• Aggressive • Charging • Kicking • Docile	• Quiet • Grunting • Bawling with acute pain • Grinding teeth	• Lameness • Abnormal gait • Non-weight-bearing • Reluctance to move	• Dropped eye lids • Dull eyes • Isolated • Lack of interest in surrounding • Lack of appetite • Drop in milk production • Tail swishing • Ear flick • Head scratch / pressing



Seddon, personal communication

Not all evidence is created equal

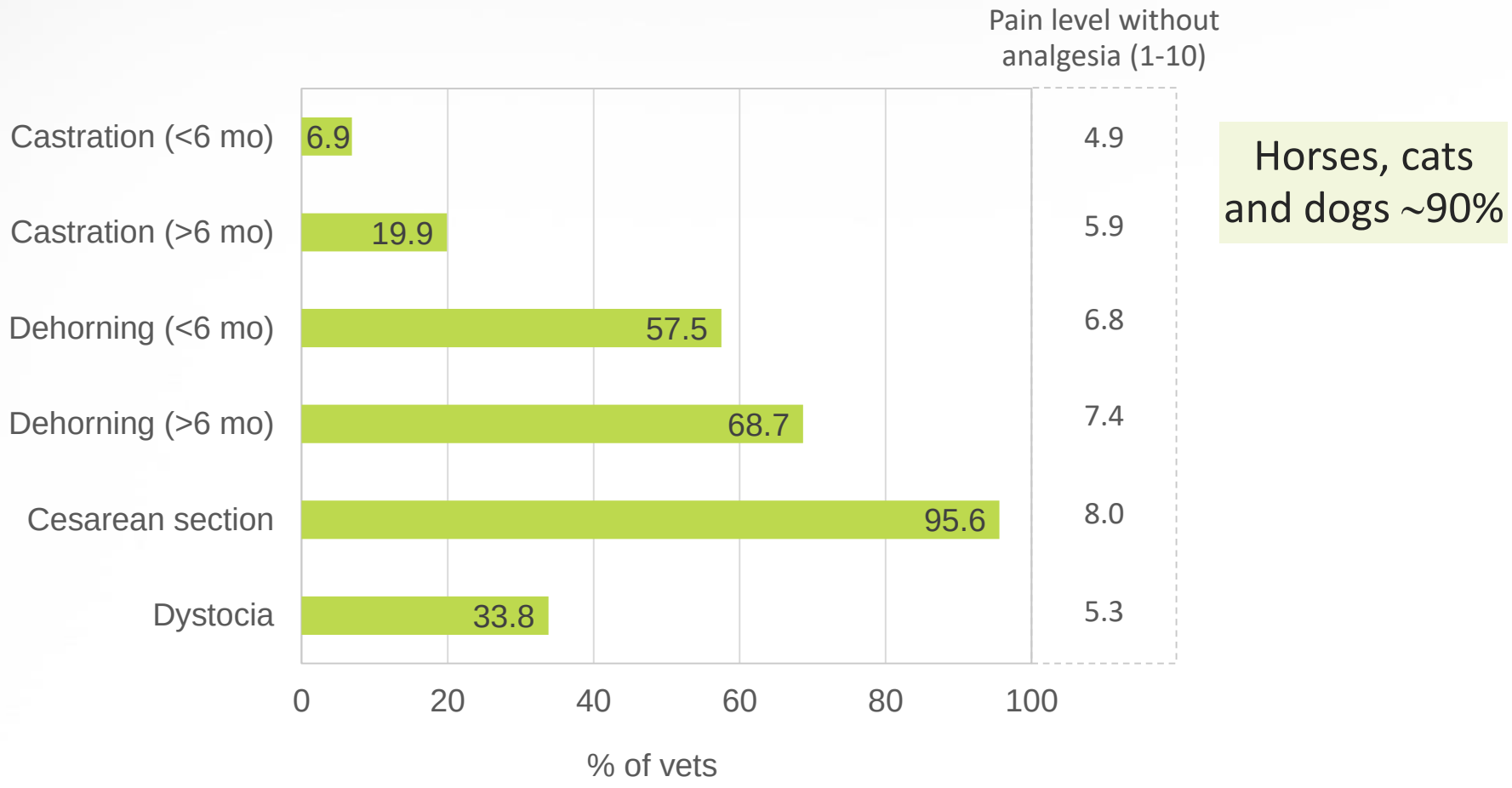
- When looking at studies to **collect your evidence**, need to consider if the study reflects the question you are interested in. Also: animals used, intervention/exposure, relevant control group, study design,…

NSAID	Study	Route	Dose	Time
Carprofen	Stilwell (2009)	i.v.	1.4 mg/kg	15 min predisbud
	Stilwell et al. (2012)	i.v.	1.4 mg/kg	15 min predisbud
	Stock et al. (2015)	Oral	2.0 mg/kg	5 min predisbud
	Stock et al. (2016)	s.c.	1.4 mg/kg	10 min predisbud
	Stock et al. (2016)	Oral	1.4 mg/kg	10 min predisbud
Dexketoprofen	Korkmaz et al. (2015)	i.v.	3.0 mg/kg	30 min predisbud
Firocoxib	Stock et al. (2015)	Oral	0.5 mg/kg	10 min predisbud
	Stock (2015)	Oral	2.0 mg/kg	5 min predisbud
Flunixin meglumine	Huber et al. (2013)	i.v.	2.2 mg/kg	At disbudding
	Huber et al. (2013)	i.v.	2.2 mg/kg	At disbudding, 3 h postdisbud
	Stock (2015)	Oral	2.3 mg/kg	5 min predisbud
Ketoprofen	Duffield et al. (2010)	i.m.	3 mg/kg	10 min predisbud
	Faulkner and Weary (2000)	Oral	3 mg/kg	2 h predisbud and 2 and 7 h postdisbud
	Milligan et al. (2004)	i.m.	3 mg/kg	10 min predisbud
Meloxicam	Allen et al. (2013)	Oral	1 mg/kg	12 h predisbud
	Allen et al. (2013)	Oral	1 mg/kg	At disbudding
	Heinrich et al. (2009)	i.m.	0.5 mg/kg	10 min predisbud
	Heinrich et al. (2010)	i.m.	0.5 mg/kg	10 min predisbud
	Mintline et al. (2013)	i.v.	0.5 mg/kg	55 min predisbud
	Stock (2015)	Oral	2.0 mg/kg	5 min predisbud

Castration

- To avoid unwanted breeding, reduce aggression (improve human and animal safety) and improve carcass quality.
- Code of Practice requirements:
  - Castrate calves as young as practically possible (preferably <1 week)
  - Castration must be performed by competent personnel using proper instruments
  - Seek guidance from your veterinarian on method, timing and pain control
  - EFFECTIVE JANUARY 1, 2018: Use pain control to mitigate pain associated with castration in bulls older than 6 months

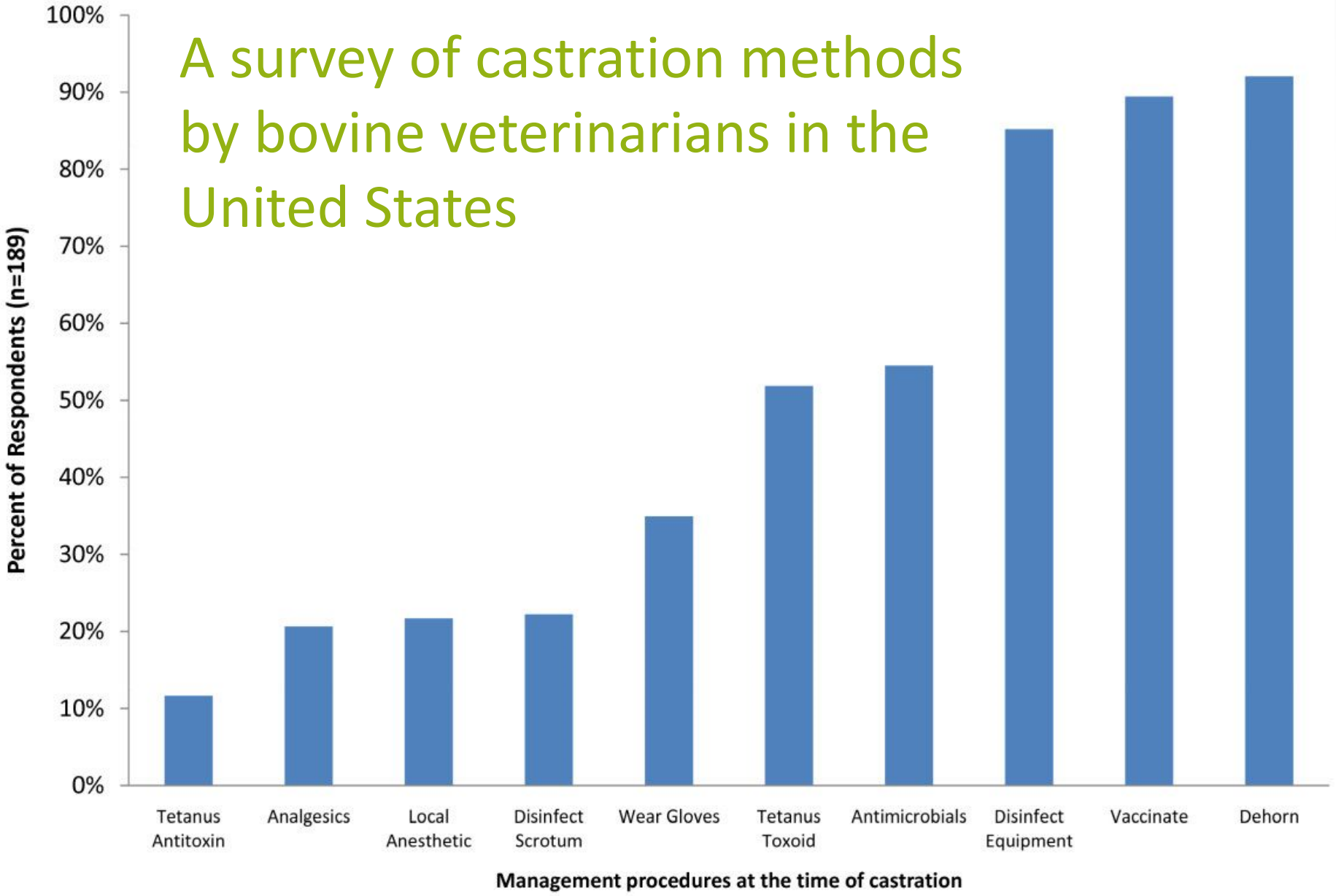
Percent of vets using analgesia



Horses, cats and dogs ~90%

Hewson et al., 2007. Can Vet J, 48:155-164

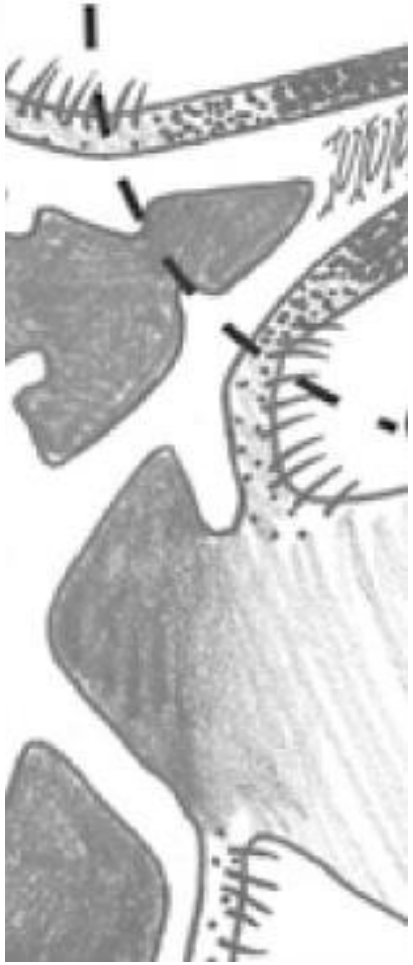
A survey of castration methods by bovine veterinarians in the United States



Coetzee et al., 2010. BMC Veterinary research

Dehorning / Disbudding

- To decrease the risk of injury for handlers and other cattle, and minimize the economic loss due to carcass bruising
- Code of Practice requirements:
  - Disbud calves as early as practically possible (<2-3 months)
  - Dehorning must be performed by competent personnel using proper instruments
  - Seek guidance from your veterinarian on pain control
  - EFFECTIVE JANUARY 1, 2016: Use pain control to mitigate pain associated with dehorning after horn bud attachment



Branding

- Permanent animal identification, easy to identify from a distance, and legally accepted as proof of ownership. It may be required by community pastures, lending institutions or for export.
- Minimize the pain of branding by using correct techniques: Hot iron or freeze branding
- Code of Practice requirements:
  - All cattle must be identified using an approved ear tag as stipulated by applicable regulations.
  - It must be performed with the proper equipment, restraint and by competent personnel
  - Do not brand wet cattle due to risk of scalding

Pain mitigation strategies

- Procedures are much less invasive in **young animals**. The wound is smaller, there is considerably less blood loss, and young animals recover more quickly with a smaller setback in animal performance.
- Performed by a **competent operator** using clean, properly maintained tools, is the simplest way to reduce pain during painful routine management procedures.
- Painful procedures **should not be performed** during times when the animal will be **experiencing other stressors** (e.g. don't castrate at the same time as weaning). Stress reduces the animal's immune system and makes them less able to fight off infection.

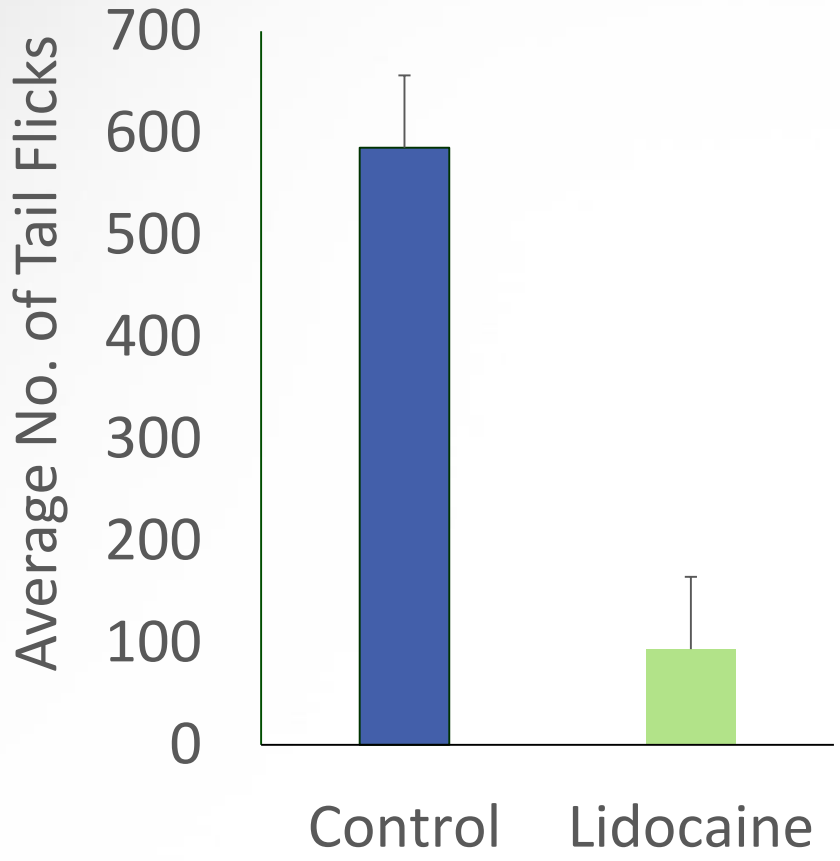
Using drugs for pain control

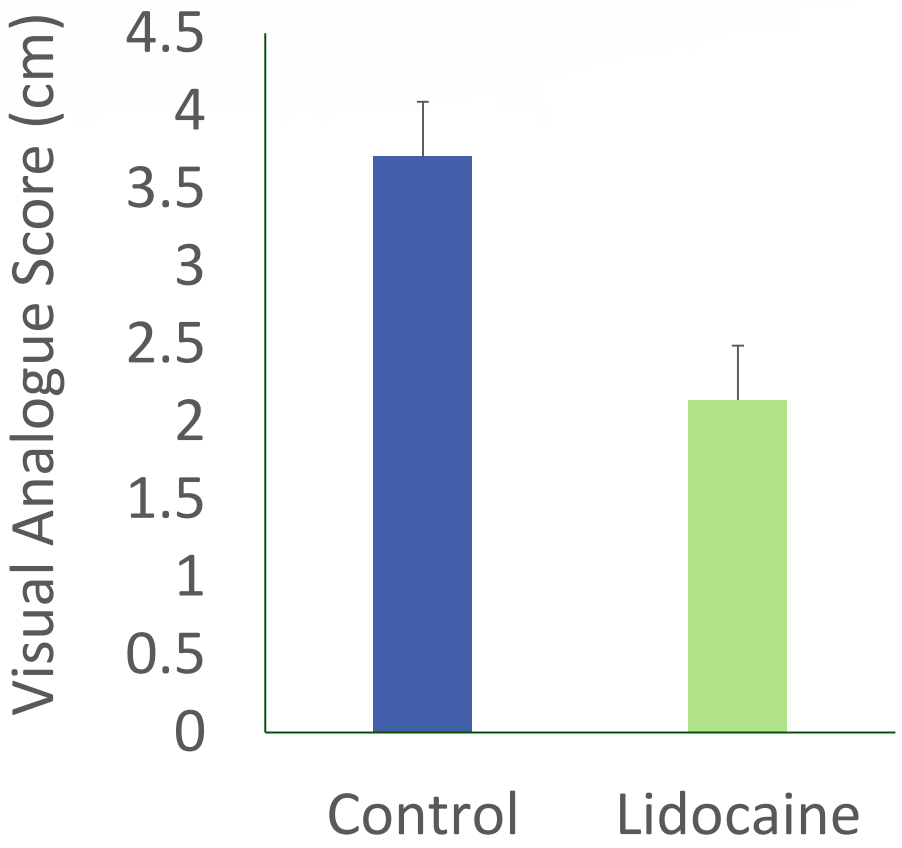
- Use of anesthetics or analgesics can also help to control pain, especially in older animals. Work closely with the veterinarian to develop a pain mitigation strategy that works in a particular situation.

Does administering lidocaine immediately before castration minimize pain in beef calves?

- 40 Hereford cross bull calves (47.9 ± 10.43 d)
  - Meloxicam (2.5 mL SQ) (Control)
  - Meloxicam (2.5 mL SQ) + lidocaine (10 mL in scrotum 90 s before).

Does administering lidocaine immediately before castration minimize pain in beef calves?





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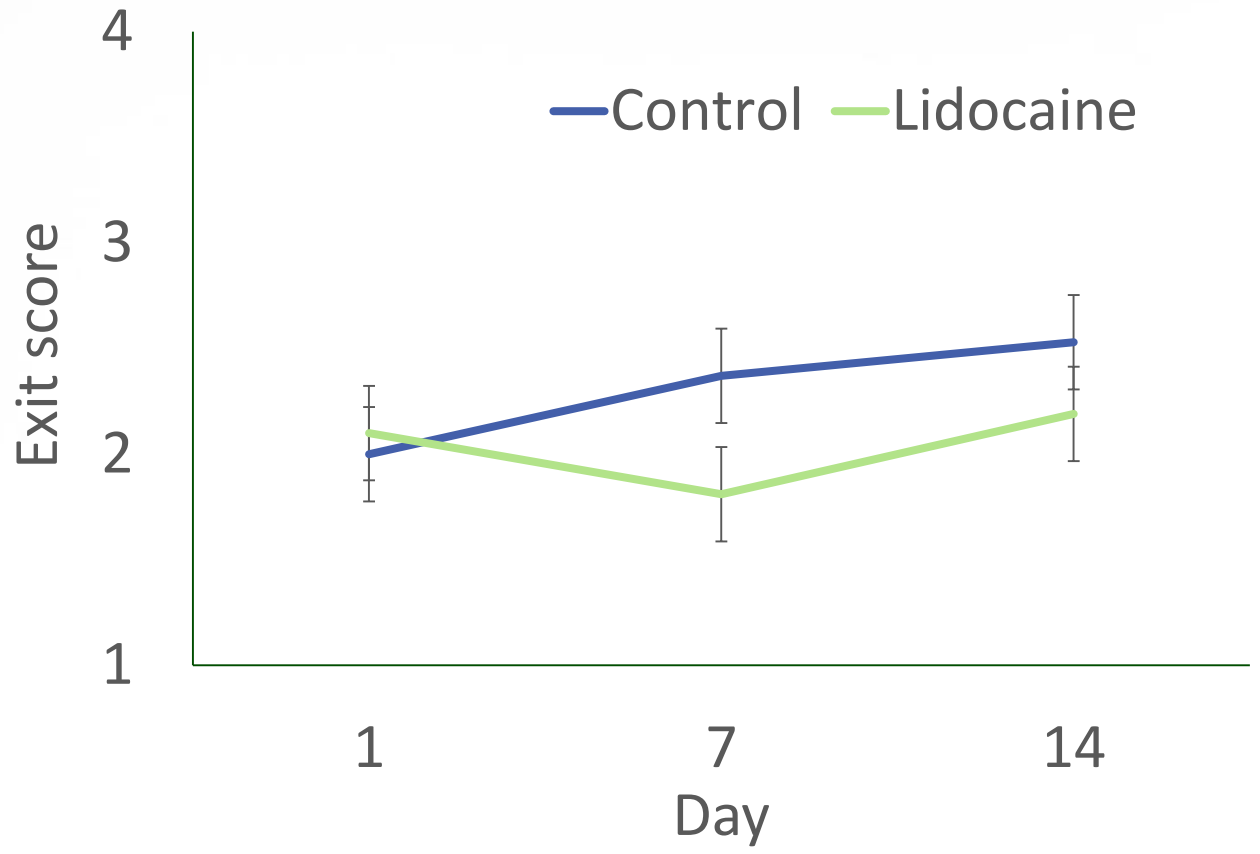

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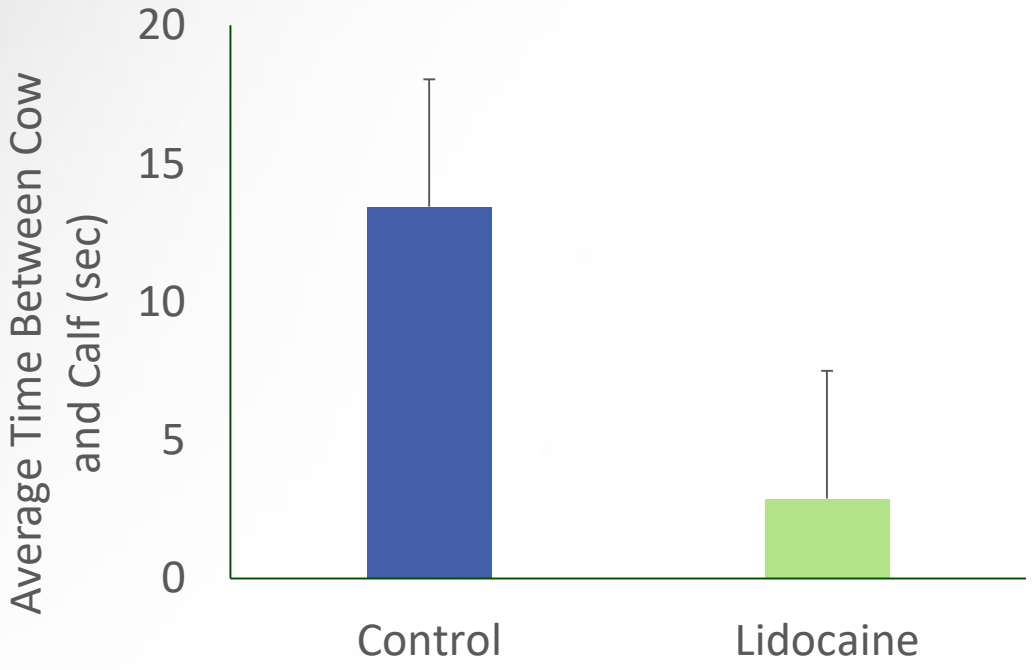
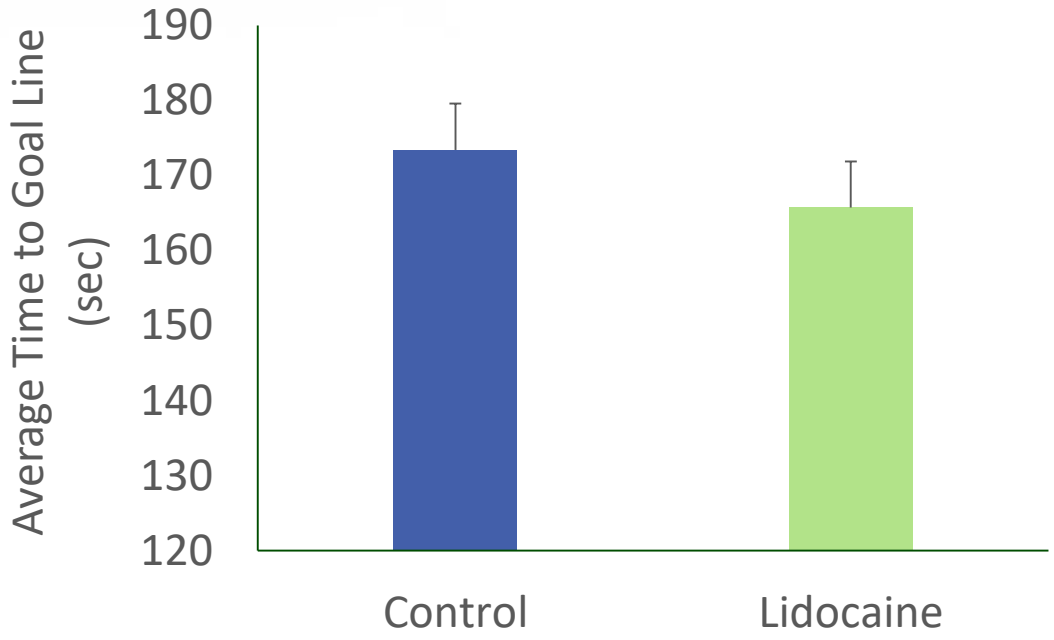
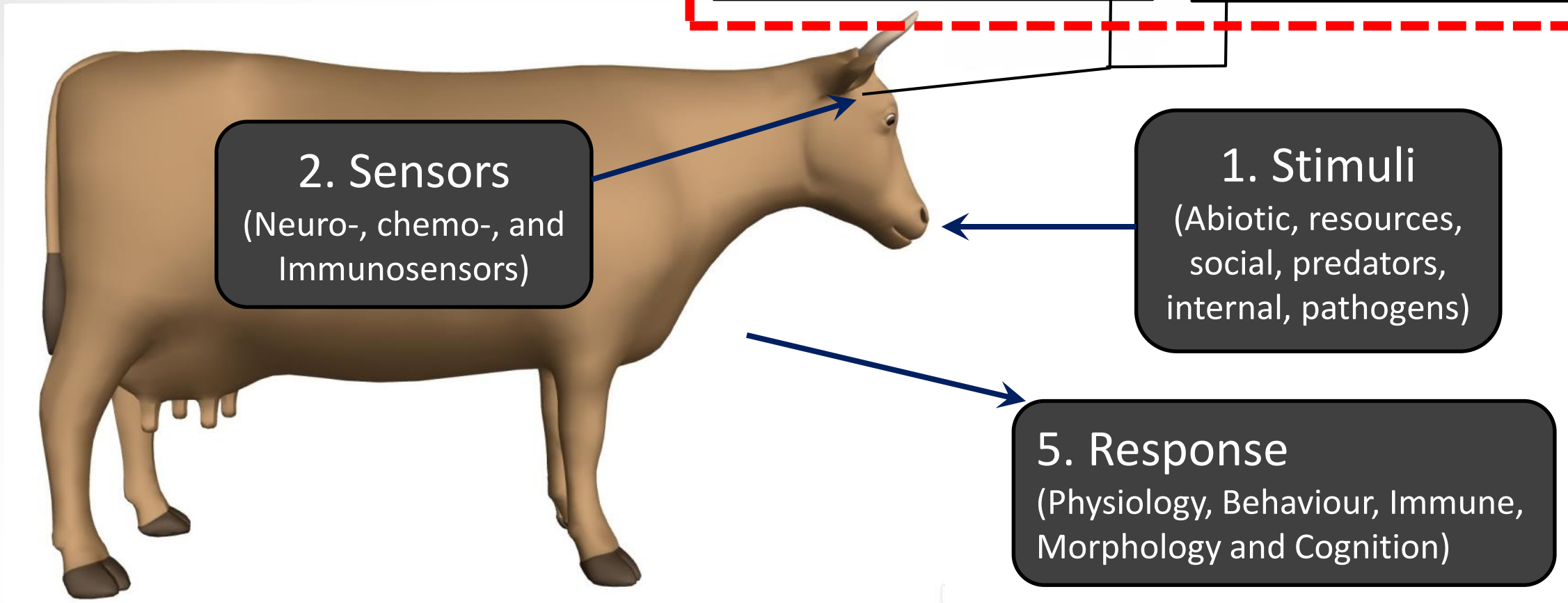




- Administering lidocaine immediately before castration does further minimize pain experienced by calves during castration.
- Lidocaine could be a practical pain control option for producers when castrating.

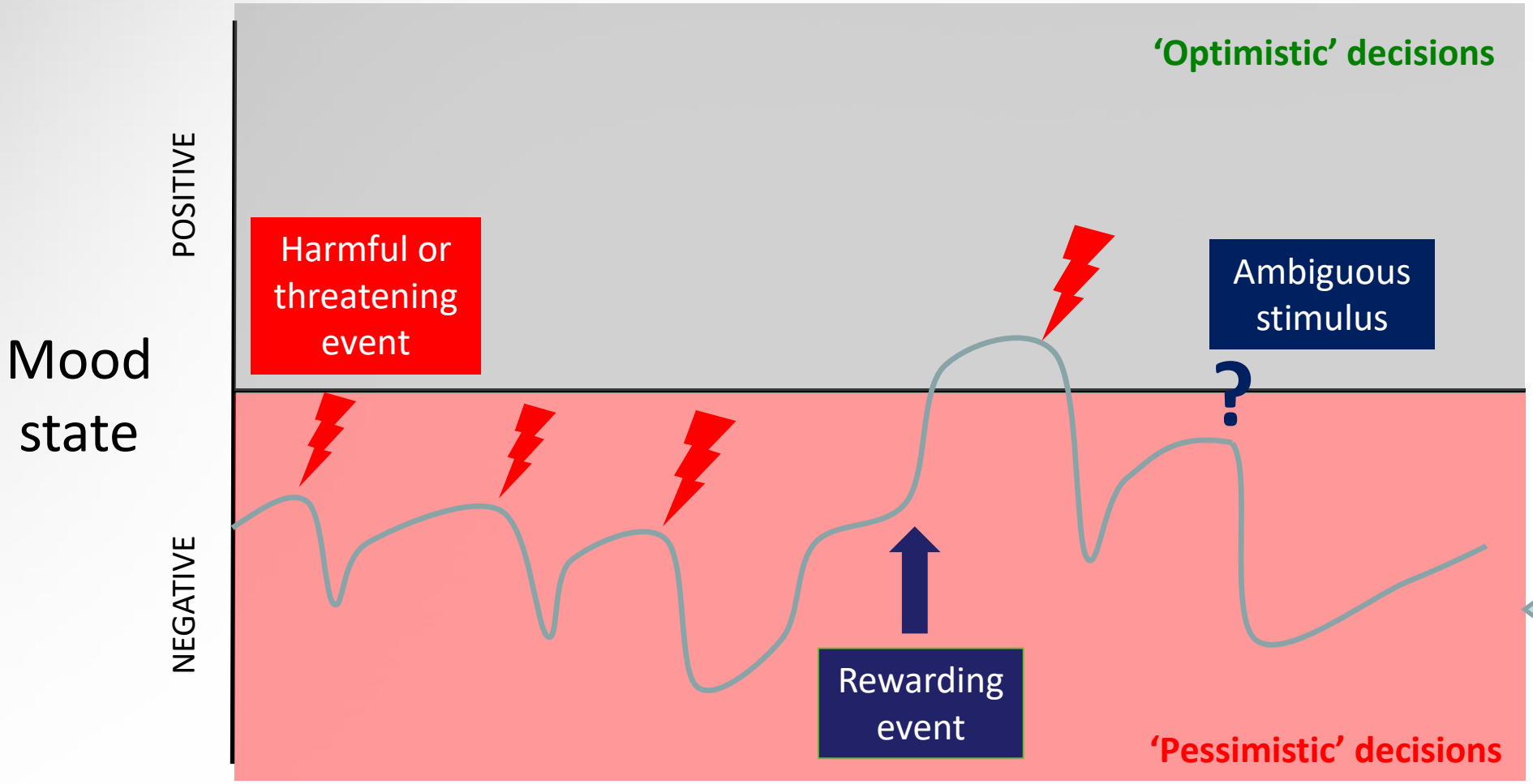
- What does “welfare” mean?
- One Welfare
- Gut-Brain axis
- Relationship health-welfare
- Live animal transportation
- Stocking density
- Painful procedures
- Affective states

A representation of stimulus processing



Colditz and Hine, 2016

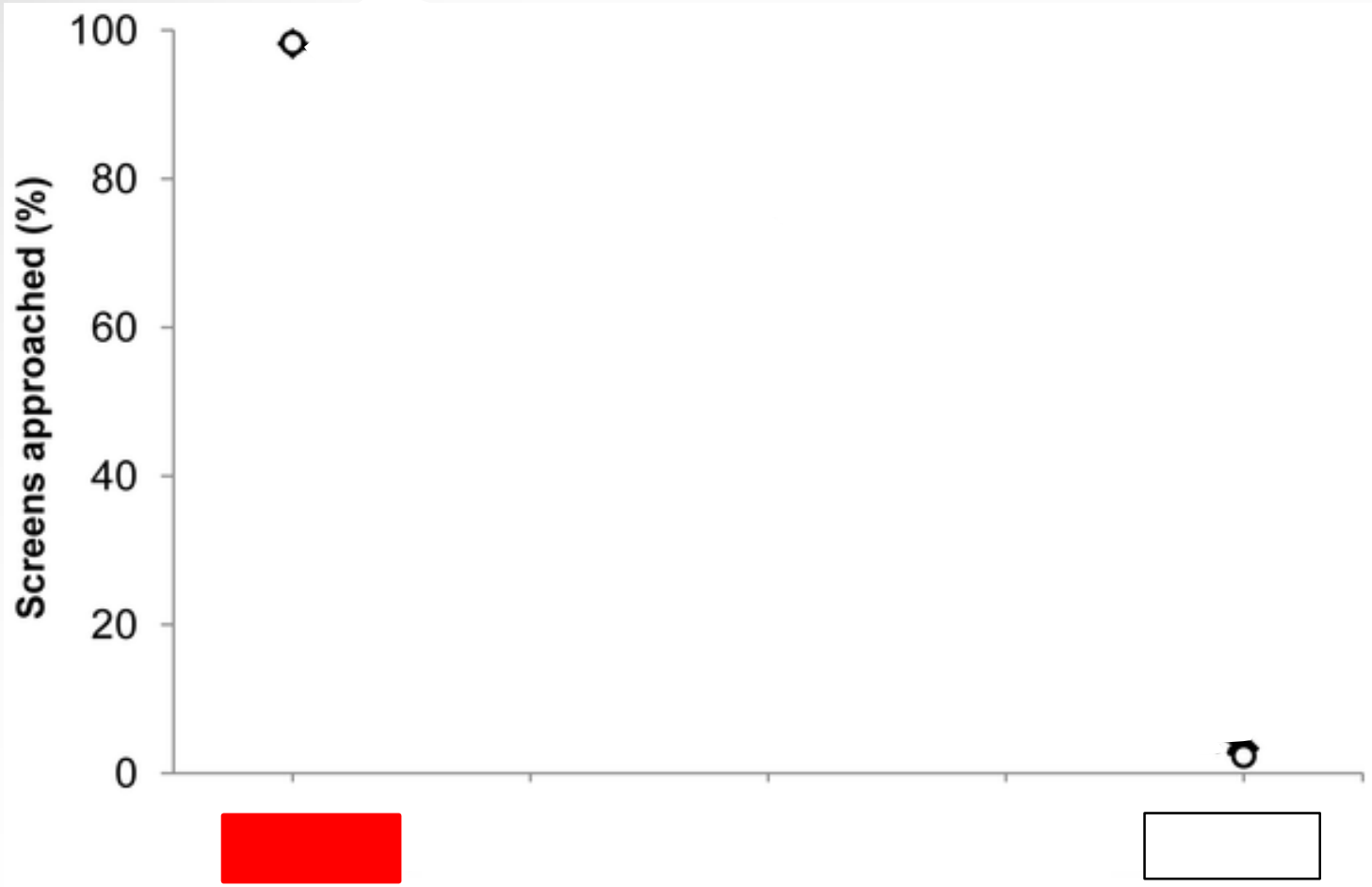
Moods integrate past experience and guide decision-making



Negative mood state reflects cumulative experience of threat/harm leading to **'pessimistic' decisions** under ambiguity

Mendl et al., 2017 *Personal communication*

Judgement bias tasks reveal differences in decision-making under ambiguity



Chronic stress leads to pessimistic bias

Neave et al. 2013. *PLoS ONE* 8, e80556

Coulon et al, 2015

SUMMARY: Applying the One Welfare framework to the beef cattle industry

- Pressure towards more sustainable systems:
  - More animal-friendly production systems
  - Low use of antibiotics (One Health)
- More attention to animal welfare:
  - Prevent painful procedures
  - Provide animals with behavioural possibilities
  - Assess affective states
- Farm economy
  - Farmers with a healthier income
  - Consumers prepared to pay for added value

My take home messages

- Industry standards, codes of practice and communication strategies are increasingly influenced and shaped by citizens' demands and consumers' behaviours towards welfare issues.
- We all have to keep working on getting our message across to the general public and policymakers, and connect with consumers' sensitivities.
- Animal welfare is important due to ethical reasons, but also due to its impact on animal health (consequences for all stakeholders).

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