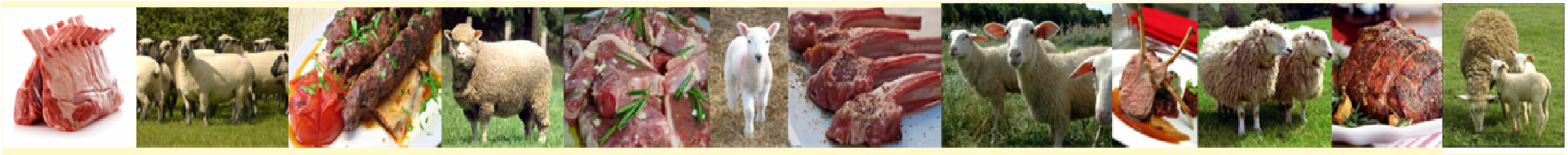

Lamb – it's healthy!!!

Iron, Zinc, and Omega 3's

Graham Gardner

mla
MEAT & LIVESTOCK AUSTRALIA

Murdoch
UNIVERSITY

SHEEPCRC

Outline

1. The consumer matters!
2. What are the mineral levels in lamb?
3. Fatty acids: Omega 3s and the rest…

Mean serves of meat types per week based on Mums with Kids

	Oct-Dec '06	Jan-Mar '07	Apr-Jun '07	Jul-Sept '07	Oct-Dec '07	Jan-Mar '08	Apr-Jun '08	Jul-Sept '08	Oct - Dec '08	Jan-Mar '09	Apr-Jun '09
Beef Serves	2.15	2.05	2.27	2.23	2.16	2.11	2.21	2.2	2.02	**2.23**	2.16
Chicken Serves	2.17	2.11	2.09	2.15	2.07	2.1	2.17	2.19	2.17	2.31	2.19
Fish Serves	1.01	1.08	1.04	1.00	1.12	1.28	1.11	1.03	0.96	1.1	0.98
Lamb Serves	0.95	0.96	0.85	0.96	0.98	0.93	0.95	1.03	0.84	**1.03**	1.03
Pork Serves	0.48	0.56	0.62	0.59	0.64	0.62	0.66	0.66	0.57	0.65	0.56
Veal Serves	0.23	0.25	0.25	0.23	0.24	0.22	0.24	0.28	0.14	**0.24**	0.21

Based on mums with kids aged 5-17 yrs old

Mean serves of meat types per week based on Mums with Kids

	Oct-Dec '06	Jan-Mar '07	Apr-Jun '07	Jul-Sept '07	Oct-Dec '07	Jan-Mar '08	Apr-Jun '08	Jul-Sept '08	Oct - Dec '08	Jan-Mar '09	Apr-Jun '09
Beef Serves	2.15	2.05	2.27	2.23	2.16	2.11	2.21	2.2	2.02	**2.23**	2.16
Chicken Serves	2.17	2.11	2.09	2.15	2.07	2.1	2.17	2.19	2.17	2.31	2.19
Fish Serves	1.01	1.08	1.04	1.00	1.12	1.28	1.11	1.03	0.96	1.1	0.98
Lamb Serves	0.95	0.96	0.85	0.96	0.98	0.93	0.95	1.03	0.84	**1.03**	1.03
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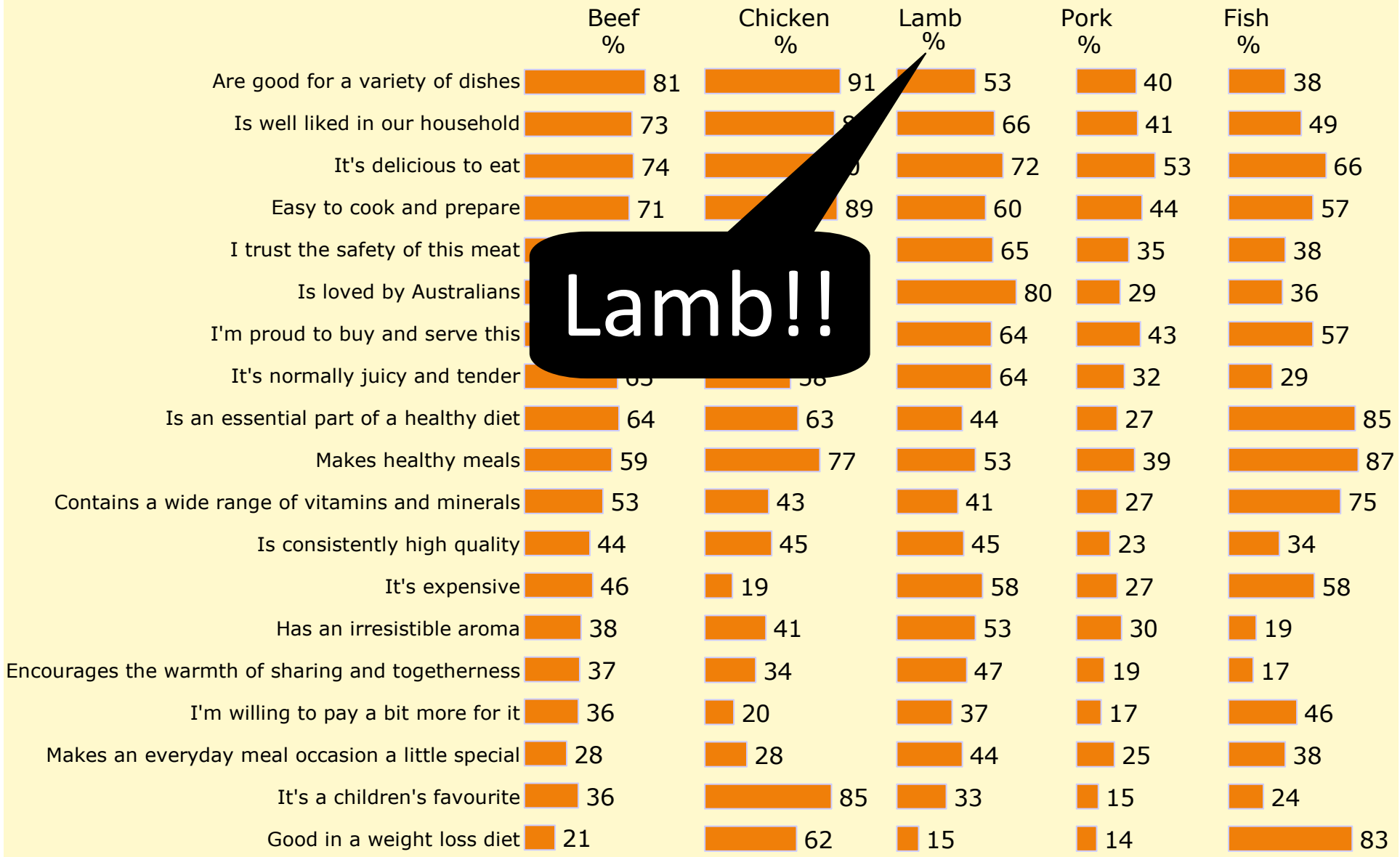
Veal Serves	0.23	0.25	0.25	0.23	0.24	0.22	0.24	0.28	[illegible]	**0.24**	0.21

Room to capture more market share?

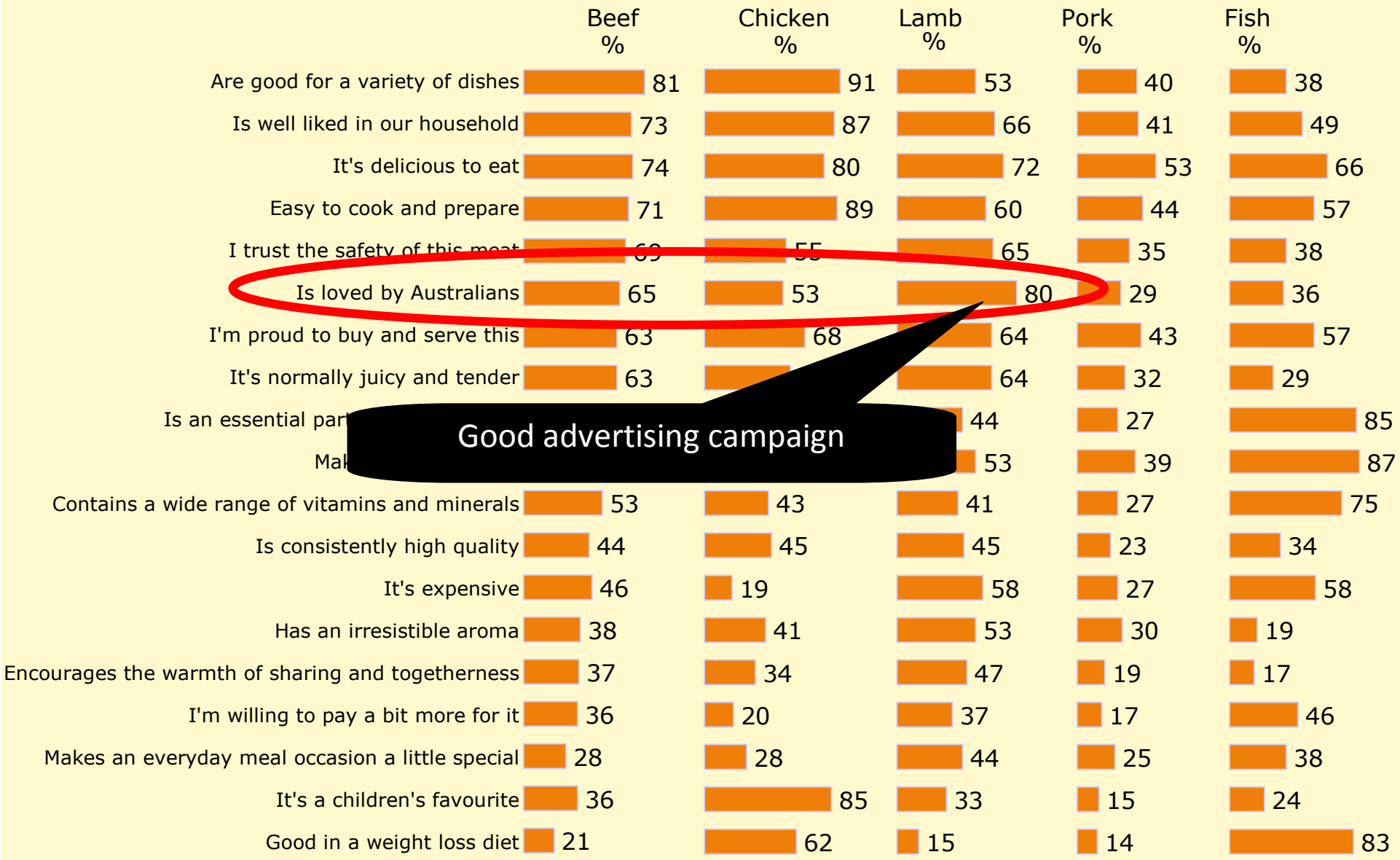
Based on mums with kids aged 5-17 yrs old

Image - Mums



Apr - Jun '09, Base: (n=371)

Image - Mums



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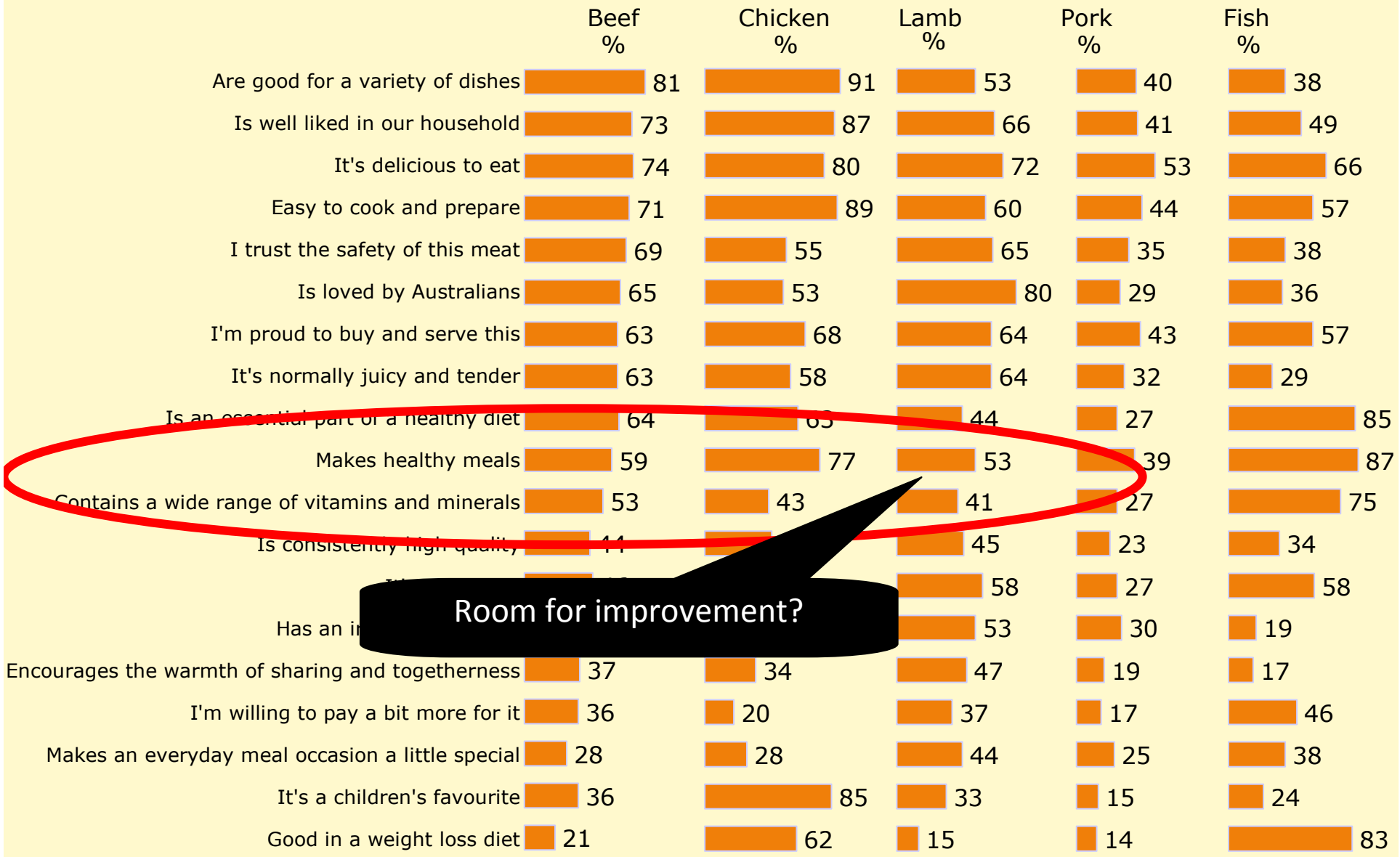


Apr - Jun '09, Base: (n=371)

Image - Mums

Apr - Jun '09, Base: (n=371)

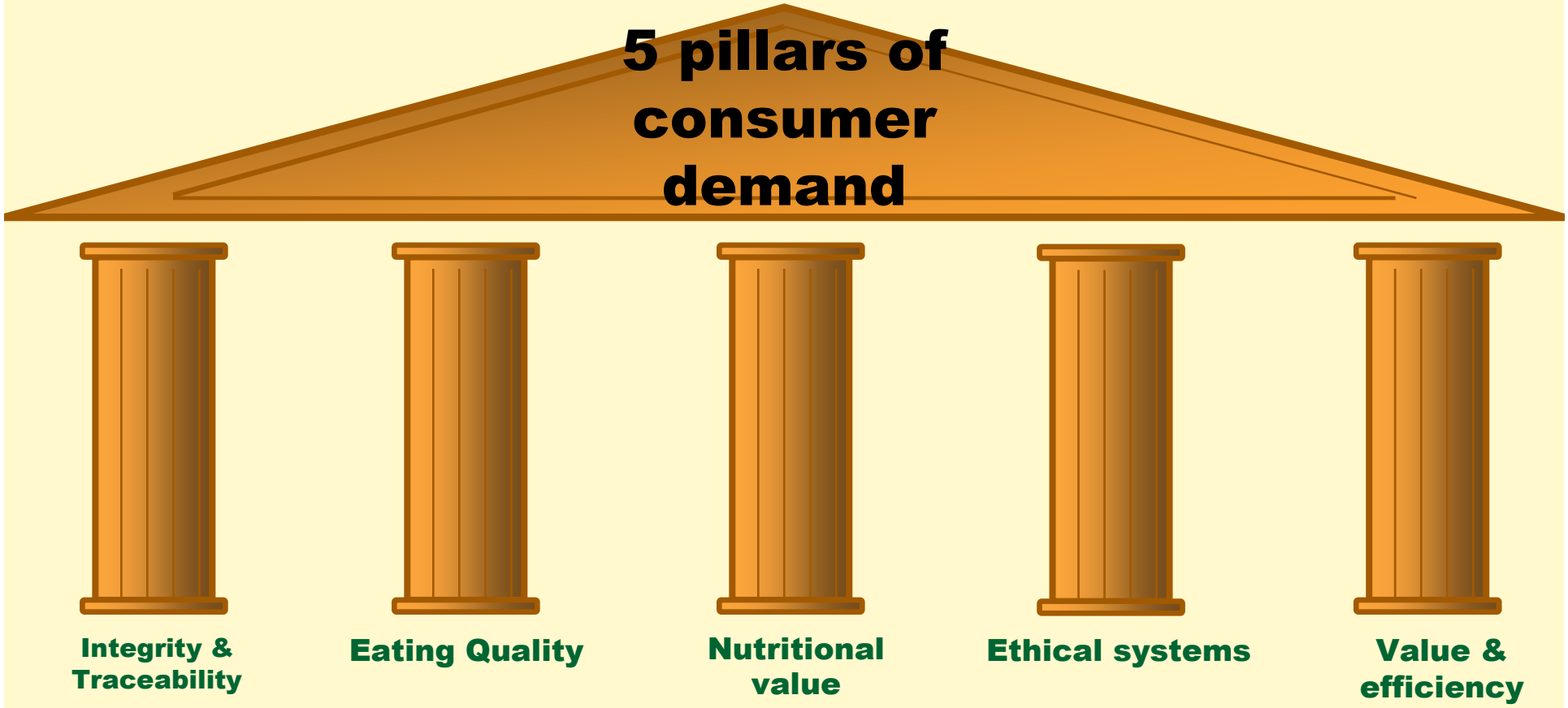
Lamb ‘lean’ is expensive

$39.99/kg

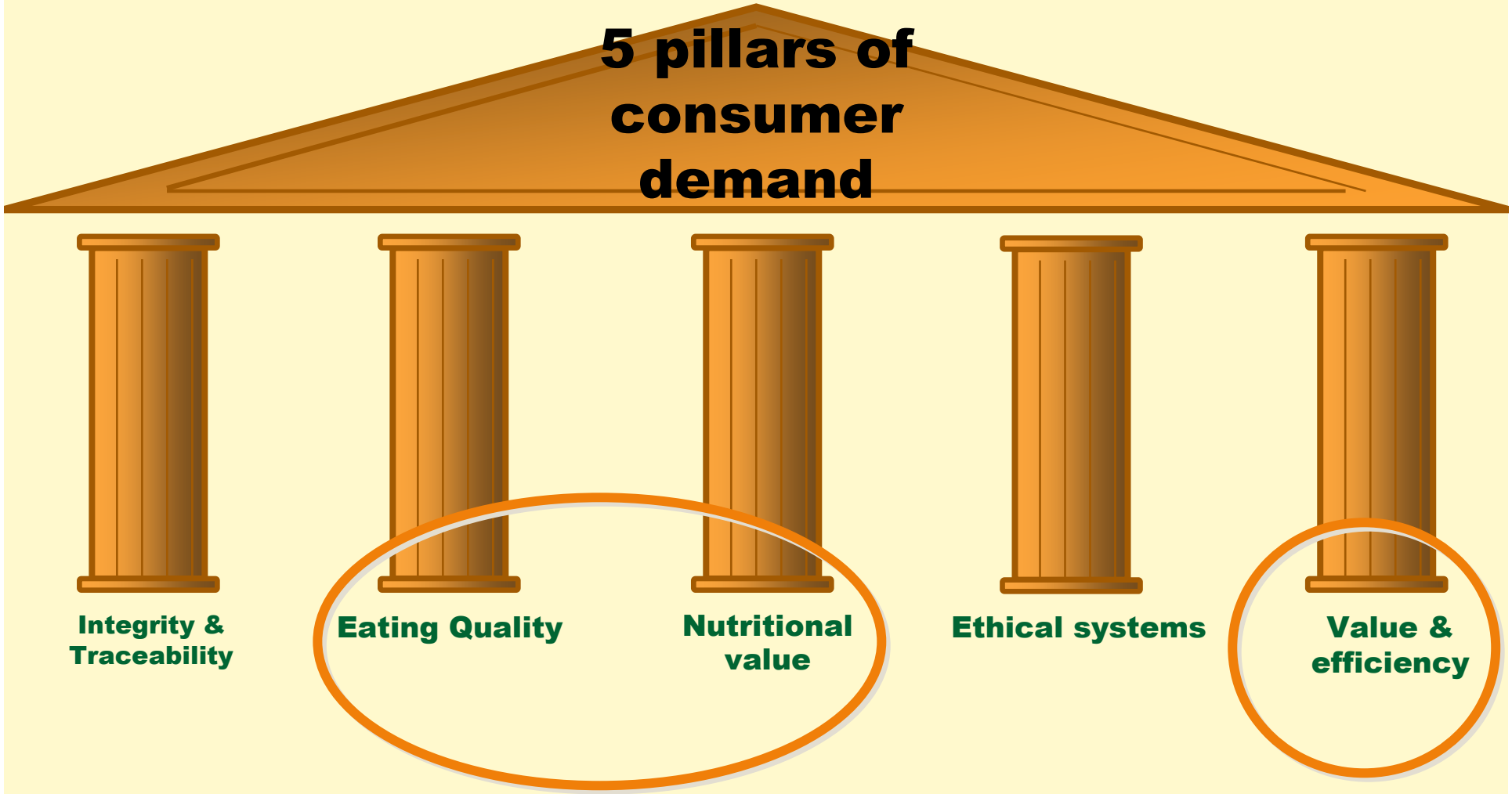
$59.33/kg

Lamb ‘lean’ is expensive

Back to basics – the CONSUMER



Back to basics – the CONSUMER

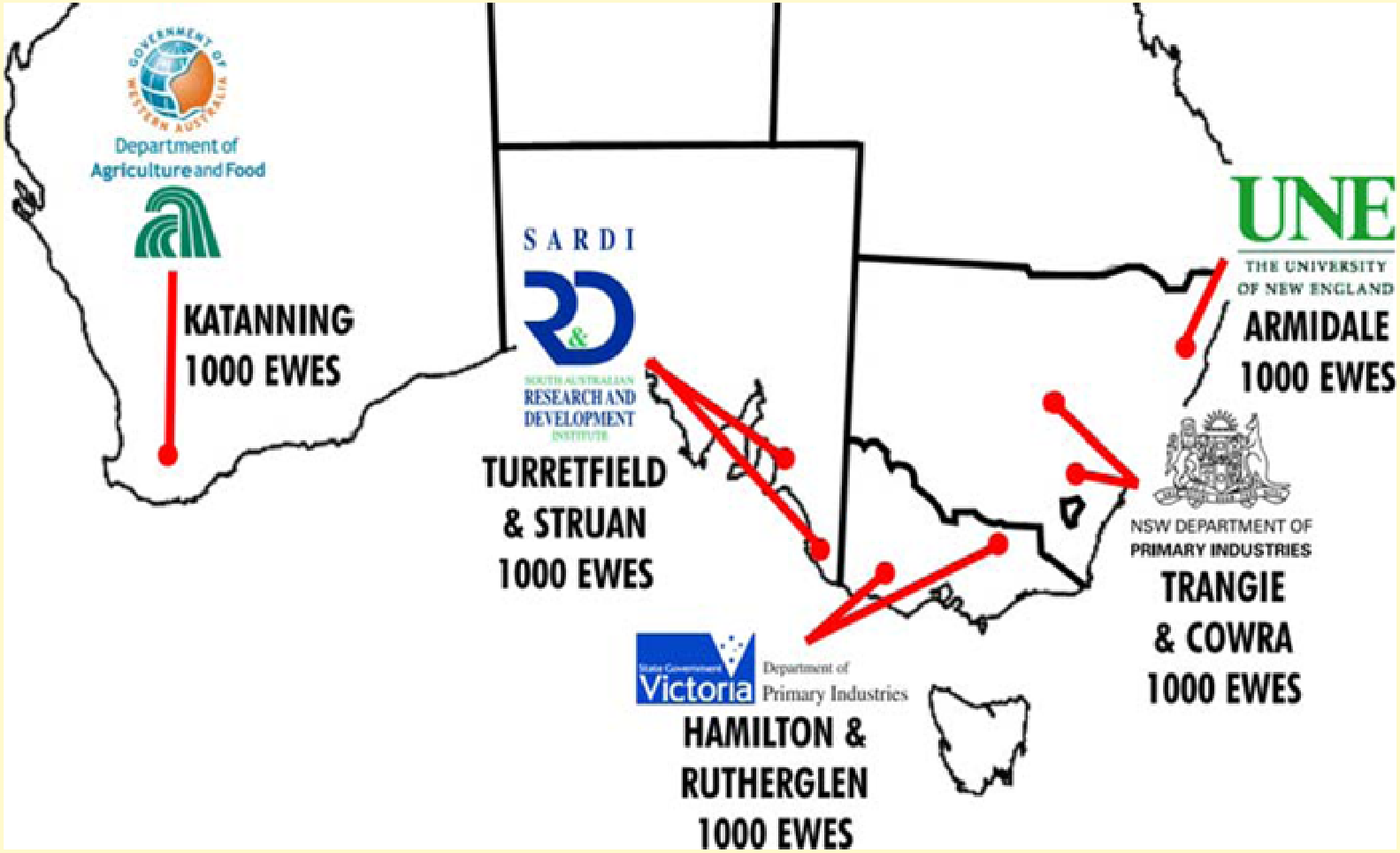


Sheep CRC & MLA

Into the Future with

Information Nucleus

Information Nucleus



Human Health Traits

- Iron
- Zinc
- Fat

Importance of Iron and Zinc

- Key nutrients
- Human health (iron & zinc deficiency)
- Australian diet – Red meat is the largest contributor of bioavailable iron and zinc

Recommended Daily Intake (RDI)

Source = 10% RDI

Good Source = 25% RDI

*Recommended Daily Intake

Recommended Daily Intake (RDI)

Source = 10% RDI

Good Source = 25% RDI

	Iron RDI	Zinc RDI
Women	8 mg over 50yrs 18 mg under 50yrs	8 mg
Men	8 mg	14 mg

*Recommended Daily Intake

Recommended Daily Intake (RDI)

Source = 10% RDI

Good Source = 25% RDI

- One serve of fresh red meat = 135g

*Recommended Daily Intake

Good Source Claim

Good Source = 25% RDI

Iron
2.2mg/100g

Iron
2.1mg/100g

*Recommended Daily Intake

Industry levels

- Industry values show substantial levels of iron and zinc in lamb:

Meat	Iron mg/100g	Zinc mg/100g
Lamb	**2.2**	**2.3**
Pork	0.7	1.9
Chicken	0.35	0.6

How do minerals in lamb compare?

- Industry values show substantial levels of

Lamb: Good source of iron

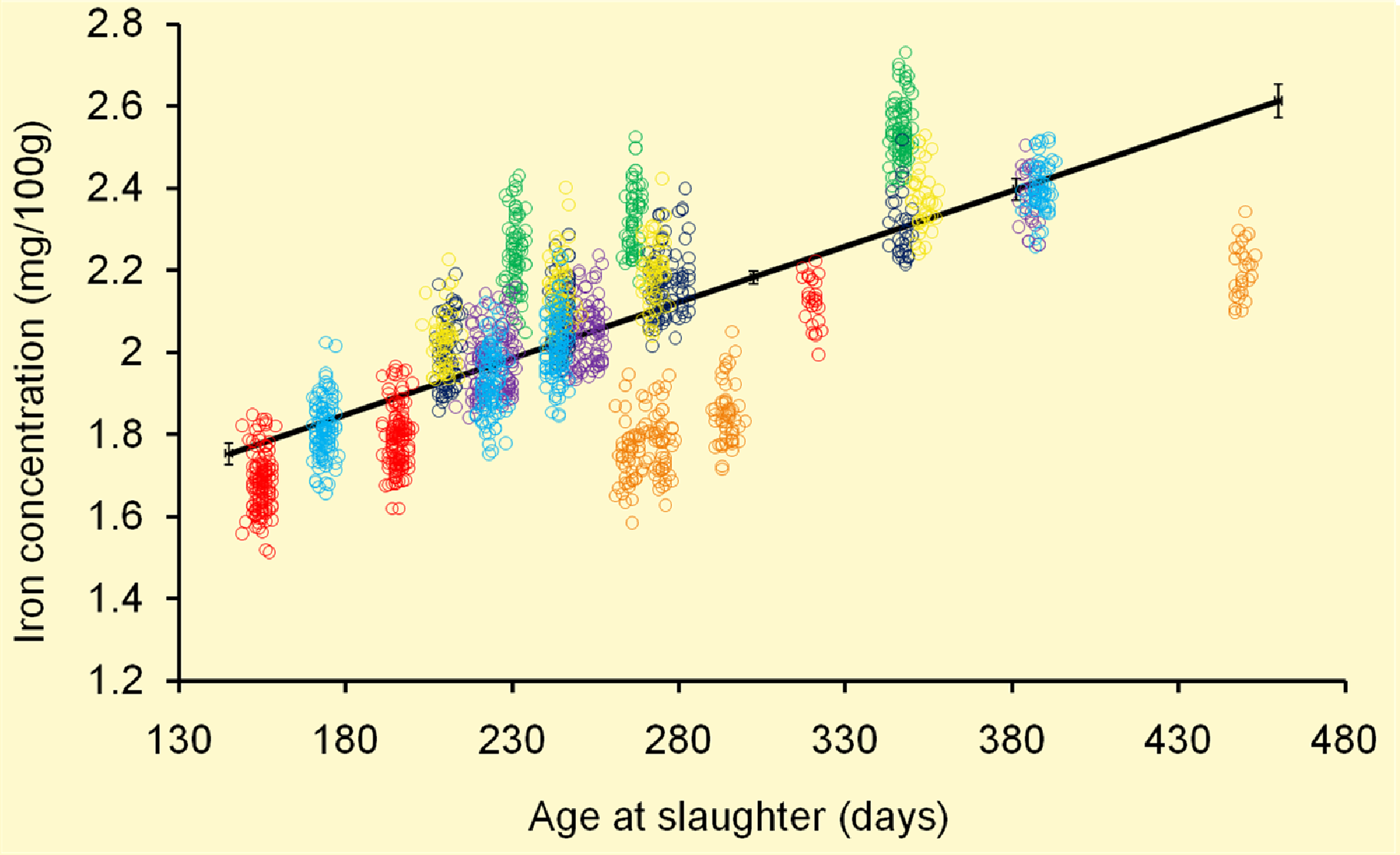
	mg/100g	mg/100g

Lamb: Source of zinc – men
Good source of zinc - women

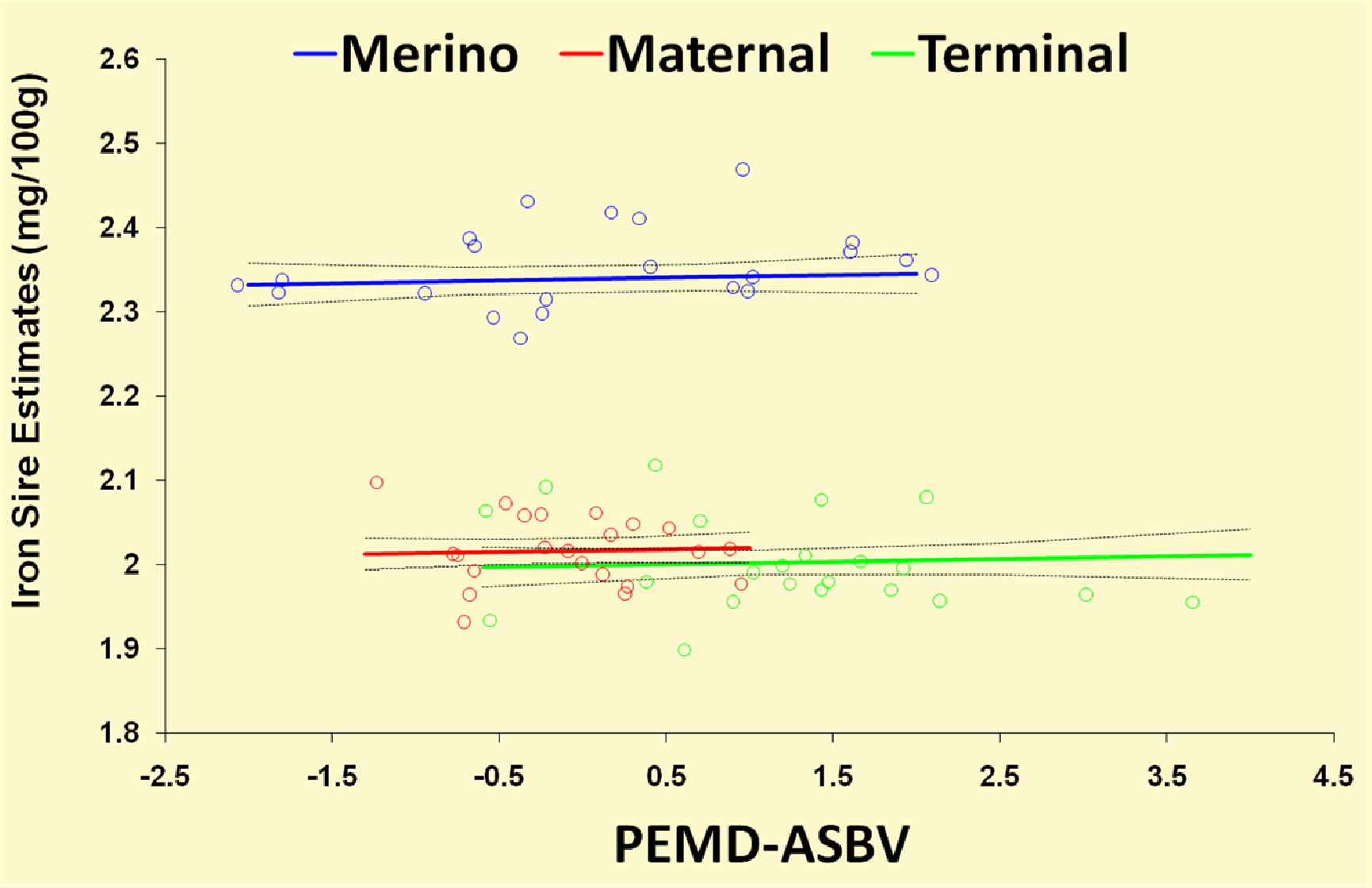
Factors affecting mineral levels

- Muscle type
- Genetics
- Sex
- Exercise
- Animal age
- Nutrition
- Disease

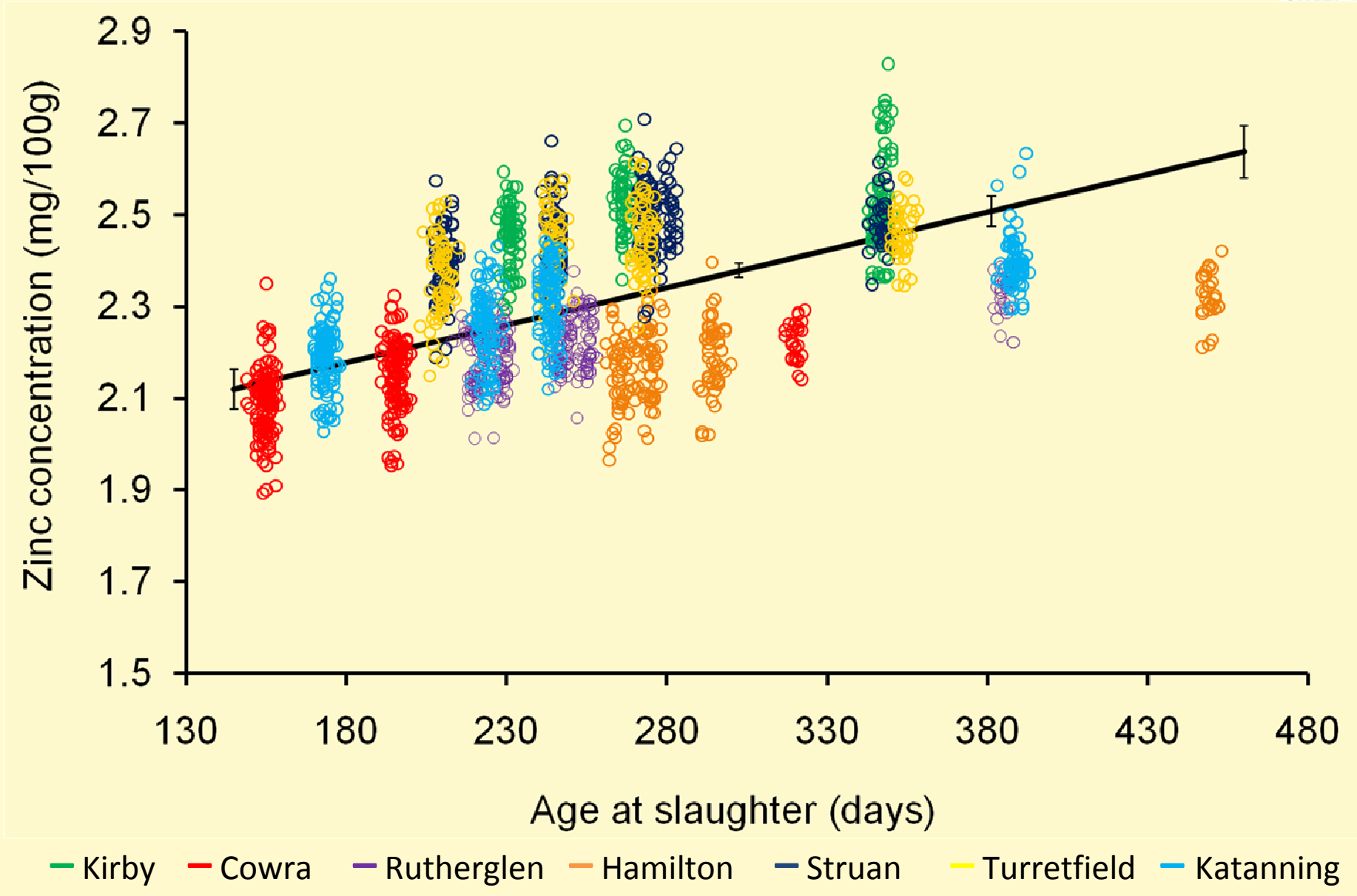
Age Increases Iron



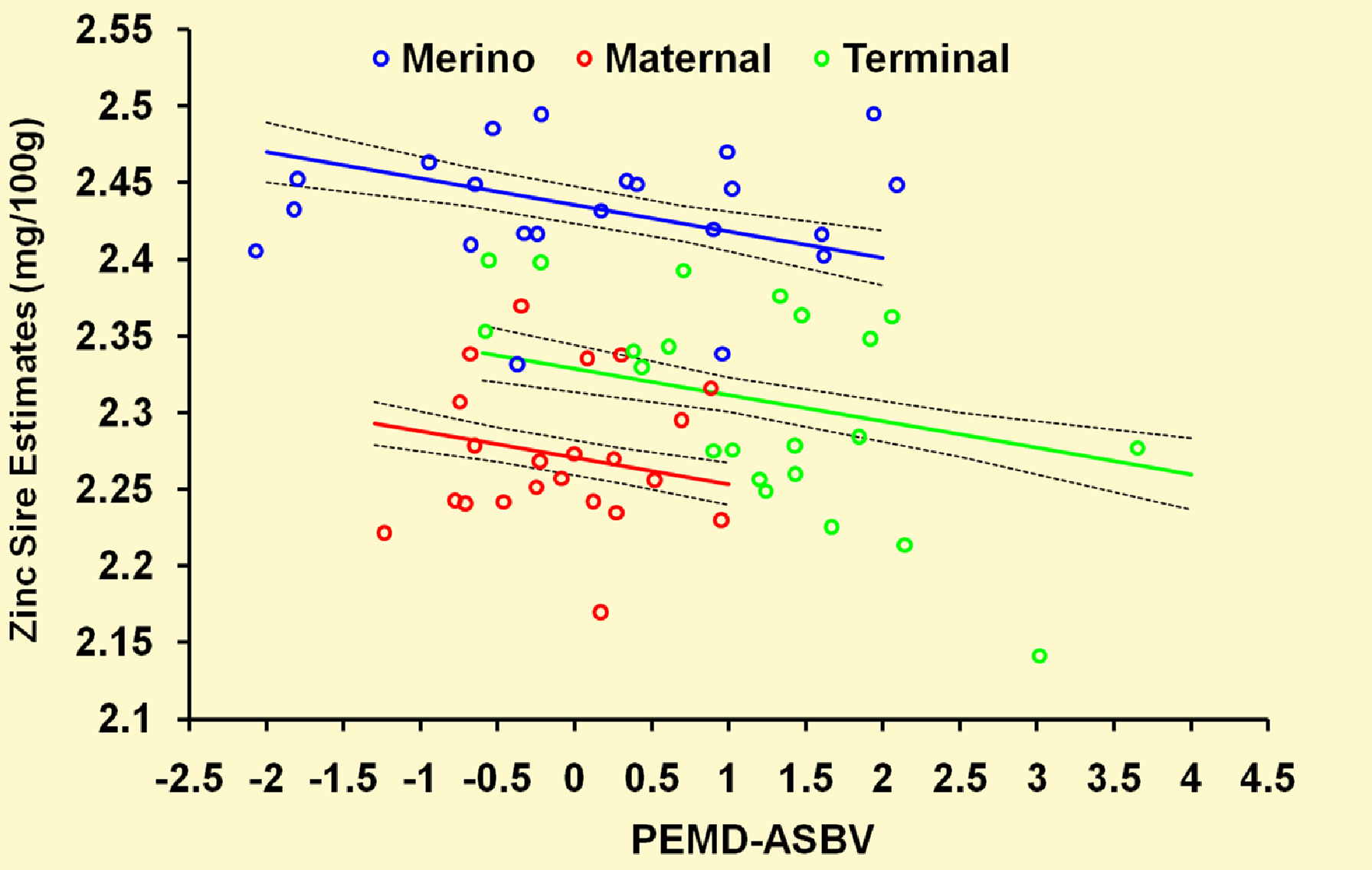
Muscling doesn't change iron – but sires differ!



Age Increases Zinc



Muscling reduces Zinc



Minerals – 2 things to watch…

- High growth will reach slaughter weight younger = less iron and zinc

- Selection for muscling reduces and zinc & maybe iron?

Don’t do it!

What about Fat?

Omega 3's and the rest…

Total Amount of Fat

Juiciness

Health Claims

- Low fat claim <3%
- Heart Tick <10%

Lamb Intramuscular Fat 4-5%

Saturated fat

- Total Sat = 1.19g/100gm (low claim = 1.5)

Lamb lean:
No problems with saturated fat!!!

Short and medium versus long chain saturates

- ≤ 16 carbons (atherogenic):
  - 721 mg per 100g muscle
- ≥ 18 carbons (harmless/neutral)
  - 473 mg per 100g muscle
- Lamb contains less than 1g/100g of SFA that are thought to be CVD risk

It's healthy no matter how you look at it!!

What about Omega 3?

Omega 3 – good for you because…

- Keeps arteries clear (artherosclerosis)
- Stops arteries from thickening
- Reduces blood clotting/strokes
- Reduces blood pressure
- Reduces cholesterol
- Improves insulin response
- Better brain development in kids

Omega 3 – where does it come from?

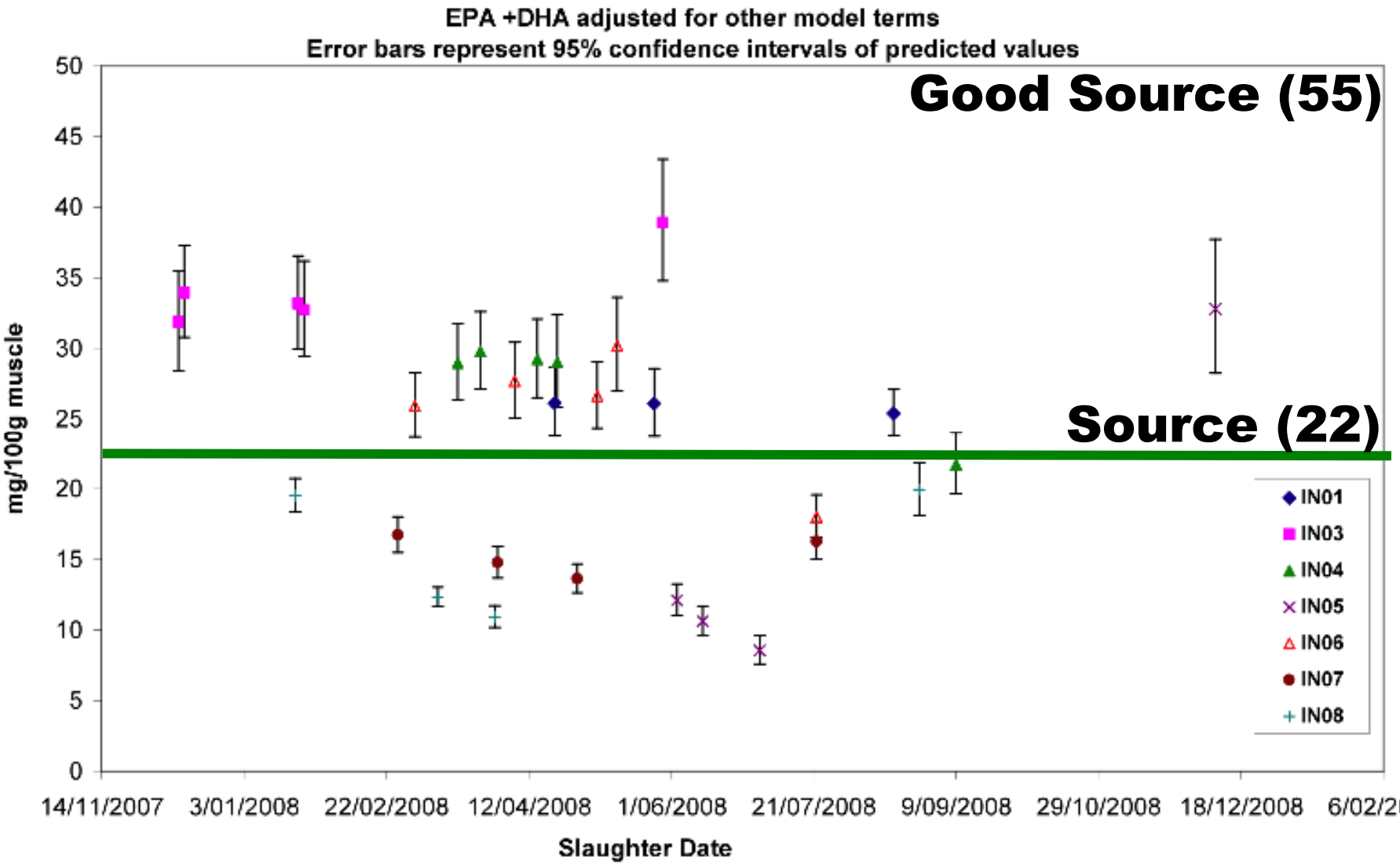
- Precursor from green grass!!!!! (Chloroplasts)
- Then converted into long chain omega 3's
- EPA and DHA (high in fish)
- Can lamb be a 'source' of these fats ?

Nutritional value – omega 3

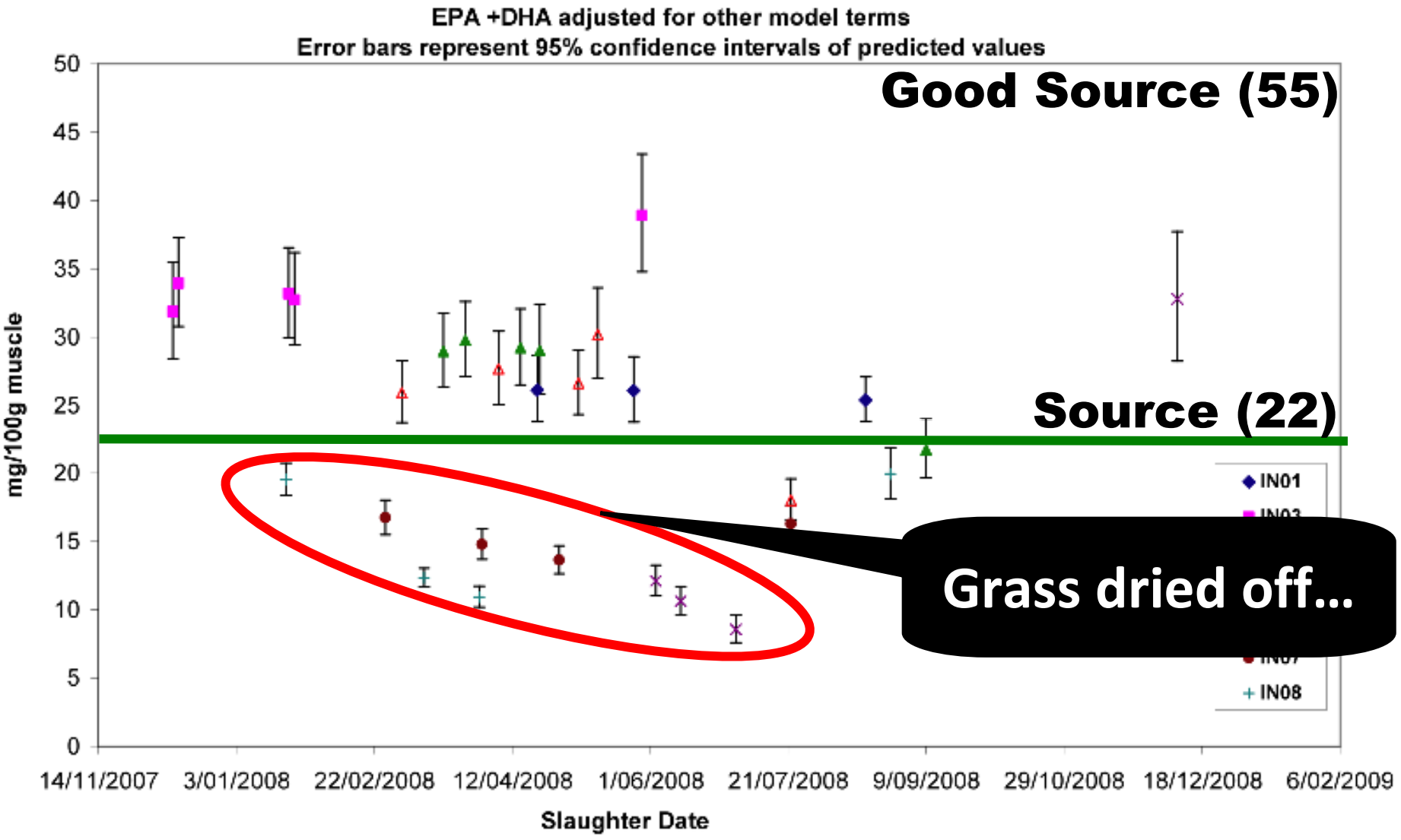
Fatty acid	Mean of 2,001 lambs (mg/100gm)
n-3 EPA+DHA	24
n-6:n-3	2

Source EPA/DHA @ 135gm serve = 22mg/100gm

Omega 3 – site variation



Omega 3 – site variation



Initial idea of Omega 3 dynamics (**needs confirmation)**

- Mean grass fed about 30-35mg/100g
- Takes about 3 months of grain feeding/supplementation to reduce Omega 3 below a claim

Human health

Lamb: Source of Omega 3 22mg/100g

- Australians >50% of Omega 3 from red meat
- Plus they are heritable!
- Chicken and pork don't cut it…

Conclusions

Iron & Zinc

- Most lambs reach a good source claim
- Need to watch muscling
- Animal age is a key driver
- There are ‘site effects’ but unclear on basis of these – environmental effects of sites

Conclusions

Omega 3

- Most lambs reach a source claim
- Particularly on grass
- Possibly target through genetics

Summary

- Lamb is known as a quality product
- Focus on the consumer is critical
- Maintain human health attributes – market share!
- Industry will underpin its status for iron, zinc and fat composition

Lamb

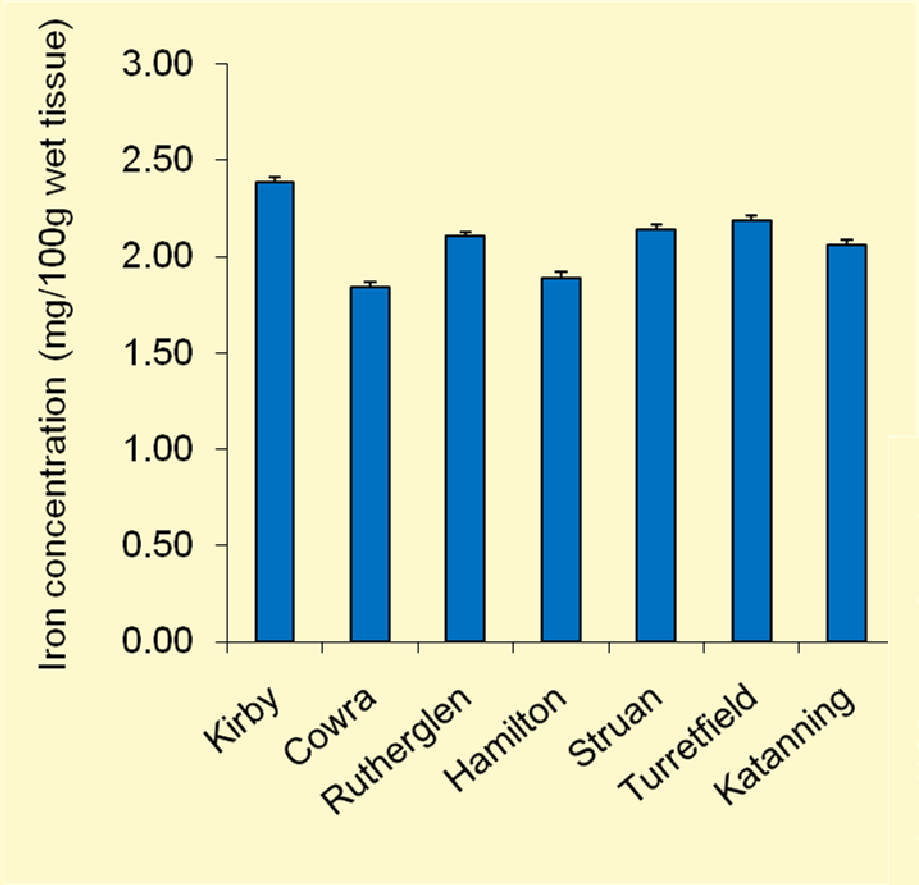
Eat it…

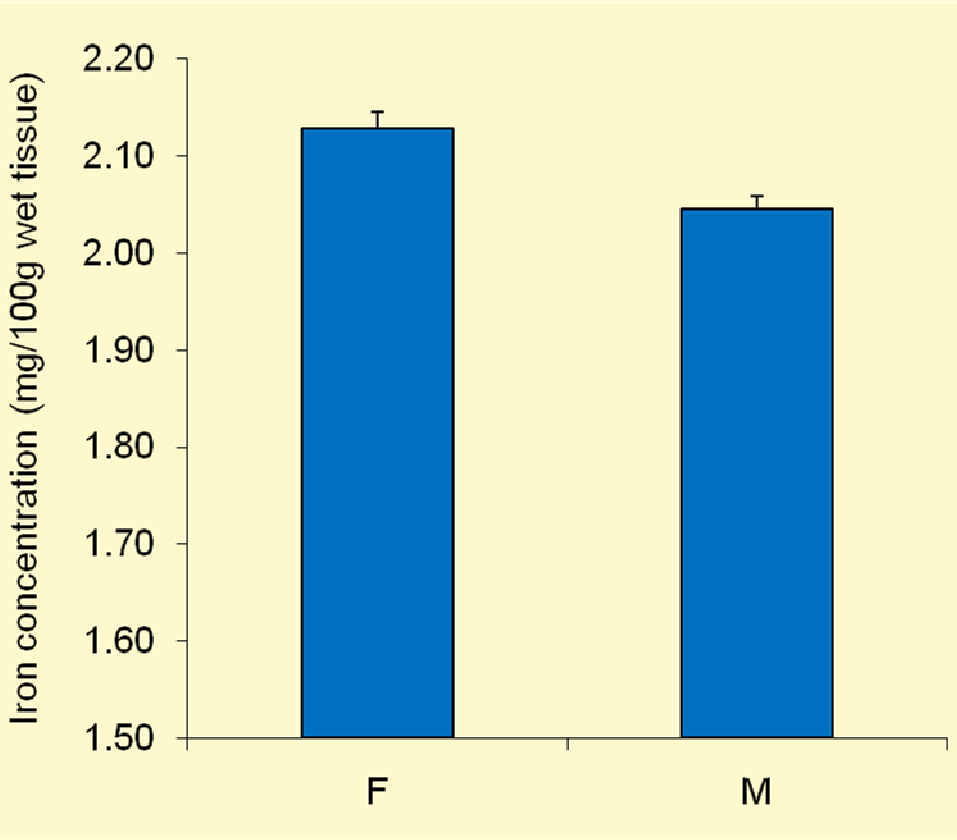
It's health food!!!

What are the mineral levels in lamb?

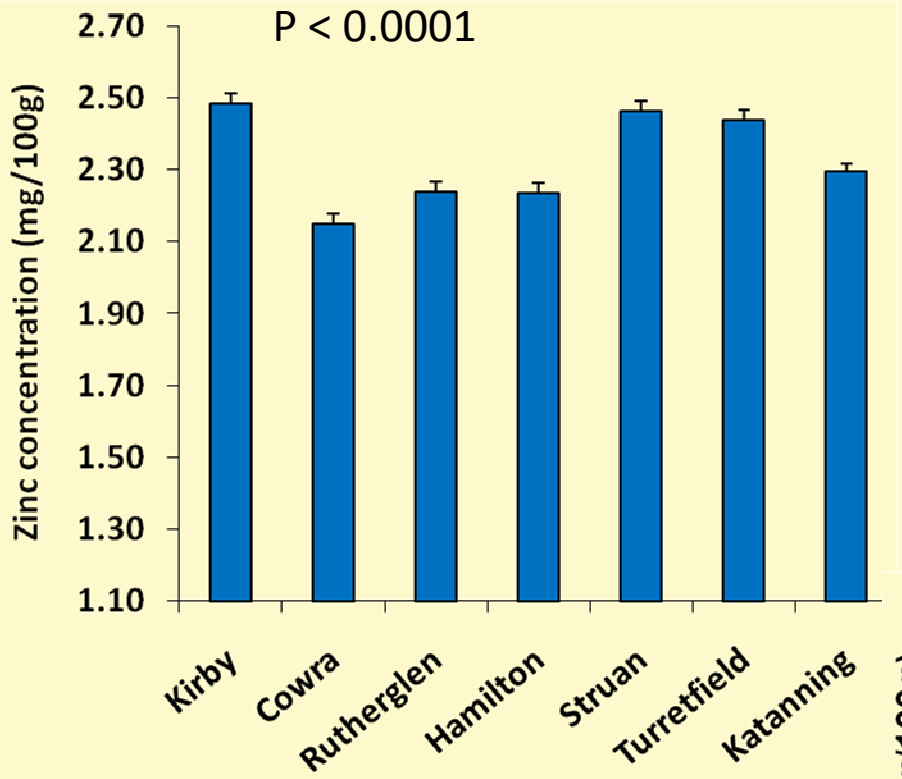
	Iron (mg/100g)		Zinc (mg/100g)	
	Source 10% RDI	Good Source 25% RDI	Source 10% RDI	Good Source 25% RDI
Women			□	□
> 50yrs	□	□		
< 50yrs	□	46%		
Men	□	□	□	66%

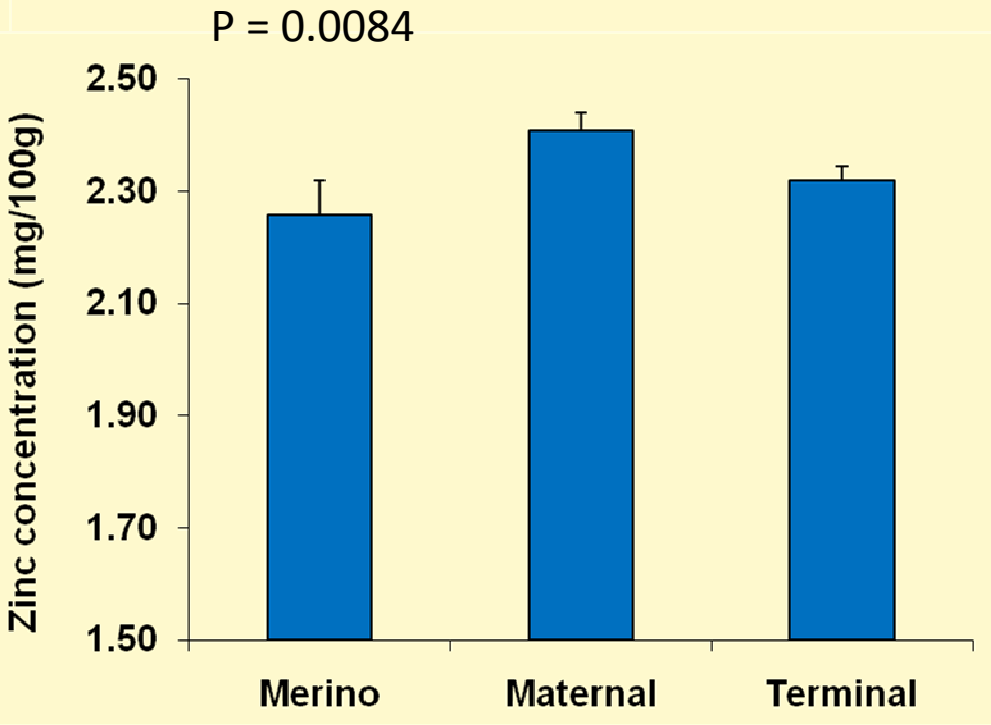
Site and breed affects - Iron





Site and breed affects Zinc





Nutritional value – fat – early data

- Lamb often criticised for its fatty acid profile
- Saturated fat – IMF = 4.12% and 40% is saturated
- = 1.65g/100gm
- Low in saturated fat claim = 1.5g/100g (FSA&NZ)

Nutritional value – fat – early data

Fatty acid	Mean of 2,001 lambs (mg/100gm)
n-3 linolenic	37
n-3 EPA+DHA	**24**
n-3 EPA+DHA+DPA	44
	81
n-6 linoleic	**130**
n-6 arachidonic	42
	172
n-6:n-3	**2.1**

Source EPA/DHA @ 135gm serve = 22mg/100gm

Ollis, Meyer, Howe 1999 – n-6:n-3 = 8:1

Nutritional value – fat – early data

Highest/lowest kill groups for the 7 sites

Fatty acid	Dry pasture kill groups	Growing pasture kill groups
n-3 EPA+DHA	15 ↓	37 ↑
n-3 EPA+DHA+DPA	25 ↓	65 ↑

Source EPA/DHA @ 135gm serve = 22mg/100gm

Nutritional value – fat – early data

Highest/lowest kill groups for the 7 sites

Fatty acid	Dry pasture kill groups	Growing pasture kill groups
n-3 EPA+DHA	15 ↓	37 ↑
n-3 EPA+DHA+DPA	25 ↓	65 ↑
n-6:n-3	5.9 ↑	1.0 ↓

Source EPA/DHA @ 135gm serve = 22mg/100gm

Ollis, Meyer, Howe 1999 – n-6:n-3 = 8:1

Nutritional value – fat – early data

Highest/lowest kill groups for the 7 sites

Fatty acid	Dry pasture kill groups	Growing pasture kill groups
n-3 EPA+DHA	15	37
n-3 EPA+DHA+DPA	25	65
n-6:n-3	5.9 ↑	----> 1.0 ↓

Sire/genetic effects