NMR milk recording: current situation and future prospects

ICAR 2017

Ben Bartlett
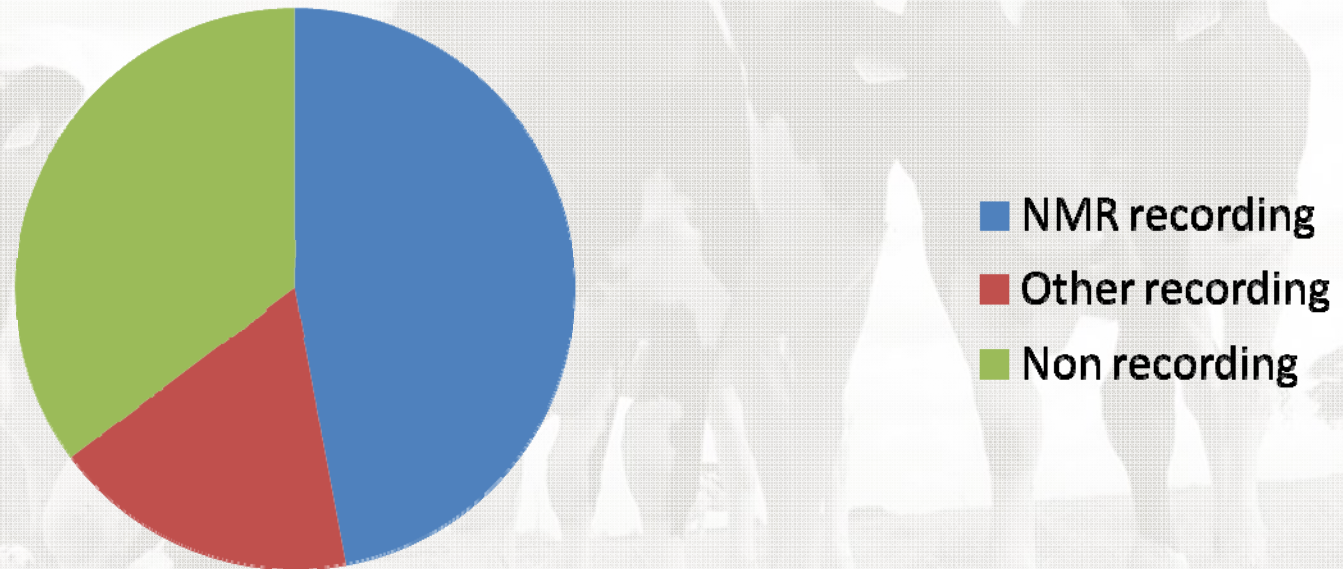Director, NMR plc
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Know your cows, know your business

NMR

The GB milk recording market

Share of market

- NMR recording
- Other recording
- Non recording
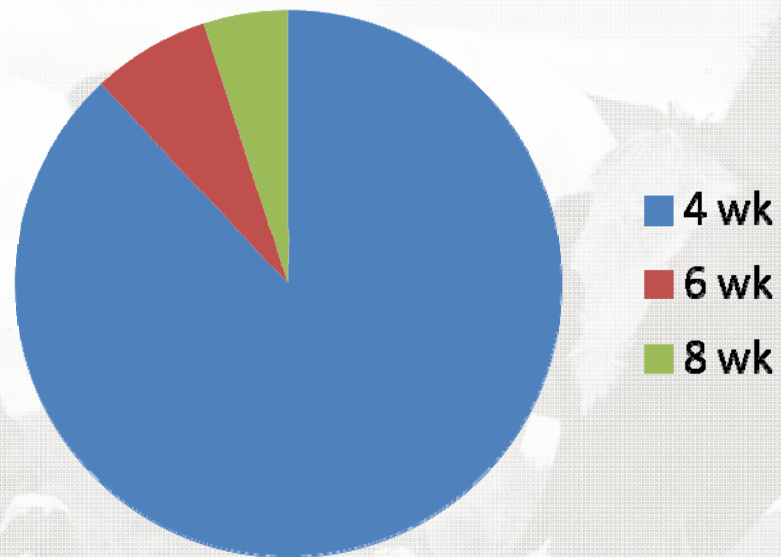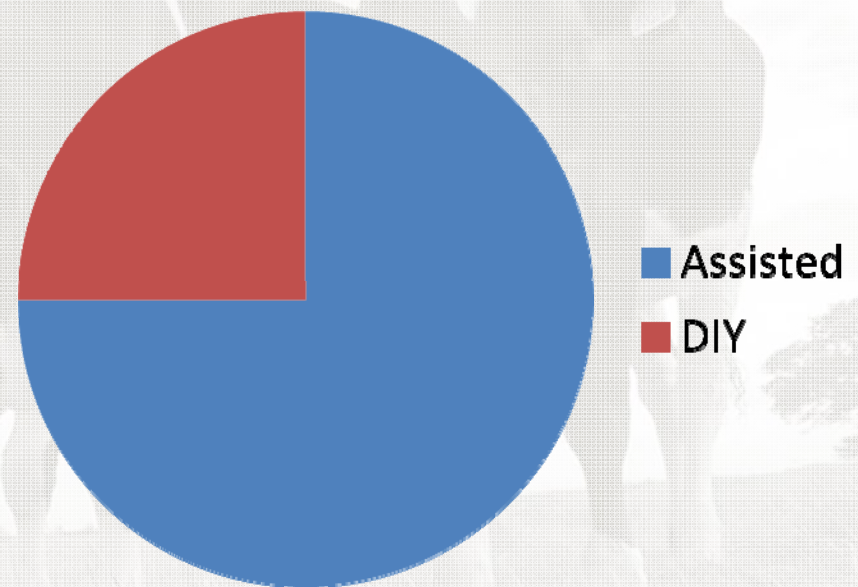
Range in performance across NMR herds
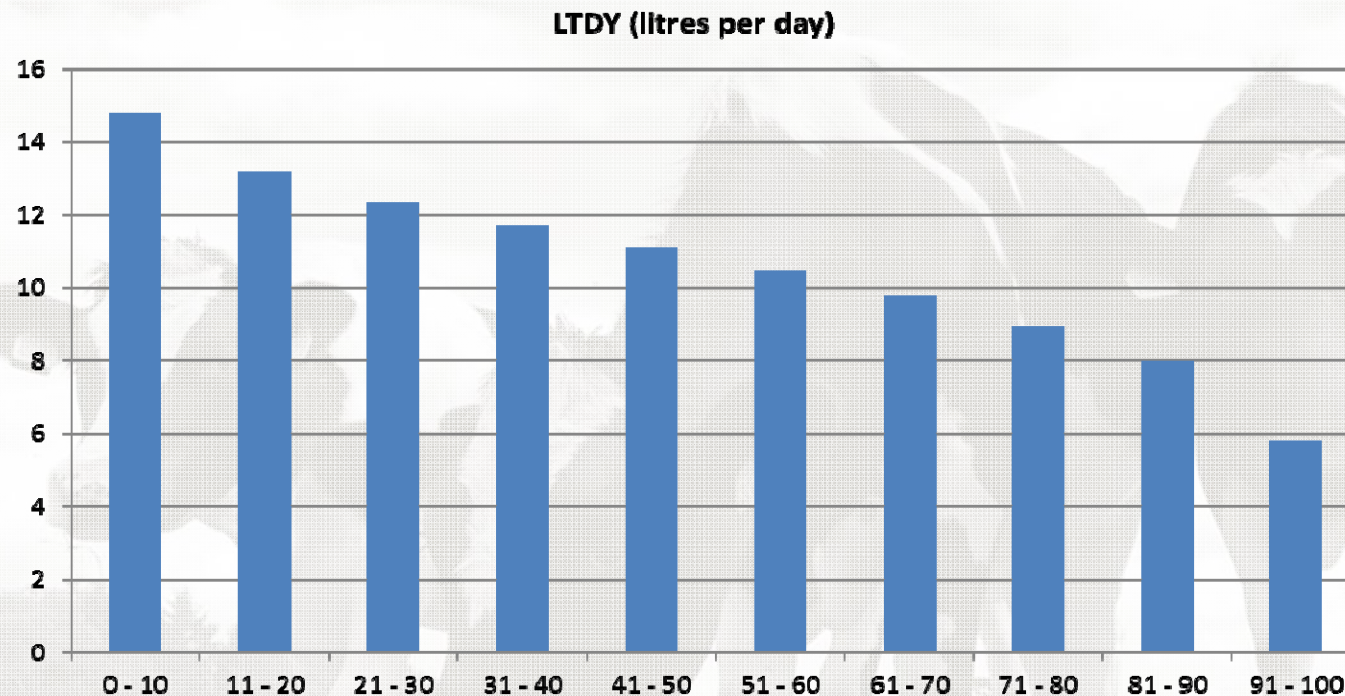
LTDY (litres per day)

- The top 10% of NMR herds measured in LTDY terms achieve an average LTDY of 14.78 litres per day of life
- The bottom 10% achieve just 5.8 litres/day

NMR

Calving interval (days)
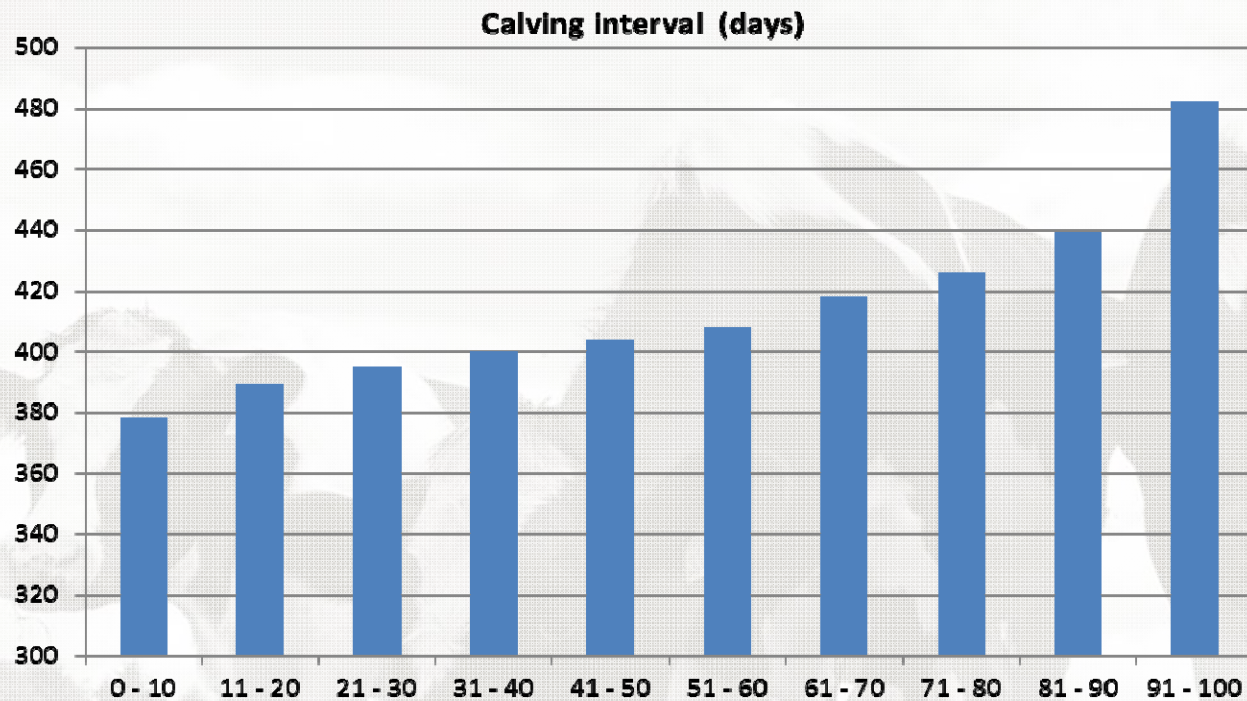
- The top 10% of NMR herds measured on calving interval achieve a herd average of 378 days
- The bottom 10% have an average of over 480 days

HORIZON SCANNING

Market demands from UK MRO's

- More integration

- More bespoke

- Better decision support and action lists

- Ability to demonstrate return on investment

- Aid compliance with processor requirements

NMR

NMR approach

- Bundling to achieve integration
- Bespoke offerings – farm specific settings for action lists
- Third party links
  - On line reporting
    - Producers registered
    - Third parties registered
- Benchmarking
- Unlock more from the milk sample

Bundling

- Linkage of different testing and data recording services
  - Bulk milk and individual cow milk
  - Blood/tissue testing services
  - Bespoke data recording
- Individual farm 'decision tree'

NMR

Sample type	Frequency	Reliability	Outcome	Value	Example
Bulk milk	Quarterly or every sample	✔	Alert	**+**	**Urea**
Bulk milk	Quarterly or every sample	✔ ✔	Action	**++**	**Inf disease**
Indiv cow (DHI)	Monthly	✔	Alert	**+**	**Energy balance**
Individual cow (DHI)	Monthly	✔ ✔ ✔	Action	**+++**	**PD, SCC, Johne's**
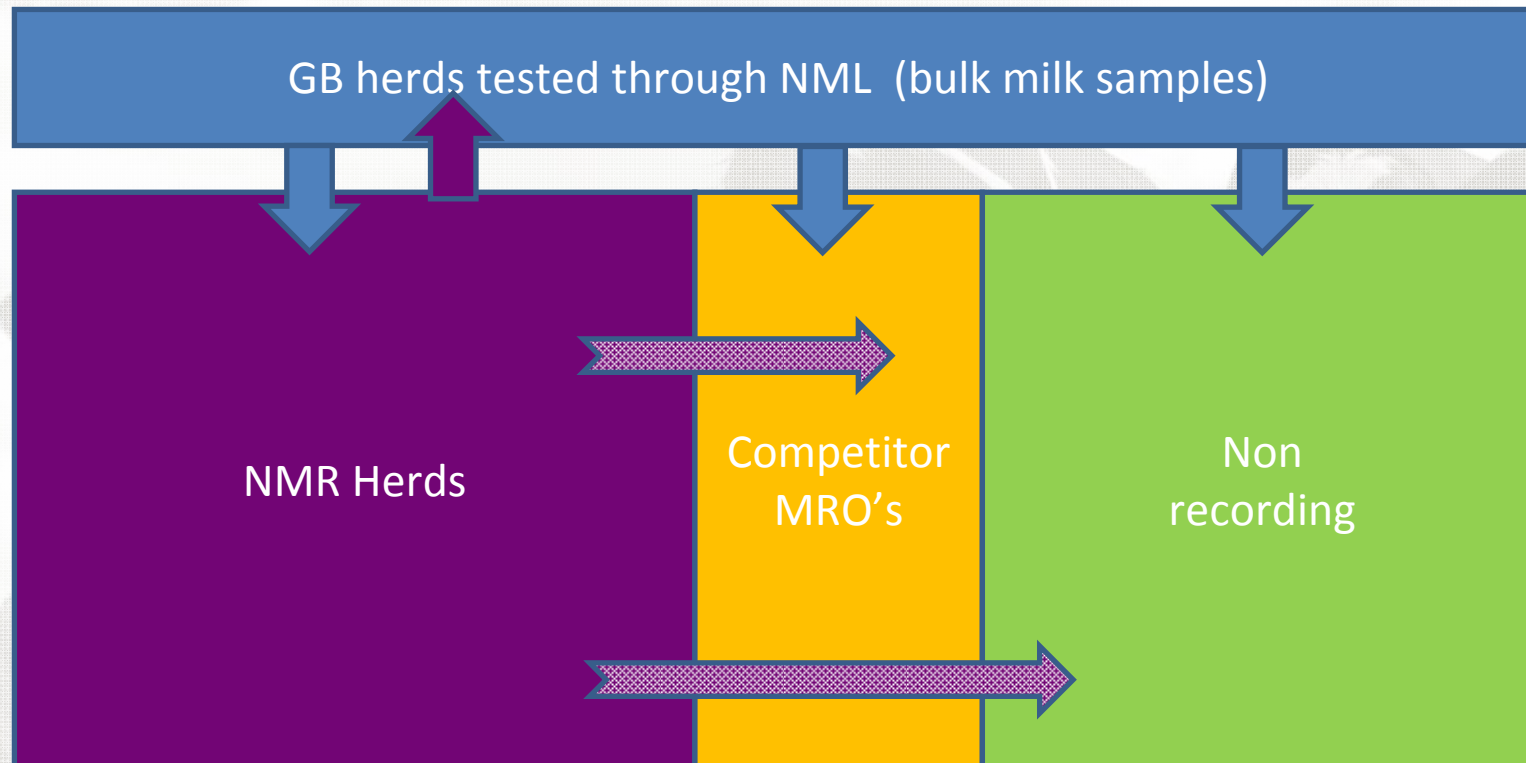
BUNDLING

Selective Dry Cow
therapy report

Going beyond traditional 'Action Lists'

- Fertility
- Lameness
- Mastitis
- Disease

- Actual .v. predicted milk yield
- Calving ease
- Antibiotic use

Cull criteria weightings

	Points
Per 1% below herd average milk production	0.2
Not pregnant 100 days after calving	1
Not pregnant 150 days after calving	3
Not pregnant 200 days after calving	6
Per lameness event in last 6 months	2
Per mobility score 2 in last 6 months	1
Per mobility score 3 in last 6 months	5
Per mastitis event in last 6 months	2
Per SCC >= 200 in last 6 months	1
Per SCC >= 500 in last 6 months	2
Positive JOHNE'S test in life	3
Postive BVD test in lfe	3
Positive IBR test in life	3
Positive LEPTO test in life	3

The cull list…….

135 Cull candidates

Number	Age	Lact	Last calving		Next calving		Fertility status	Lactation status	Milk prod.	Not preg.	Lame events	Mobility	Mast. events	High SCC	Disease	Total points	To cull?	Scheduled cull date
549	8y0m	6	25/11/16	199	24/11/17	165	Pregnant	Milking	4.0	0.0	0.0	0.0	0.0	8.0	9.0	21.0	☐	
804	9y7m	6	29/01/17	134			Served	Milking	6.3	1.0	0.0	0.0	0.0	9.0	3.0	19.3	☐	
12	6y2m	4	28/07/16	319			Served	Milking	8.6	6.0	0.0	0.0	0.0	1.0	3.0	18.6	☐	
561	8y2m	7	08/05/17	35			NH/NS	Milking	6.8	0.0	0.0	0.0	0.0	5.0	6.0	17.8	☐	
284	8y0m	5	12/08/16	304			Served	Milking	1.1	6.0	0.0	0.0	0.0	10.0	0.0	17.1	☐	
189	6y10m	4	27/12/15	533	25/08/17	74	Pregnant	Dry	8.5	0.0	0.0	0.0	0.0	2.0	6.0	16.5	☐	
465	10y2m	7	13/12/16	181			Served	Milking	6.7	3.0	0.0	0.0	0.0	6.0	0.0	15.7	☐	
777	8y3m	6	12/11/16	212			Served	Milking	0.5	6.0	0.0	0.0	0.0	0.0	9.0	15.5	☐	
2	8y1m	5	17/07/16	330	12/06/17	0	Pregnant	Dry	6.1	0.0	0.0	0.0	0.0	0.0	9.0	15.1	☐	
547	7y7m	5	01/05/16	407	07/11/17	148	Pregnant	Milking	5.5	0.0	0.0	0.0	0.0	3.0	6.0	14.5	☐	
4	7y0m	3	30/11/15	560	20/08/17	69	Pregnant	Milking	-0.5	0.0	0.0	0.0	0.0	12.0	3.0	14.5	☐	
972	6y7m	4	27/05/16	381	03/07/17	21	Pregnant	Dry	6.2	0.0	0.0	0.0	0.0	8.0	0.0	14.2	☐	
266	3y1m	1	19/11/16	205			Served	Milking	1.1	6.0	0.0	0.0	0.0	6.0	0.0	13.1	☐	
7	6y7m	4	22/12/16	172			Served	Milking	2.9	3.0	0.0	0.0	0.0	4.0	3.0	12.9	☐	

Securing and maintaining engagement through benchmarking

Table 1(a)   Summary of Key Performance Indicators derived from analysis of 500 NMR milk recording herds for the year ending 31st August 2016 – Culling, fertility & milk parameters.
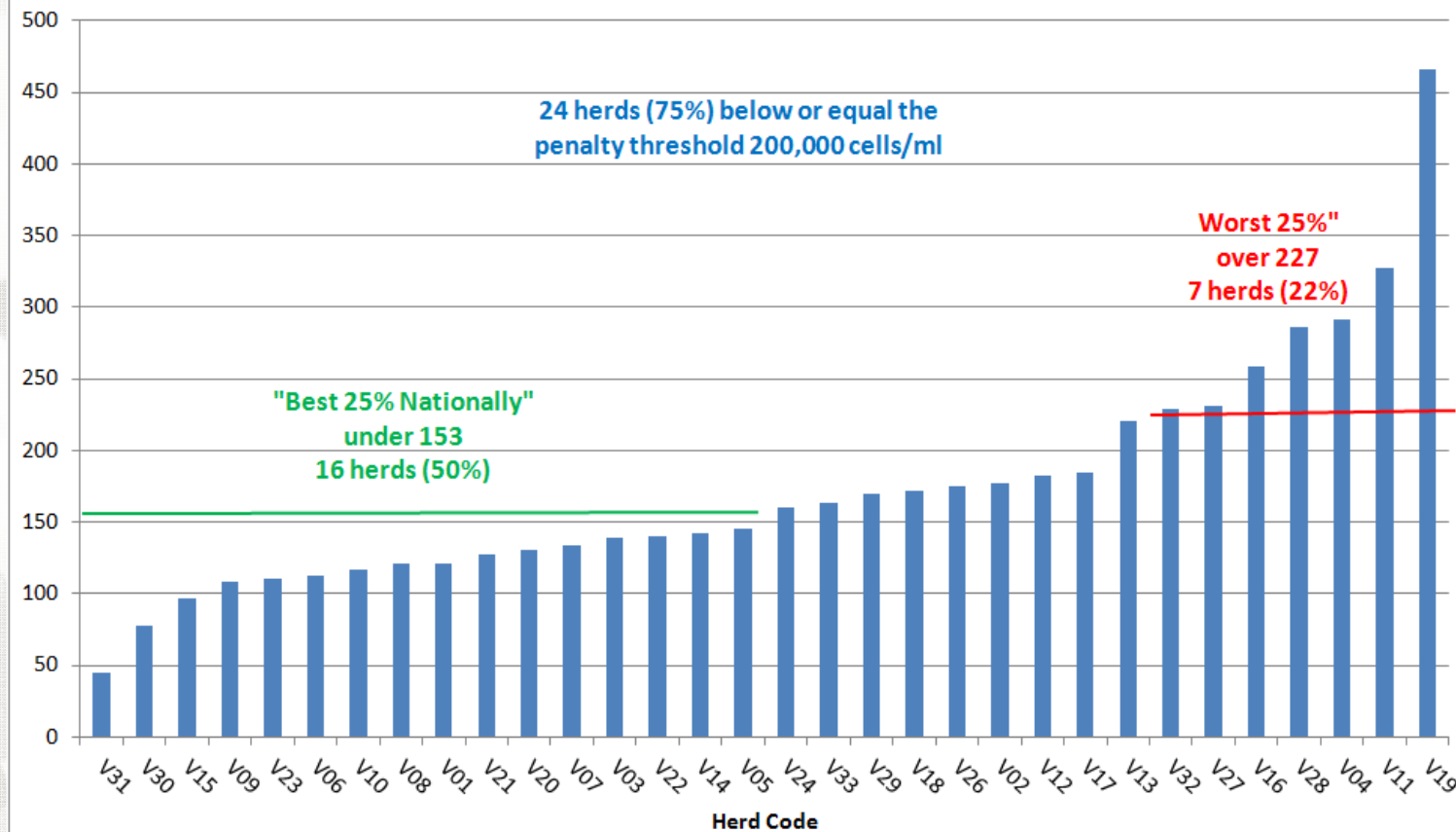
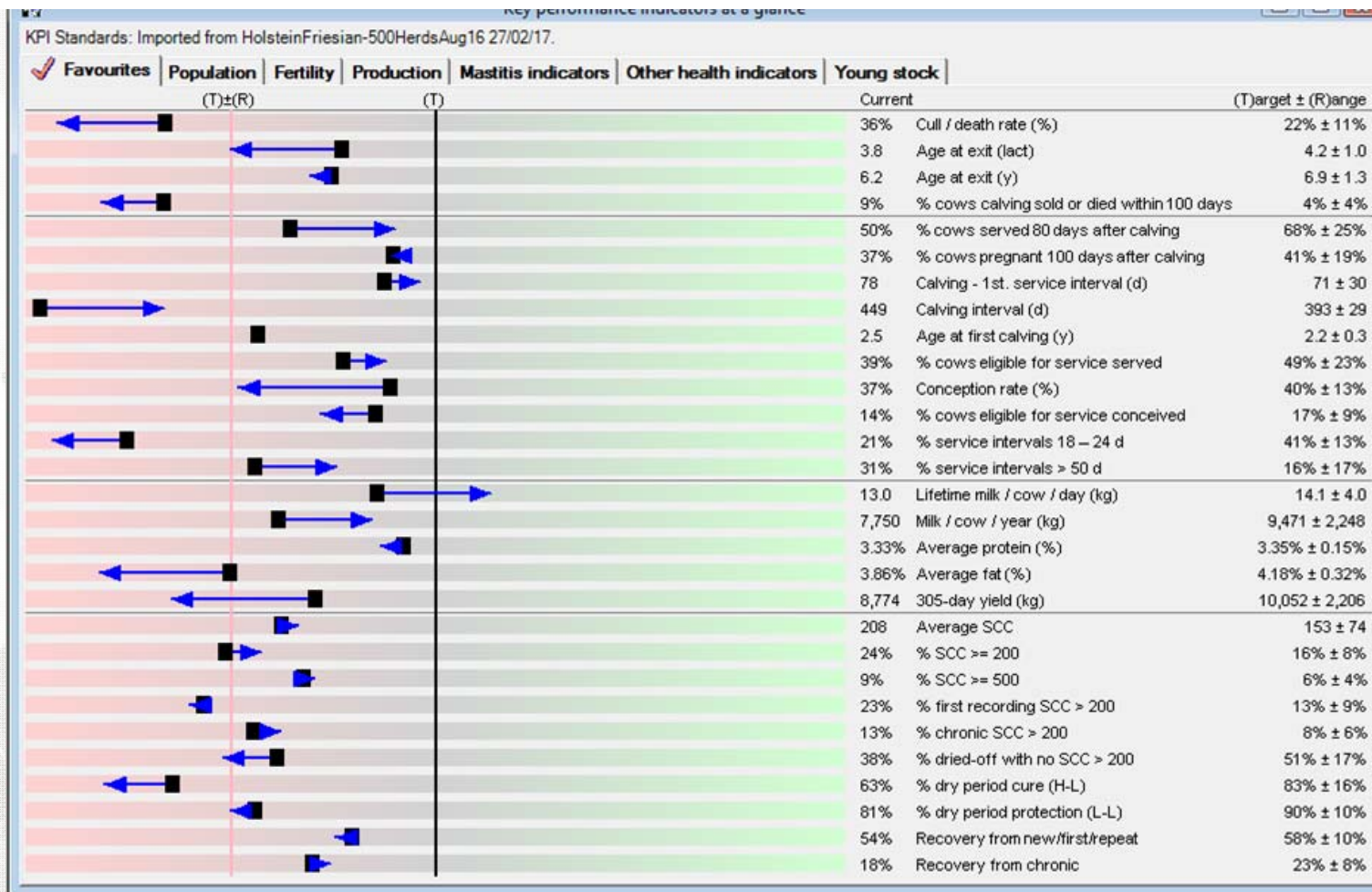| Parameter	Median (1)	1st – 3rd quartile (25% - 75%) (2)	Target (3)	Inter-quartile range (4)
A. Culling rate	27%	22% - 33%	22%	11%
B. Culling / death rate in first 100 days of lactation	5%	4% - 8%	4%	4%
C. Age at exit (years)	6.1	5.6 - 6.9	6.9	1.3
D. Age at exit by lactations	3.6	3.2 - 4.2	4.2	1.0
E. Percentage Served by day 80	56%	43% - 68%	68%	25%
F. Percentage conceived 100 days after calving	33%	22% - 41%	41%	19%
G. Calving to 1st service interval (days)	82	71 - 101	71	30
H. Calving interval (days)	407	393 - 422	393	29
I. Age at 1st calving (years)	2.3	2.2 - 2.5	2.2	0.3
J. Conception rate	34%	27% - 40%	40%	13%
K. Percentage service intervals at 18-24 days	35%	28% - 41%	41%	13%
L. Percentage service intervals >50 days	24%	16% - 33%	16%	17%
M. Percentage eligible for service that served	38%	26% - 49%	49%	23%
N. Percentage eligible for service that conceived	13%	8% - 17%	17%	9%
O. Lifetime milk / cow / day (kg)	12.2	10.1 - 14.1	14.1	4.0
P. Milk / cow / year (kg)	8,291	7,223 - 9,471	9,471	2,248
Q. Average protein%	3.26%	3.20% - 3.35%	3.35%	0.15%
R. Average fat%	4.03%	3.86% - 4.18%	4.18%	0.32%
S. 305-day milk yield (kg)	8,911	7,846 - 10,052	10,052	2,206
T. 305-day protein yield (kg)	287	259 - 325	325	66
U. 305-day fat yield (kg)	354	313 - 394	394	81

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Average Somatic Cell Count (SCC '000 cells/ml)
(32 Vet. Practice herds - Data for the Year Ending 31 August 2016)

24 herds (75%) below or equal the
penalty threshold 200,000 cells/ml

Worst 25%"
over 227
7 herds (22%)

"Best 25% Nationally"
under 153
16 herds (50%)

Herd Code

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KPI Standards: Imported from HolsteinFriesian-500HerdsAug16 27/02/17.

Favourites | Population | Fertility | Production | Mastitis indicators | Other health indicators | Young stock

|	Current		(T)arget ± (R)ange
	36%	Cull / death rate (%)	22% ± 11%
	3.8	Age at exit (lact)	4.2 ± 1.0
	6.2	Age at exit (y)	6.9 ± 1.3
	9%	% cows calving sold or died within 100 days	4% ± 4%
	50%	% cows served 80 days after calving	68% ± 25%
	37%	% cows pregnant 100 days after calving	41% ± 19%
	78	Calving - 1st. service interval (d)	71 ± 30
	449	Calving interval (d)	393 ± 29
	2.5	Age at first calving (y)	2.2 ± 0.3
	39%	% cows eligible for service served	49% ± 23%
	37%	Conception rate (%)	40% ± 13%
	14%	% cows eligible for service conceived	17% ± 9%
	21%	% service intervals 18 – 24 d	41% ± 13%
	31%	% service intervals > 50 d	16% ± 17%
	13.0	Lifetime milk / cow / day (kg)	14.1 ± 4.0
	7,750	Milk / cow / year (kg)	9,471 ± 2,248
	3.33%	Average protein (%)	3.35% ± 0.15%
	3.86%	Average fat (%)	4.18% ± 0.32%
	8,774	305-day yield (kg)	10,052 ± 2,206
	208	Average SCC	153 ± 74
	24%	% SCC >= 200	16% ± 8%
	9%	% SCC >= 500	6% ± 4%
	23%	% first recording SCC > 200	13% ± 9%
	13%	% chronic SCC > 200	8% ± 6%
	38%	% dried-off with no SCC > 200	51% ± 17%
	63%	% dry period cure (H-L)	83% ± 16%
	81%	% dry period protection (L-L)	90% ± 10%
	54%	Recovery from new/first/repeat	58% ± 10%
	18%	Recovery from chronic	23% ± 8%

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Getting more from the milk sample – interrogating spectral data

- Looking to identify cows suffering from negative energy balance in early lactation to allow action to be taken before energy status has an effect on future fertility and production
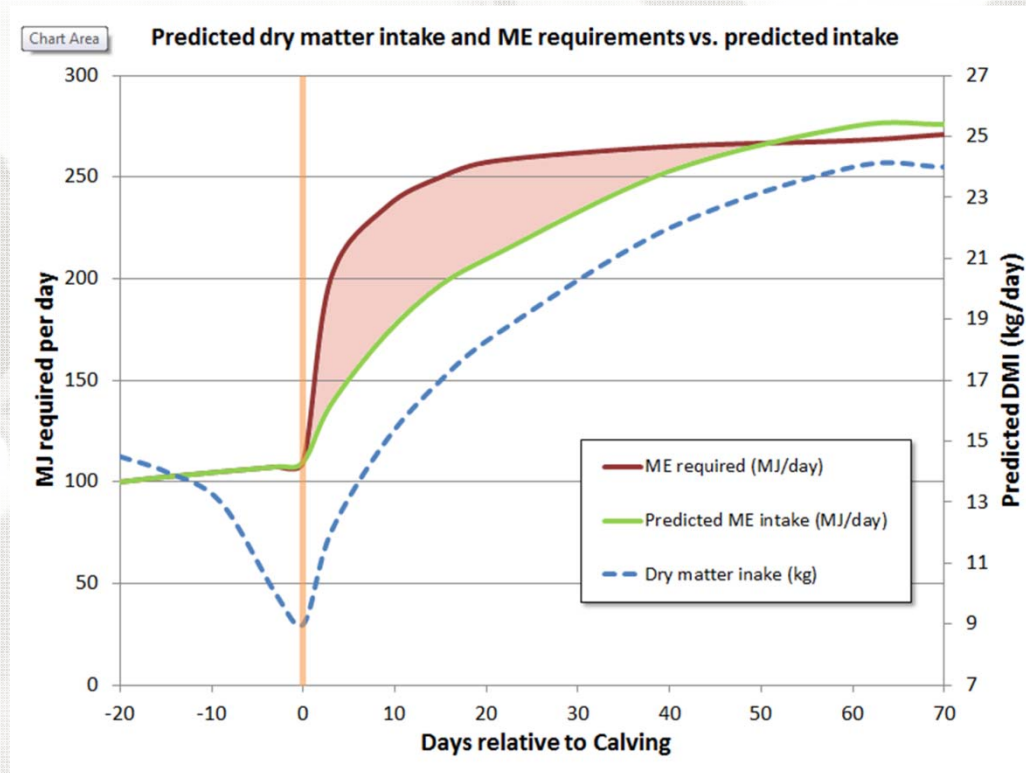
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Dairy cattle: metabolic athletes
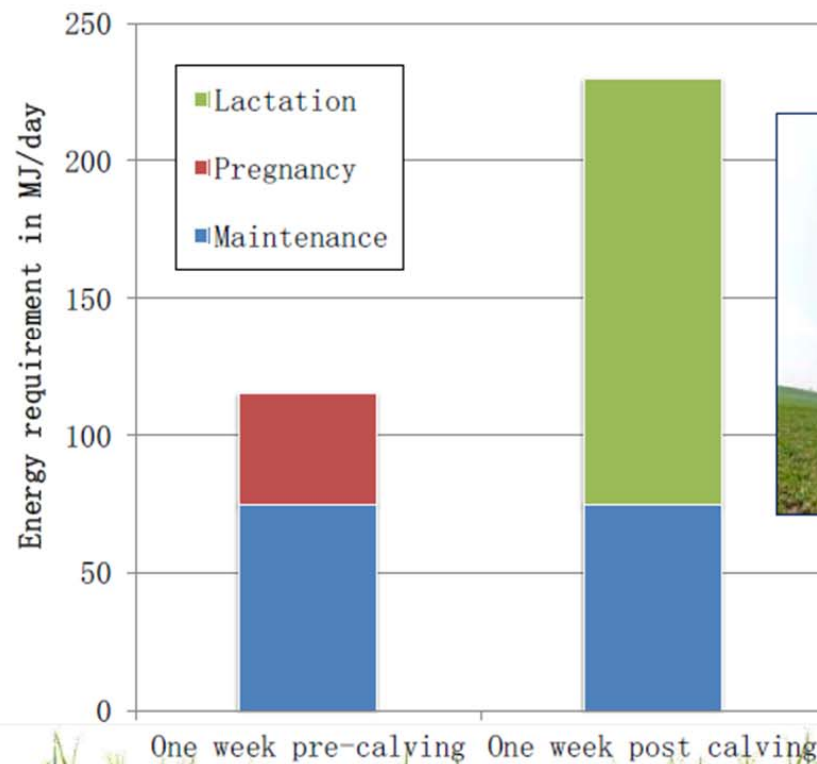
Negative Energy Balance (NEB)

Source: EBVC

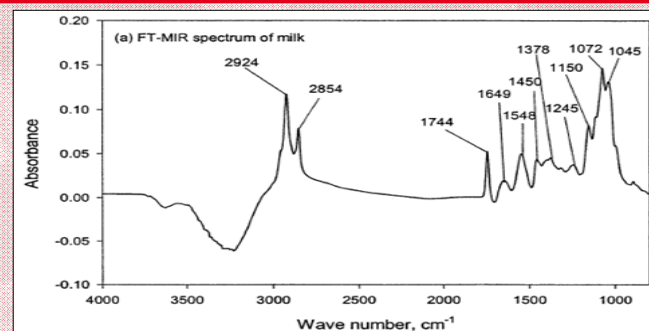*Know your cows, know your business*

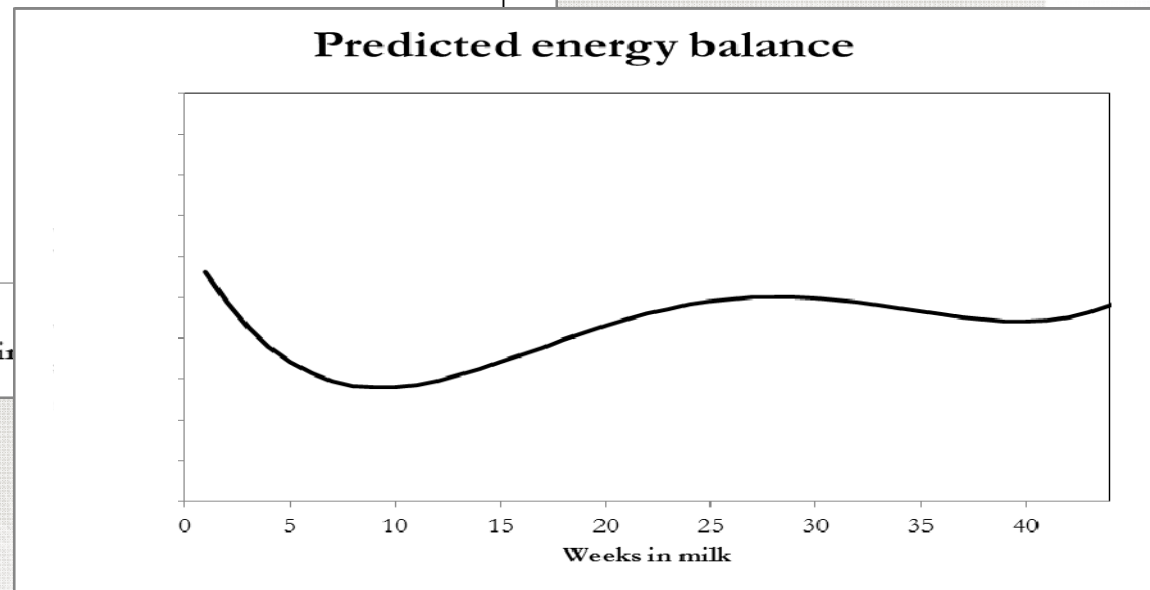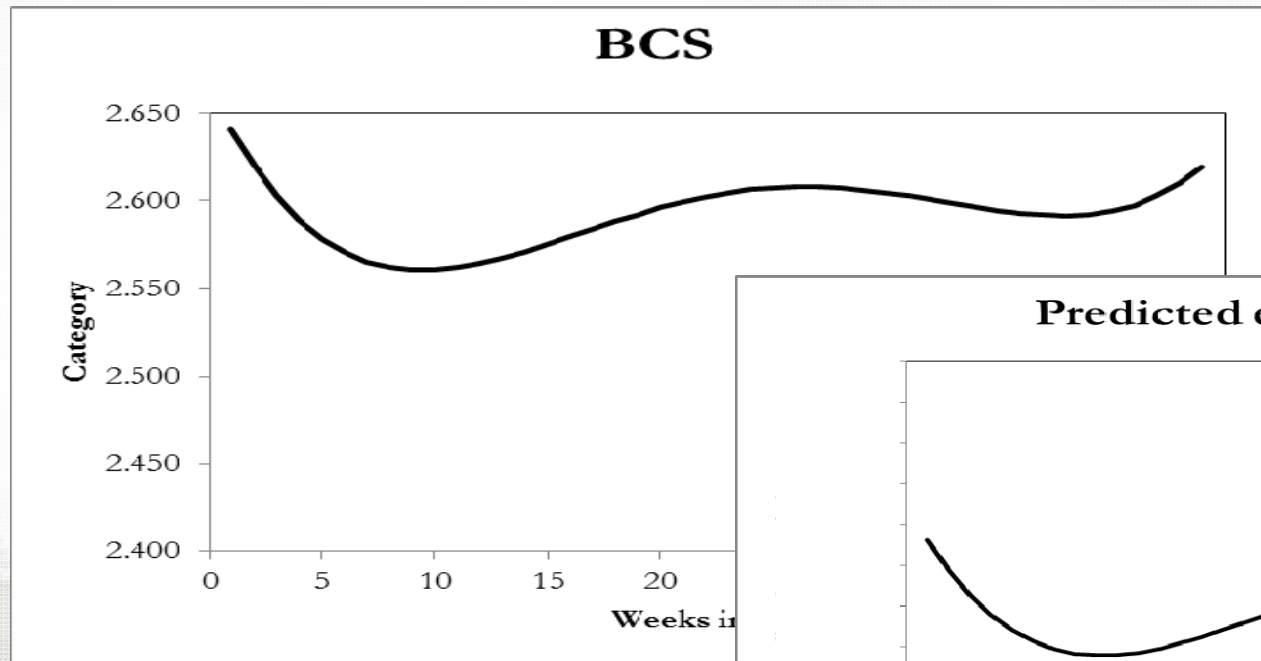# How do we do it?

MIR spectra from individual cow milk samples

Prediction equations

Energy Balance

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BCS and Energy Balance

Individual Cow Results...

Individual Cow Data

Line No	Name	Eartag	Lactation Number	Calving Date	DIM ▲	Fertility Status 09/06/2016	Milk Yield 09/06/2016	Energy Balance 12/04/2016	Energy Balance 11/05/2016	Energy Balance 09/06/2016
0360	M MAXI JENNIFER	UK305856602360	01	05/06/2016	4	Calved	29.80			
0079	M CANVAS KIM	UK305856502079	02	04/06/2016	5	Calved	37.60			
0385	M PLEASURE BRENDA	UK305856302385	01	03/06/2016	6	Calved	21.00			
0652	M ROY MILDRED	UK305856501652	04	03/06/2016	6	Calved	53.60			
0133	M DRAYMAN BRENDA	UK305856302133	02	02/06/2016	7	Calved	33.80			
0124	M BLUESKY BEATRIX	UK305856102124	02	30/05/2016	10	Calved	45.80			
0040	M CANVAS AMBER 2	UK305856602080	02	27/05/2016	13	Calved	42.60			
0571	M LEE JENNIFER RED 2	UK305856101571	04	25/05/2016	15	Calved	39.60			
0592	M SWEETNESS 65	UK120775704592	02	22/05/2016	18	Calved	39.00			
0861	M OUTBACK DEWDROP	UK305856401861	03	20/05/2016	20	Calved	45.00			
0646	M LEE BLACKBIRD	UK305856601646	04	16/05/2016	24	Calved	47.60			
0906	M BLUESKY PETUNIA	UK305856701906	03	12/05/2016	28	Calved	51.20			
0168	M DESTRY NADIA	UK305856302168	01	09/05/2016	31	Open	36.60			
0201	M DRAYMAN CLOVER	UK305856102201	01	06/05/2016	34	Calved	38.20			
0723	M FICTION HONESTY	UK305856601723	04	03/05/2016	37	Calved	56.60			
0910	M CANVAS AMBER	UK305856401910	03	30/04/2016	40	Ready	58.20			
0205	M PEDRO CHERRY	UK305856300810	08	29/04/2016	41	Open	38.80			
0028	M BLUESKY MAXINE	UK305856102096	02	28/04/2016	42	Ready	41.40			
0688	M MISSION BEATRIX	UK305856601688	04	27/04/2016	43	Ready	40.80			
0073	M CANVAS GAYNOR	UK305856602073	02	19/04/2016	51	Open	52.00			
0265	M PONDER PEACH	UK305856202265	01	17/04/2016	53	Open	22.80			
0515	M ROY DREAM	UK305856101515	05	16/04/2016	54	Ready	22.00			
0749	M CANVAS PETUNIA RED	UK305856401749	03	16/04/2016	54	Ready	48.00			

Legend: ■ Losing 1kg+ ■ Losing 0.5kg to 1kg ■ -0.5kg to +0.25kg ■ Gaining 0.25kg to 1kg ■ Gaining 1kg+
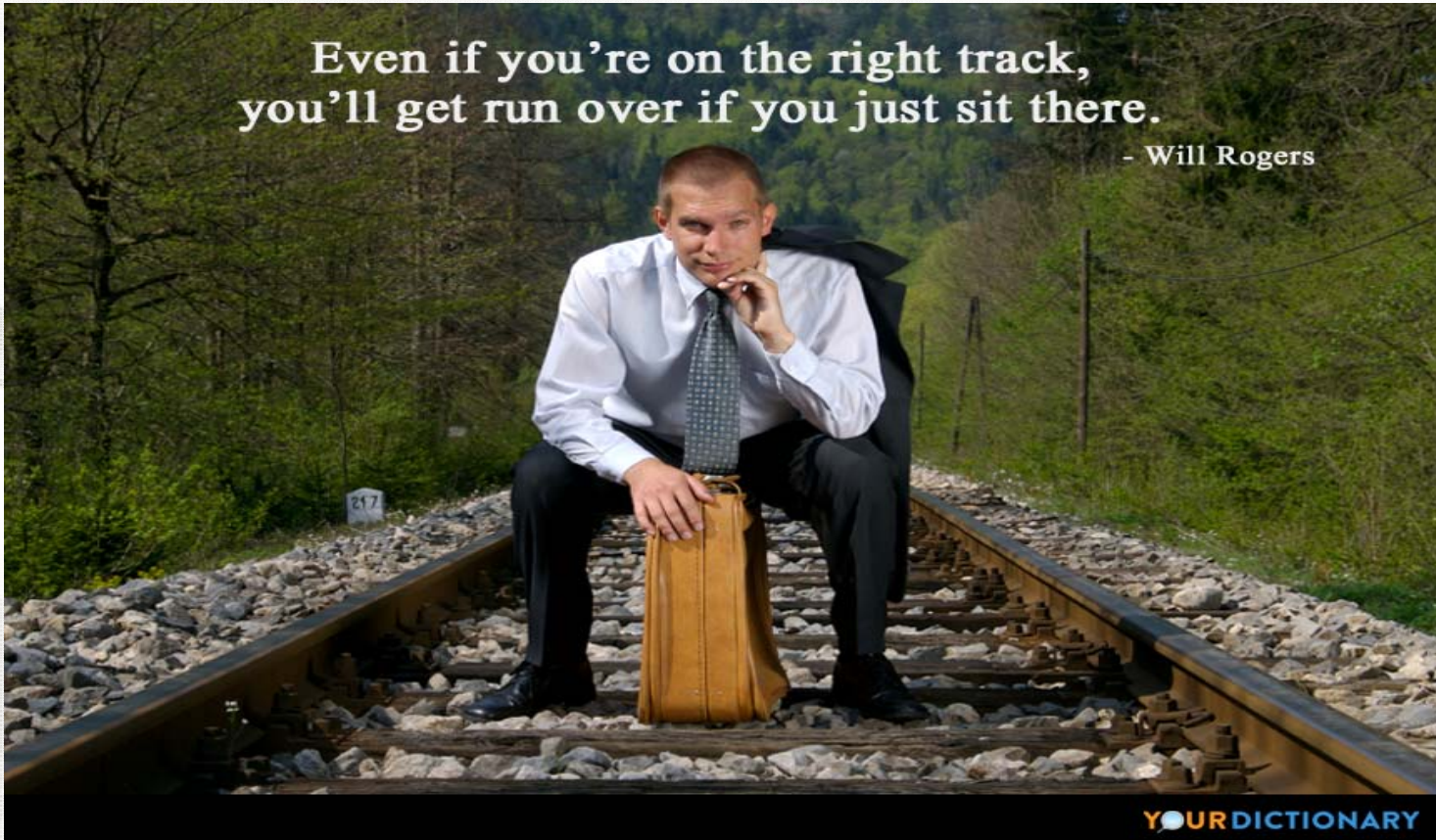
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Conclusions

- Growing demand for a new generation of innovative milk recording services........

- MRO's need to challenge themselves – and challenge their suppliers........

- Change is a constant – and those that respond most effectively to change will succeed

Thank you......

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