



# Better Training for Safer Food *Initiative*

Training course on “Animal Welfare in pig production”

Measures to fulfill basic needs and  
prevent aggression within groups

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# BT SF

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Consumers,  
Health And Food  
Executive Agency

Herning, Denmark, 12-15 May, 2014

- Demands placed on farmers
- The impacts of aggression
- How do we measure aggression on-farm?
- How do we minimise social stress?
  - Environmental factors
  - Genetic factors

# Demands placed on farmers

EU Council Directive 2008/120/EC requires:

- Sows and gilts must be **kept in groups** from 4 weeks after service to one week before the expected farrowing date (holdings of <10 sows may use individual housing)
- Minimum unobstructed **floor area allowance** of 1.64m<sup>2</sup> (gilts) and 2.25m<sup>2</sup> (sows)
  - Group size <6 requires 10% more space/animal
  - Group size >40 may have 10% less space/animal
- Sows and gilts kept in groups must be fed using a system which ensures that each individual can obtain sufficient food even when competitors for the food are present

- Member States shall ensure that pigs that have to be kept in groups, that are particularly aggressive, that have been attacked by other pigs or that are sick or injured **may temporarily be kept in individual pens**
- Sows and gilts: Measures shall be taken to minimise aggression in groups.

## Weaners and rearing pigs:

- When pigs are kept in groups, **measures must be taken to prevent fighting** which goes beyond normal behaviour.
- They should be kept in groups with as **little mixing as possible**. If pigs unfamiliar with one another have to be mixed, this should be **done at as young an age as possible**, preferably before or up to one week after weaning. When pigs are mixed they shall be provided with **adequate opportunities to escape and hide** from other pigs.

- When signs of severe fighting appear the causes shall be immediately investigated and **appropriate measures taken**, such as providing plentiful straw to the animals, if possible, or other materials for investigation. Animals at risk or particularly aggressive animals shall be kept separate from the group.
- The use of **tranquillising medicaments** in order to facilitate mixing shall be limited to exceptional conditions and only after consultation with a veterinarian.

# Aggression as an economic and welfare problem

- Mixing is routine
- Post-mixing aggression:
  - ↑ injury, disease, activity
  - ↓ food intake, FCE, growth rate, reproductive success

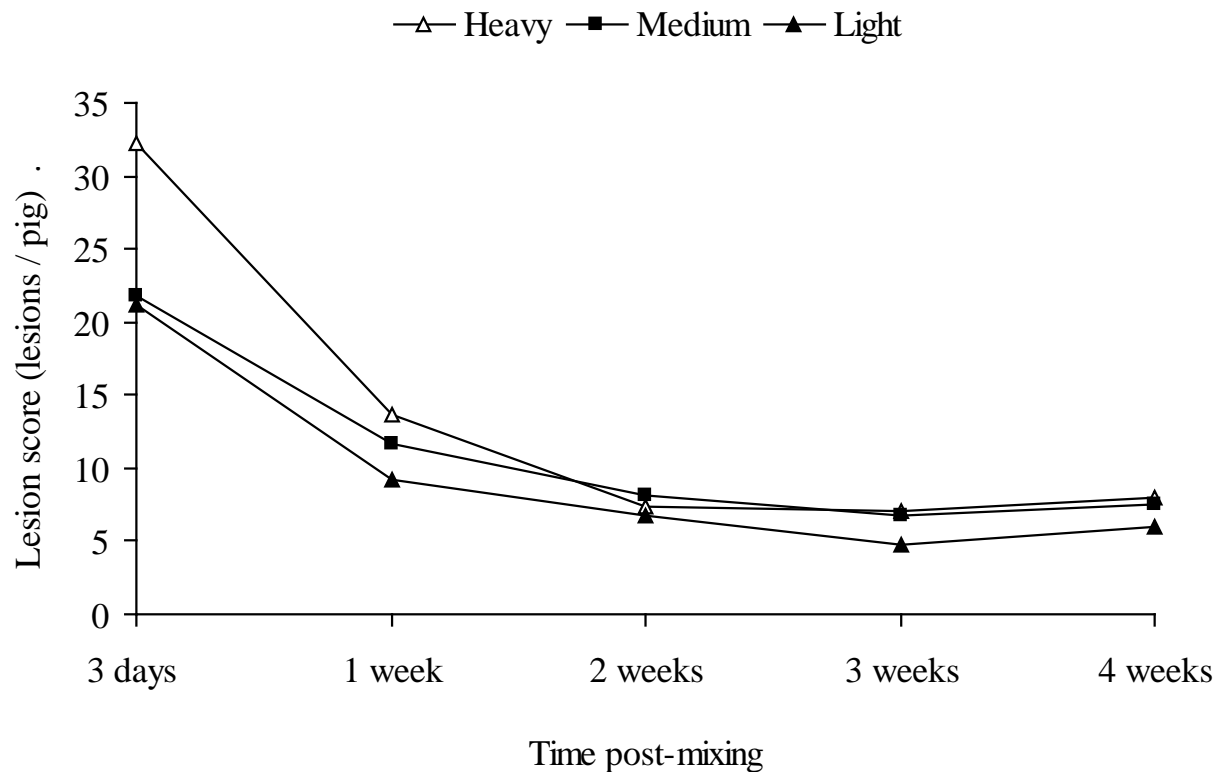
**Euro 890  
million/year?**



Age	Mixed	Unmixed	% difference	Duration of effect	Reference
<b>Growers</b>	0.65	0.77	-16%	6 weeks	Sherritt et al 1974
<b>Finishers</b>	0.72	0.83	-13%	1 week	McGlone et al 1986
<b>Finishers</b>	0.77	0.87	- 12%	2 weeks	Stookey & Gonyou 1994

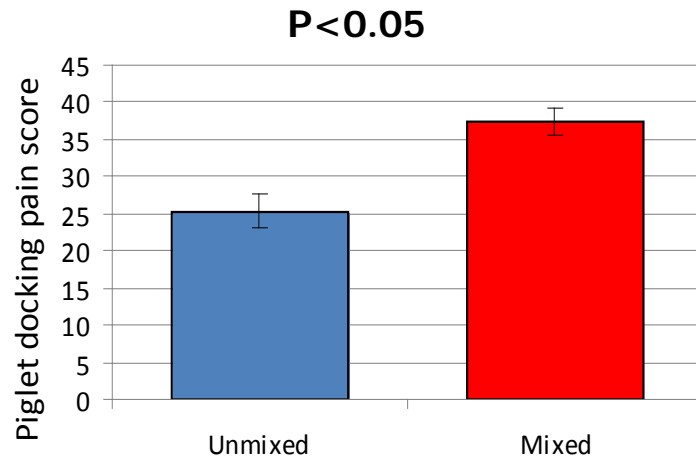


It takes at least 2 weeks for fresh skin lesions to return to baseline after regrouping



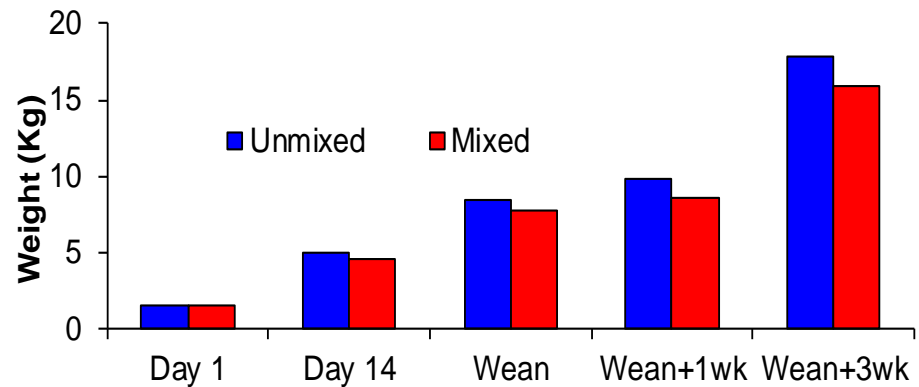
Turner et al. 1997

## The greatest risk factor for pre-natal stress in the pig industry

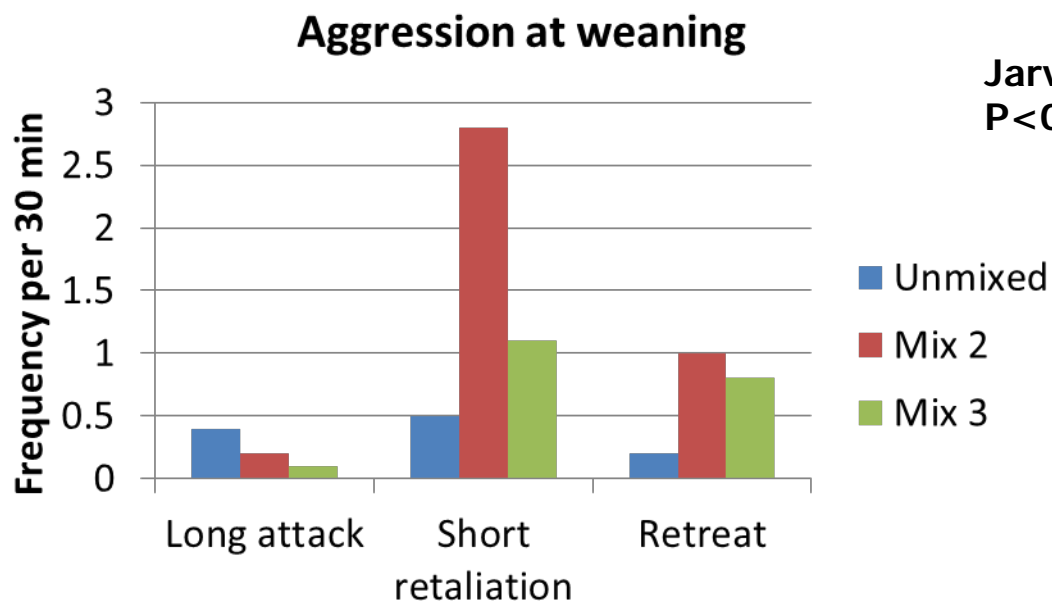


Piglets from unmixed or mixed gilts

**Rutherford et al. 2009**



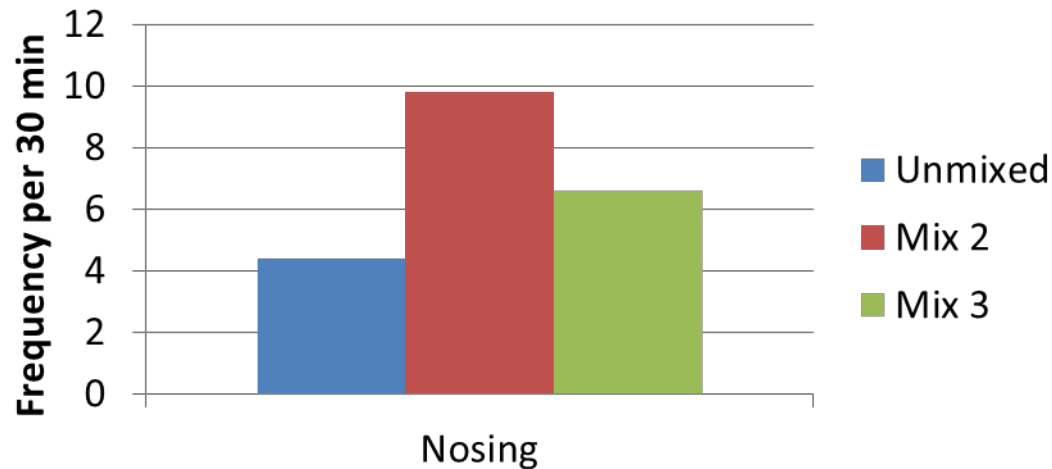
**Jarvis et al. 2006**



Jarvis et al. 2006  
 $P < 0.05$

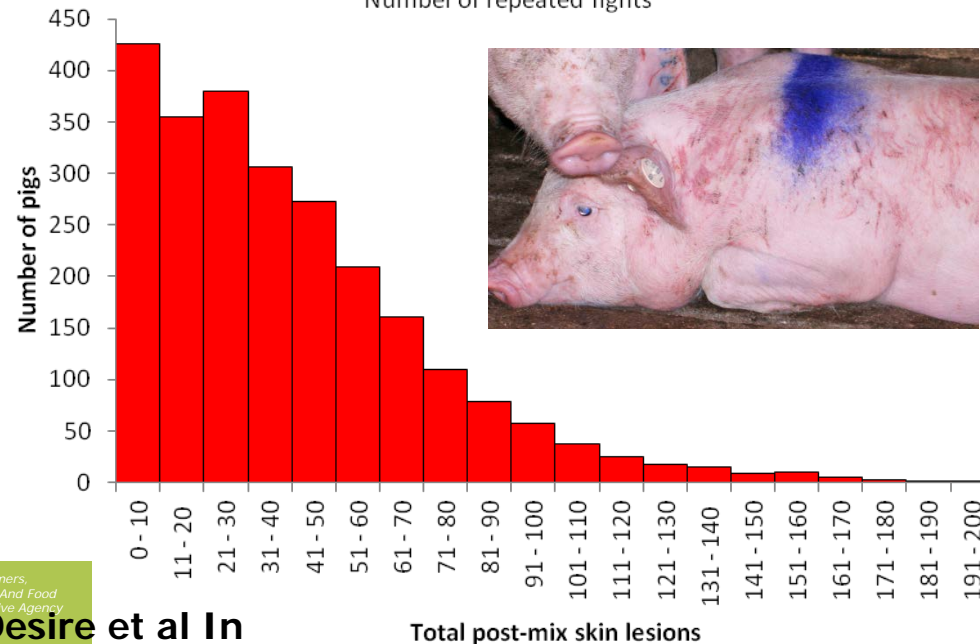
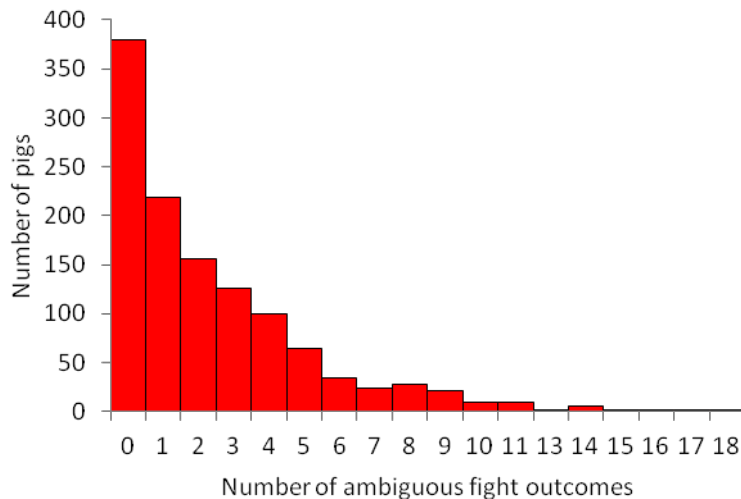
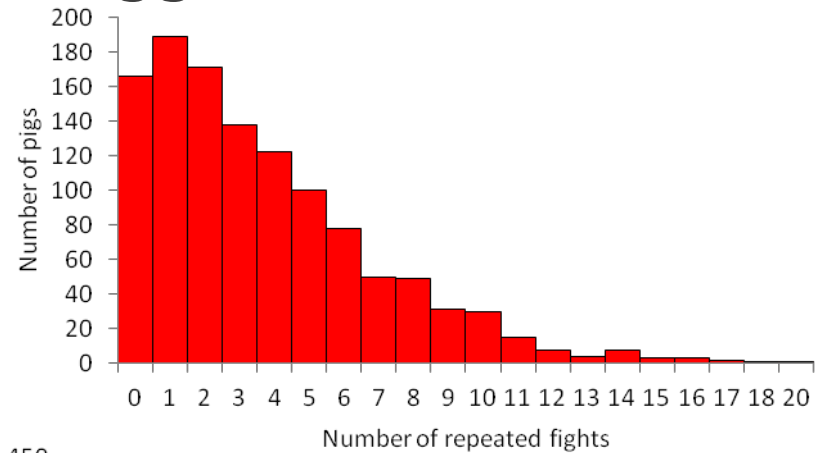
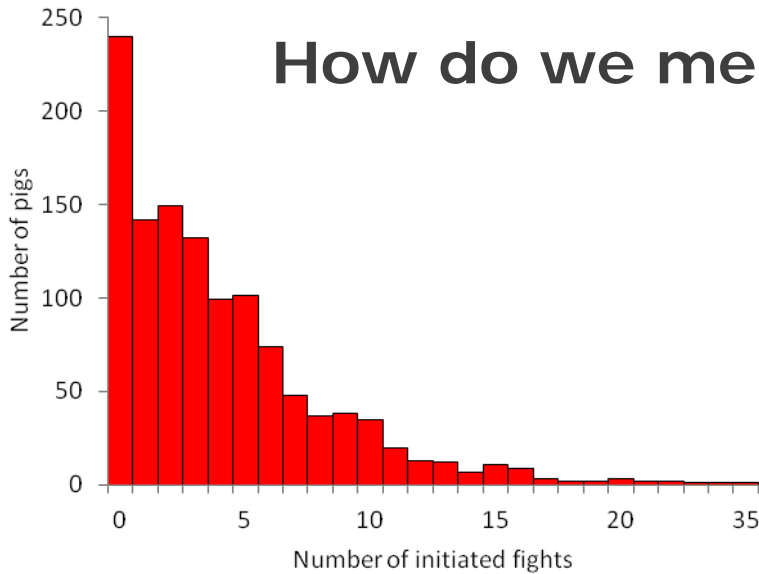
## Effect of pre-natal mixing on nosing at weaning

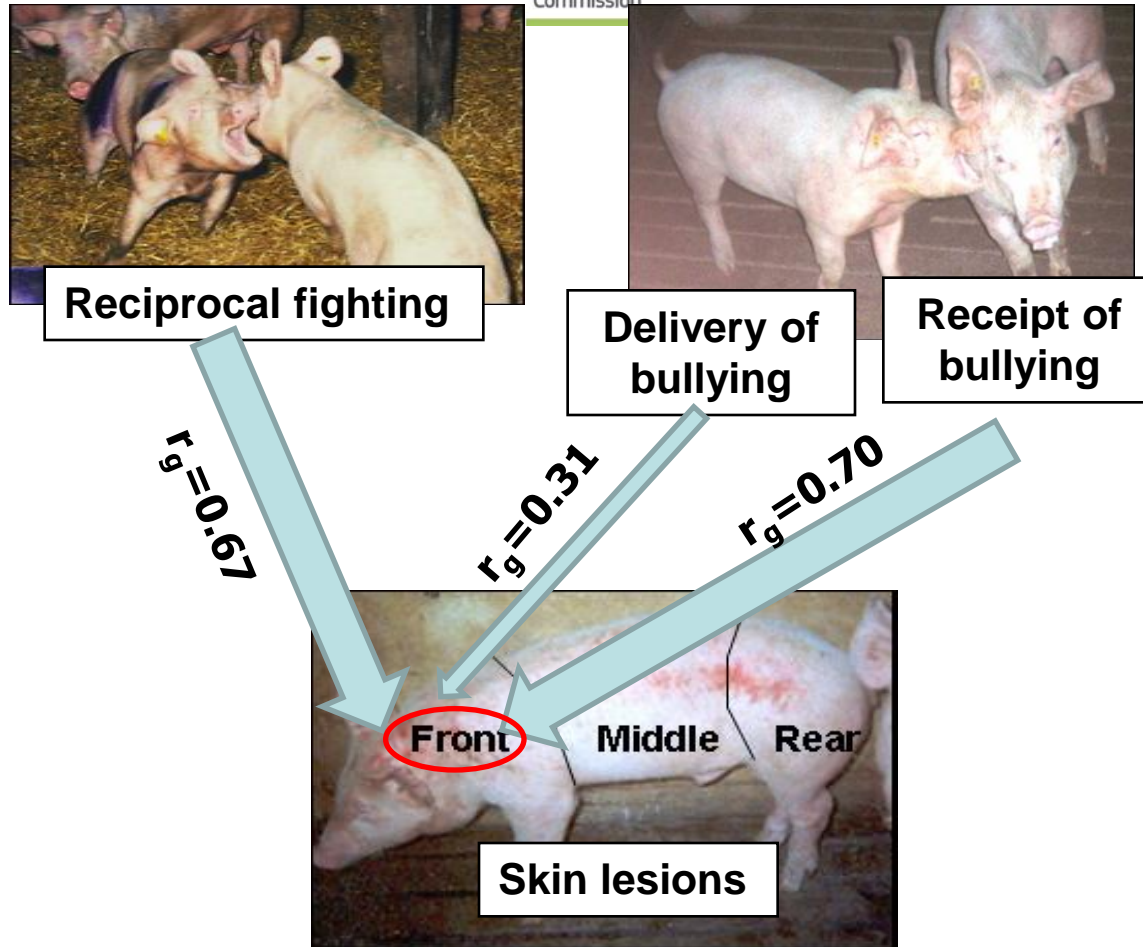
Jarvis et al. 2006  
 $P < 0.05$



- Pre-natally stressed piglets became poorer mothers
  - More frequent postural changes
  - Greater tendency to bite piglets

# How do we measure aggression on-farm?







European  
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**Reciprocal fighting**

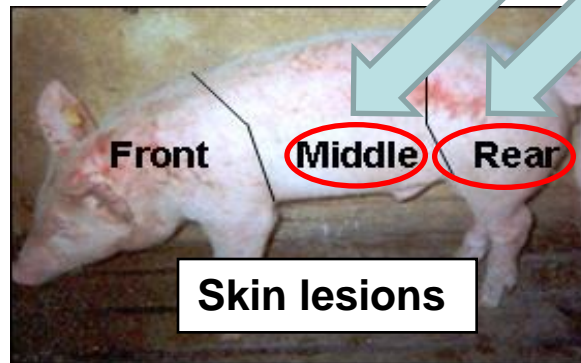


**Delivery of  
bullying**

**Receipt of  
bullying**

$$r_g = 0.80$$

$$r_g = 0.79$$



**Skin lesions**

**1 minute per  
pig**



## Welfare Quality approach

Welfare principle	Welfare criteria	Measure	Sows	Growers and finishers
Good health	Absence of injuries	Wounds on the body	30 dry 10 lactating	150 from at least 10 pens
Appropriate behaviour	Expression of social behaviours	Social behaviour	40+	3x50-60 animals



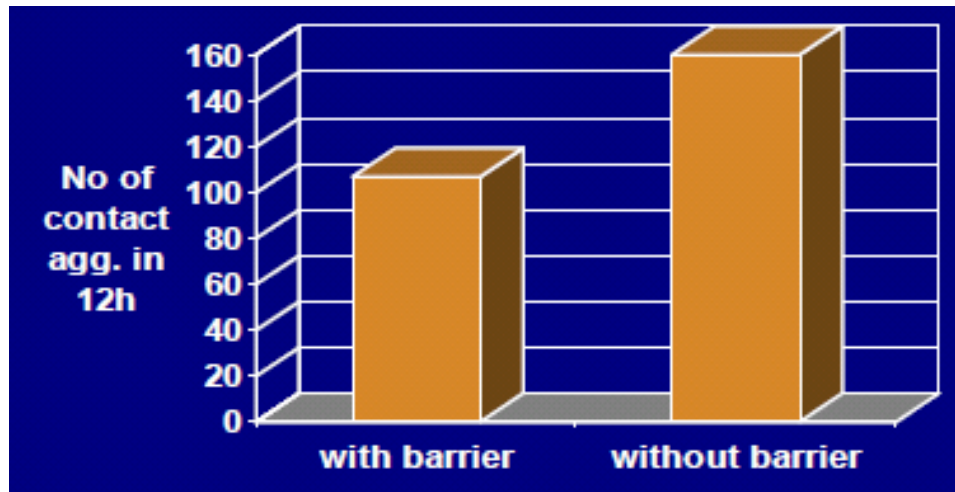


- Five body regions
- Importance of lesions weighted according to age and size
- Animals categorised as:
  - 0-4 lesions
  - 5-10 lesions
  - 11-15 lesions

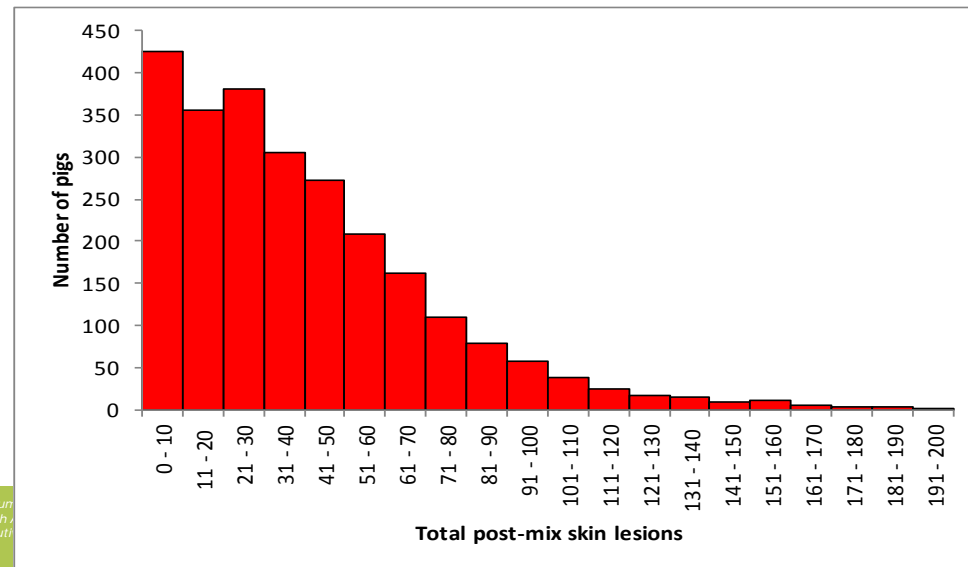
## How do we minimise aggression?

- Low-labour, low-cost methods of minimising aggression have minimal benefits:
  - Masking scents, tranquilisers, mixing at night, low light levels
- Some benefits of presence of mature boar and early life socialisation
- Accept that:
  - dominance hierarchies have a function
  - pigs are highly motivated to establish dominance relationships
  - methods that help them get through this process efficiently will have more success than those that try to prevent it altogether

- Maximise opportunities for contest resolution at regrouping:
  - Adequate floor space
  - Stable group structure
  - Environmental complexity

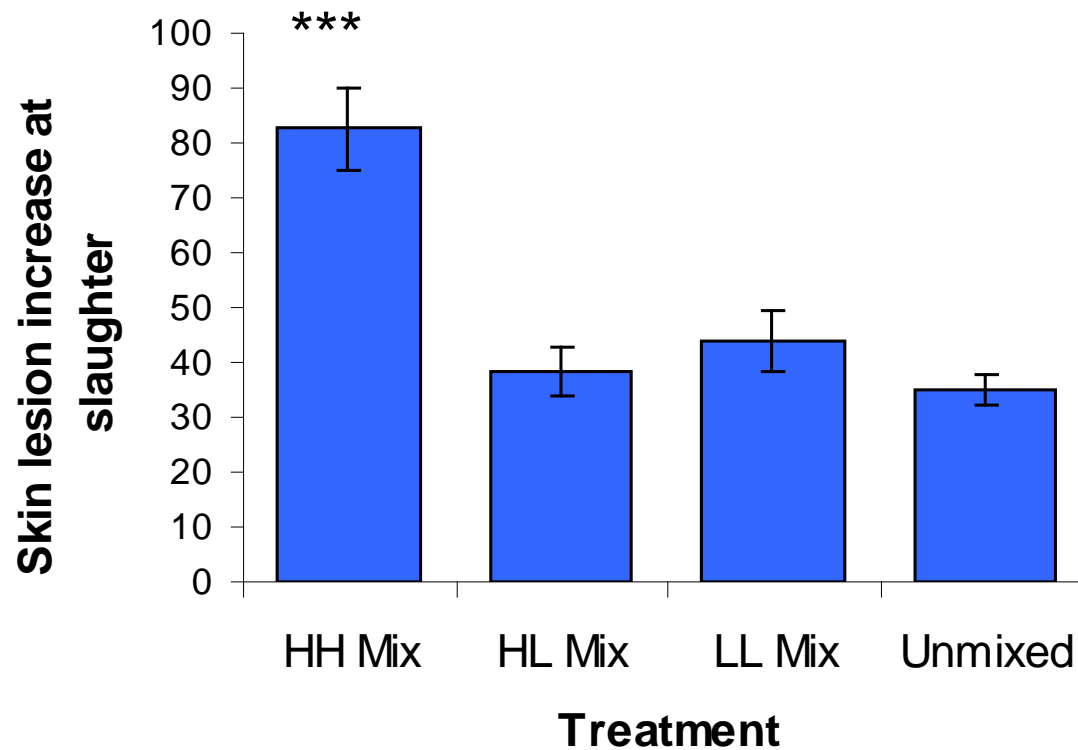


- Should we mix groups of similar or different weight?
  - No right or wrong answer to this
- Depends on which animal you are trying to benefit
  - Average aggression is reduced by mixing pigs of different weight
  - Experience of the smallest pig is probably worse in a pen with a large weight variation
  - Chronic stress from constant subordination may be more significant than acute stress from mixing aggression which they probably avoid



- Minimise competition for limited resources to reduce chronic stress
  - Adequate floor space and appropriate group size
  - Choice of feeding system
  - Design of feeding system
  - Management of satiety

Simply moving pigs to a new environment increases fighting even if pigs aren't mixed

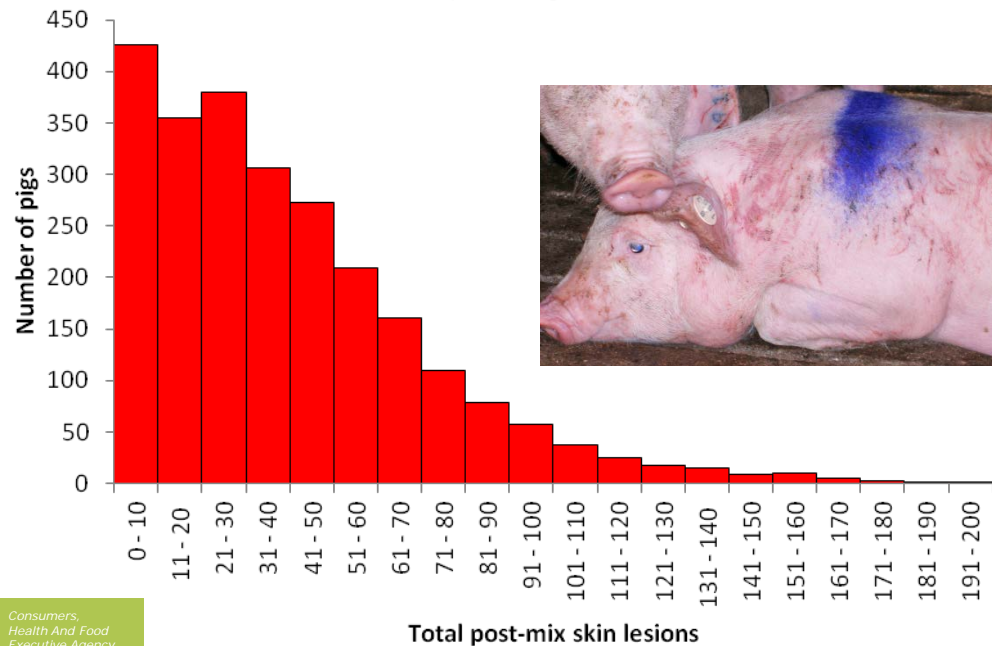
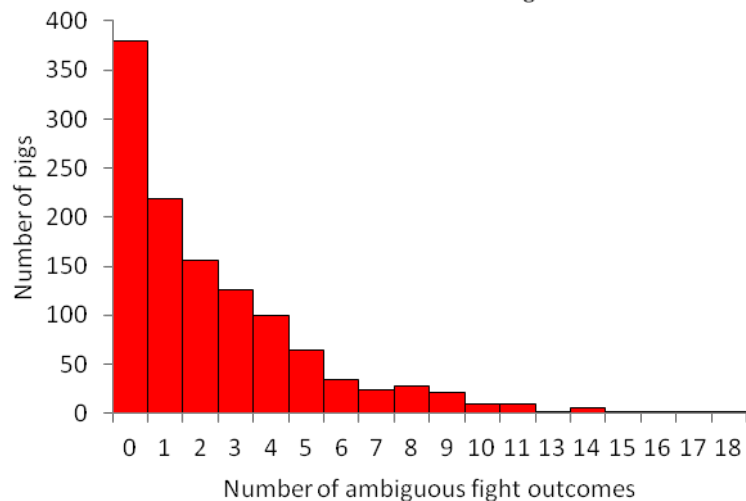
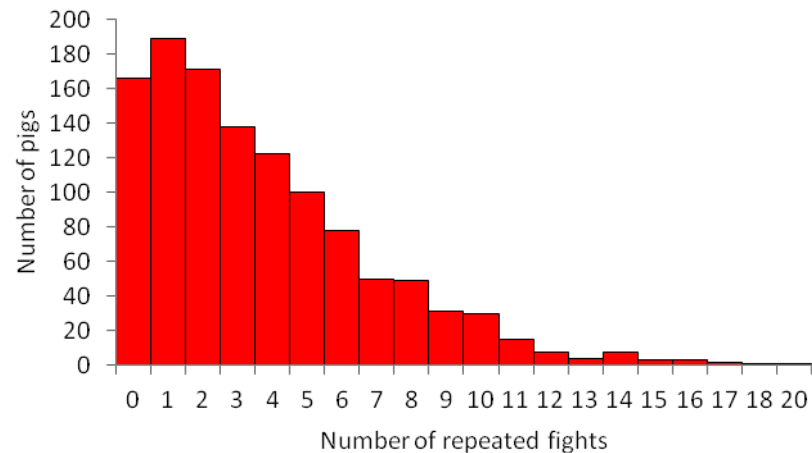
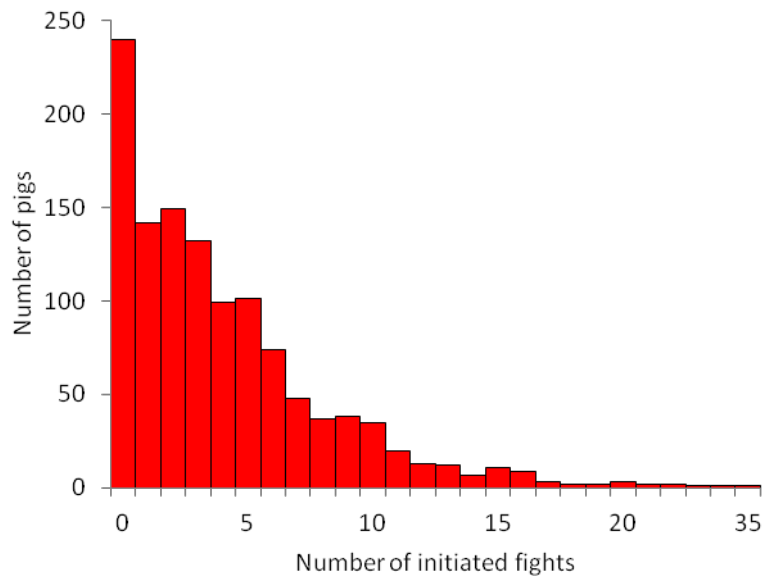


D'Eath et al  
2010

# A long-term solution to social stress?

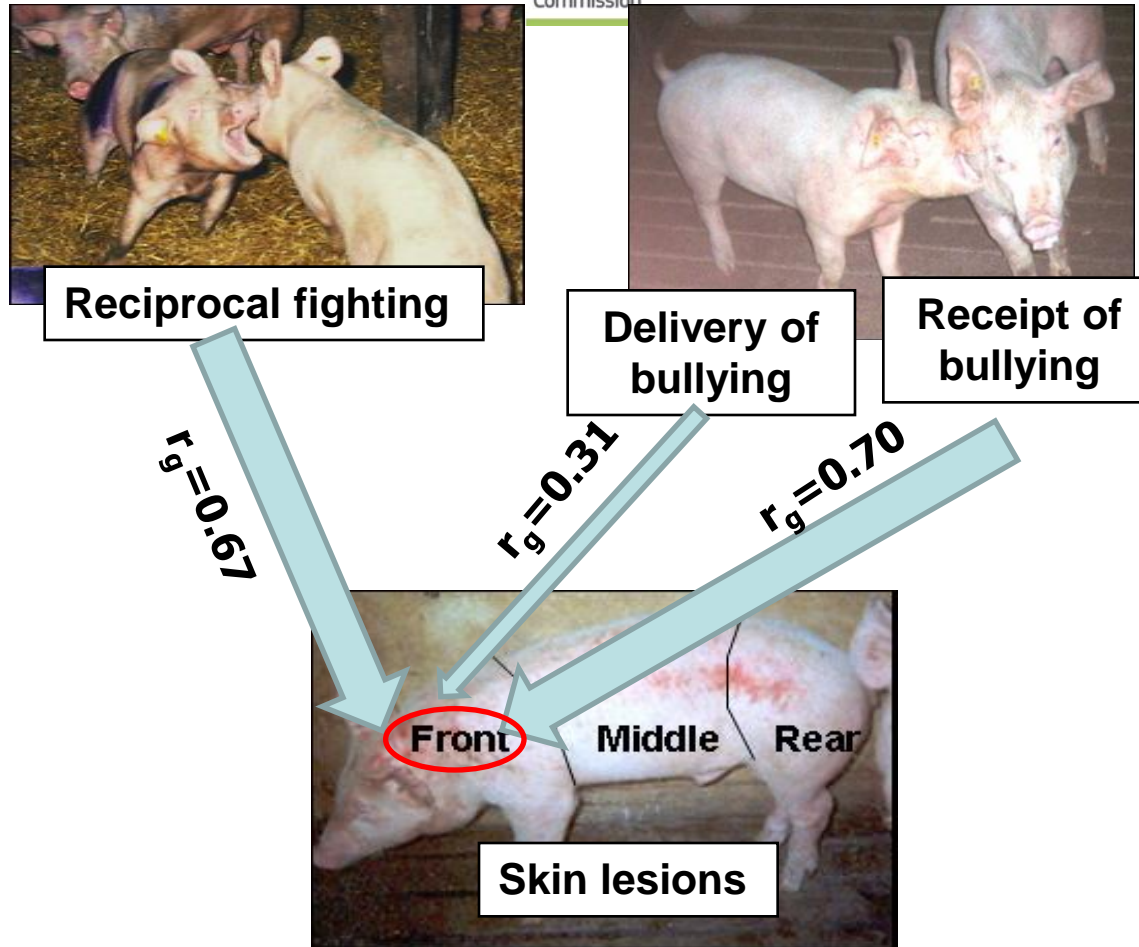


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**Reciprocal fighting**

$h^2=0.43$

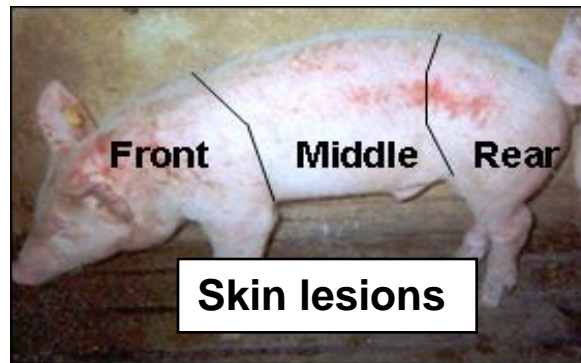


**Delivery of  
bullying**

$h^2=0.31$

**Receipt of  
bullying**

$h^2=0.08$



**Front**

**Middle**

**Rear**

**Skin lesions**

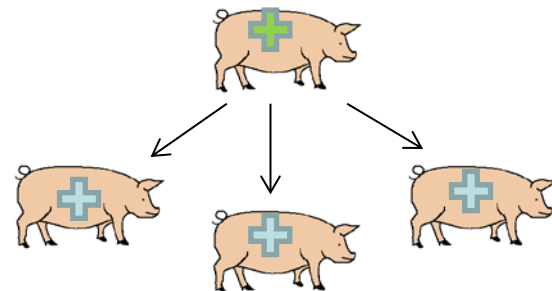
**Front**  
 $h^2=0.26$

**Middle**  
 $h^2=0.25$

**Rear**  
 $h^2=0.21$

**Turner et al  
2006, 2009**

- Technically possible to achieve genetic change in aggressiveness at similar rate to growth
- Likely benefits for meat quality and maternal behaviour (e.g. Lovendahl et al. 2005; Canario et al., 2013)
- Potential to achieve genetic improvement without costs of measuring aggressiveness by breeding for pigs that benefit productivity of group mates
  - Will probably reduce chronic aggression but increase aggression at regrouping (Canario et al., 2012)



# Conclusions

- Social stress, as evidenced through aggression, has significant and far-reaching impacts on pig production, reproduction and welfare
- Body wounds indicate not only involvement in aggression, but individual genetic propensity to be involved in specific forms of aggression

- Acute social stress is best minimised by facilitating rapid and effective establishment of dominance relationships
- Chronic social stress is best minimised by avoiding competition for limited resources
- Major pig breeding organisations are investigating the potential and consequences of selection against aggressiveness
  - At best, benefits will come years in the future