

# **The Costs of Ketosis**

## The hidden cash killer

**Dr Dick Esslemont**

Consultant in Dairy Farm  
Management

**[Dick@DickEsslemont.co.uk](mailto:Dick@DickEsslemont.co.uk)**

# Ketosis costs 2.88 pence per litre (35% of Total Costs of Waste)

- What are the **Total costs of Waste** due to Disease and Poor Fertility in Typical Dairy Herd (8000 litres)
- **Compared with Target Rates**
  - 100 Cows, **Calving Interval** 425 days, **Infertility Culling** 17% (Total Culling Rate 29%) = **4.2p/litre**
  - **Typical UK Disease Rates**, incl Youngstock Wastage = **2.48p/litre**
  - **Non Fertility Culling** 7% = **0.31p/litre**
  - **Death (No Value) Culls** 4% = **1.23p/litre**
- **TOTAL = 8.22 p/litre = £658 per Cow.**
- ***2.88p/litre of 8.22p/litre is 35% from Ketosis***

# Ketosis -Description

- **Clinical Ketosis** is a condition where dairy cows display overt signs such as:
- Reduced Feed Intake
- Reduced Milk Production
- Noticeable Weight Loss in a Short Period
- Measureable Elevations of Ketone Body Concentrations in All Body Fluids
- (Radostits, 2000)

# Sub Clinical Ketosis

- Condition Marked by
- Increased Levels of Circulating Ketone Bodies  
WITHOUT the Clinical Signs of Ketosis

# Ketosis

- Normal adaptation to Negative Energy Balance in Early Lactation Gives Increased NEFA's from Body Fat Stores
- NEFA's Influx in Liver is either
  - Oxidised
  - Diverted to Ketone Body Production
  - Stored in Liver as Tri-Glyceride

# Ketosis

- Poor Adaptation to NEBAL gives
  - Oversupply of NEFA's
  - Undersupply of Glucose
  - Excess of Body Fat in Liver
  - Marked Increase in Ketone Body Production

# Ketosis

- Typical Rates in UK Dairy Herd (100 Cows)
- **Average**
- Sub Clinical - 30 Cases per 100 Cows
- Clinical - 3 Cases per 100 Cow Herd
- **High rates**
- Sub Clinical - 60 Cases per 100 Cows
- Clinical - 10 Cases per 100 Cow Herd
- **Low Rates**
- Sub Clinical - 10 Cases per 100 Cows
- Clinical - 1 Case per 100 Cows





# Effects of Ketosis

- Reduced Milk Production
- Increased LDA's
- Impaired Immune Function
  - Metritis
  - Mastitis
- Impaired Reproduction Performance
- Increased Risk of Early Lactation Culling
- Duffield (2011) A Rational Approach to Ketosis Treatment 63rd Can.Vet et. Med. Assoc. Toronto July 2011  
<http://canadianveterinarians.net/SpeakerNotes2011>

# Ketosis

- **Underlying Causes**

- Milk Fever
- Long Calving Interval
- Fat Cows
- Under Feeding
- Twins
- Metritis
- LDA
- Mastitis

- **Effects**

- Low Yield
- Retained Placenta
- Metritis
- LDA
- Severe Mastitis
- SCK to CK
- Cystic Ovaries
- Infertility

# Sub- Clinical and Clinical Ketosis

- **AVERAGE RATES**

- in 100 Cow Herd (UK, Macrae, 2012)

- 30 Cows Hidden Ketosis (Sub-Clinical Ketosis, SCK)

- 3 Cows Visible Ketosis (Clinical Ketosis, CK)

- Dealing with Hidden Ketosis (SCK) .....

<b>SCK</b>				<b>Ketotic v Healthy Cows</b>
<b>Fertility</b>	<b>CI</b>			<b>Up 22 Days CI</b>
<b>Yield</b>	<b>Litres</b>			<b>Down 411 litres</b>
<b>LDA's</b>	<b>%</b>			<b>Up 15% points</b>
<b>Metritis</b>	<b>%</b>			<b>Up 20% points</b>
<b>Cystic Ovaries</b>	<b>%</b>			<b>Up 46% points</b>
<b>R F M</b>	<b>%</b>			<b>Up 5% points</b>
<b>Severe Mastitis</b>	<b>%</b>			<b>5% of Herd Up from Mild to Severe</b>
<b>Culling &lt; 60 Days</b>	<b>%</b>			<b>Up 3% points</b>
<b>Culling End of Lactation</b>	<b>%</b>			<b>Up 15% points</b>
<b>Extra Fatalities</b>	<b>%</b>			<b>Up 2% points</b>



# Costs of SCK

- Effects of Ketosis Costed
- **Direct Costs** of Each Disease
  - Direct Costs
    - Vet + Treatments
    - Herdsman's Time (at Opportunity Cost)
    - Reduced Milk Yield
    - Milk Withdrawal
- **Dealing with Cost of 100 SCK Affected Cattle**
- Compared with 100 "Healthy" Cattle – to give the Cost per SCK Affected Cow
- Then Adding Extra Culls and Fatalities Separately

# Example of Costing a Disease

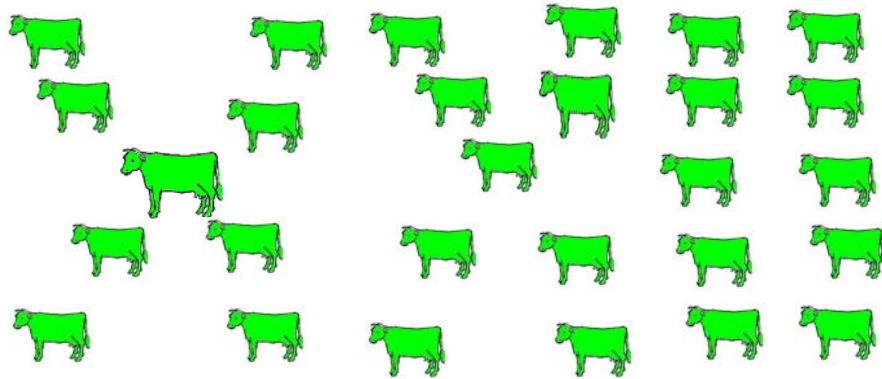
- **Retained Afterbirth**
- Costs of treatments, weighted mean, including herdsman's time, vet time, milk withdrawal. .... £43.06
- Cost of Reduced Milk Yield (415 litres @ 17p) .....£69.01
- Total Direct Costs £112.08

# Cost of A Fatality in Early Lactation

- Loss of a Sale £487.50
- Cost of Removal of Cow £80.00
- Cost of Losing 220 days of Production
  - 26 litres/day at 16.6p/litre £959.63
- Cost of Replacement (Heifer) £1,450.00
- Lower Yield from Heifer (1760 litres at 16.6p/litre) £292.69
- **Total Cost Fatality at 80 days pp £3,269.62**
- **Component by component.....**



# SCK - Per 100 Ketotic Cows (1) CI



**Per 100 Affected  
SCK Cows**

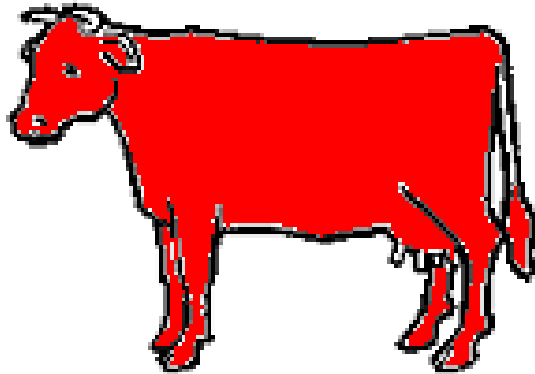
**22 More Days on  
Calving Interval at**

**£3.03 per day for  
100 Affected Cows**

**£66.61/cow**

**£6,661 per 100  
Affected Cows**

# SCK - £ Per 100 Ketotic Cows (2) Milk



**100 Affected Cows  
Yield Reduction**

**411 Litres at  
16.6p/litre**

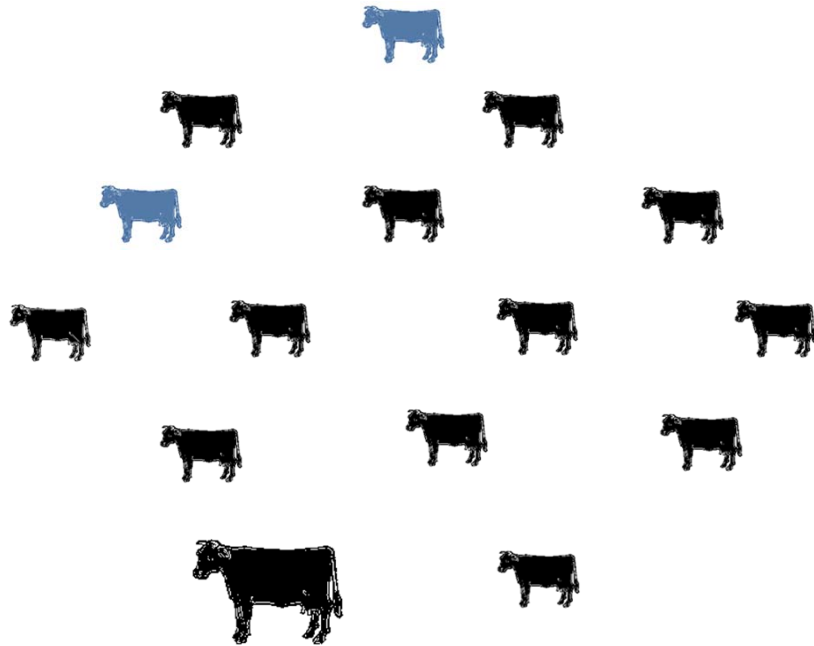
**marginal value**

**£68.30 per Cow**

**£6,830 per 100**

**Affected Cows**

SCK - Per 100 Ketotic Cows (3) LDA.



Ketosis increases  
**LDA**

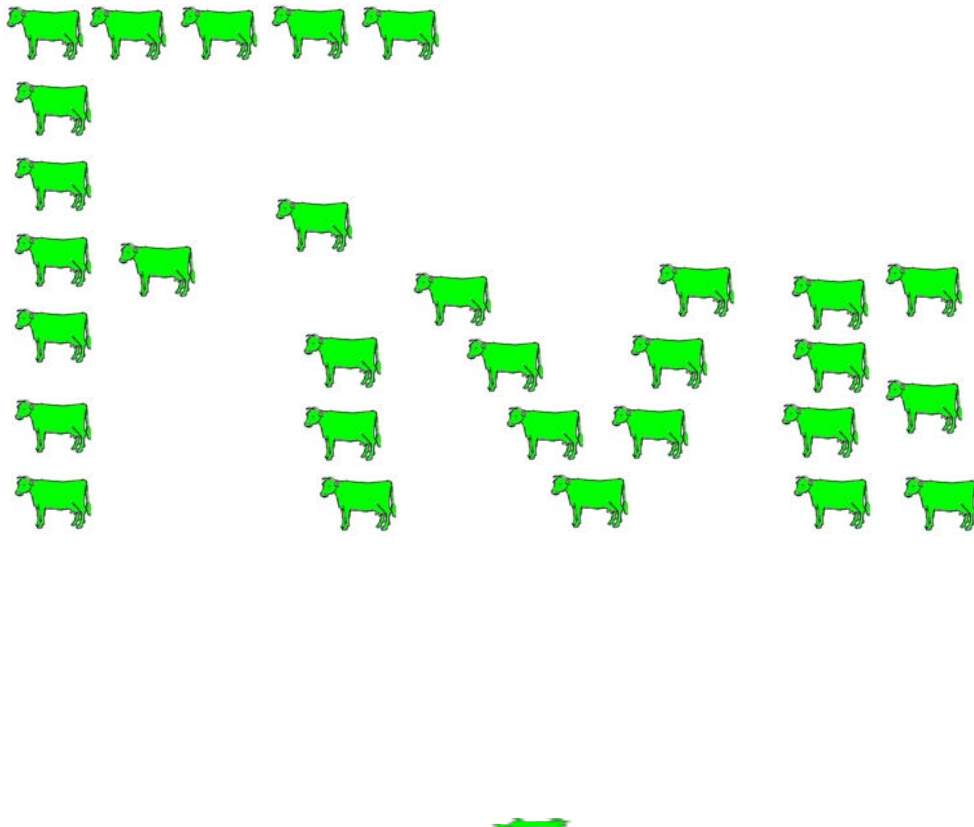
Per 100 Affected  
Cows

15 more cows with  
**LDAs**

15 at £295/case  
**Direct Costs**

= £4,429 per 100  
**Affected Cows**

# SCK - Per 100 Ketotic Cows (4) RFM

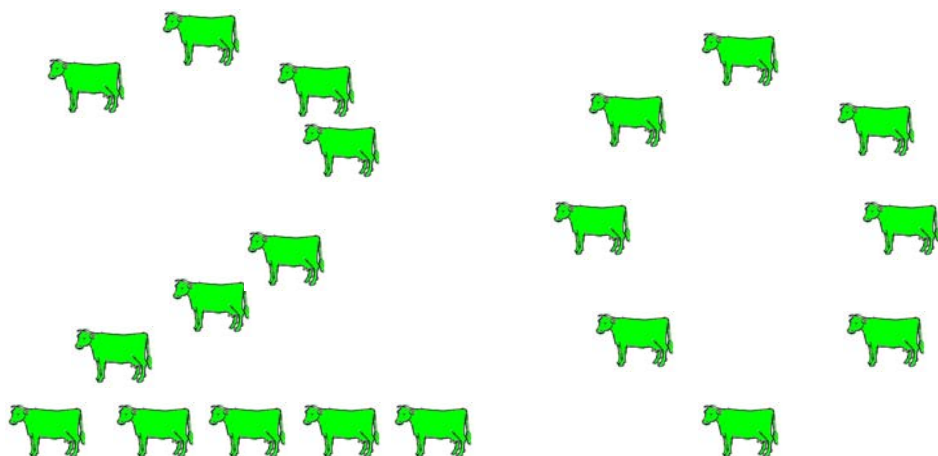


Ketosis increases  
risk ...

5 more cows with  
Retained Foetal  
Membranes

5 at £112/case =  
£560 per 100  
Affected Cows

# SCK - Per 100 Ketotic Cows (5) VLD



Ketosis increases  
**Metritis/VLD**

Per 100 Affected  
Cows

**20 more cows  
with Metritis**

**£97/case =**

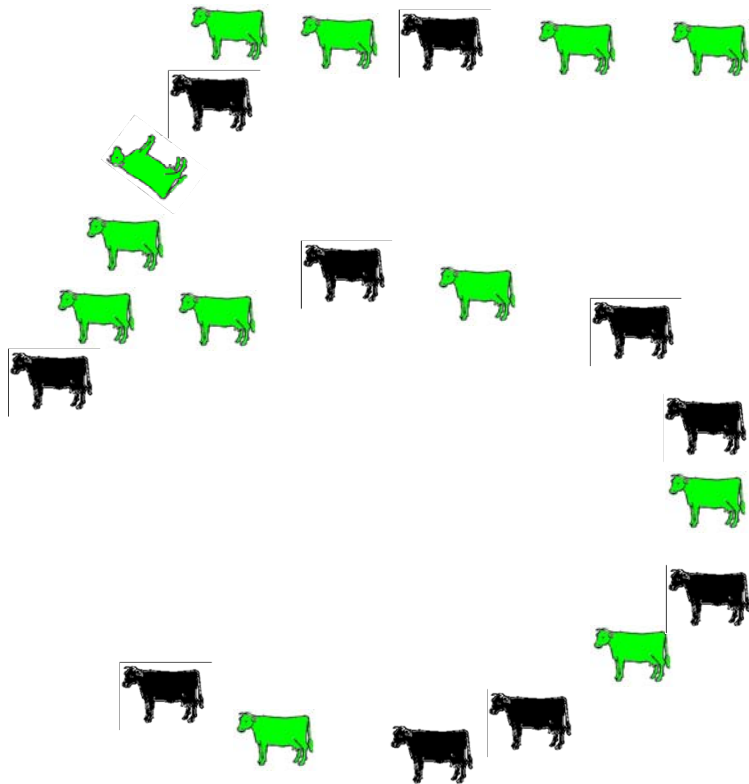
**£1,947 per 100  
Affected Cows**



# Mastitis

- Mild Cases of Mastitis Become More Severe

# SCK - Per 100 Ketotic Cows (7) MAST



Ketosis increases  
**Mastitis...**

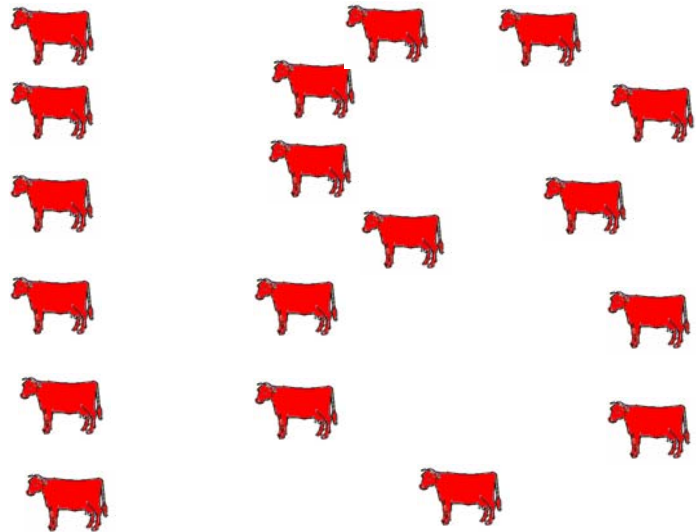
Per 100 Affected  
Cows

5 more Cases

**Severe Instead of  
Mild** at £354 per  
Case = £1,772



# SCK - Per 100 Ketotic Cows (8) CULL



Ketosis increases risk

...

**Extra Culling Per  
100 Affected Cows:**

- 1) 3 more cows**  
at < 60 days  
£2,346/cull =  
£7,037
- 2) 15 more cows**  
at end of  
lactation  
£1,255/cull =  
£18,828

# SCK - Per 100 Ketotic Cows (9) Death



Ketosis increases risk

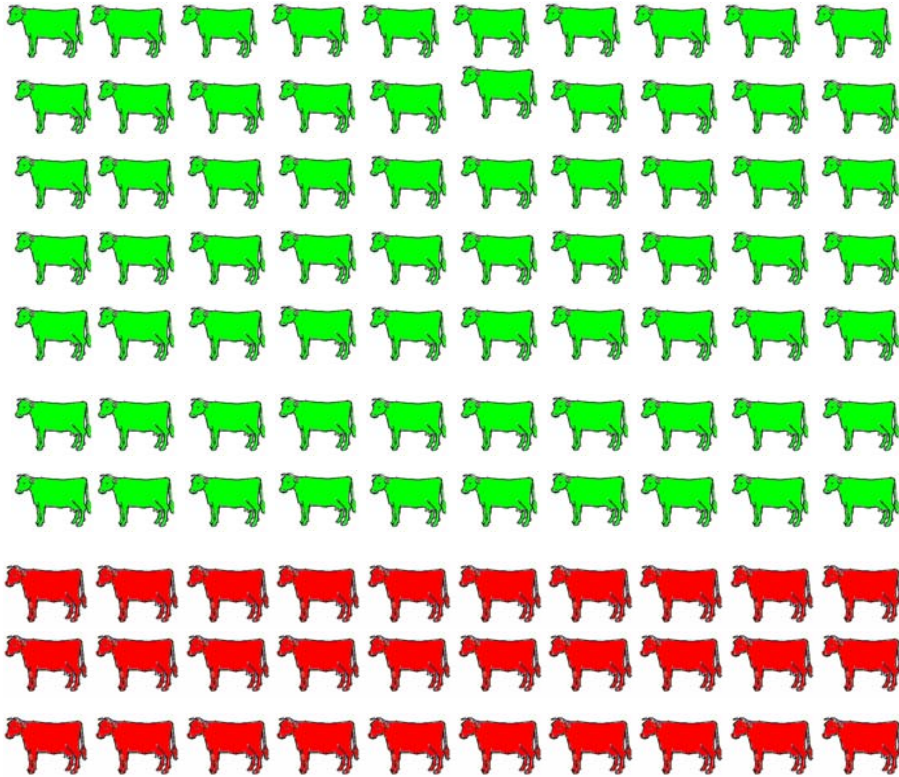
Per 100 Affected Cows

**Fatalities @ < 60 days**

2 more at £3270  
= £6,540



# SCK - Per 100 Ketotic Cows



30% incidence of ketosis  
without clinical signs

**Total Costs**  
**Sub Clinical**  
**Ketosis**  
**£55,593/100**  
**Affected**  
**Cows**  
**£560 per**  
**Affected Cow**

# Sub Clinical Ketosis (SCK) Total

- **Repeat of SCK in Next Lactation**
  - **23** Cows Repeat at £560 per Case, adds £130 per case
- £560 plus £130 = **£690 per case of SCK**
- 30 Cases Per 100 Cow herd at **£690/case =**
- **£20,710 per 100 Cow Dairy Herd (SCK)**

# Clinical Ketosis (CK)

- Costed on Similar Basis
- Increased Severity of Effects
- **Costs £823/ Affected Cow**

# Clinical and Sub-Clinical Ketosis

## Cost per 100 Cow Herd

- 30 SCK Cows @ £690 Plus
- 3 CK Cows @ £823 in 100 Cow herd
  
- SCK £20,710 and
- CK £2,469 add up to
- 
- **£23,179** Total per 100 Cow Herd
- £231 per cow in herd
- £ 2.88 p/litre (if 8000 litres/cow/yr)



# Ketosis Putting it in simpler terms

- Physical Losses
- Yield Loss
- More Dead Cows
- More Cows Culled
- More Vet Costs
- Wasting Herdsman's Valuable Time



# Thirty Three Sick Cows in A Hundred

- **Yield Reduction per Cow**
  - About 900 litres lower per affected cow
    - 460 litres directly
    - 350 litres from extended calving Interval
    - 180 litres + due to consequential diseases
    - 33 Cows 29,700 litres **£4,750**
  - **Increased Fatalities**
    - 1,7 extra/33 cows (£3,200 per fatality) = **£5,400**
  - **Increased Culling**
    - About 6 more culls/33 cows (£1,300 to £2,400 per cull)
    - = **£10,800**
  - **Extra Vet and Herdsman Costs**
  - **£2,225**
- TOTAL £23,179**

# We Know that Ketosis is Bad for Cows

- We know how to prevent/treat Ketosis
- How to convince farmers, herdsman and veterinary surgeons?
- Prevent – Transition Cow Management
- Test Body Fluids – show rates  
Cost Benefits of Treatment
- Easier Life for Stockmen
- More Free Time

# DATA CHECK No 1

- CK SCK History ? Last had CK & SCK
- 305 day Yield
- Expected Peak Yield
- BF %, Protein %, Prediction of Ratio <1.5:1
- Lactose > 4.6%
- Condition Score 3.75 or >
- Est. or Real Dry Period > 80 days

# Data Check No 2

- High Lameness Score > Zero
- Lifetime Twins > Zero
- LDA Times > Zero
- Mastitis last Date Details
- SCC Last Lact: No Times > 200 thou SCC
- MF, RFM, Metritis History
- RISK SCORE for KETOSIS

# Ketosis costs 2.88 pence per litre (35% of Total Costs of Waste)

- What are the **Total costs of Waste** due to Disease and Poor Fertility in Typical Dairy Herd (8000 litres)
- **Compared with Target Rates**
  - 100 Cows, **Calving Interval** 425 days, **Infertility Culling** 17% = **4.2p/litre** (Total Culling Rate 29%)
  - Typical UK Disease Rates, incl Youngstock Wastage = **2.48p/litre**
  - Non Fertility Culling 7% = **0.31p/litre**
  - Death (No Value) Culls 4% = **1.23p/litre**
- **TOTAL = 8.22p/litre = £658 per Cow.**
- **2.88p/litre of 8.22p/litre is 35% from Ketosis**

[www.DickEsslemont.co.uk](http://www.DickEsslemont.co.uk)

