



# Meat quality of Merino lamb and yearlings how does it stack up?

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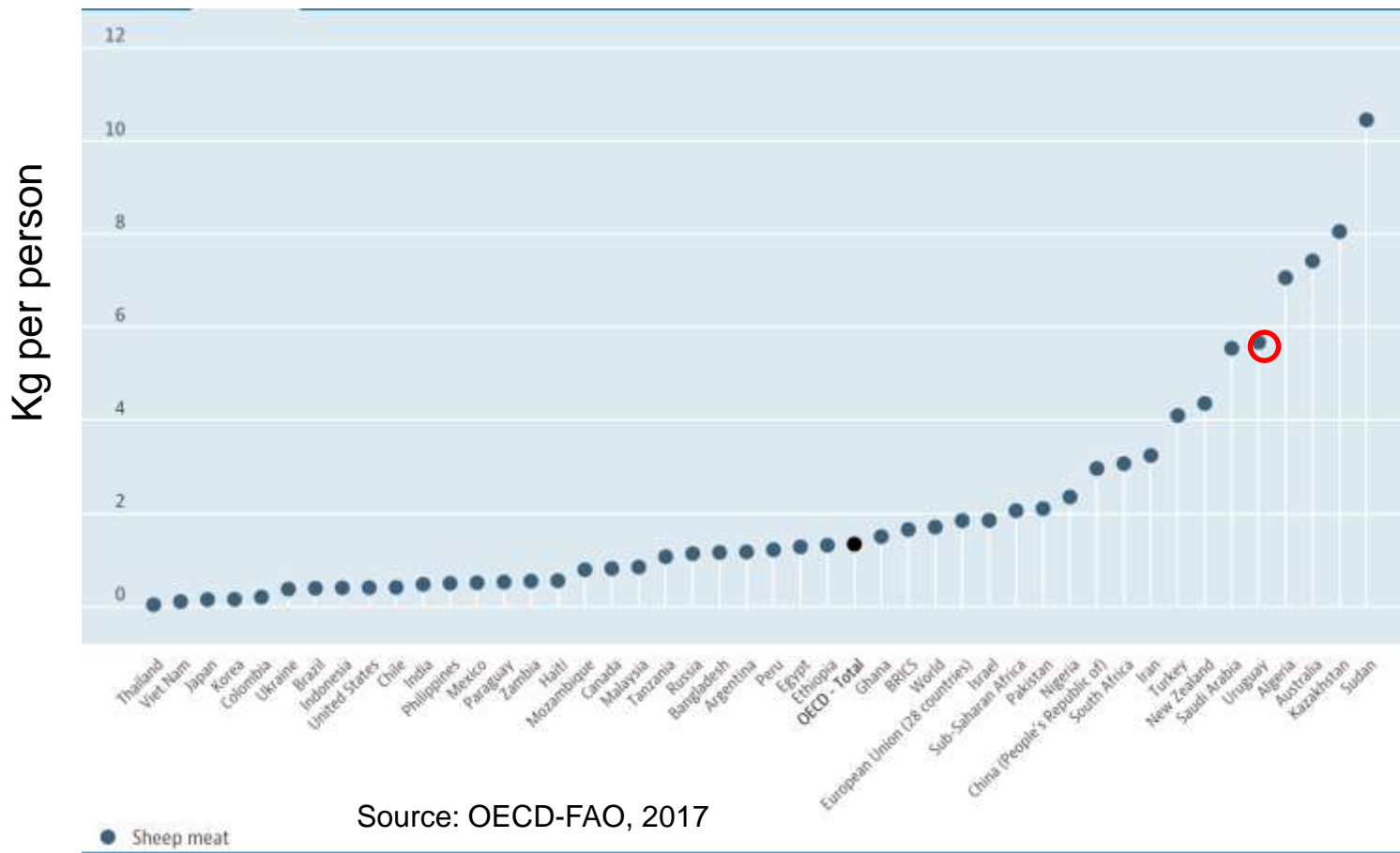


# Topics to be covered

- ◆ The Merino carcass
- ◆ Merino meat quality
- ◆ Eating quality
- ◆ Objective carcass measurement

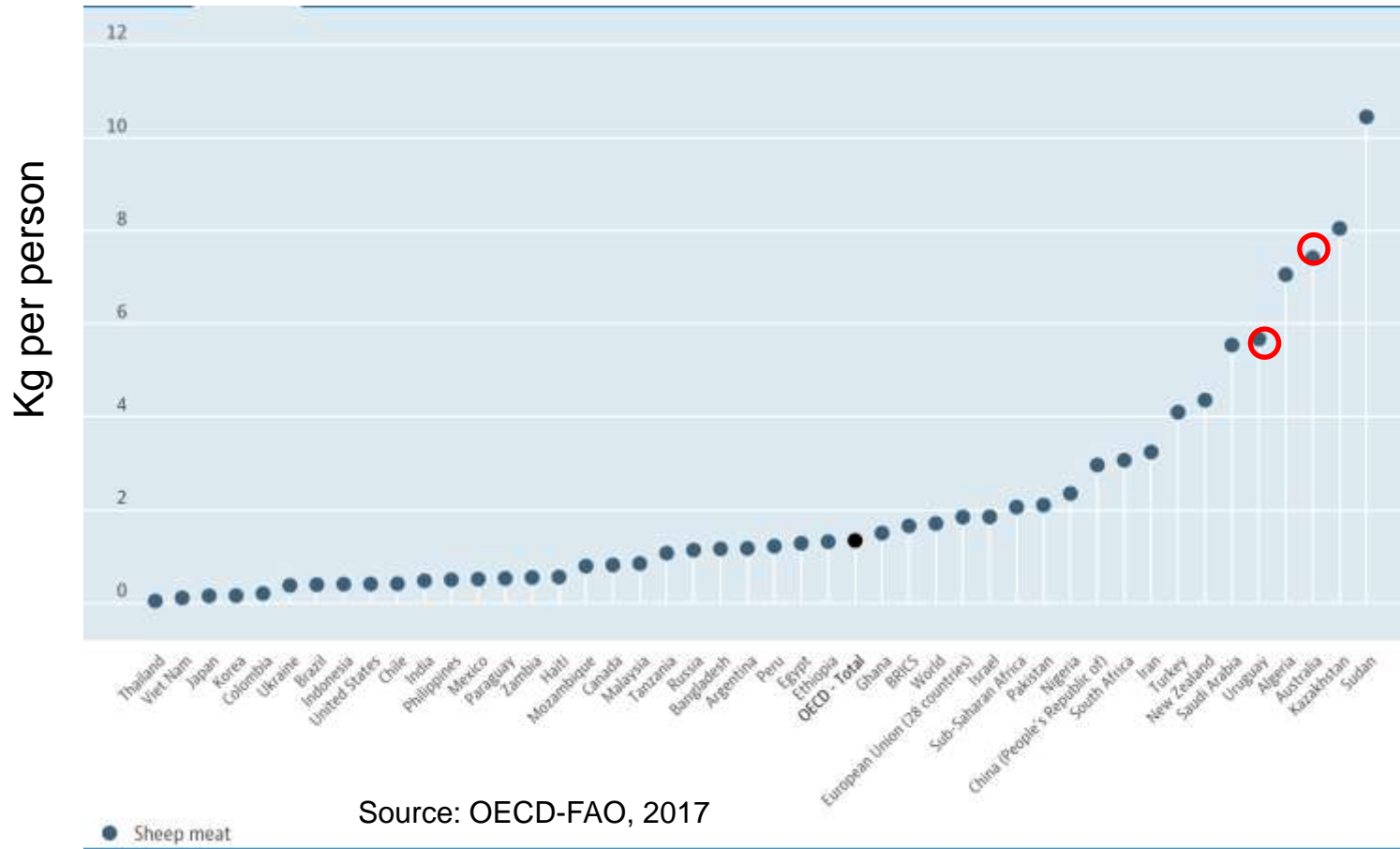
# World sheep Consumption

*Uruguay 5<sup>th</sup> for lamb & sheep meats*



# World sheep Consumption

*Mind you still have some catching to do !!*



Source: OECD-FAO, 2017

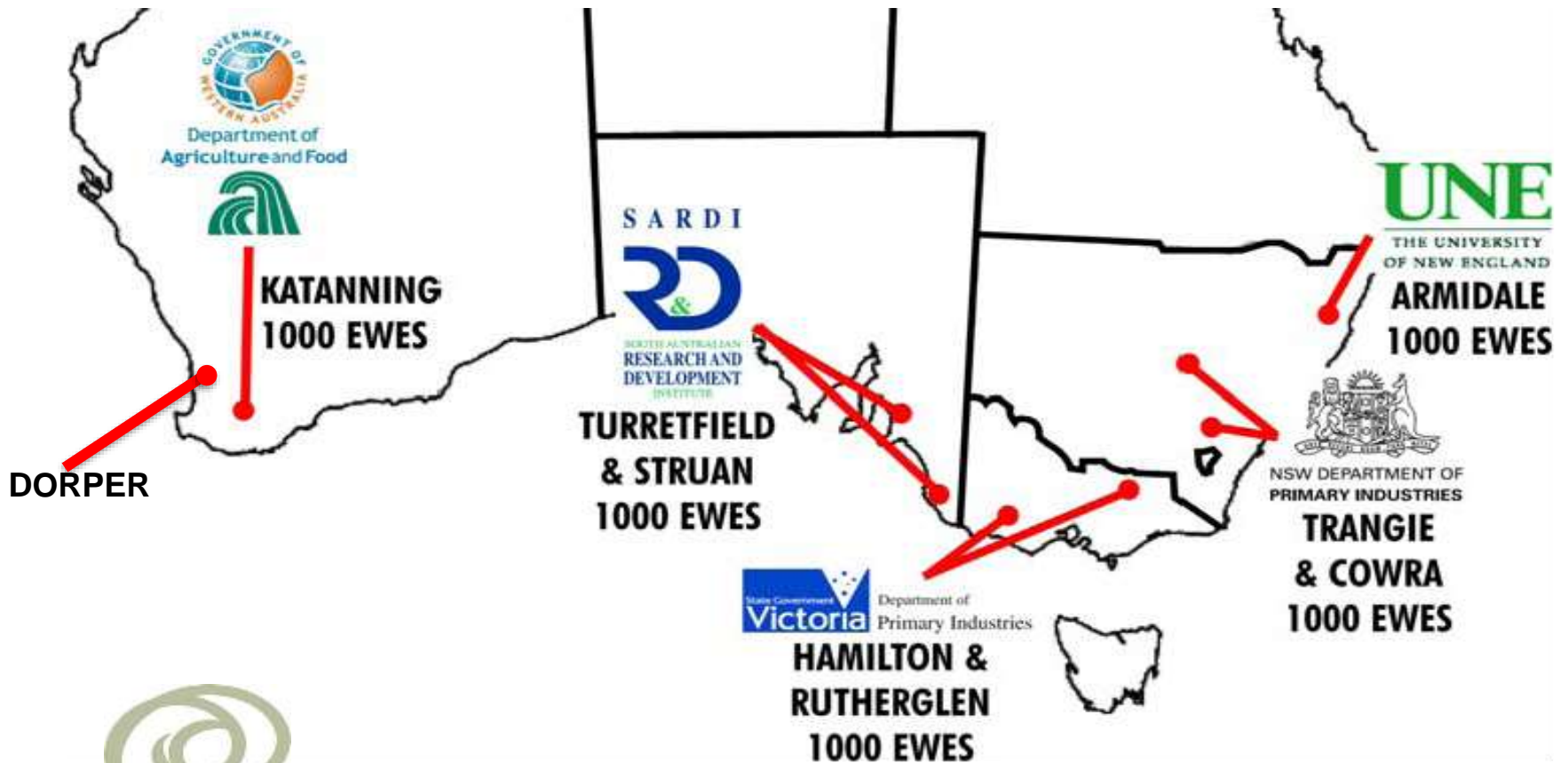
# The Merino carcass ??

Have you heard this before ??

- ◆ Very lean
- ◆ Has less meat
- ◆ All bone
- ◆ We will pay you less

# The Information Nucleus

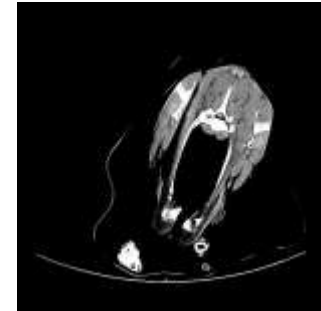
(9 sites, 500 sires, 10,000 slaughter lambs)



# Gold standard – lean meat yield

## ◆ Cat Scan (CT) lean (Computed Tomography)

- Constant
- Highly accurate



# Carcase Value (23kg)

	<b>Merino x Merino</b>	<b>Terminal x Merino</b>
Lean meat (kg)	12.8	13.0
Carcase Retail Value	\$271	\$282
Saddle lean	3.5	3.7
Saddle value	\$93	\$100

Anderson et al. 2016 Meat Science  
Modelling based on CT Scanning (251 Merinos)



# The Merino carcase

In conclusion

- ◆ carcase composition is quite similar
- ◆ There is typically less weight in the rack & loin
- ◆ There is more bone
- ◆ Of course a lot slower growing and so the lamb window can be problematic

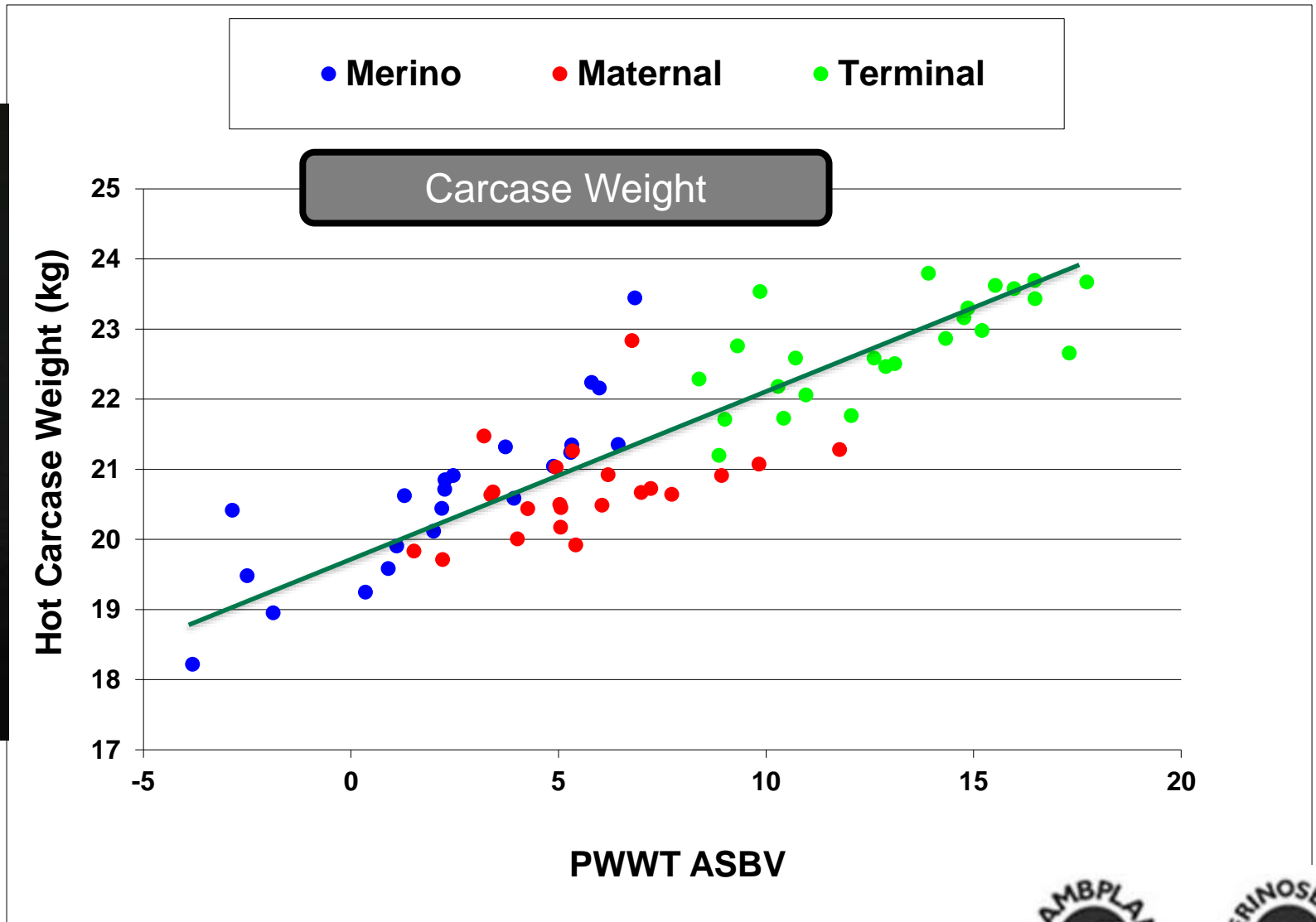
# The Merino carcase

New Objective Carcass Measures of lean meat yield should be +ve for Merinos (later)

# Genetics and the Merino carcasse

- ◆ So the previous story was 'on average'
- ◆ Carcasse attributes are heritable and can be readily changed with genetics
- ◆ Moreover there is a great deal of genetic variation in Merinos

# Post Weaning Weight Breeding value = PWWT (Sheep Genetics)



# Effect of breeding values in Merinos (11mo)

Sheep Genetics - Australian Sheep breeding values



Breeding Value	Range	Parameter	Effect
Post weaning Wt	-5 → +11	HCW	16 → 21 <b>(5kg)</b>
Post Weaning Muscle depth	-3 → +3	CT lean	10 → 11 <b>(1kg)</b>
Post weaning fat depth	-2 → +2	CT fat	3.9 → 4.3 <b>(0.4kg)</b>

Anderson et al. 2016 Meat Science  
Modelling based on CT Scanning at 11mo of age (251 Merinos)

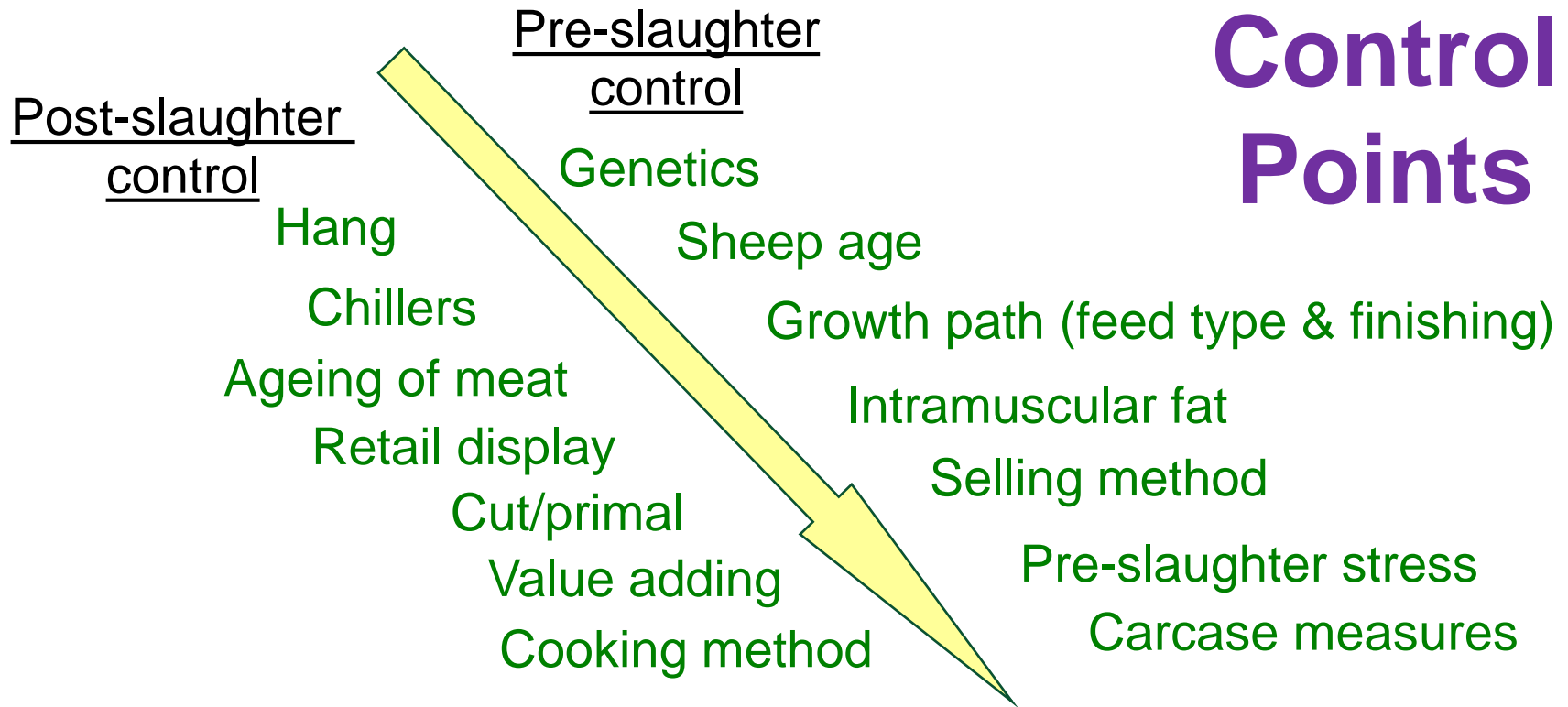
# Eating Quality

- Critical control points
- Meat Standards Australia sensory methods
- Animal age
- Finishing important
- Predicting EQ
- Carcase grading



# Conception

# Critical Control Points



# Consumer



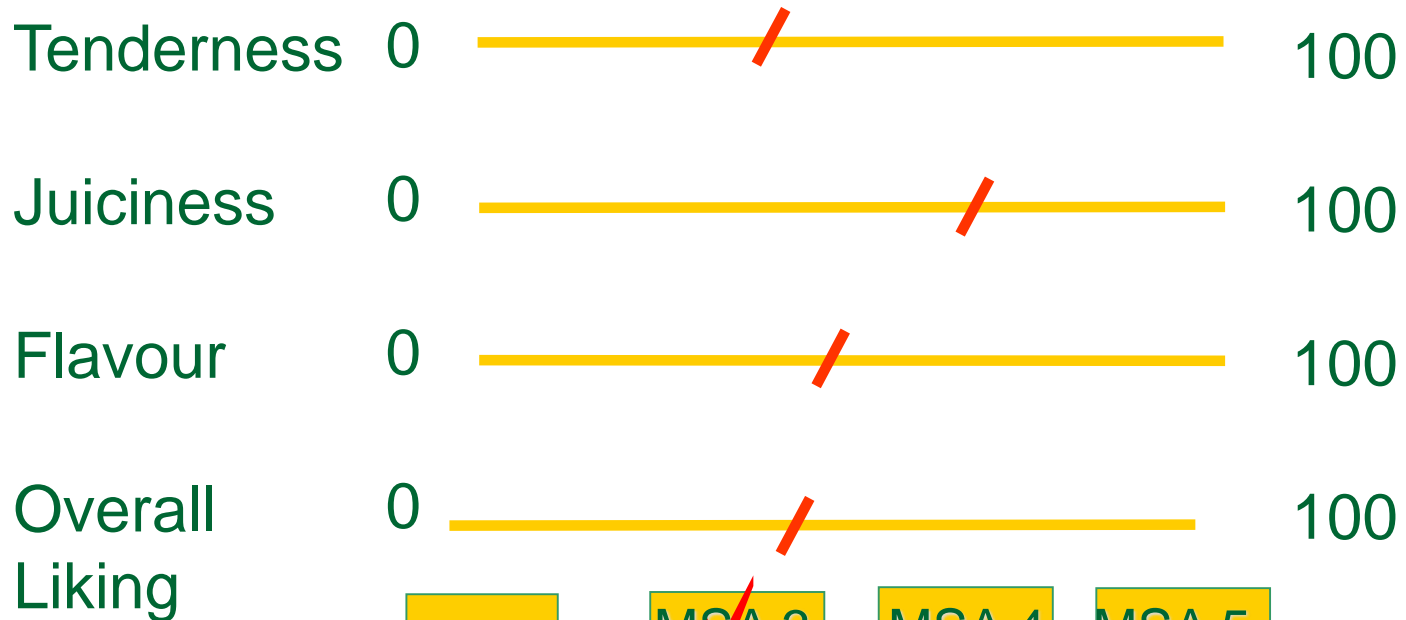
# MSA consumer testing Real people – real answers !







# Untrained consumer taste tests



Good Better Best



# SQ4 = combined eating quality score

quite similar to beef

**Tenderness**      **X**      **30 %**

**Juiciness**      **X**      **10 %**

**Flavour**      **X**      **30 %**

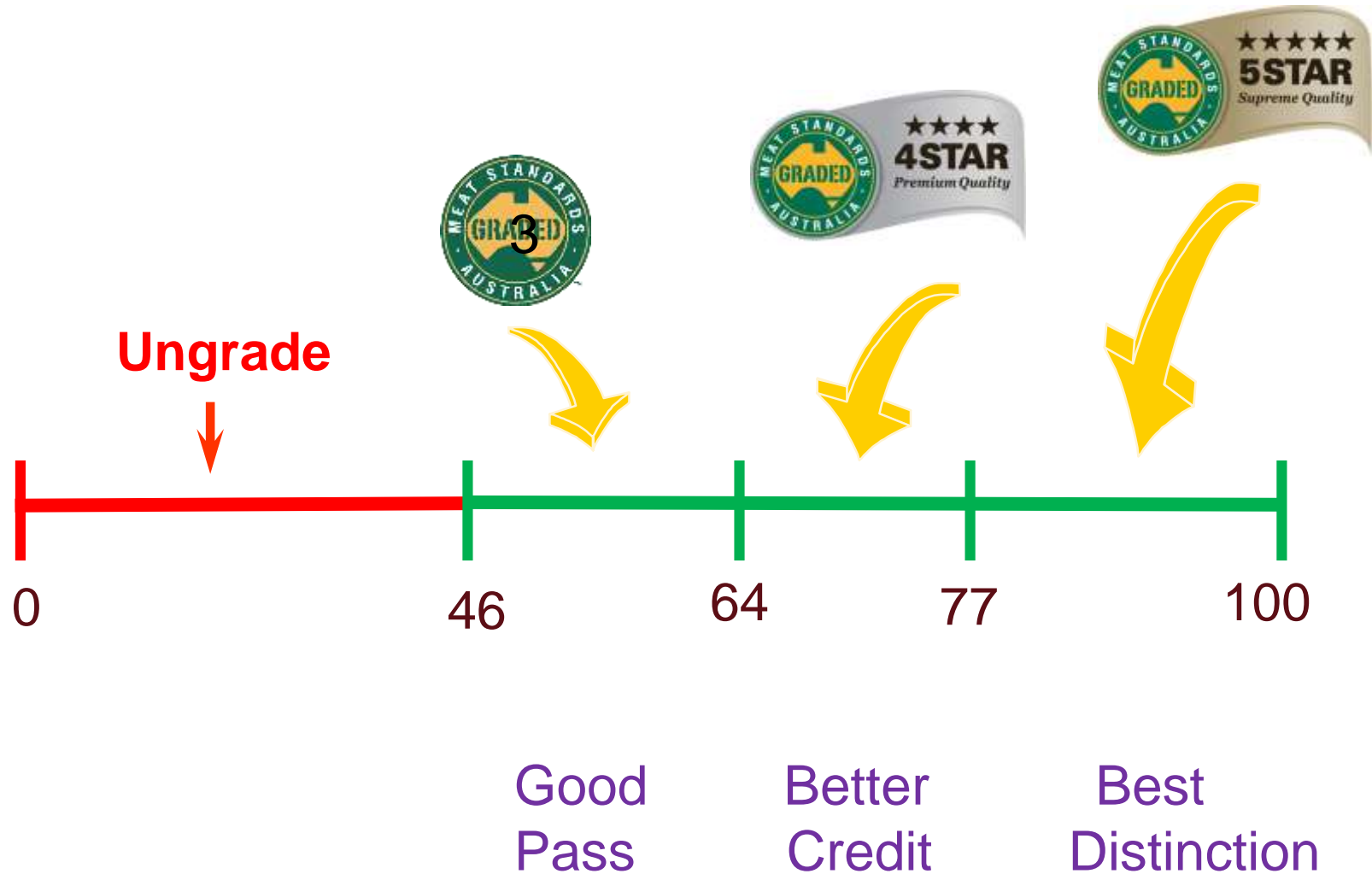
**Overall Liking**      **X**      **30 %**

**= SQ4 score**  
**(out of 100)**



# Consumers identified grades

– quite similar to beef



# Willingness to pay

(Price relative to 3\*, n = number consumers)

	<i>n</i>	Ungrade	3*	4*	5*
Mean	5,843	50%	100%	144%	190%

Australian consumers - lamb



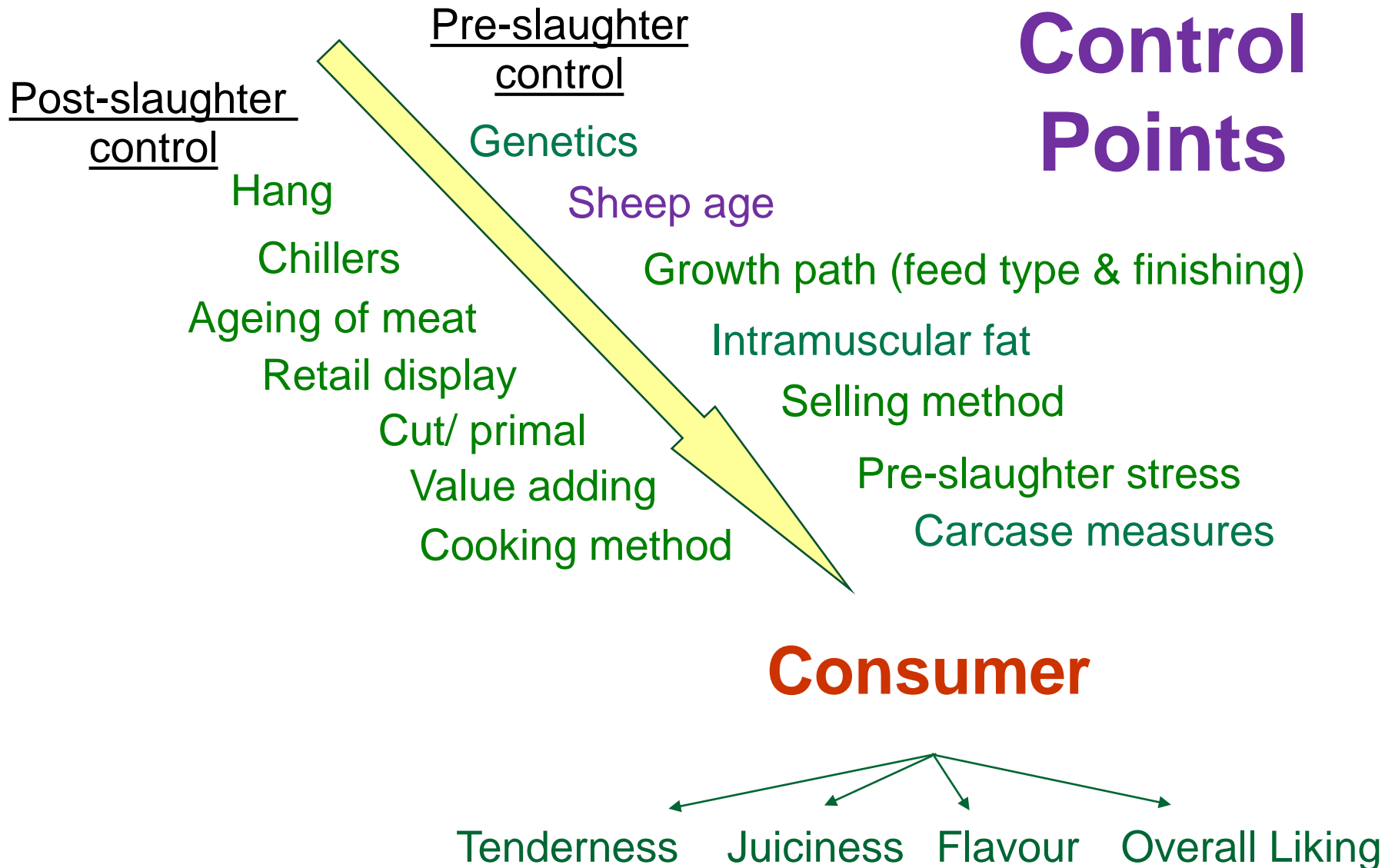
# Willingness to pay – similar across countries

	<b>Ungrade</b>	<b>Good (3*)</b>	<b>Better (4*)</b>	<b>Best (5*)</b>
<b>USA</b>	46%	100%	150%	209%
<b>China</b>	57%	100%	147%	212%
<b>AUS</b>	53%	100%	141%	189%

Grilled lamb - O'Reilly, Pannier et al 2016

# Conception

# Critical Control Points

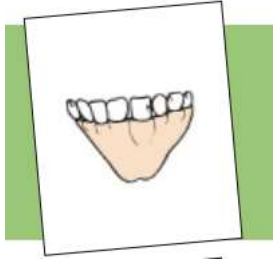


# Animal Age - 1

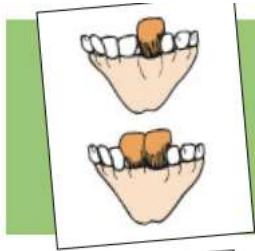
- Information Nucleus
- Merino lambs (110) compared to older half siblings (215)



# Animal Age - AUSMEAT



- **Lamb** (no teeth eruption)



- **Hogget** (1 or 2 teeth)



- **Mutton** (3 or more)

NB – I will use the term yearling to describe 2-4 teeth  
BUT this is not an official term

# Carcase grading

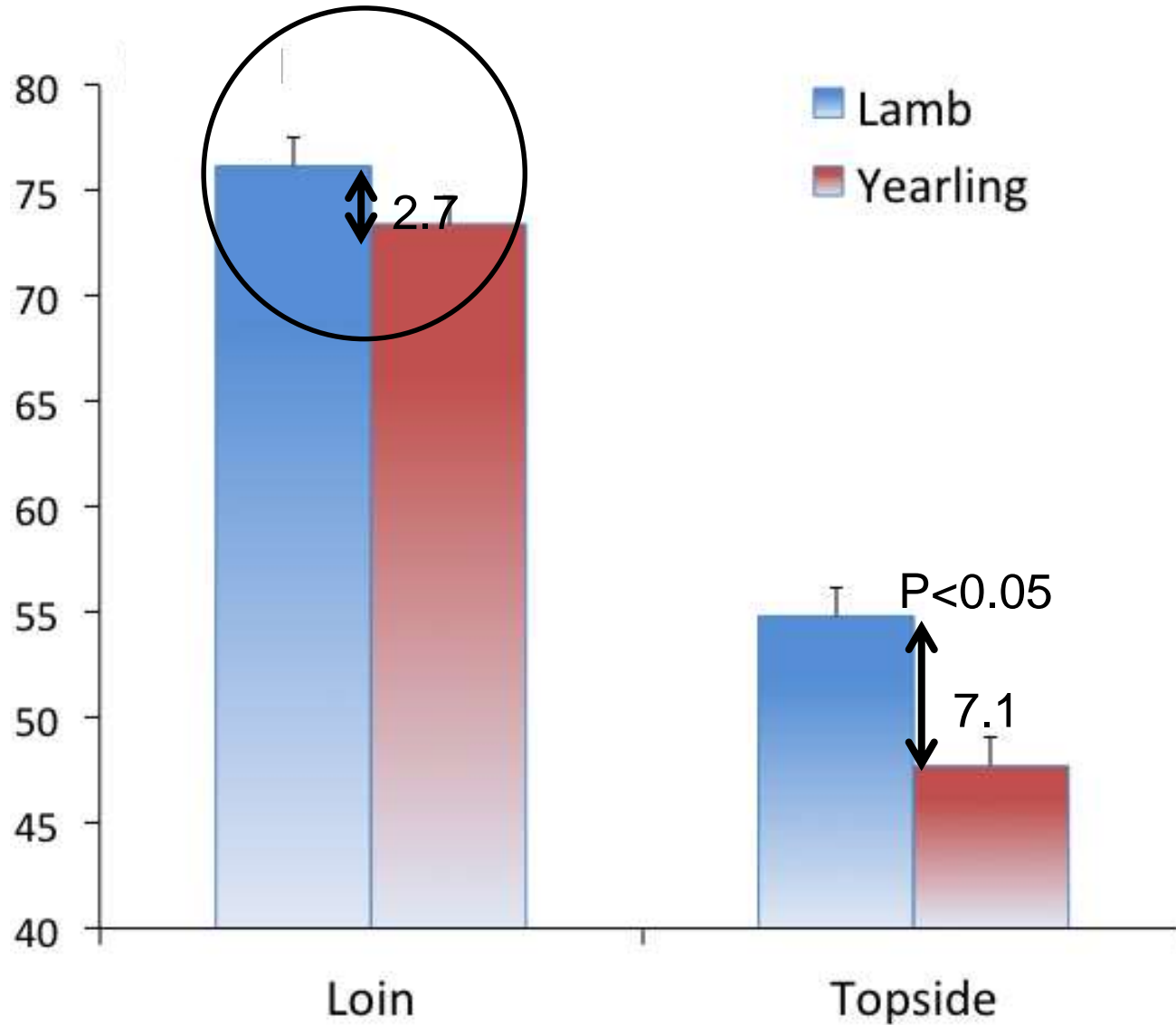
**Lamb**

**Yearling**

	<b>Trait</b>	
355 ± 44.0	Age (days)	685 ± 24.2
21.3 ± 2.2	Carcass weight (kg)	25.5 ± 4.8
11.8 ± 4.2	GR tissue depth	10.4 ± 4.7
5.0 ± 1.0	Intramuscular fat (%)	5.0 ± 1.0
46.3 ± 2.8	Lean meat yield (%)	46.7 ± 3.6

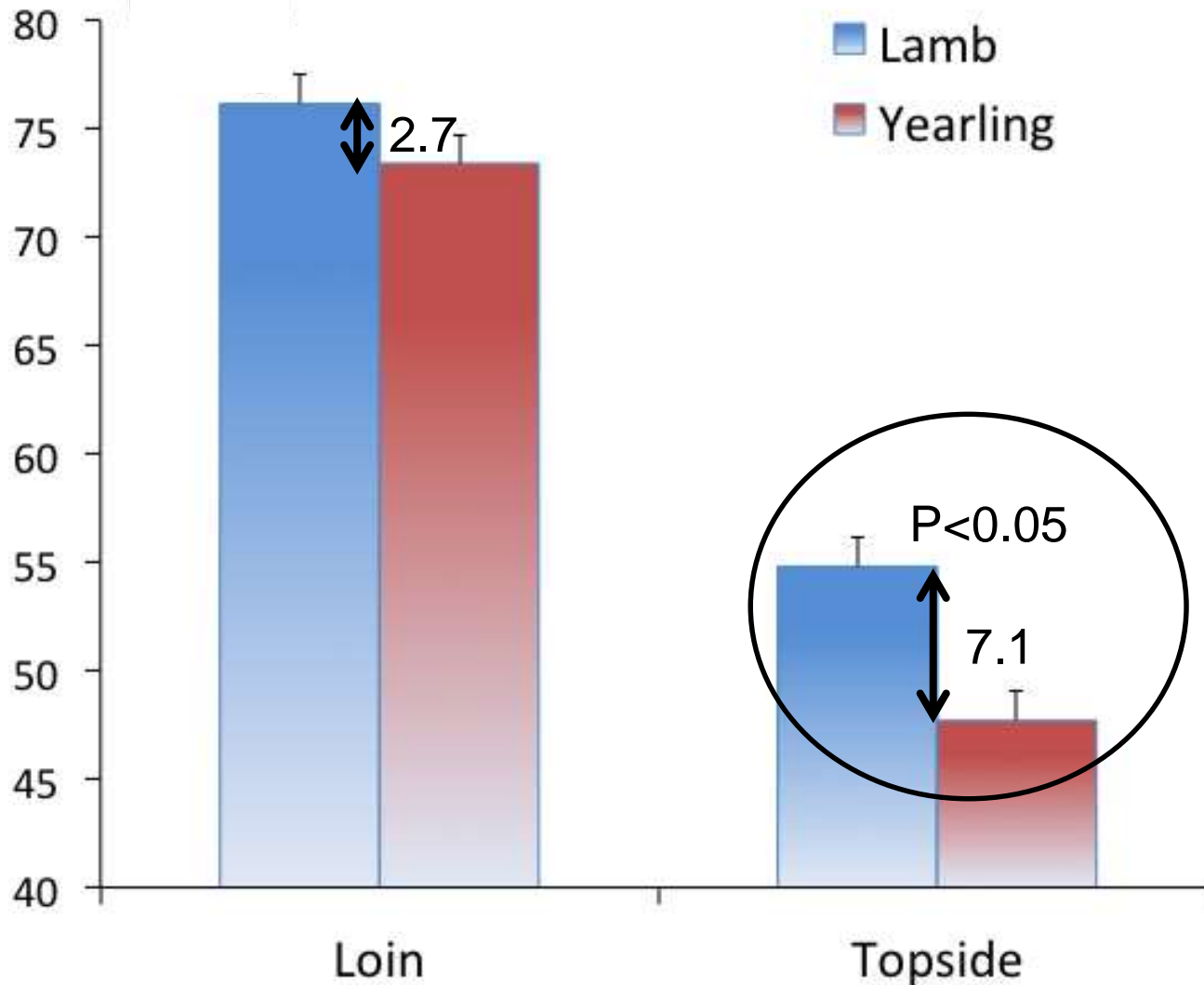
# Eating quality scores - grills

(525 consumers)



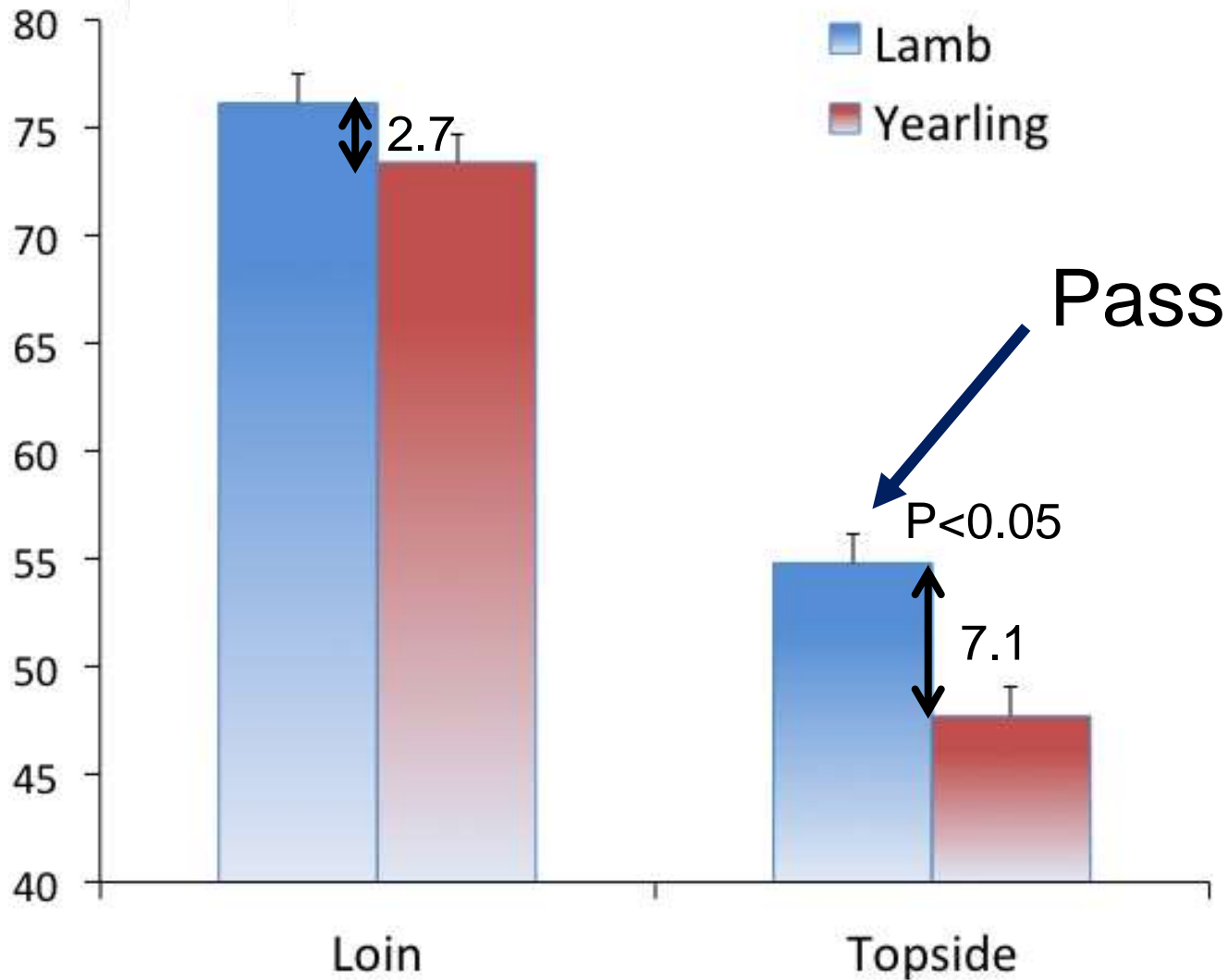
# Eating quality

(525 consumers)



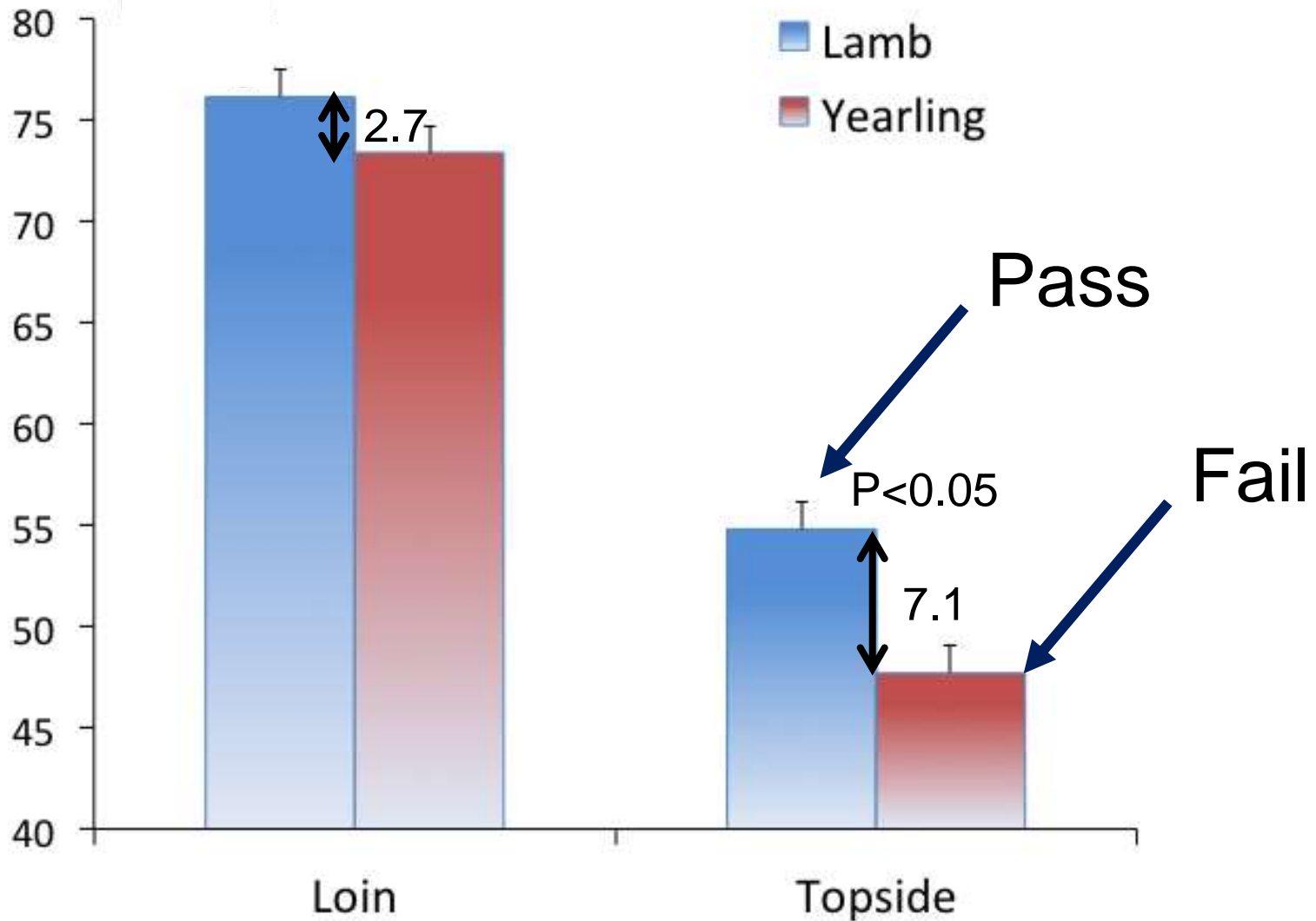
# Eating quality

(525 consumers)



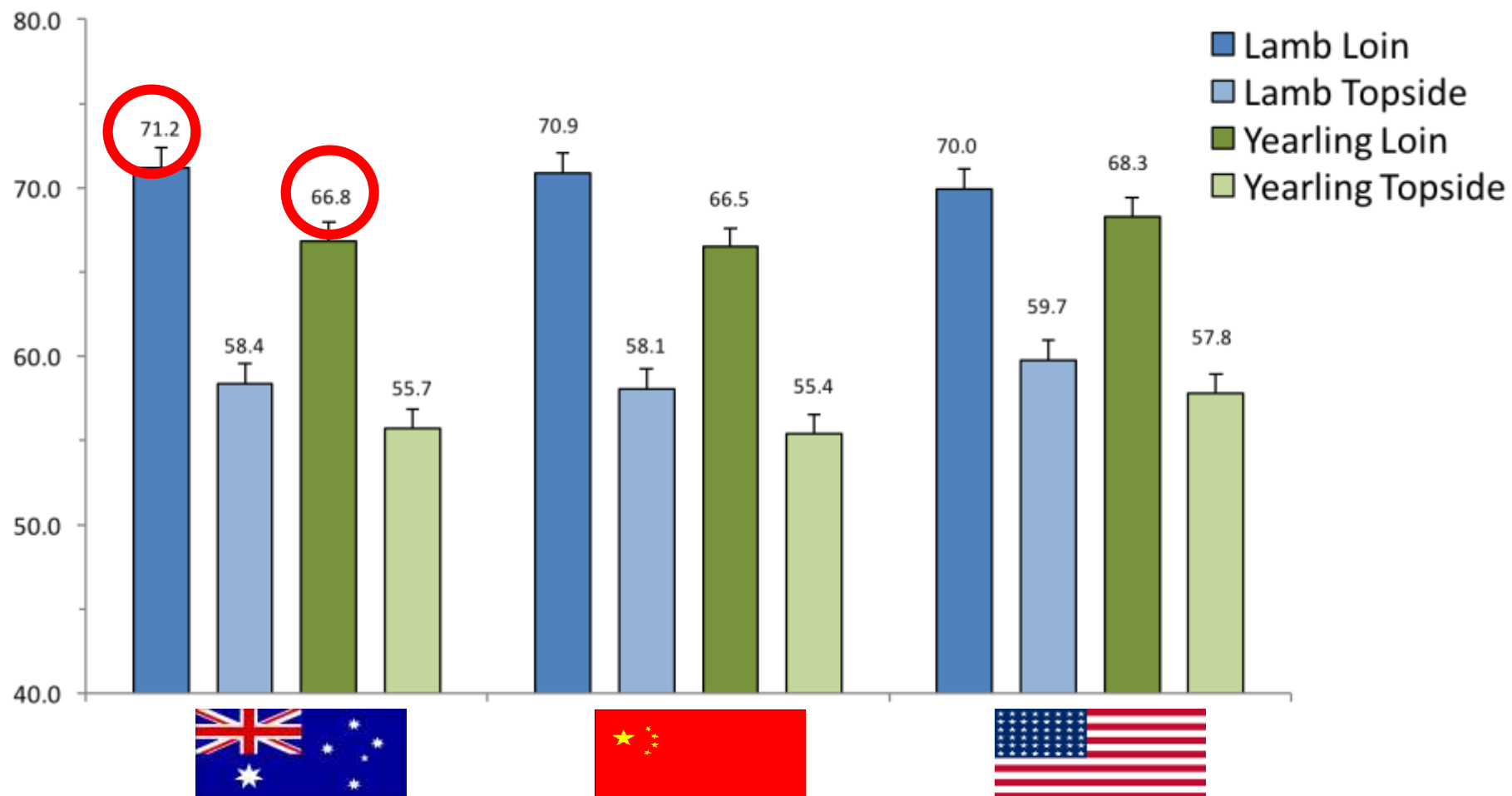
# Eating quality

(525 consumers)



# Animal Age 2: International consumers - grills

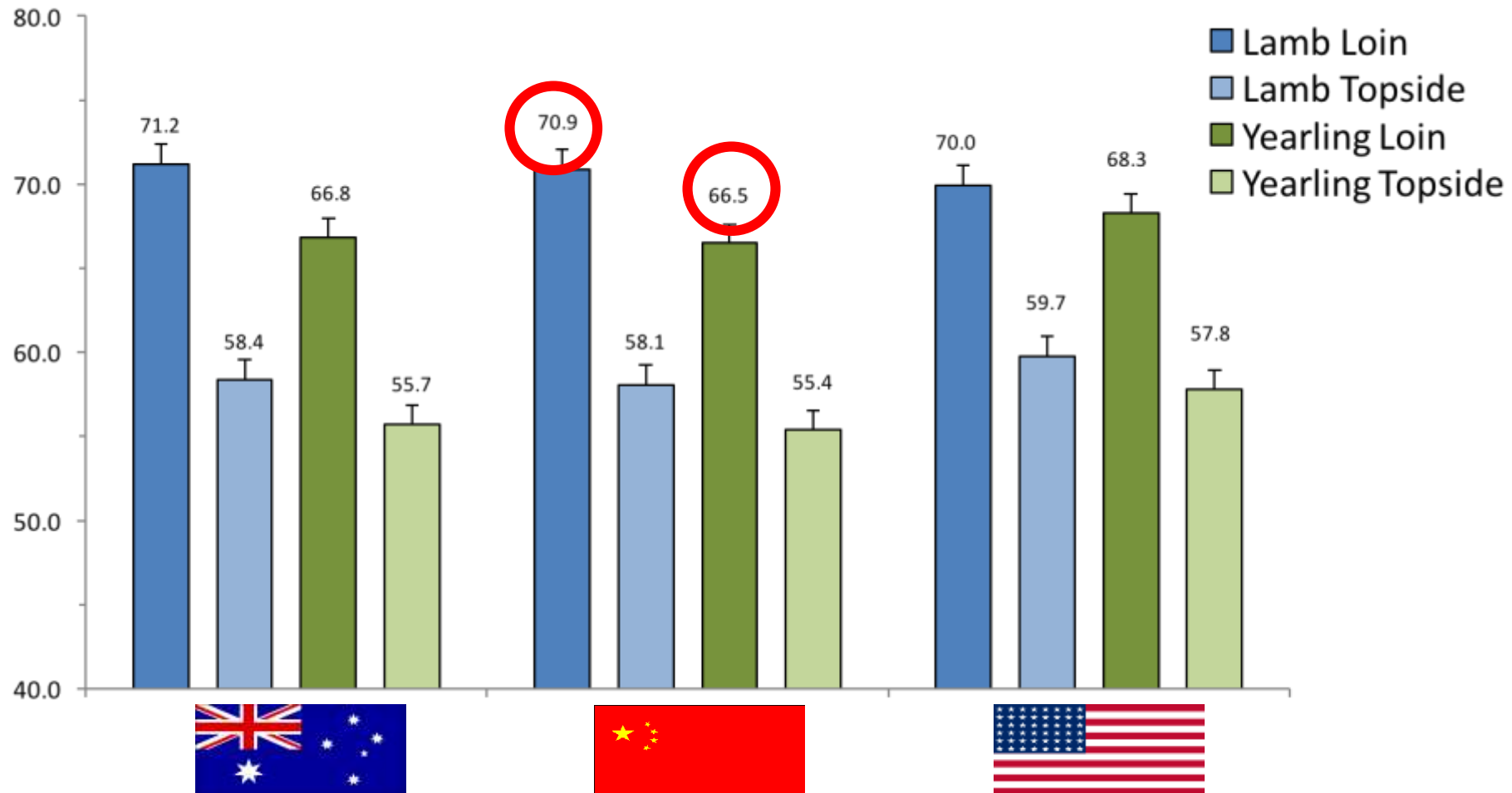
2,160 consumers



O'Rielly *et.al.* 2017

# Animal Age - 2: International consumers

2,160 consumers

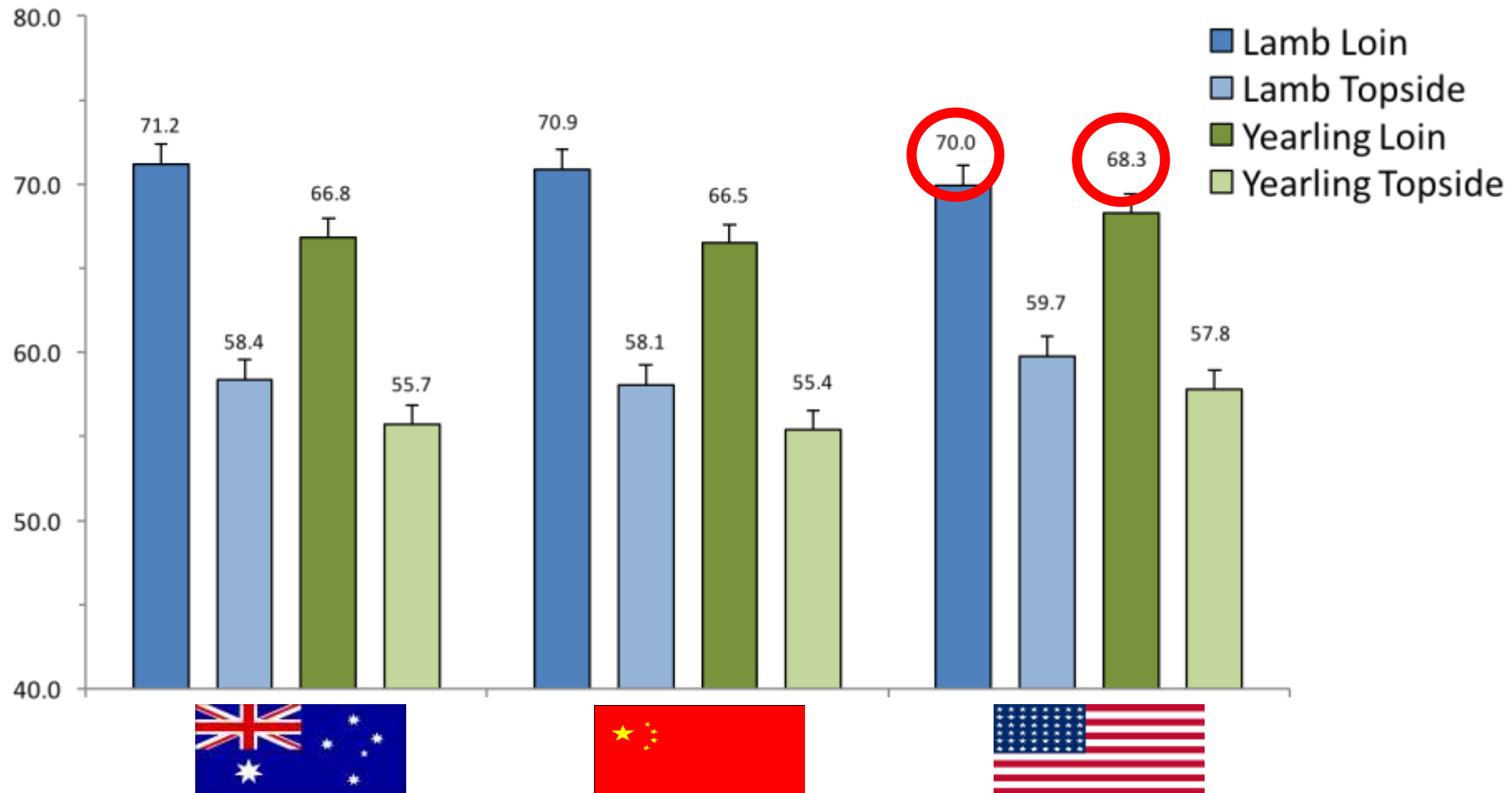


O'Rielly *et.al.* 2017



# Animal Age - 2: International consumers

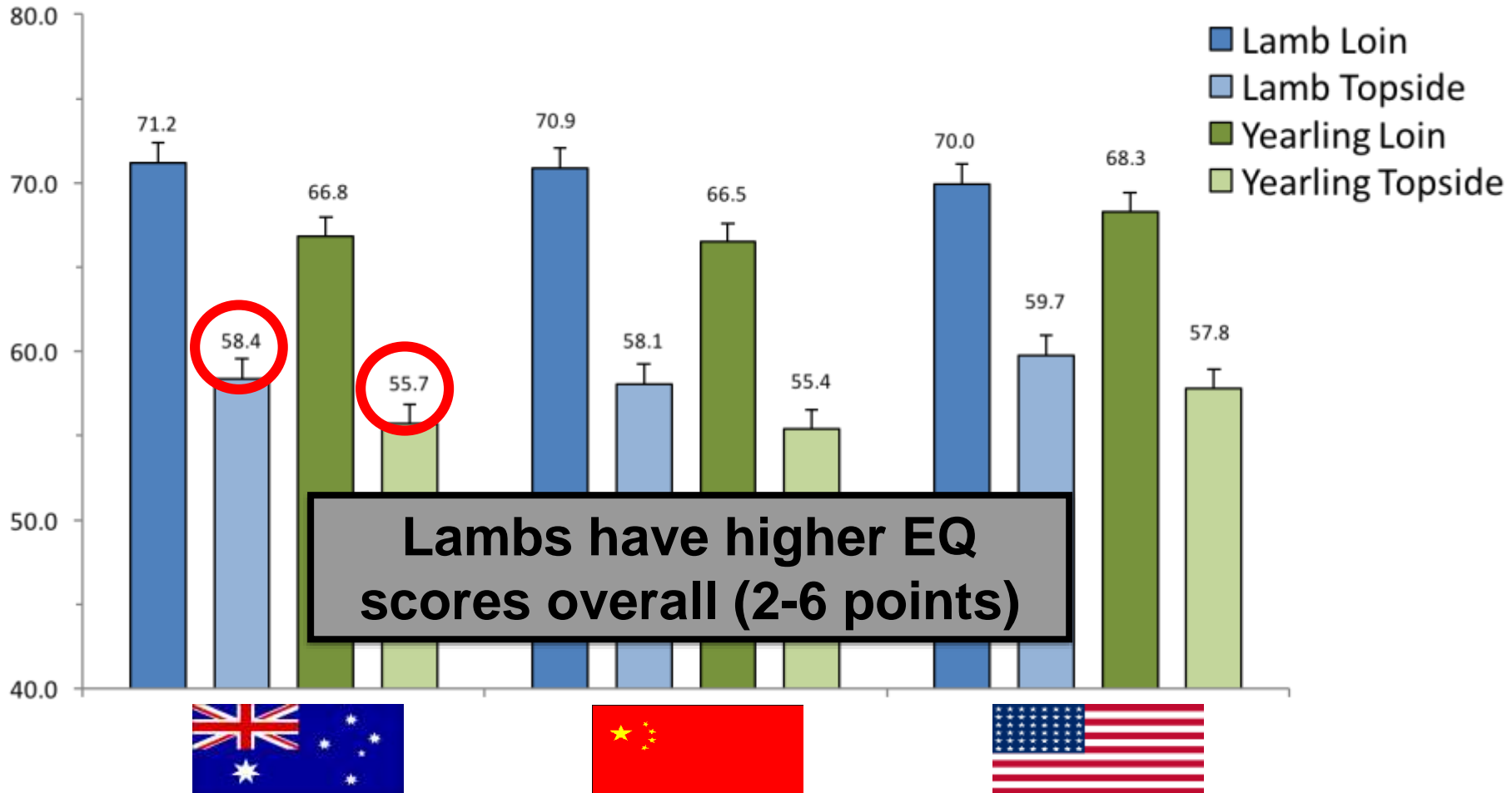
2,160 consumers



O'Rielly *et.al.* 2017

# Animal Age - 2: International consumers

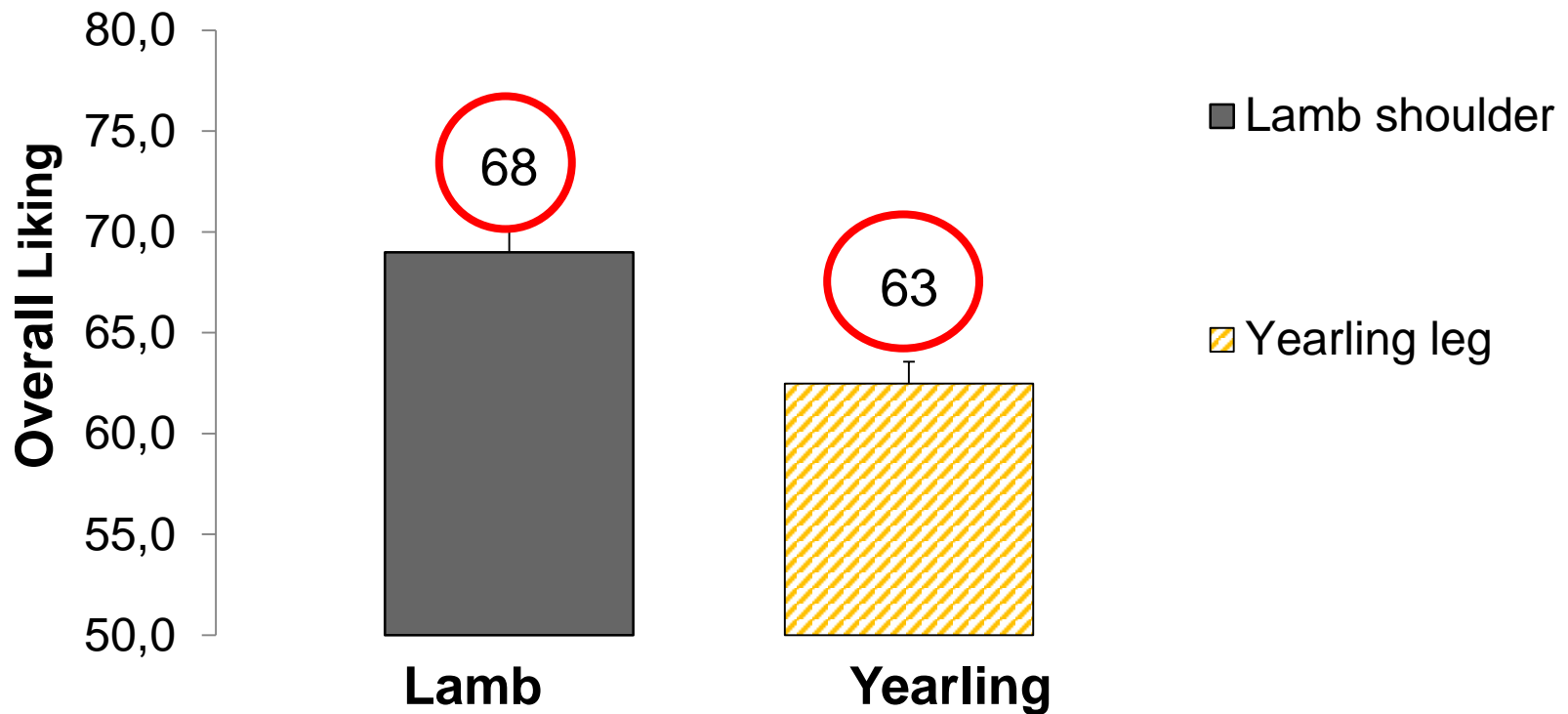
2,160 consumers



O'Rielly *et.al.* 2017

# Animal Age 3 – Chinese consumers – hot pot (1.6mm)

720 consumers



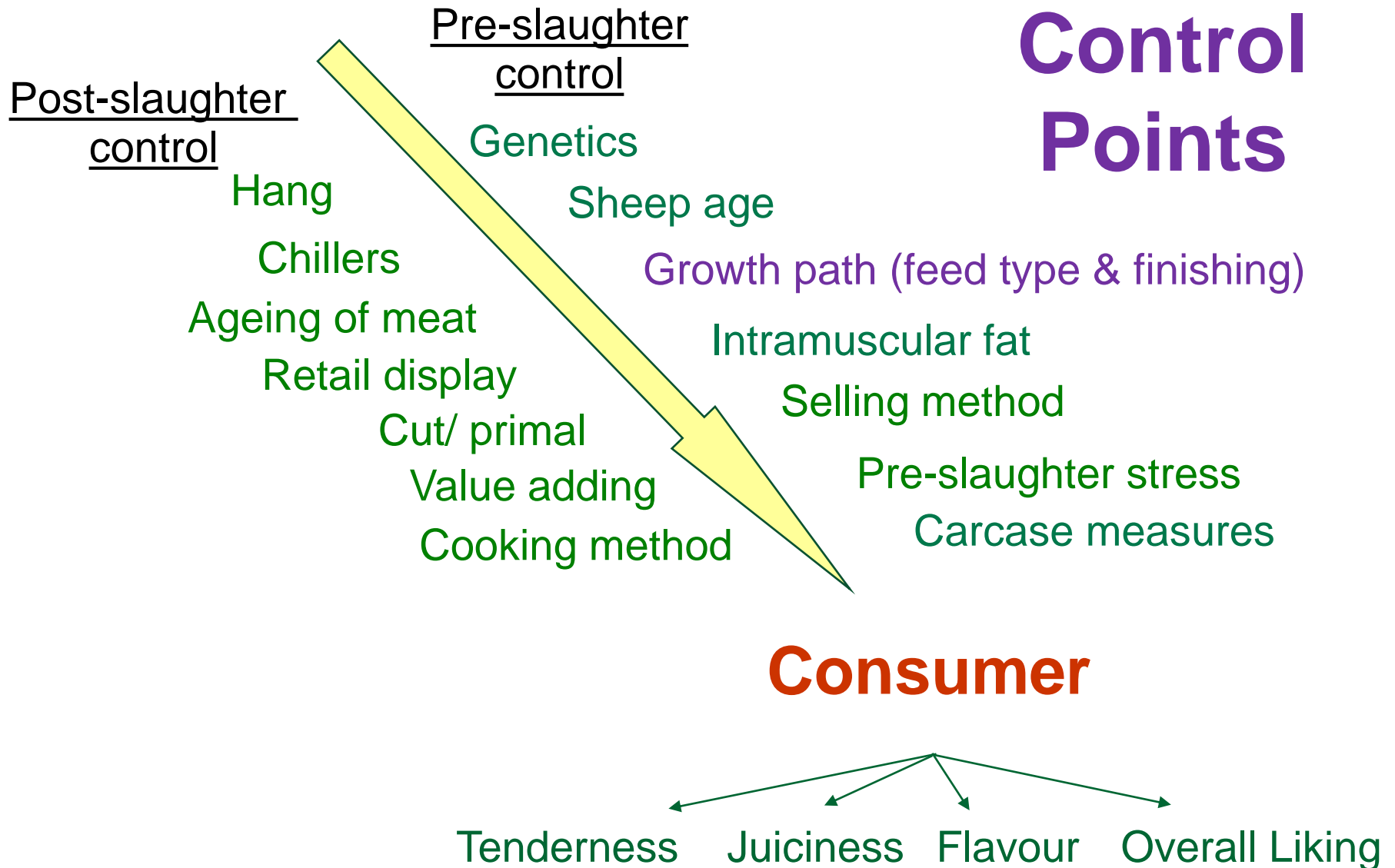
n = 240 lambs + yearling

# Lamb better Hogget/Yearling

- Lamb always ahead of hogget (2T) or yearling (2-4T)
- Especially in leg cuts
- Consistent for Australian, USA and Chinese consumers
- However most hogget & yearling cuts perfecting acceptable
- **Main issue is the supply**

# Conception

# Critical Control Points



# The importance of finishing

- Grass vs balanced grain - *No difference*
- Just must be gaining wt.
- If not get
  - Increased risk of high pH meat
  - Decreased flavour and juiciness = lower intramuscular fat
- 18kg HCW & fat score 2 (GR>5mm)



# Why is finishing important (i) glycogen & meat pH

- Muscle sugar - used as energy source
- Glycogen converted to lactic acid in carcass
- Ideally pH = 5.5 (acidic)

- Cherry red meat colour (not dark cutting)
- Consistent cooking time
- Reduces off flavours
- Keeping quality of chilled product for export



Bucket of  
muscle  
glycogen