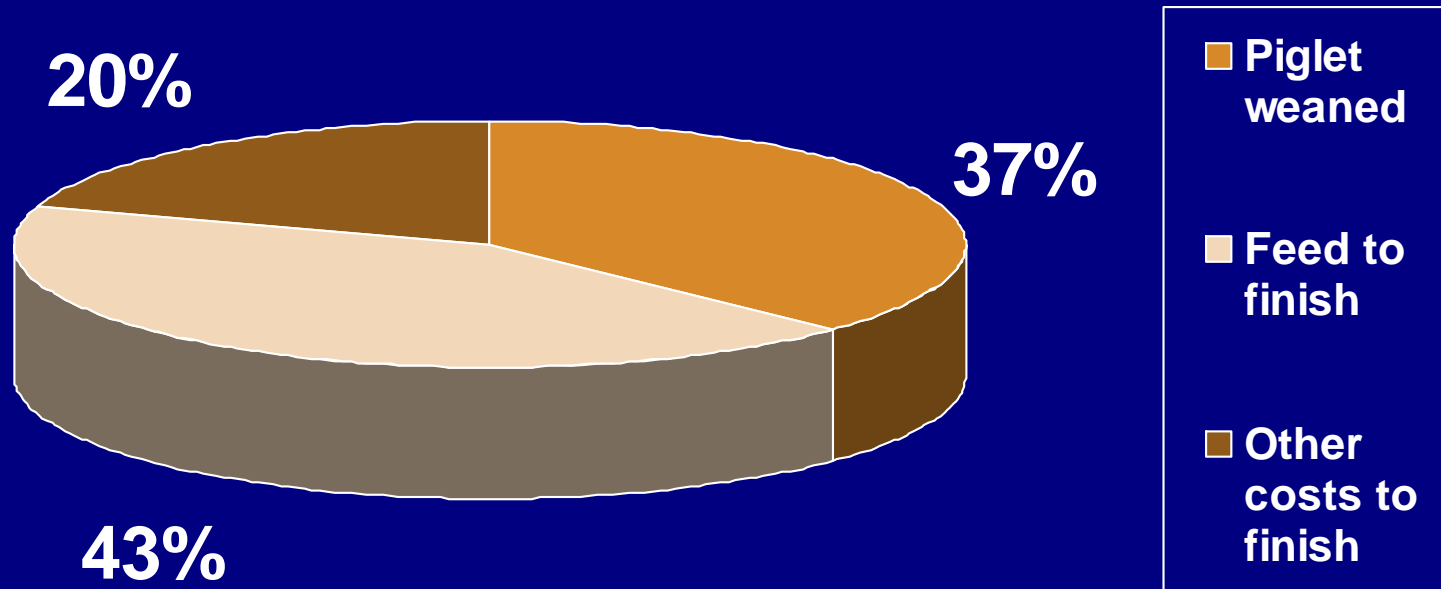




PRODUCING 2 TONNES OF PIGS PER SOW

Sandra Edwards & Emma Baxter

Cost of producing a finished pig in the UK



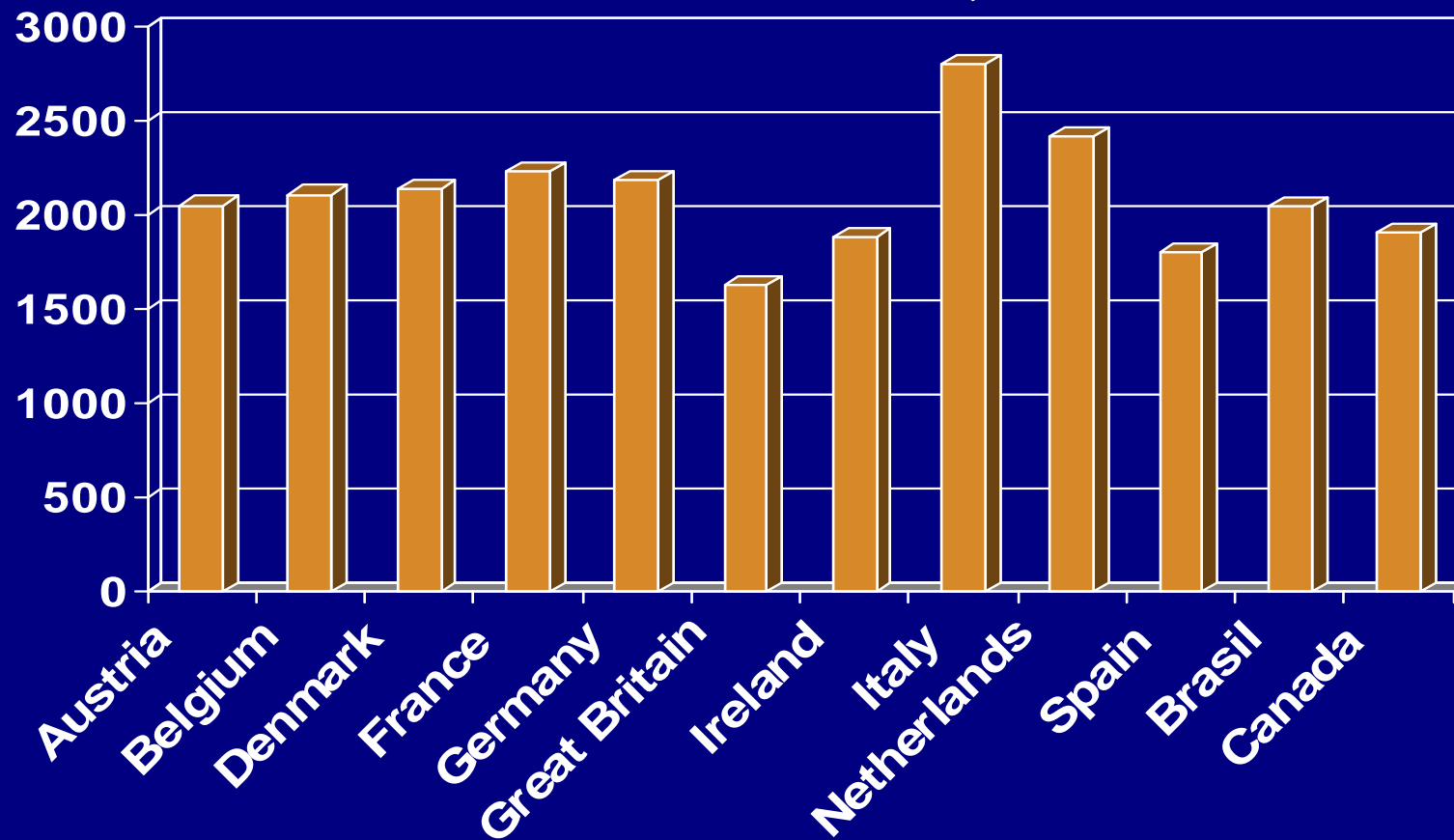
- **Spreading sow cost (cost of piglets weaned) over as many kg of pigmeat sold as possible maximises profit**

How well do we currently do?



Kg carcass sold / sow / year

Italy: 2.8t



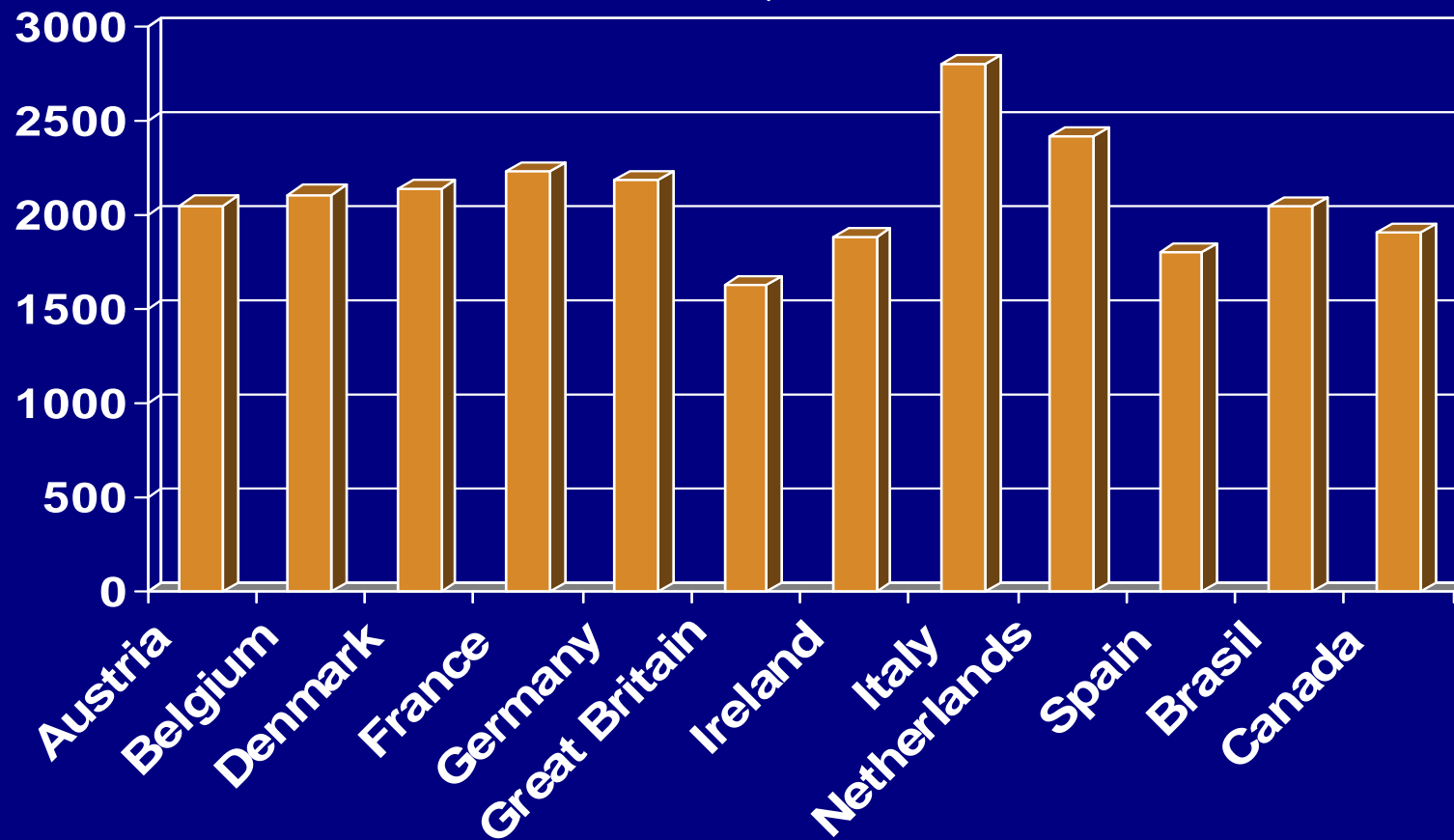
(Interpig 2011)

How well do we currently do?



Kg carcass sold / sow / year

GB: 1.6t



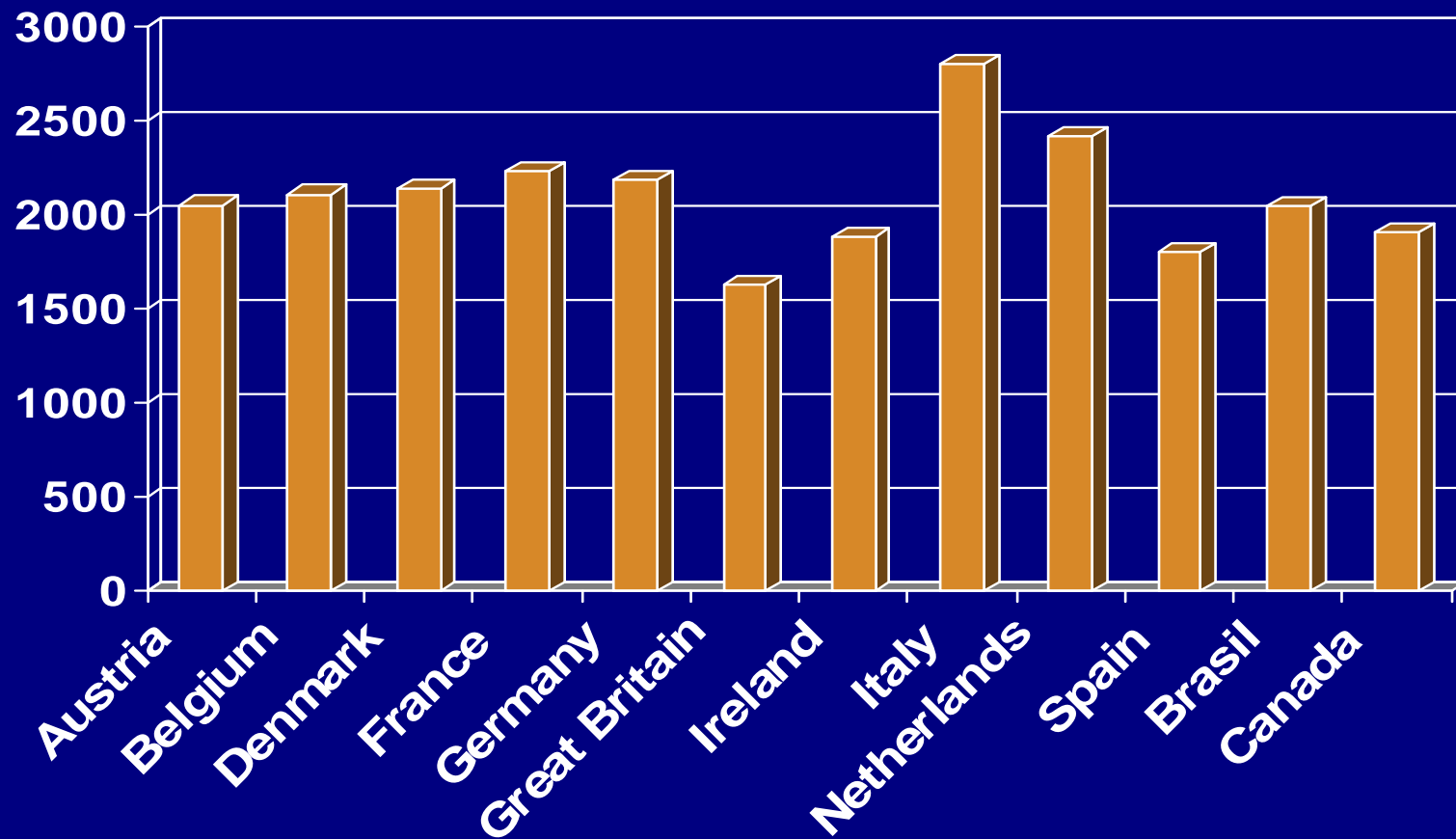
(Interpig 2011)

How well do we currently do?



Kg carcass sold / sow / year

Canada: 1.9t



(Interpig 2011)

Cost of producing a UK finished pig at different tonnes pigmeat sold/sow

Tonnes of pigmeat sold	1.652 (GB)	2.135 (DK)	1.908 (CAN)
Weaner production cost (cent/kg) (Annual sow cost \$1383)	83.6	64.7	72.5
Finishing cost (cent/kg)	141.8	141.8	141.8
Total cost (p/kg carcass)	225.4	206.5	214.3
Cost saving if 2 tonnes/sow (cent/kg)	14.5	Already there!	3.4

Assuming £1 = \$1.56

The BPEX 2 Tonne Sow campaign

- **British Pig Executive 2009 initiative**



- **Target: 2,000 kg pig meat sold per sow by 2013**

Looking for improvement (1)

Carcass weight sold
/sow /year

Average
carcass weight

Pigs sold
/sow /year

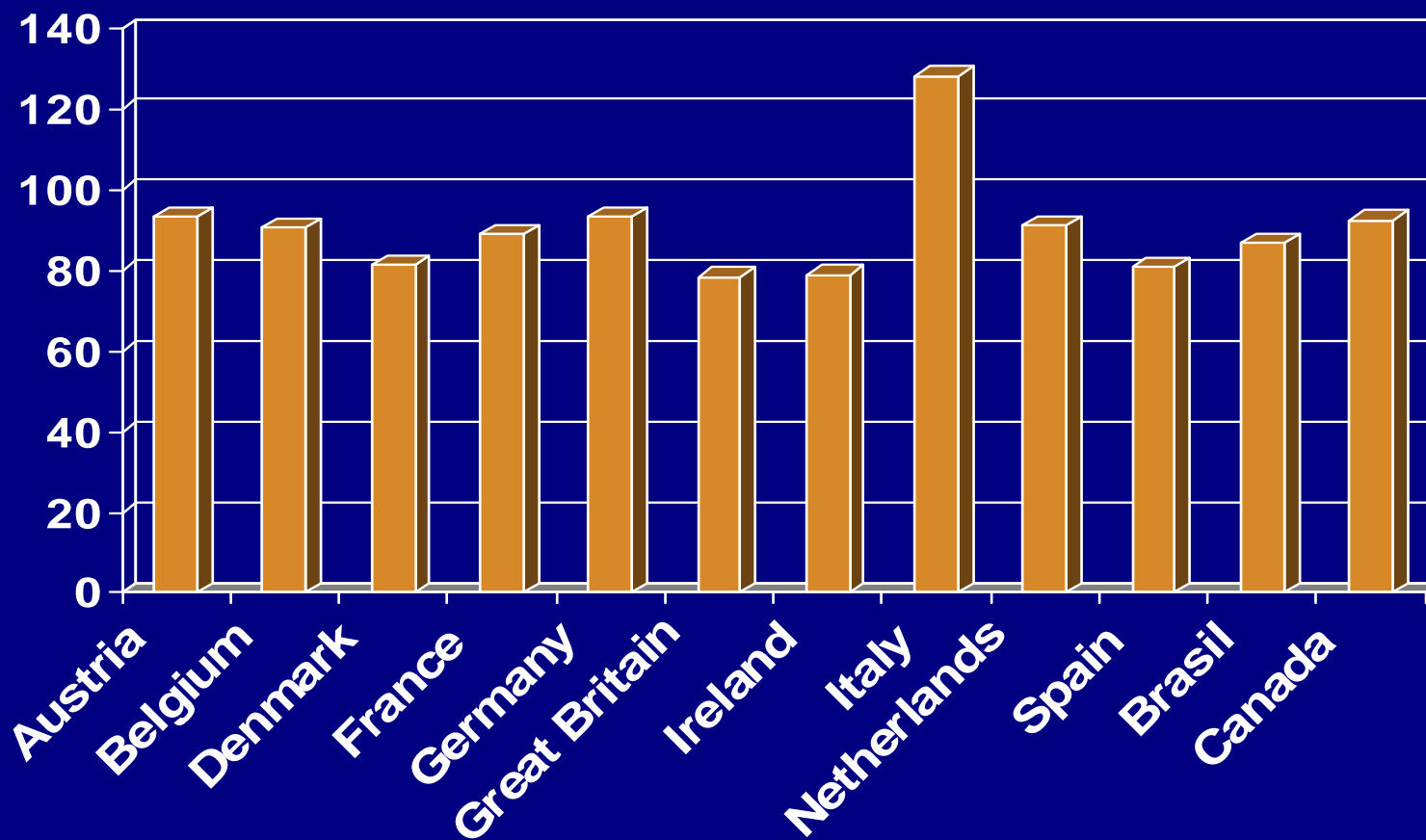
How well do we currently do?

Average carcass weight (kg)

78

128

92



(Interpig 2011)

Constraints to increasing sale weight (1)

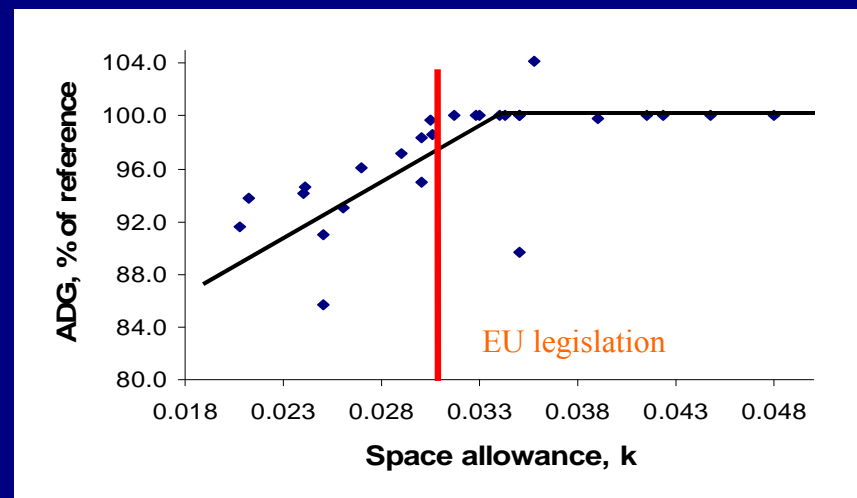
- **Practical**

- **Contract specifications**

- packer weight limits, so assess alternative contracts

- **Space on farm**

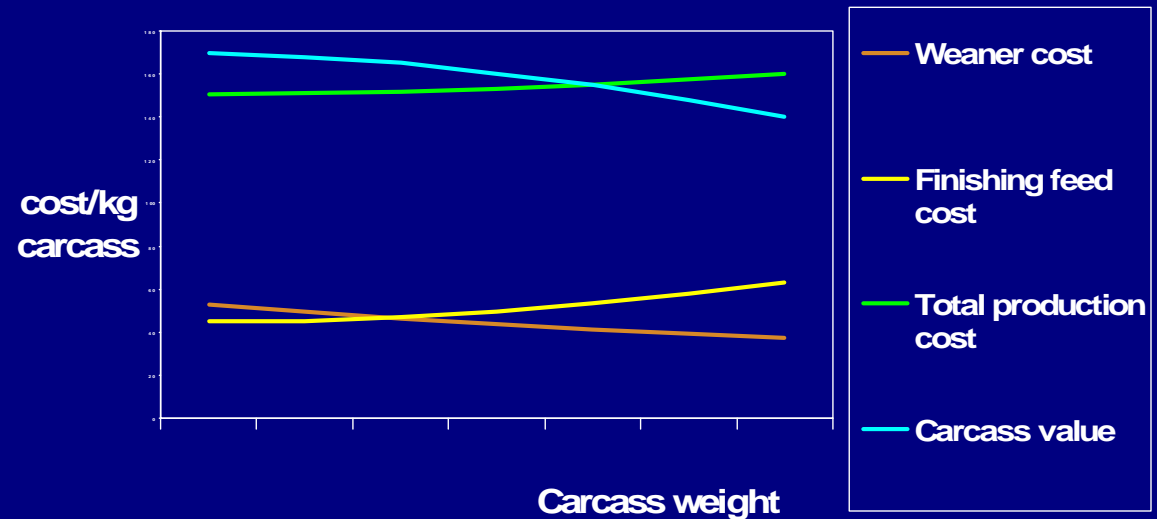
- overstocking reduces performance, so increase growth rates



Constraints to increasing sale weight (2)

● Economic

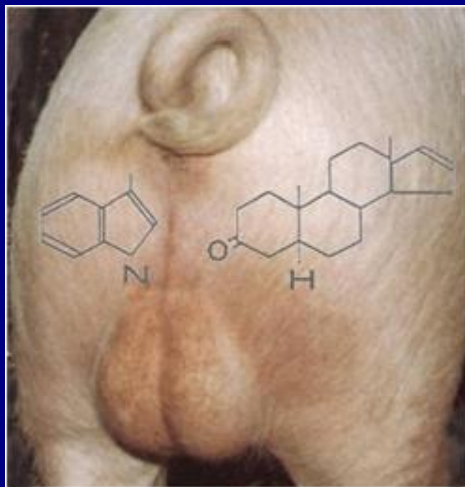
- Feed efficiency
 - deteriorates at heavier weights
- Grading
 - lean % deteriorates at heavier weights



Balance depends on genetic quality of stock, health status and price of feed

Constraints to increasing sale weight (3)

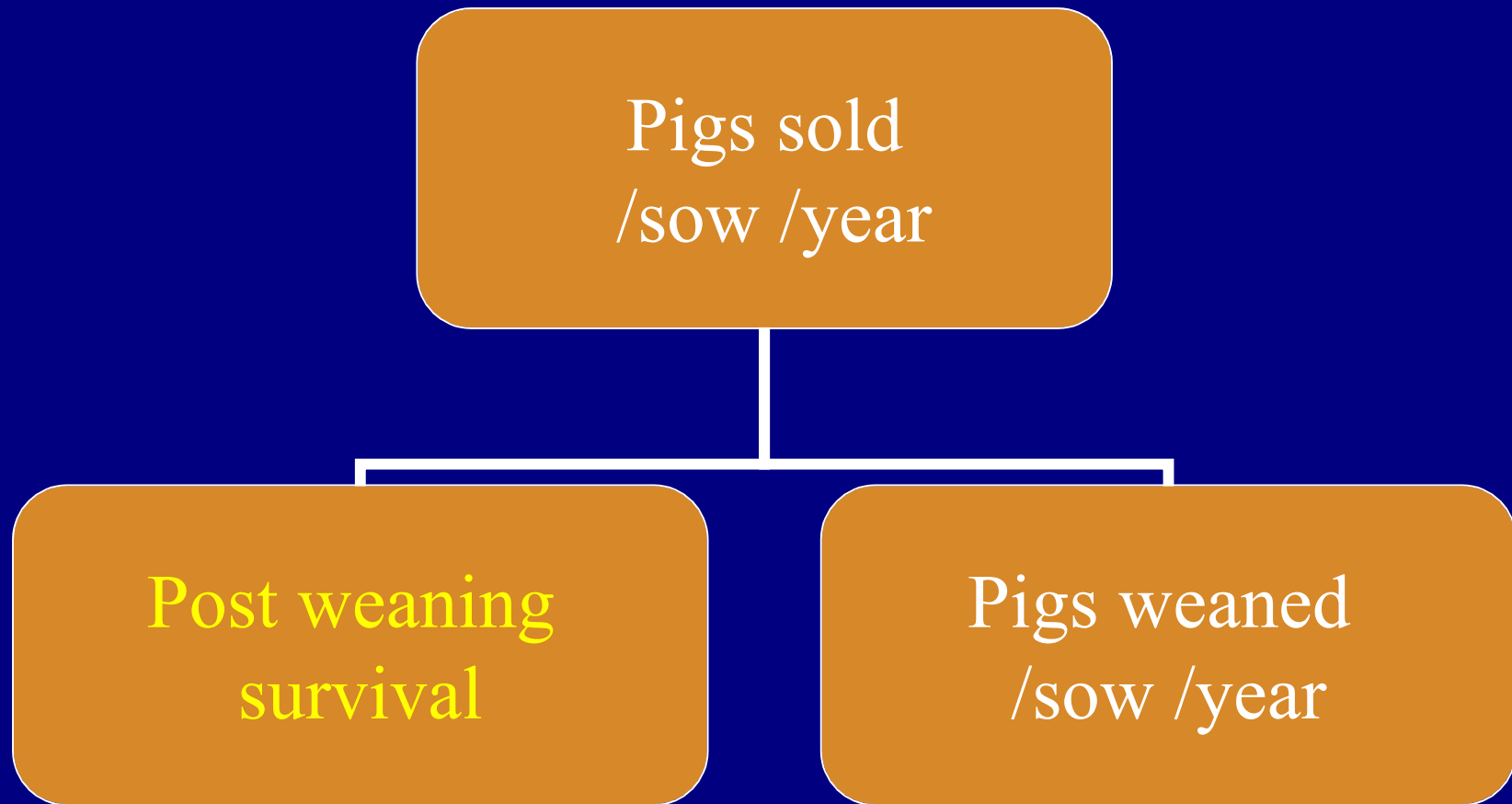
- **One for the future (UK already there)**
 - **Entire males? [current hot topic in EU]**
 - **Boar taint risk increases in older animals**



European Declaration on alternatives to surgical castration of pigs (voluntary declaration 2010)

“surgical castration of pigs should be abandoned by 1 January 2018”

Looking for improvement (2)



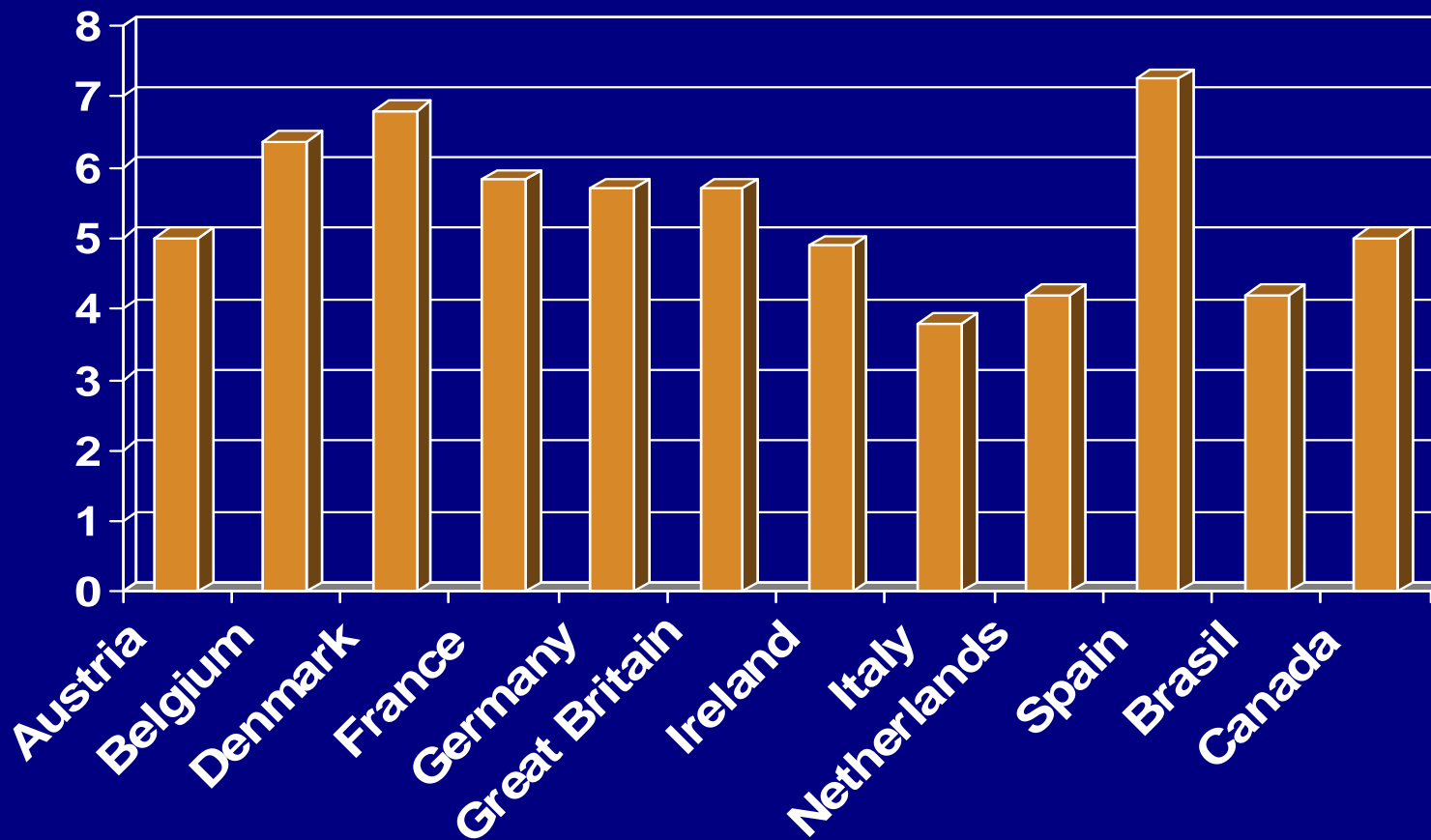
How well do we currently do?

Post weaning mortality (%)

5.7

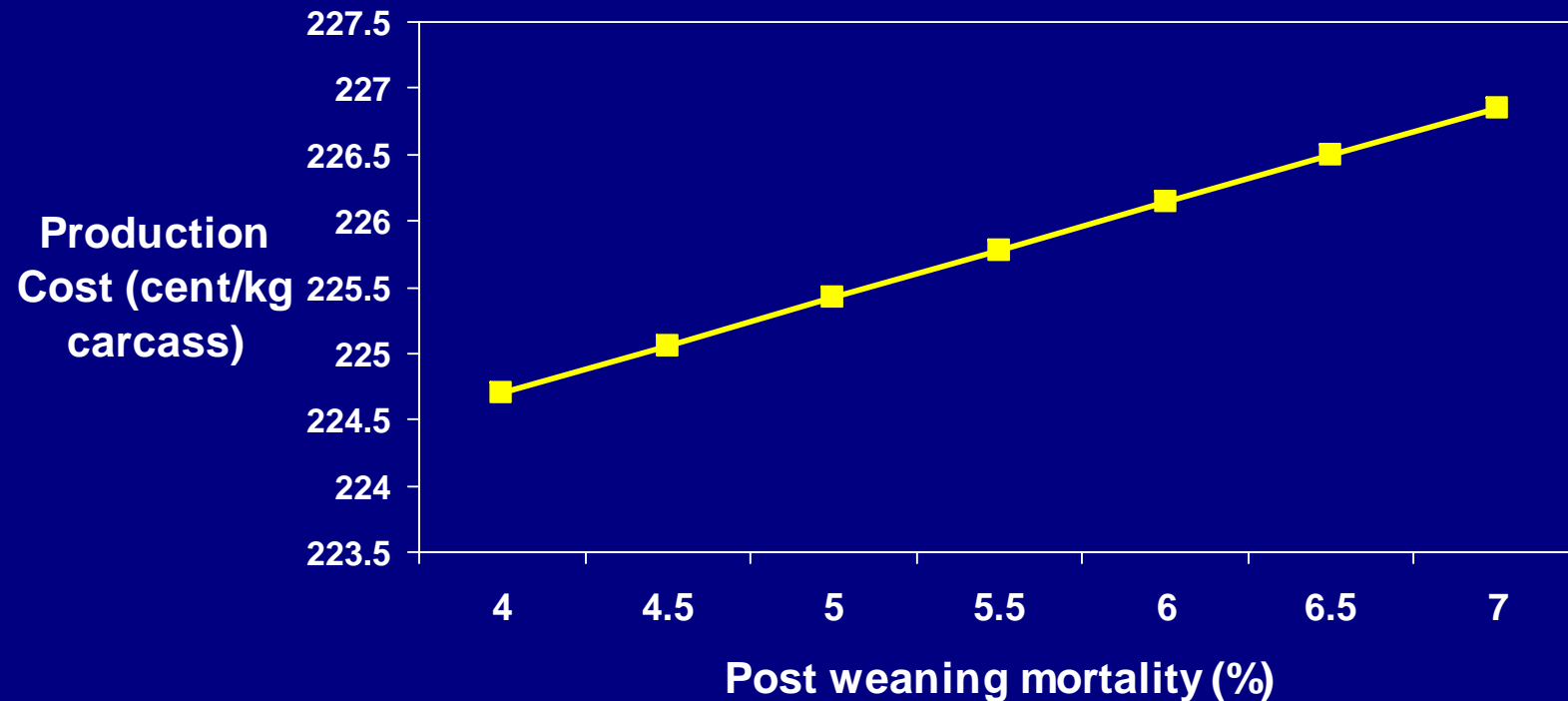
3.8

5.0



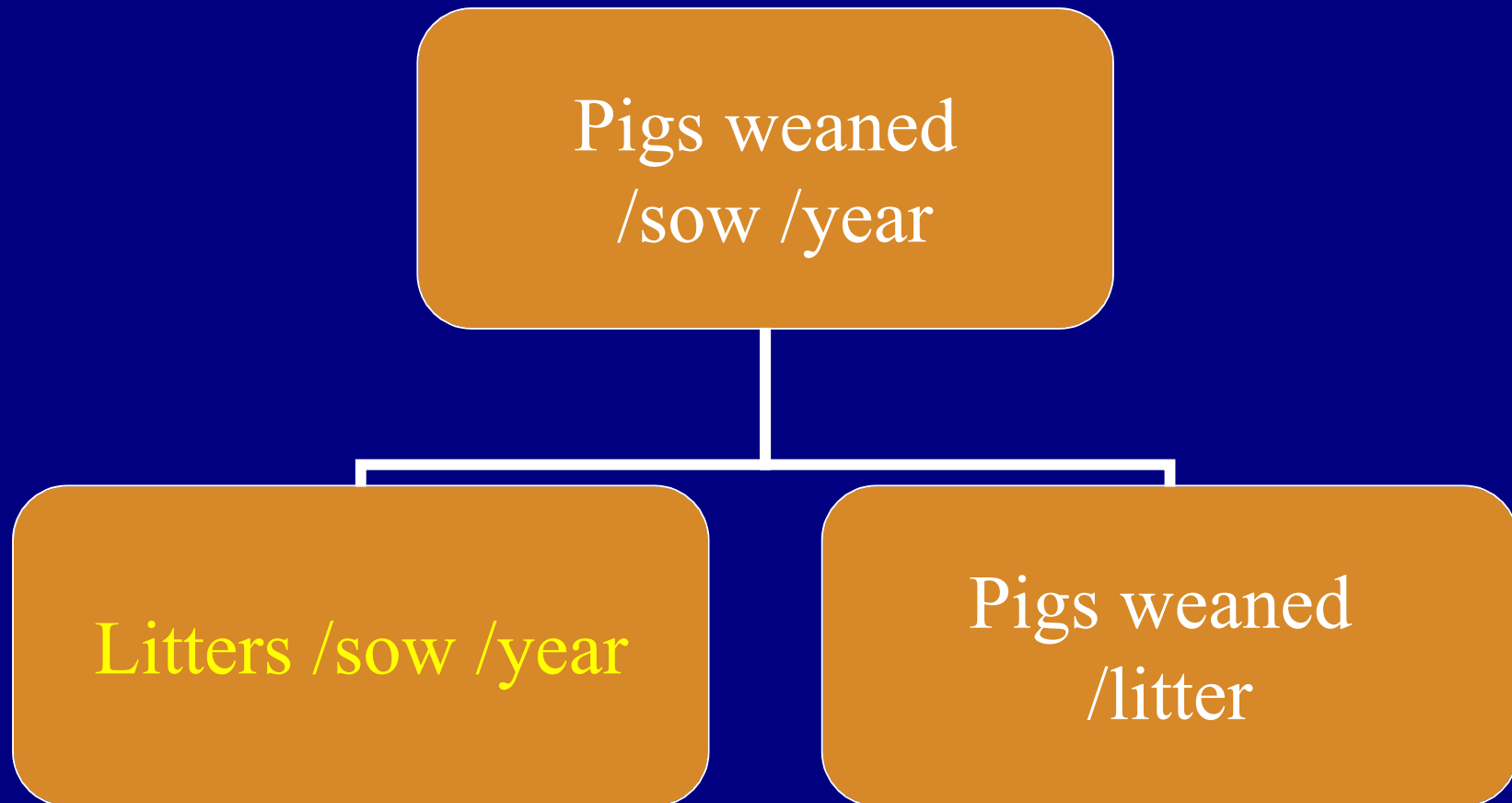
(Interpig 2011)

The cost of post weaning mortality



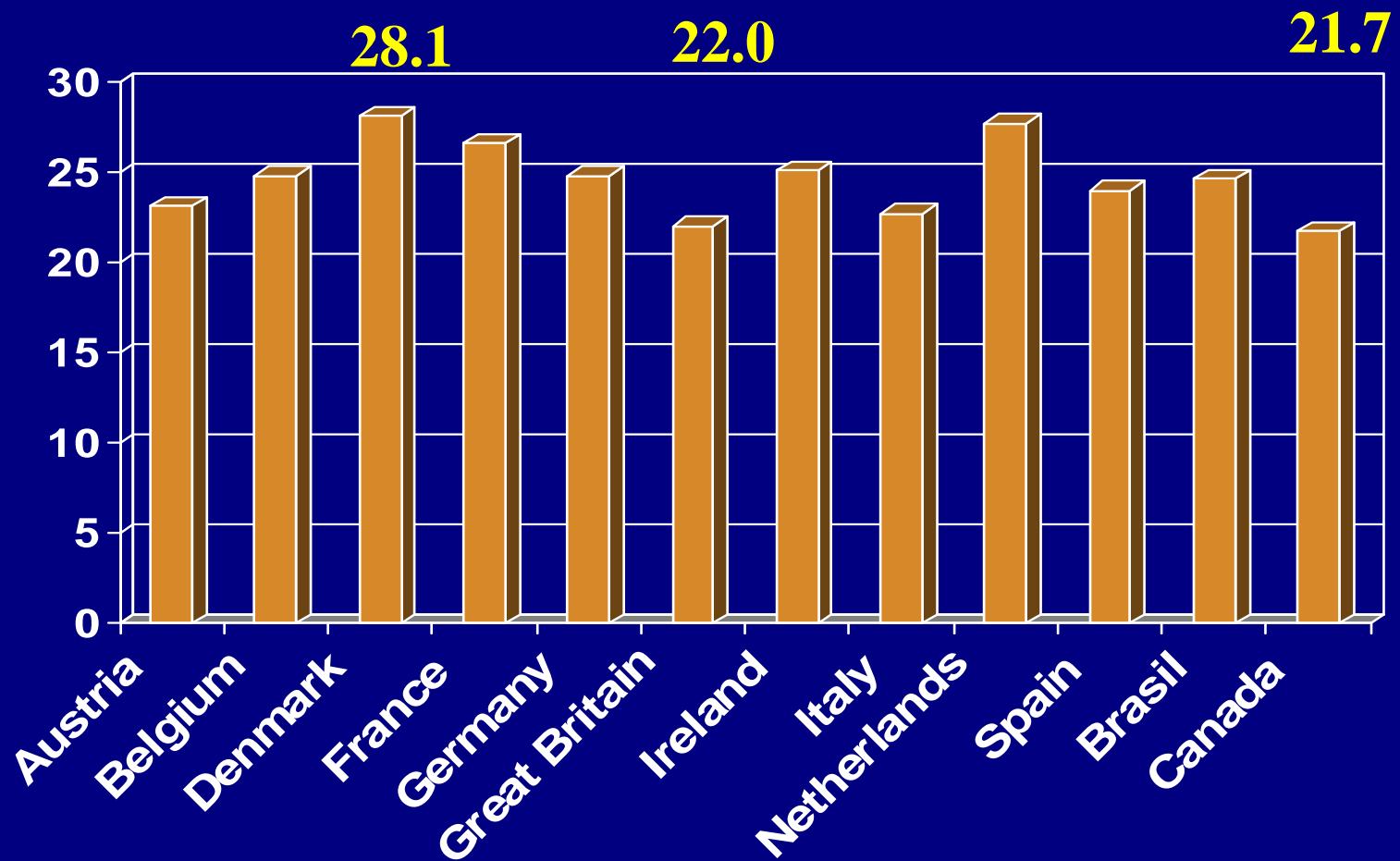
Improve health management

Looking for improvement (3)



How well do we currently do?

Pigs weaned / sow /year



(Interpig 2011)

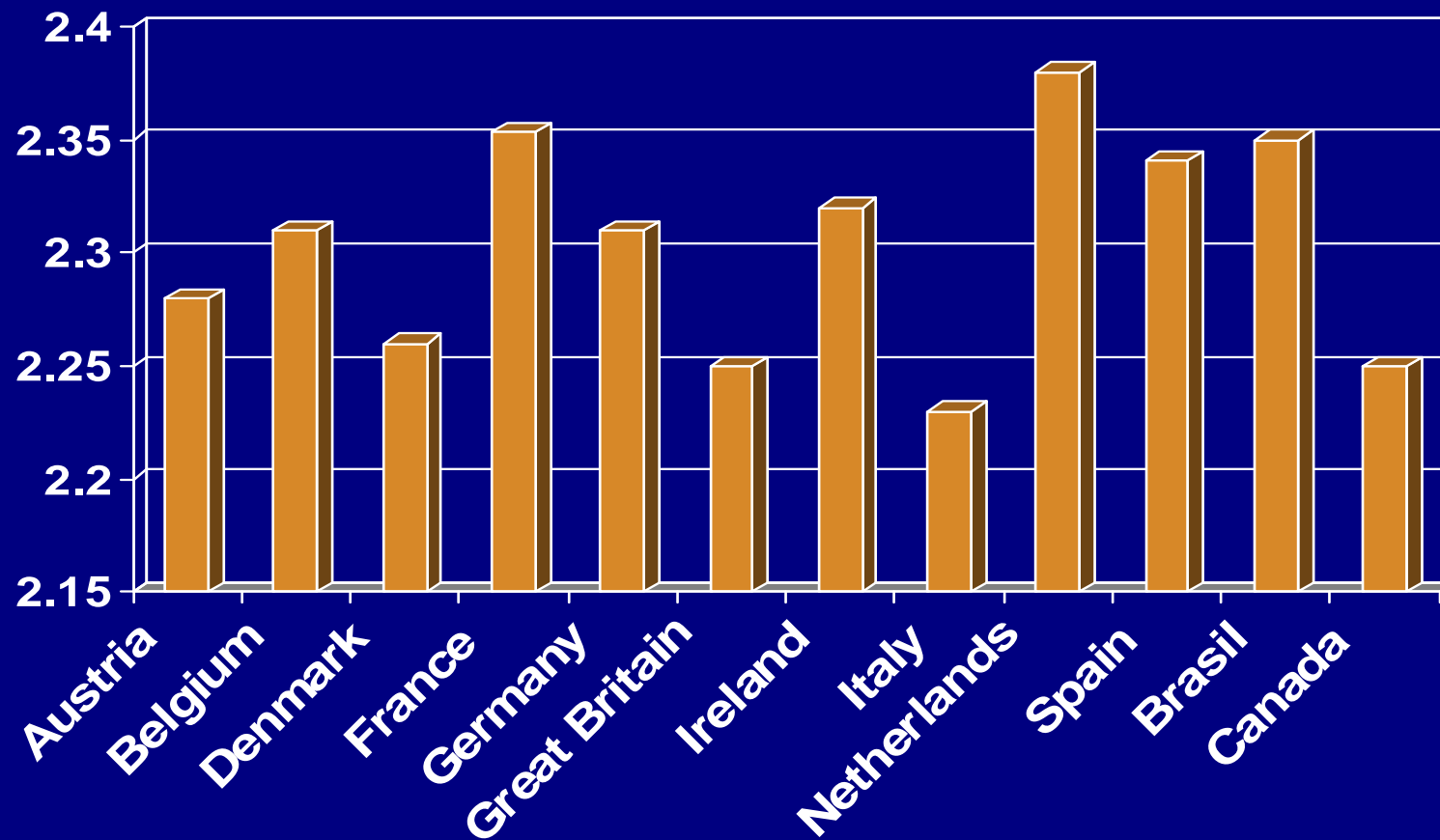
How well do we currently do?

Litters / sow / year

2.25

2.38

2.25

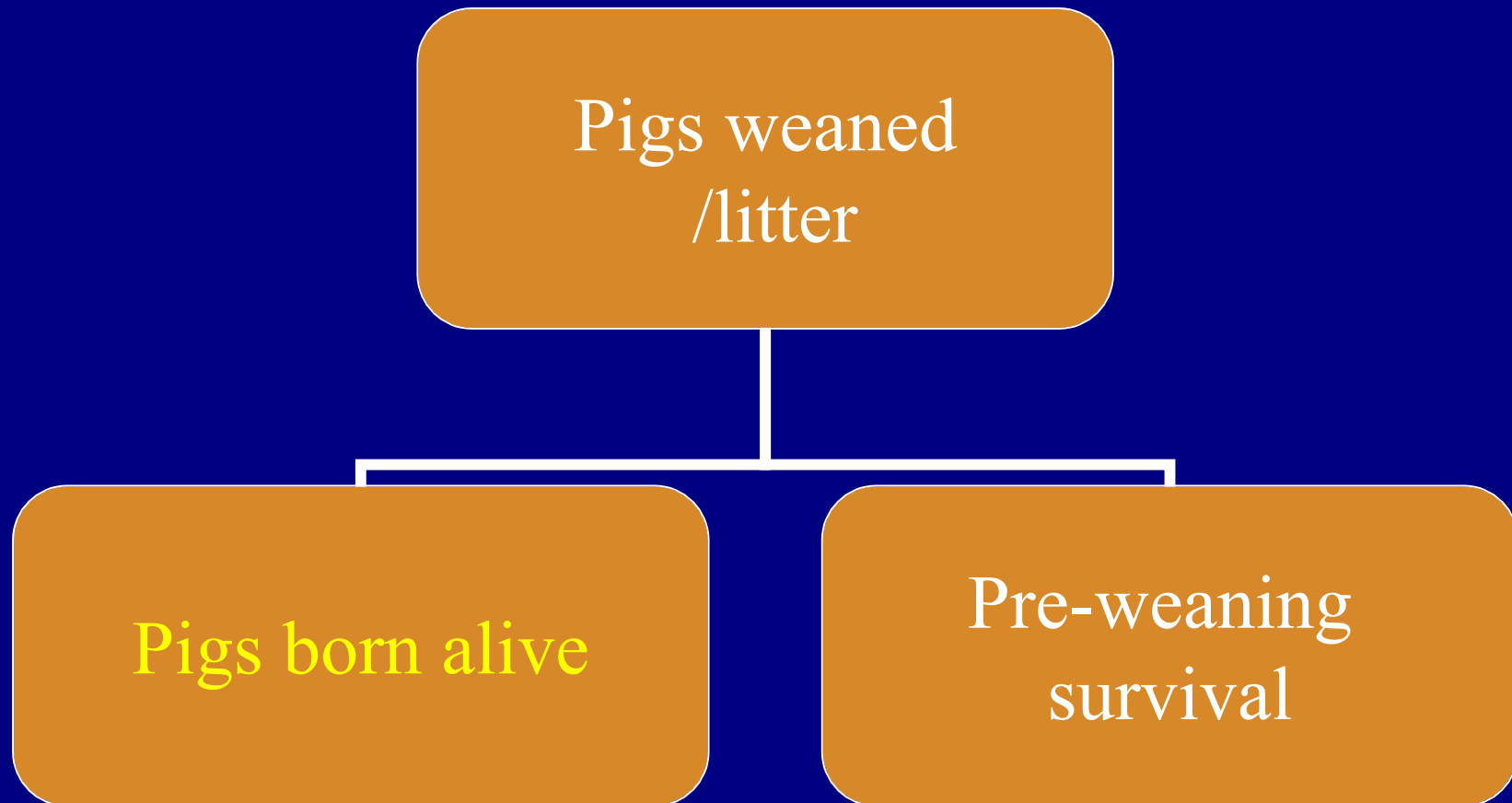


(Interpig 2011)

Increasing litters /sow/ year

- Wean earlier?
 - Increase conception rate
- A 1% increase in farrowing rate increases output by 17 kg/sow/year
- Better lactation feeding
 - Better service management
 - Reduced stress at implantation
 - a challenge for group housing systems

Looking for improvement (4)



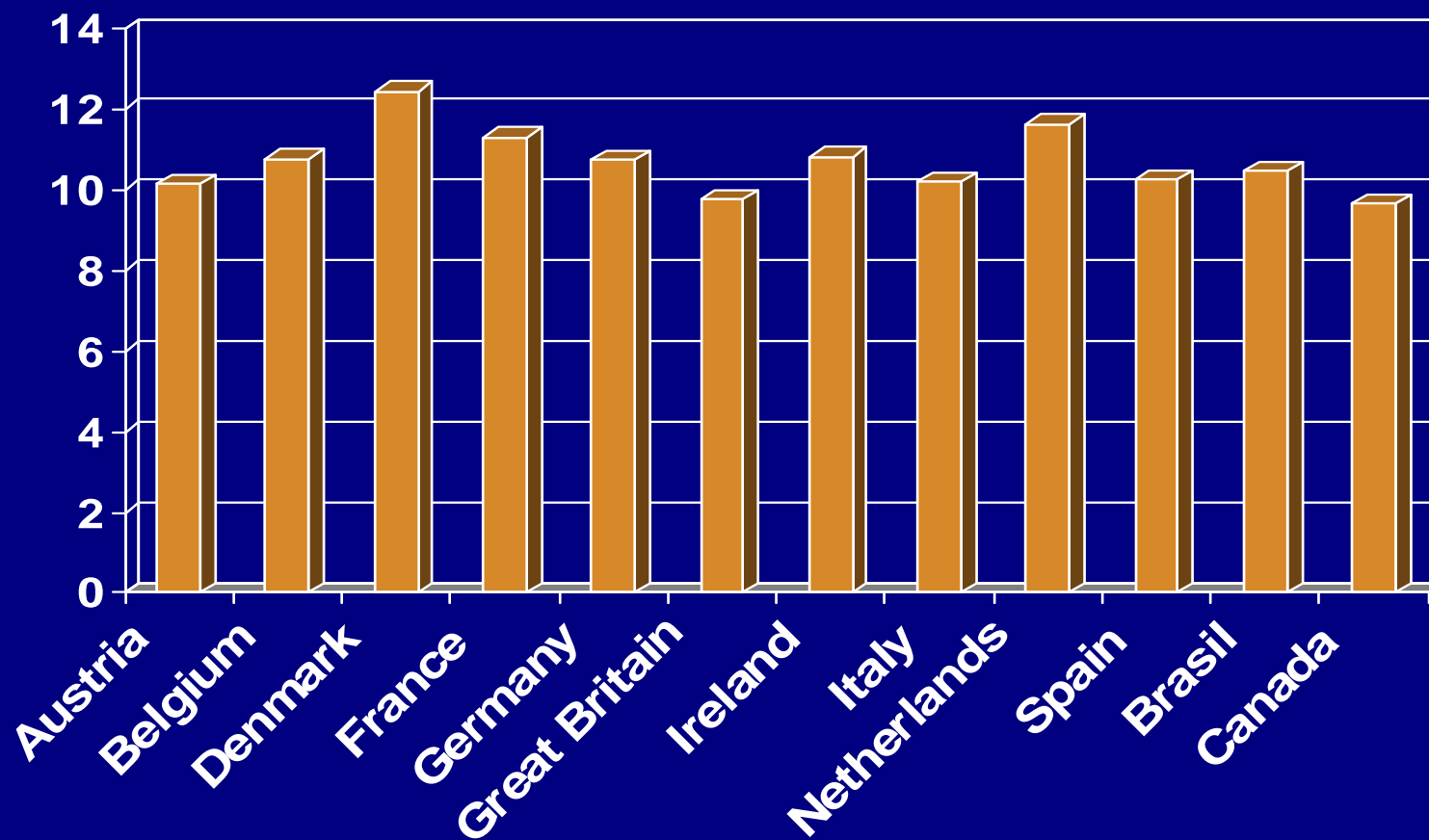
How well do we currently do?

Pigs weaned / litter

12.4

9.8

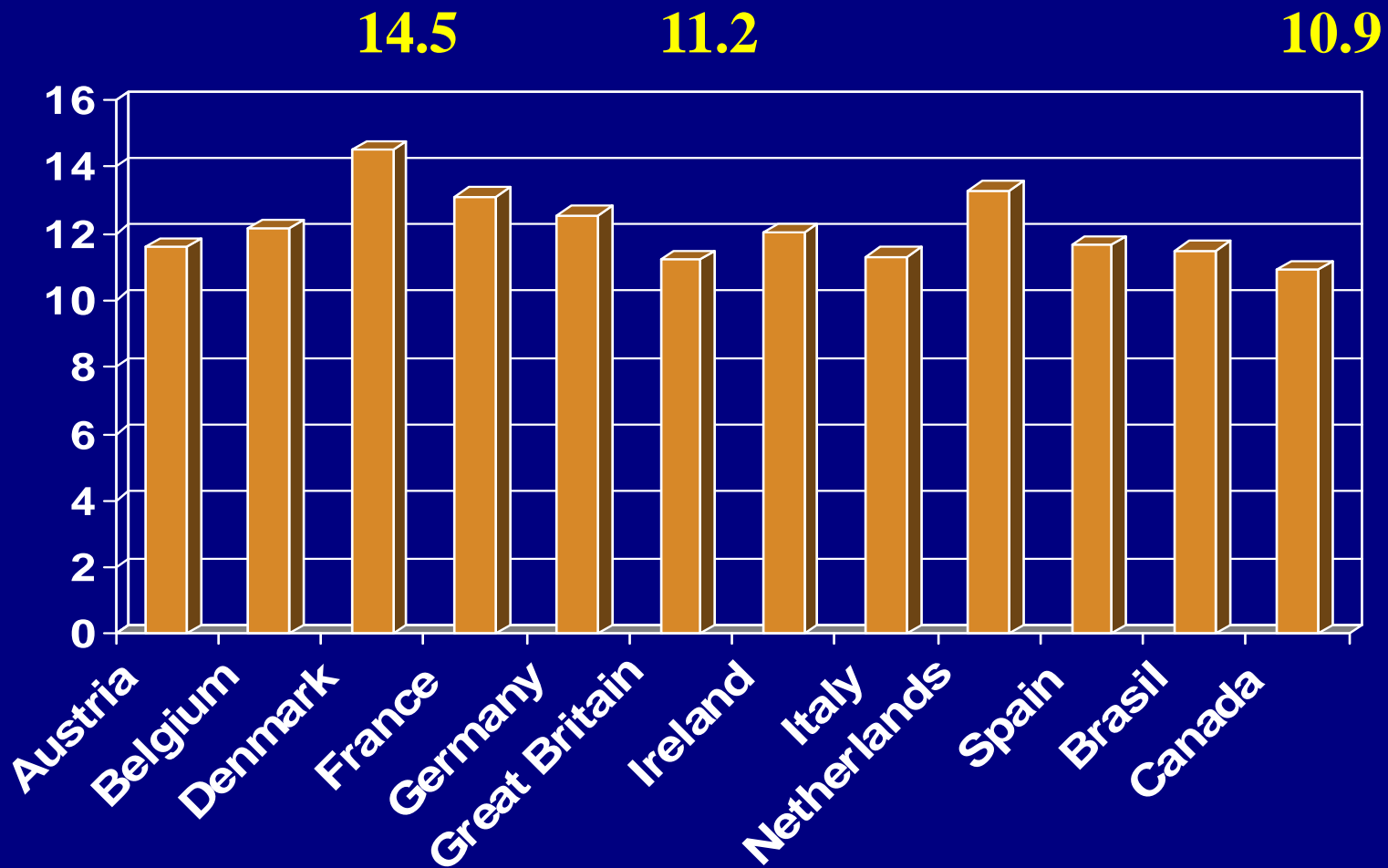
9.6



(Interpig 2011)

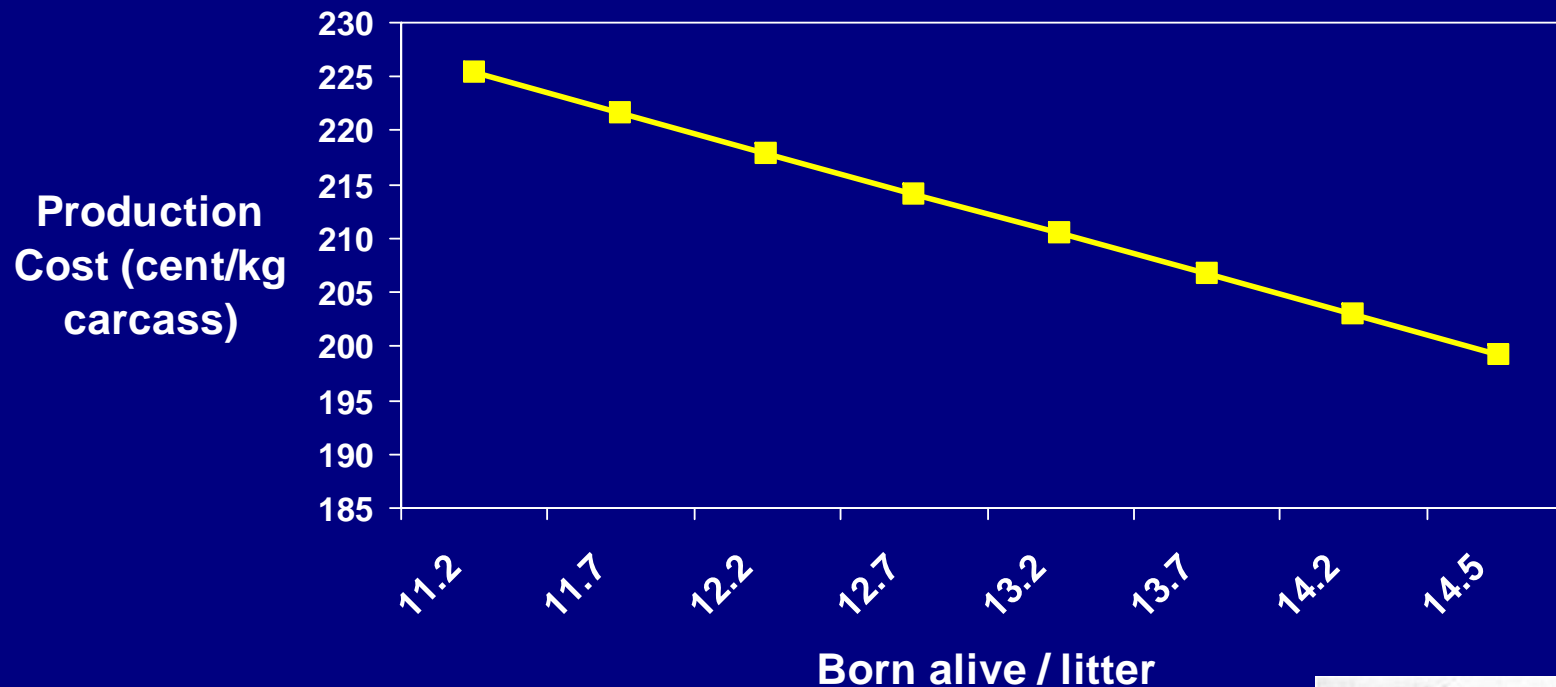
How well do we currently do?

Pigs born alive / litter



(Interpig 2011)

The importance of litter size



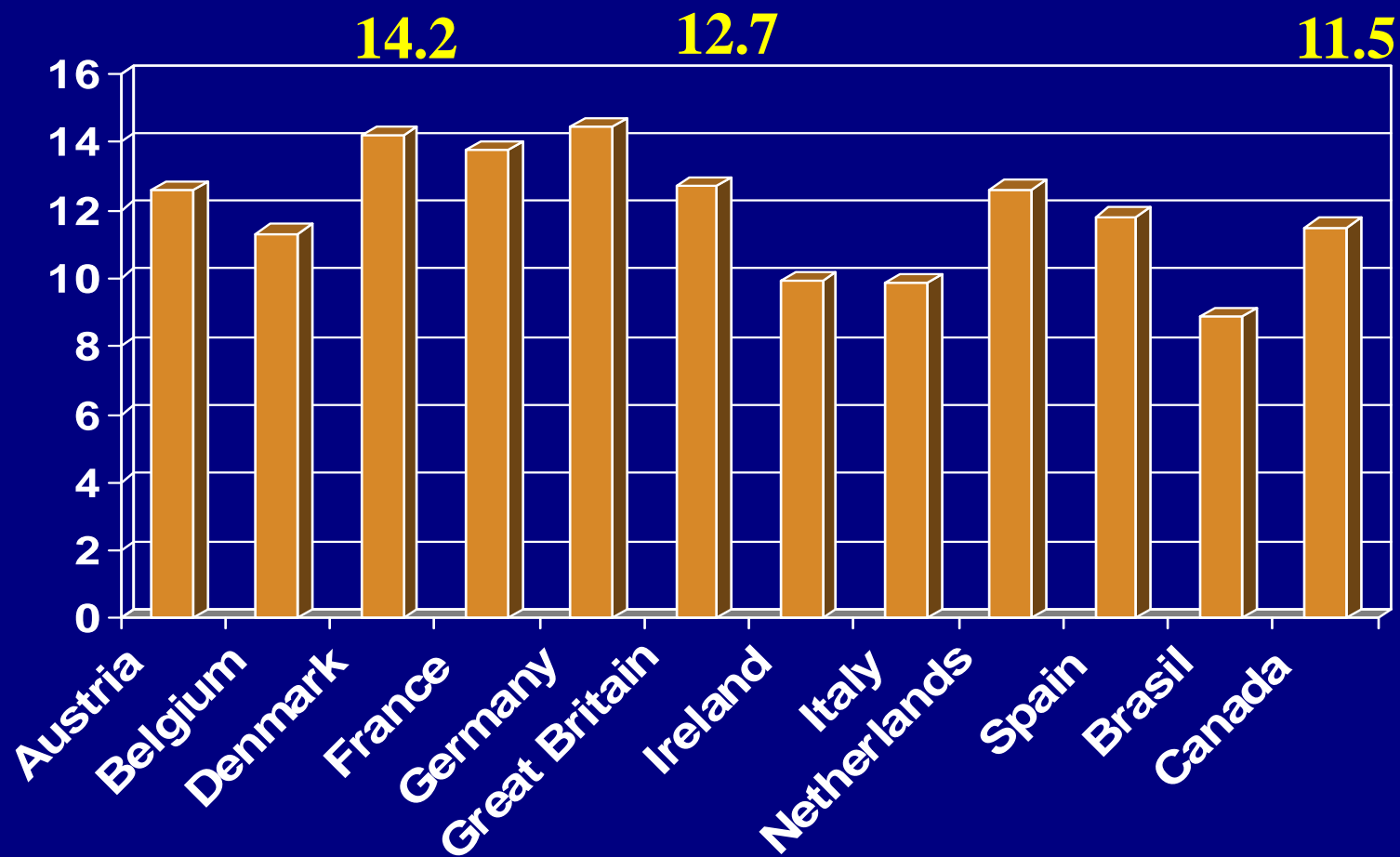
An increase of 0.25 pigs BA per litter increases output by 36kg /sow /year

But only if they stay alive!



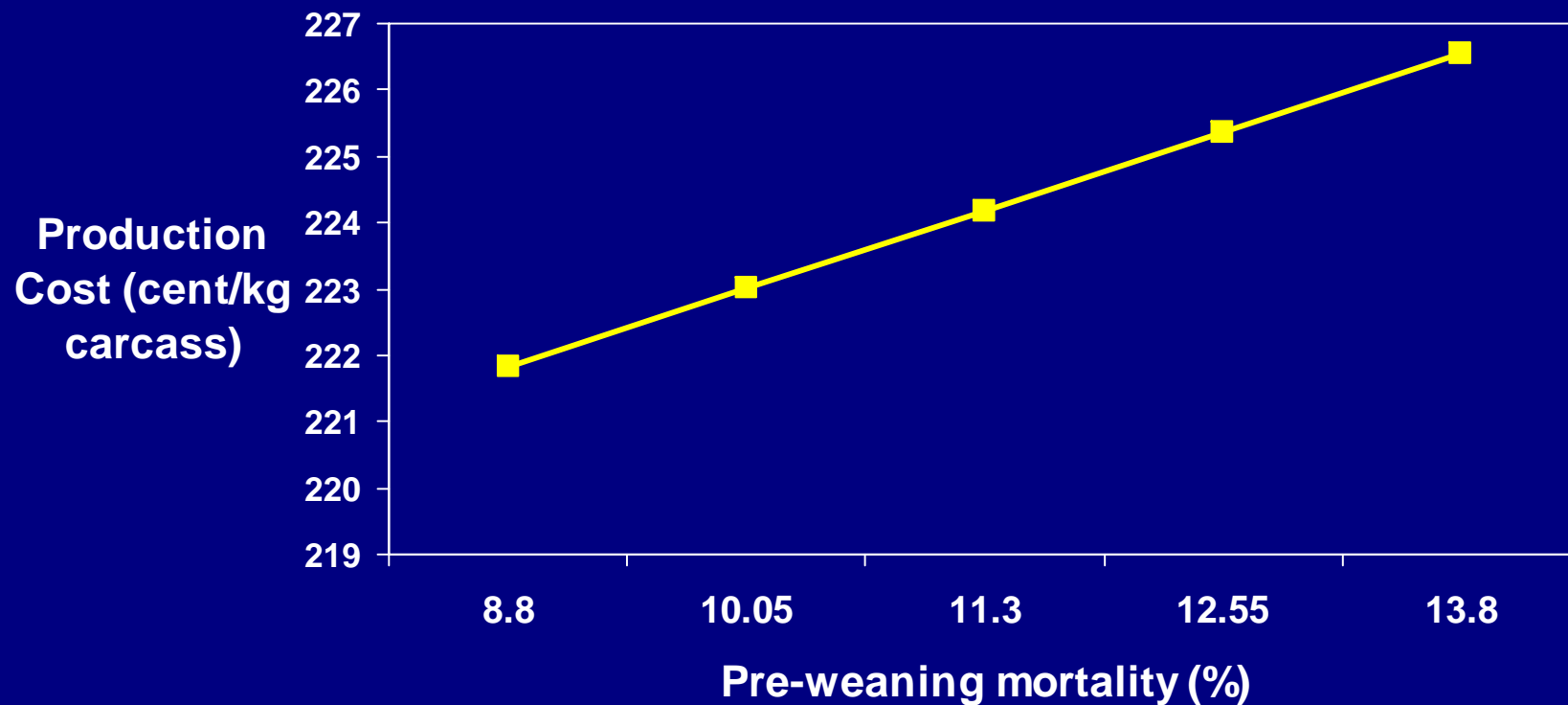
How well do we currently do?

Pre-weaning mortality (%)



(Interpig 2011)

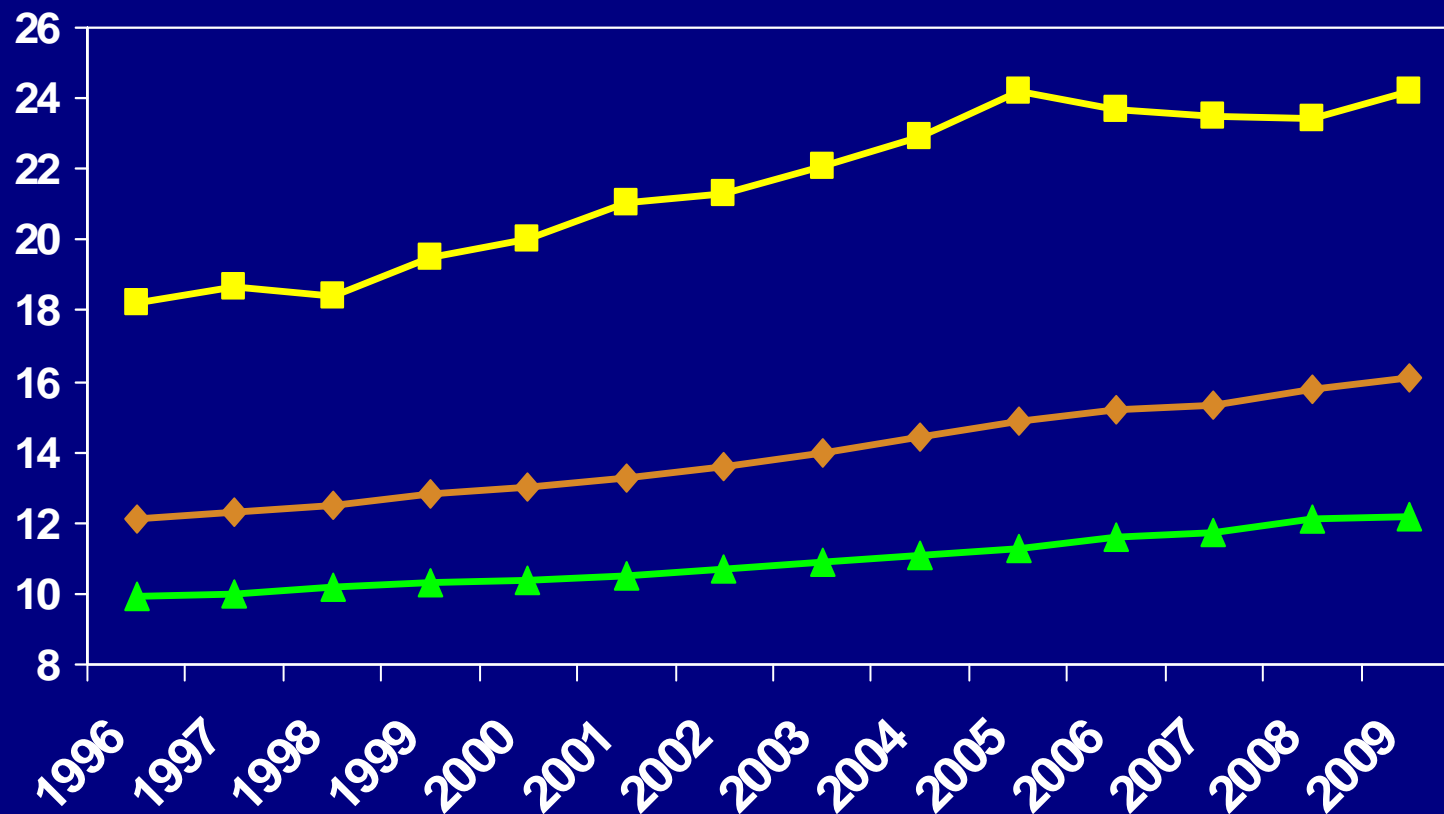
The importance of piglet survival



An increase of 0.5% in pre-weaning mortality reduces output by 10kg /sow /year

Changes in Litter size in Denmark

◆ Total born ■ Total pre-weaning mortality ▲ Number weaned



How do we make neonates more viable?

What characteristics do viable and non-viable piglets have?

- **Stillborn** mortality (prenatal) vs. Surviving piglets
- **Live-born** mortality (postnatal) vs. Surviving piglets



(Baxter et al., 2006)

What are the most important prenatal survival indicators?

- **Birth weight (BW)**
Stillborn piglets were lighter (~200g lighter).
- **Ponderal index (PI)**
= $\text{birth weight}/\text{crown-rump}^3$
In humans, considered a better predictor of mortality than birth weight
Measure of soft tissue growth
- **Body Mass Index (BMI)**
= $\text{birth weight}/\text{crown-rump}^2$
A measure of fat covering



Stillborn piglets were disproportionately long and thin (low PI and BMI) – can be a sign of intra-uterine growth retardation (IUGR)

What are the most important prenatal survival indicators?

Stillborn piglets experienced low placental efficiency
→ could lead to IUGR

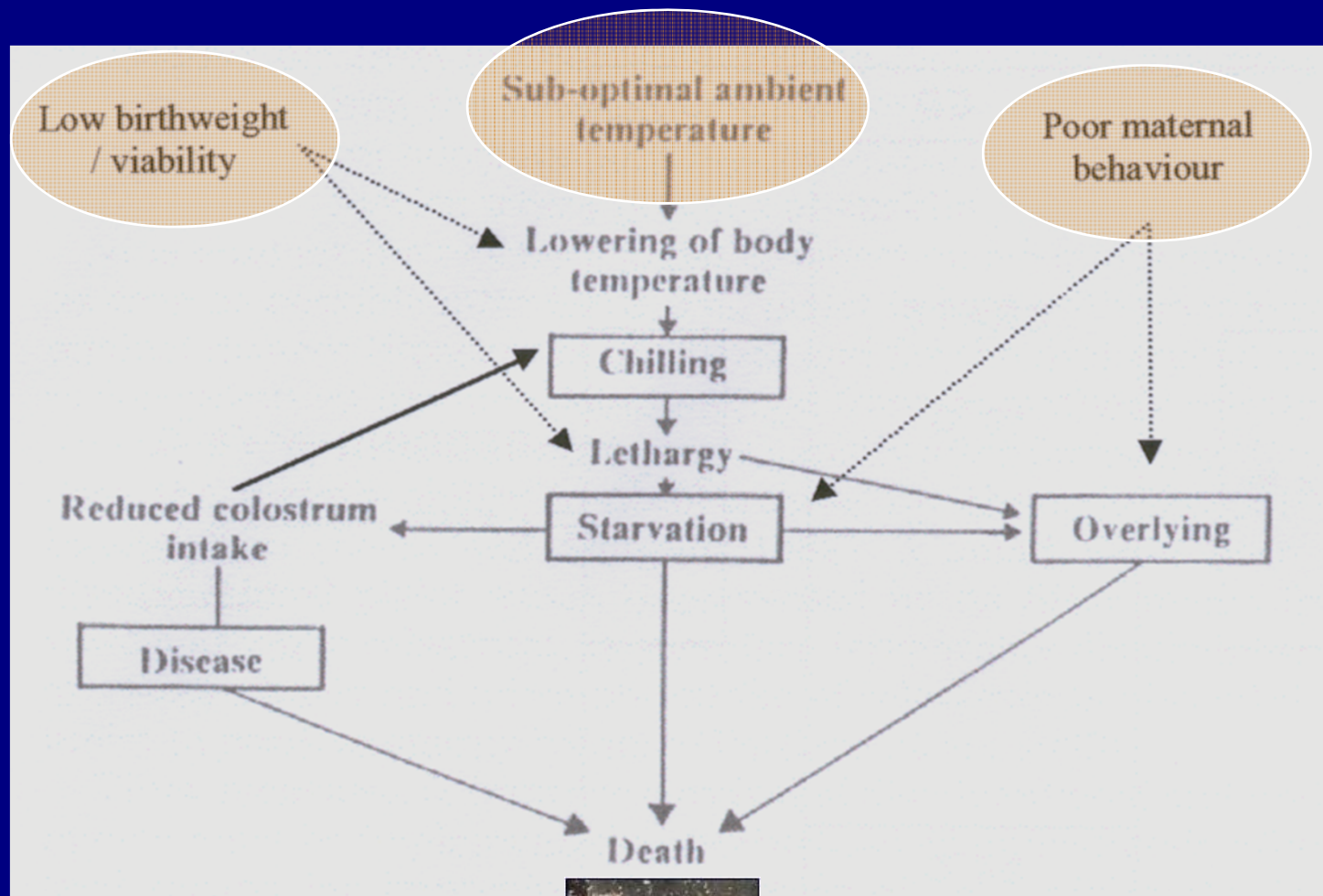


- **Farrowing progression is also important**

Stillborn piglets were born later in the birth order



Why do piglets die?



Adapted from P R English

What are the most important postnatal survival indicators?

- **Birth weight (BW)**

Dying piglets were lighter (~330g)

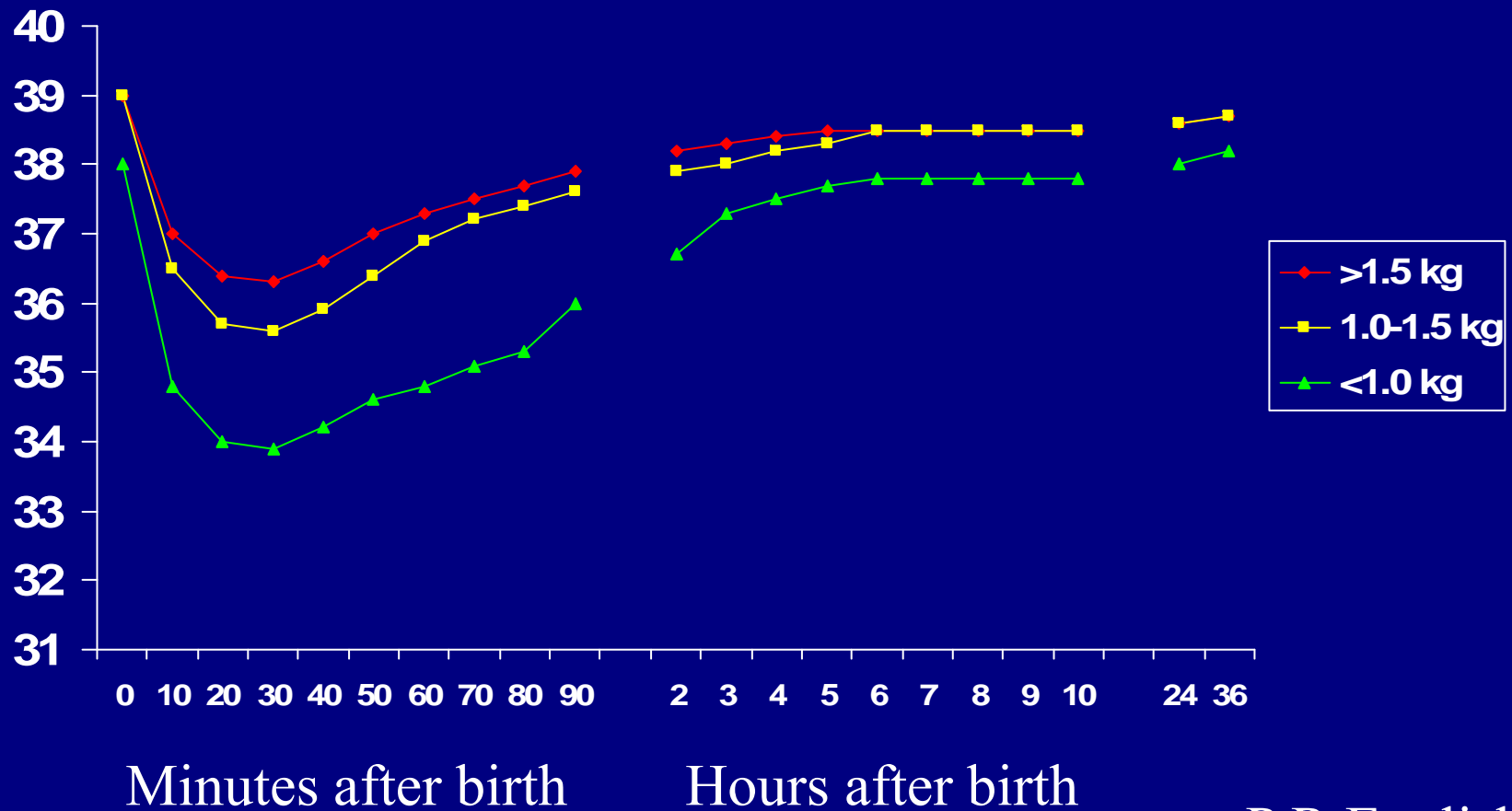
- **Thermoregulation**

Dying piglets had lower rectal temperature at birth (-0.6 °C), at 2h (-0.4 °C) and at 24h (-1.0 °C)

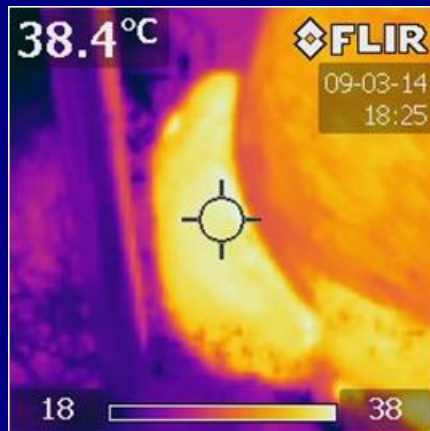


Dying pigs were more easily chilled and showed low vigour

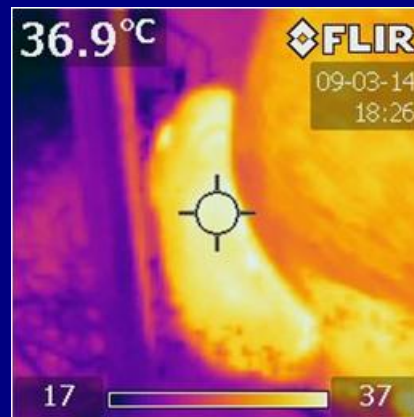
THE IMPORTANCE OF PIGLET BIRTH WEIGHT



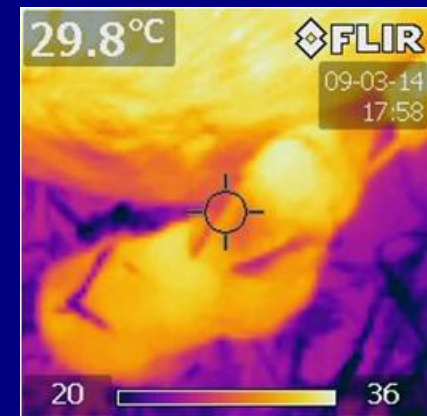
Thermoregulation



Newborn = 0

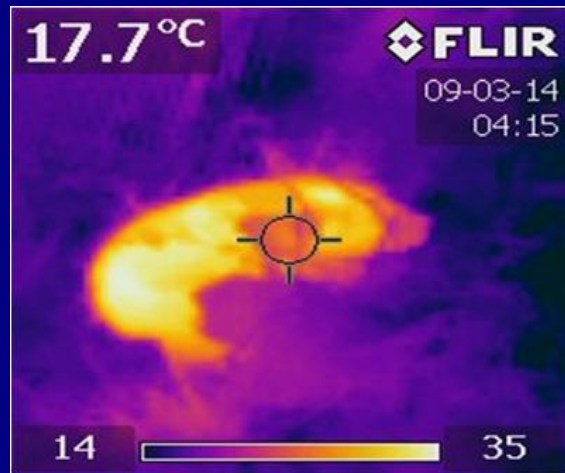


+1 minute



+30 minutes

Suckling and Thermoregulation



At risk – no suckling



51 minutes



Suckling improves thermoregulation



33 minutes

Surviving piglets
quicker to suckle

Vitality Score (in first 15 secs after birth)

- 0- Stillborn or resuscitated
- 1- Remains in the same position after expulsion, does not move, but breathes or attempts to breathe
- 2- Moves onto sternum and can move its head, but the rest of the body does not move
- 3- Moves a lot and attempts to stand



Mean Score 2.3

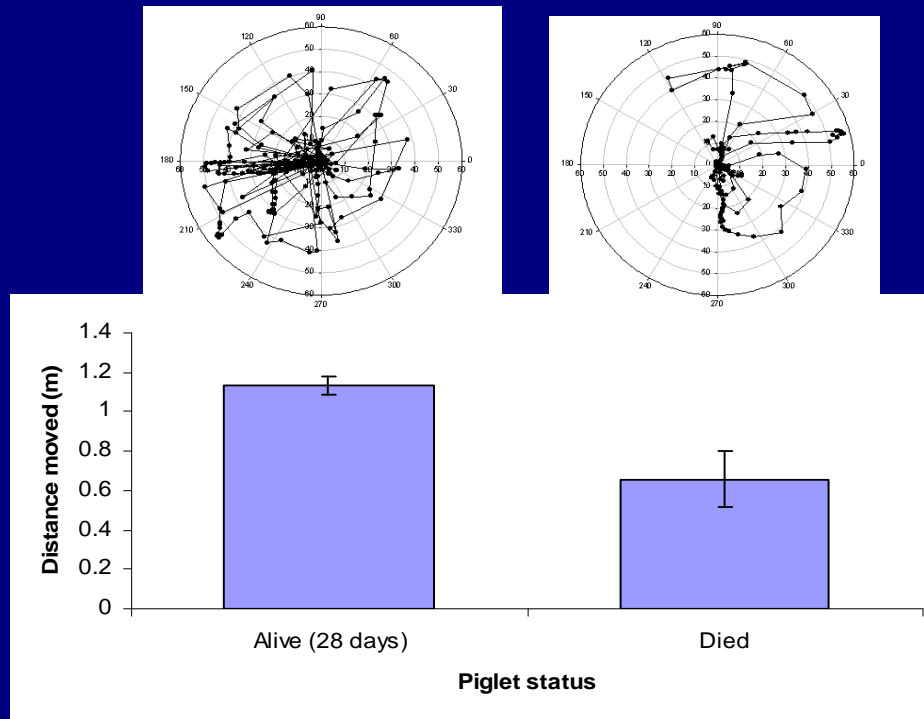


Mean Score 1.8



(Sacy & Le Treut, 2011; modified from Baxter et al., 2008)

Piglet rooting test shows “vitality”



Difference is not explained just by birthweight

(Baxter et al., 2006)

How can we improve viability ?

- **Management approaches**
 - reducing hypoxia, hypothermia , starvation
- **Genetic approaches**
 - selection for survival, weight, vitality
- **Nutritional approaches**
 - improving birthweight, vitality

Management to improve vitality

	% high viability score	Time to udder (m)	% mortality to 10d
Asphyxiated	36	63	43
Control	79	32	19
		P<0.05	P=0.06

(Herpin et al 1996)

Selection experiment for direct and maternal genetic effects of liveborn piglet survival

Selection: 1st Generation



Selection: 2nd Generation

Genetic Improvement of Viability

- “**GENOMUM**” study

unique (<22k records) **cross-over selection experiment** for piglet survival

(High vs. Average)
on a Scottish outdoor unit

No genotype x environment interaction

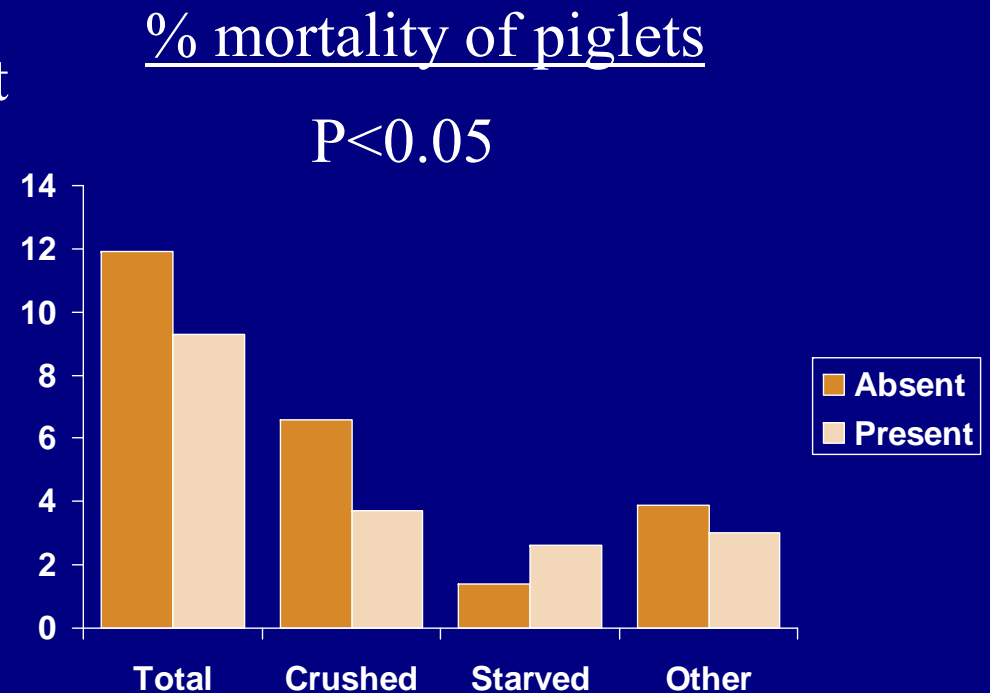


/// **genetic improvement in survival:**
3% better in HS lines
(over 2 generations)

Nutrition to improve neonatal vitality

100 sows per treatment
Trial diets with DHA supplement
fed from after breeding
through gestation and lactation

Piglet birth weight:
Vegetable oil (control) = 1.54 kg
Salmon oil (16.5g/kg) = 1.47 kg



(Rooke et al. 2001)

Nutrition to improve placental quality



	Control	+Arginine
Embryo survival (%)†	68%	77%
Placenta vascularisation score†	2.6	2.9
Birth weight (kg)‡	1.36	1.41

†25g L-arginine/d (Hazeleger et al, 2007)

‡1% L-arginine (Matteo et al, 2006)

Nutrition to improve oocyte quality

Diets with fermentable substrates fed through lactation & pre-service (157 litters)

	Control	Dextrose + Lactose	
Litter size	14.09	14.40	ns
Birthweight (g)	1.46	1.55	P=0.05
Cv birthweight (%)	23.7	20.5	P=0.04
Total mortality (%)	20.4	17.2	P=0.09



(van den Brand et al., 2009)

How to get a 2 Tonne sow

	GB current	GB target
Non productive days	19.7	- 6
Farrowing rate (%)	80.5	+ 6
Born alive	11.2	+0.75
Pre-weaning mortality (%)	12.6	-1.5
Post weaning mortality (%)	5.28	- 1.5
Sale wt (kg live)	102.9	+ 6
Tonnes / sow /year	1.65	2.14