

Mastitis Management and SCC Control in Once a Day Herds

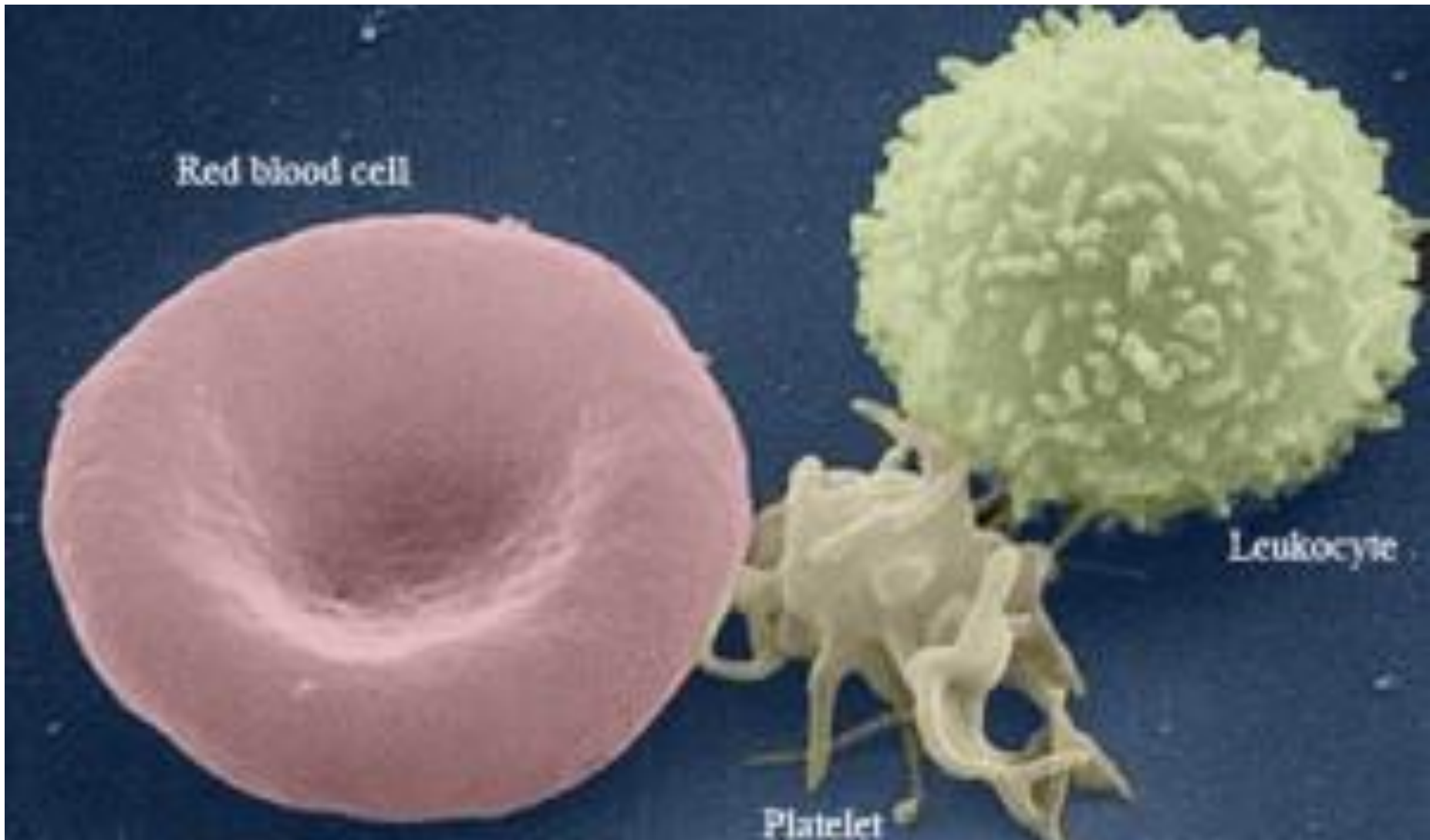
Don Crowley- Teagasc



What is a SCC ?

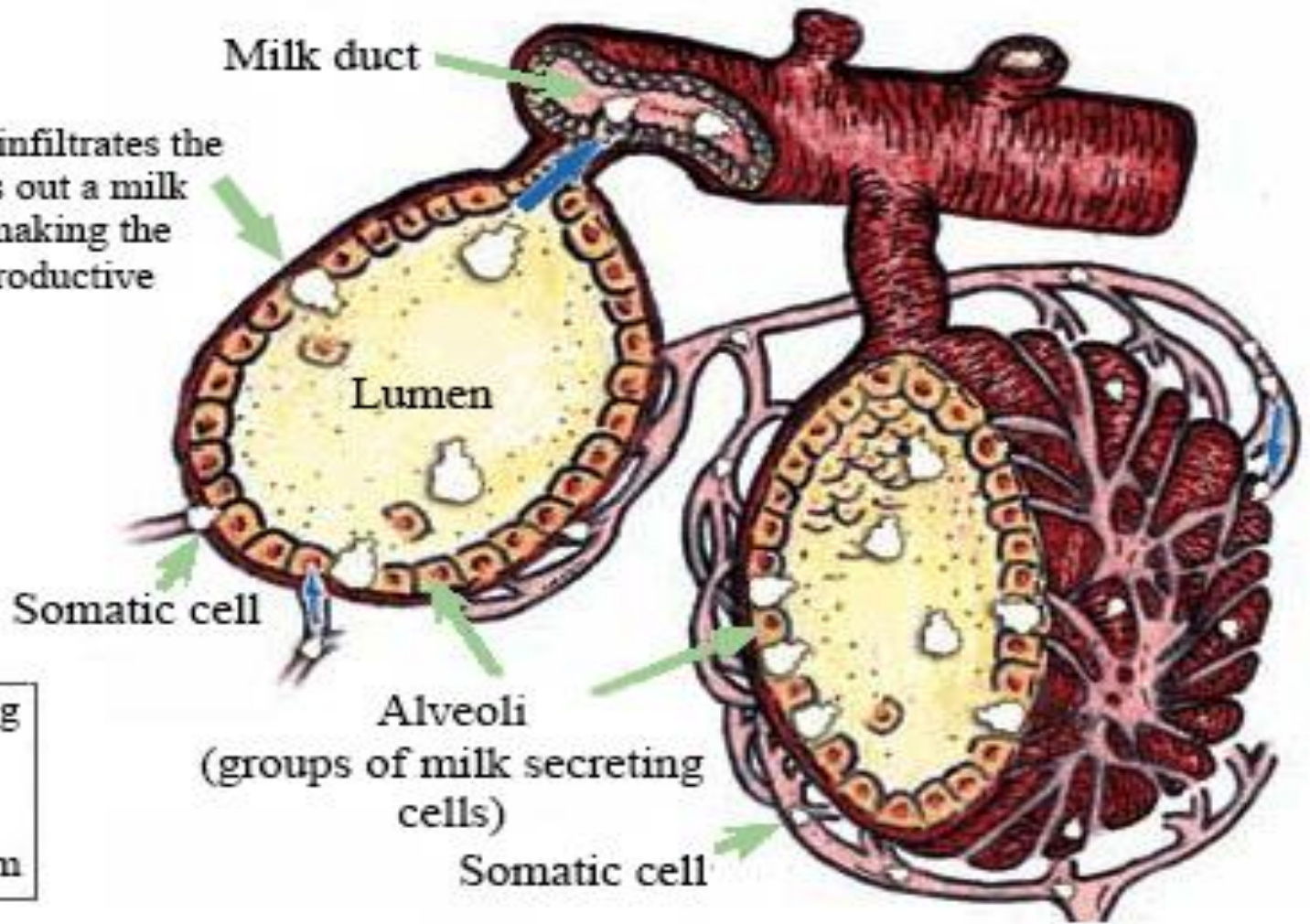
- **Somatic cells (or “body” cells)** are a mixture of milk-producing cells shed from the udder tissue (about 2%) and cells from the immune system (the other 98%), known as leukocytes (also called white blood cells).
- High Somatic cell counts indicate infection.
- To understand a bit more about the cells and why they are found in milk we need to understand the function of leukocytes a bit better.

Leukocytes are the cells responsible for identifying bacteria and killing them



Defence mechanism

As a somatic cell infiltrates the lumen, it pushes out a milk secretion cell making the alveoli less productive



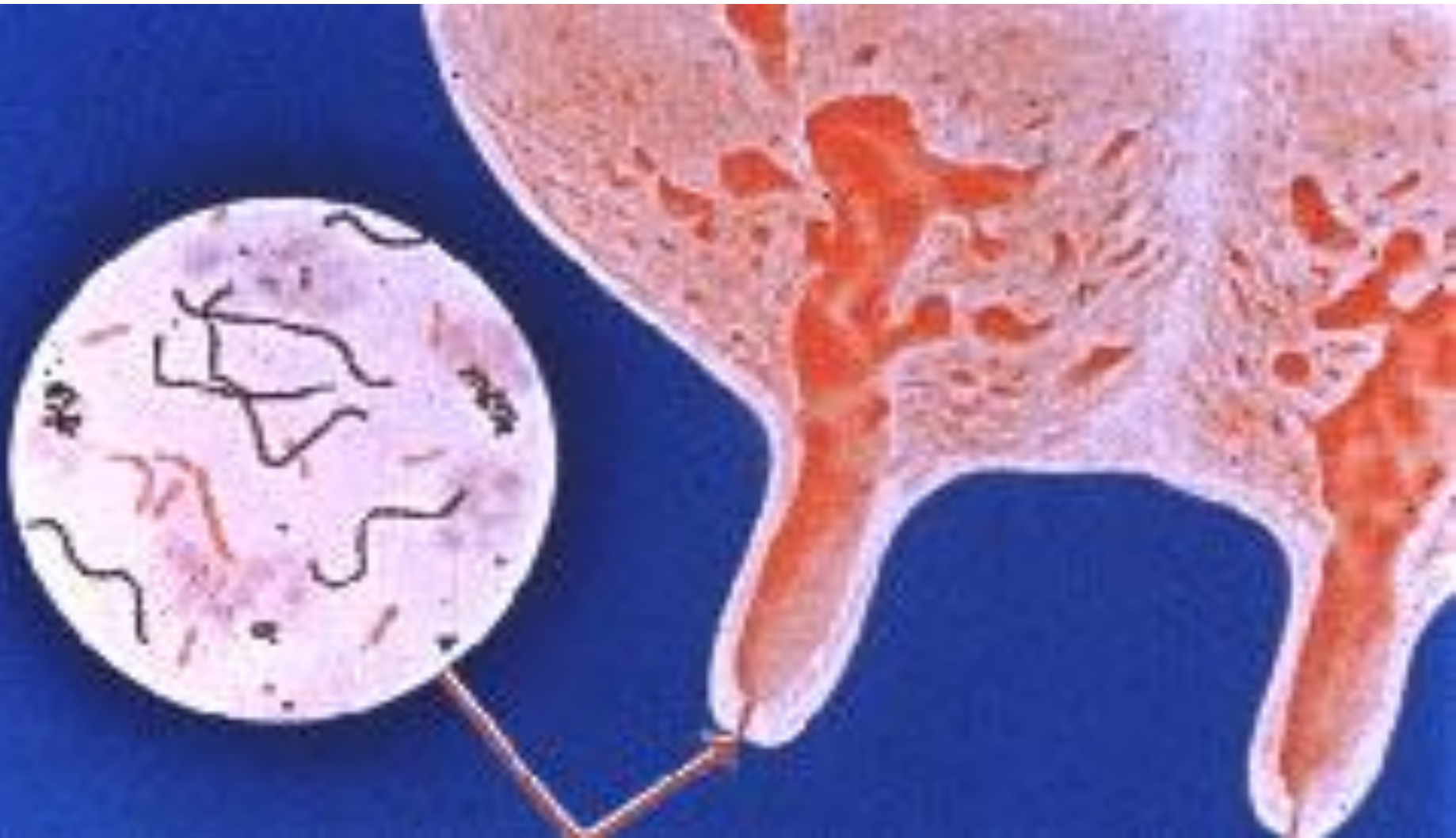
Inflammatory response



Once a Day Milking Risks

- Bacterial Challenge in the herd.
 - Milking Frequency.
 - Delay in Identification.
 - Impact on Cure rate.
 - Potential for infection.
 - Duration of milking.
 - Out by day in by night. (leaking on Beds)
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Bacteria Gain Entry Through The Teat Duct



Assess Teat End

Damage:Hyperkeratosis (scored)



Mastitis Control

- Mastitis Caused by Bacteria
 - Clinical Mastitis
 - Clots Visible
 - Sub Clinical Mastitis
 - No clots visible but have “High Cell Count”
 - This is Mastitis we cannot see
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Mastitis Categories

- Contagious mastitis
 - E.g. Staph aureus, Strep agalactiae

Environmental mastitis:

e.g. Strep uberus, E.Coli

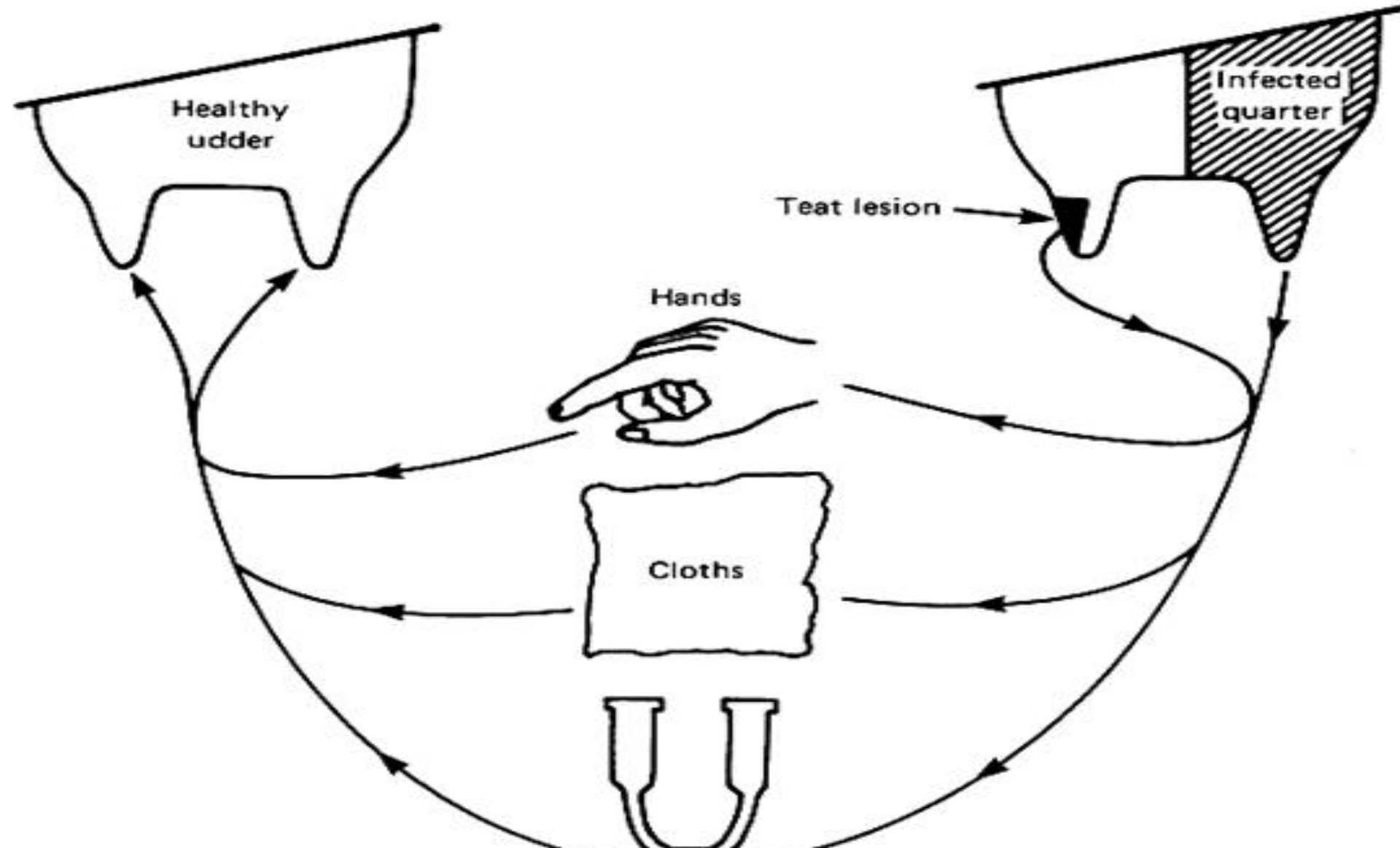
Staph Aureus and Strep Uberis

- Staph Aureus: Very important to control in once a day herds. Avoid under milking
- If converting from twice a day need to cull heavy, no chronic cows.
- Sub clinical infections. Cluster dip or segregate, cure rates very poor.
- Prevent spread.

For Strep uberis: Early detection crucial
can have a very sick cow in 12 hours,
dead in 24 hours !!!

- Environmental with contagious features

Main vectors for Contagious mastitis



Milking Parlour Issues

How does the action of the cluster influence milk quality?

1. **Liner compression**
 2. **Liner Age**
 3. **Rapid airflow towards the teat end (liner slips)**
 4. **Ineffective pulsation or pulsation failure**
 5. **Dr John Upton, Moorepark**
-

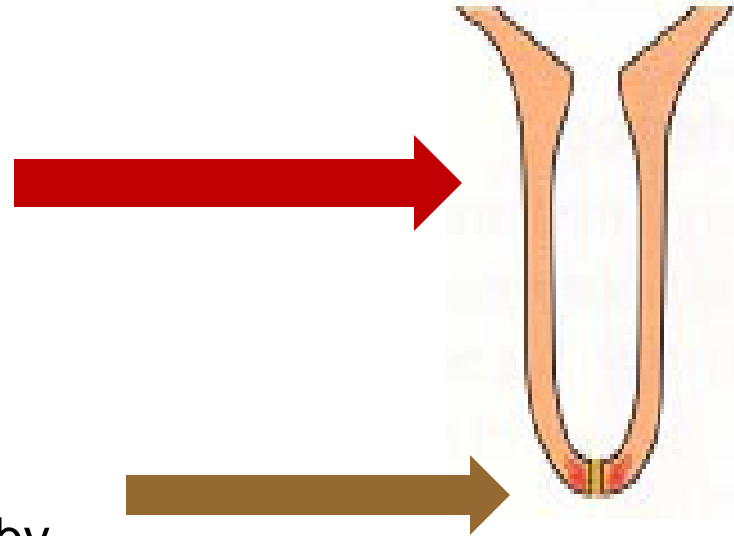
What is congestion

- **Congestion is the accumulation of blood within the circulatory system**
 - **engorged capillaries in the teat-end during the b-phase of pulsation**
 - **Oedema is the accumulation of fluids outside the circulatory system in extravascular tissues**
 - **Oedema is a consequence of persistent and severe congestion and it takes longer to subside than congestion**
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Teat Tissue Congestion

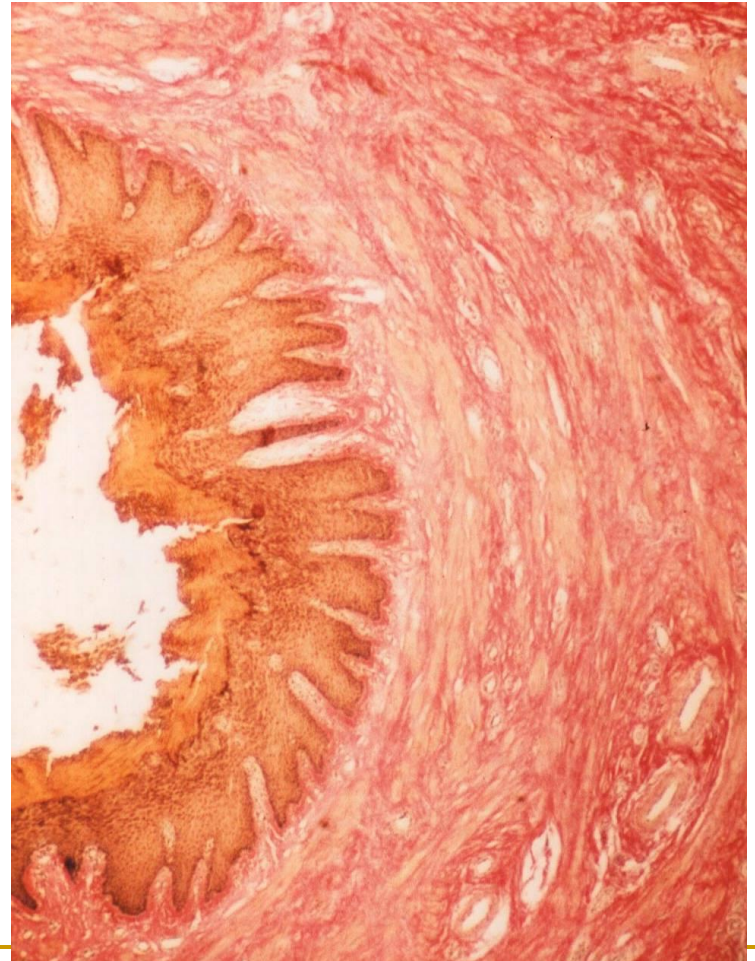
Teat Barrel Congestion produced by Mouthpiece Chamber Vacuum - cannot be relieved by liner collapse

Teat-End Congestion produced by milking vacuum – can be reduced by Liner Compression (LC also contribute to hyperkeratosis)



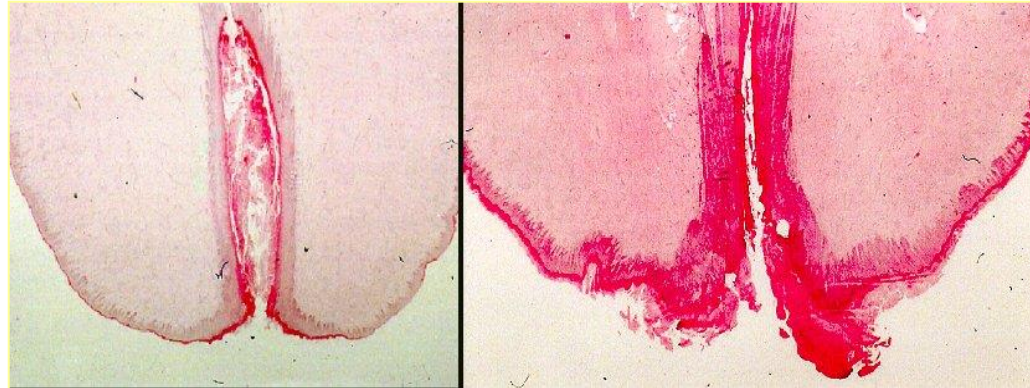
The Keratin Lining

- The Keratin removal is influenced by liner compression
- The balance of keratin production and removal is important in maintaining teat integrity



When Liner Compression is too high

- Increased teat-end hyperkeratosis
- Excessive keratin removal from canal



Normal,
smooth

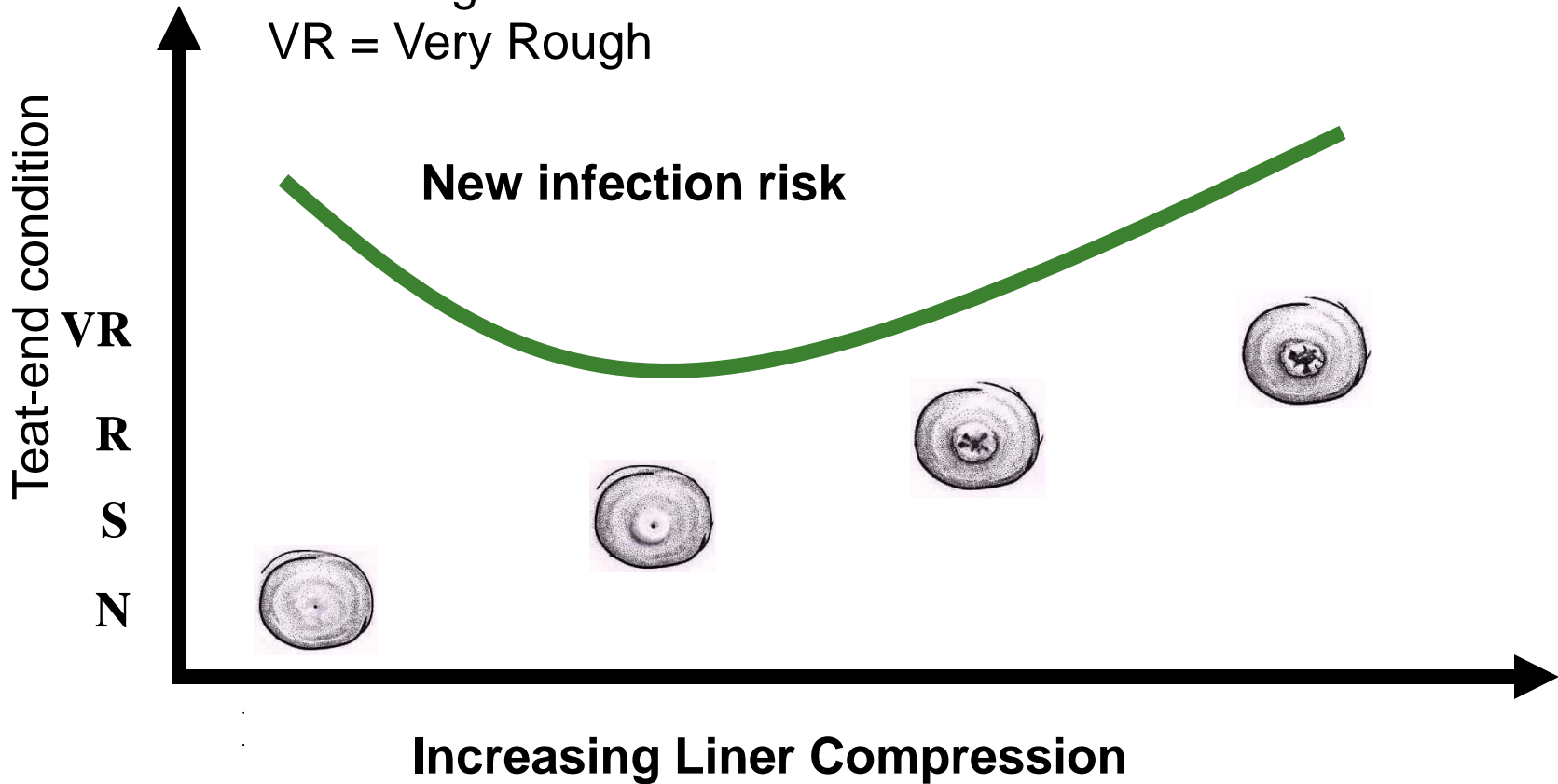


Hyperkeratosis,
rough



Hyperkeratosis and New Infection Risk

N = Normal
S = Smooth
R = Rough
VR = Very Rough



Optimize Compression of Liner

- Operating Vacuum of 46 kpa.
- Pulsation Ratio of 65:35 with D phase > 20
- If a high level of hyperkeratosis present consider triangle liners low compression.
- Improvement will be evident within 3 to 4 weeks.



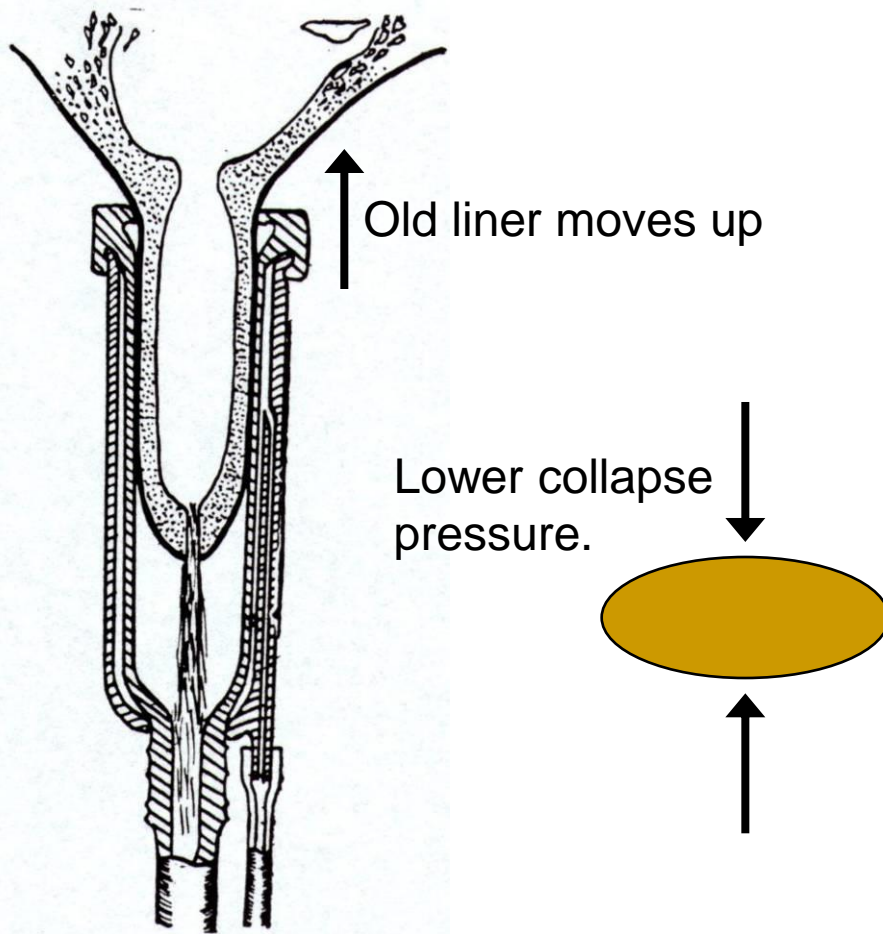
Liner age

- Liner age influences milking performance and milk quality
- Max liner life is 2000 milkings.
e.g. 10 rows of cows 1.5 x daily =
 $2000 / (10 \times 1.5) = 150 \text{ days} = 4.5 \text{ months}$

In once a day herds very important to stick to 2,000 milkings. May have to reduce if significant hot washing practiced.



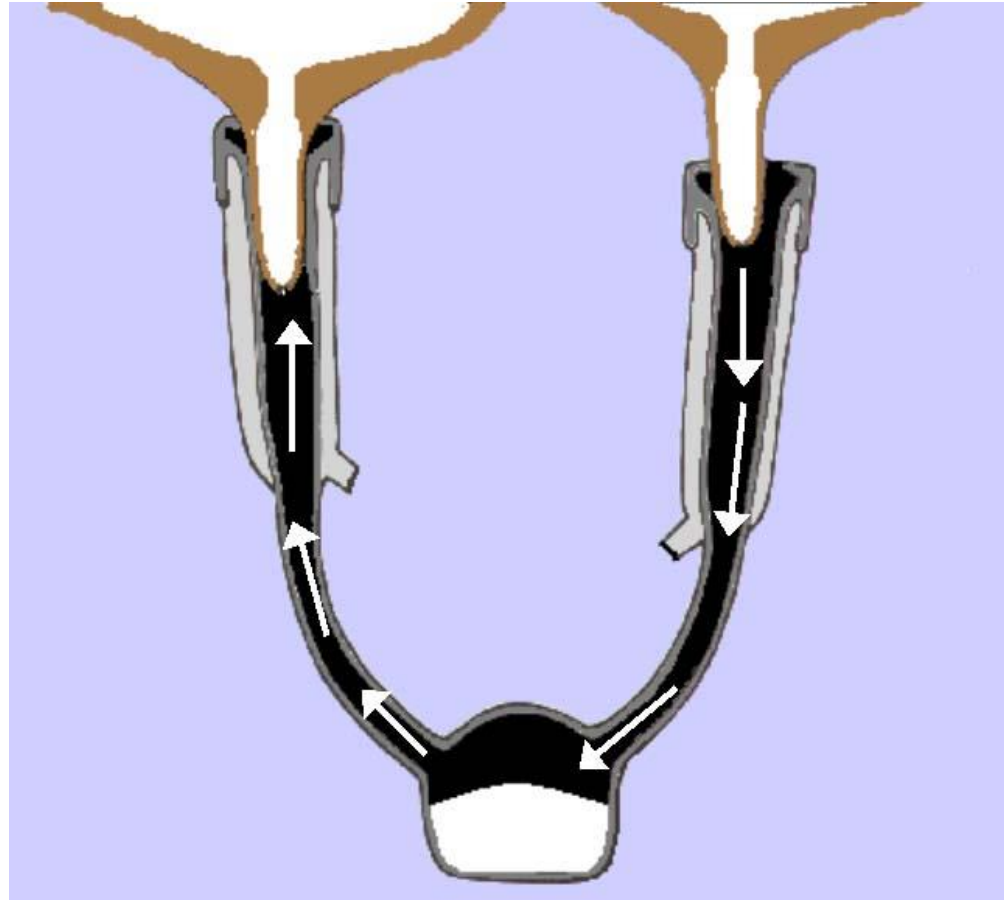
2. Liner ageing



- Old liners depress milk yield and cause longer milking times. NB in once a day.
- Teat sinus closes off which causes under milking. Very NB
- Milking phase is shorter hence milking time is lengthened
- Longer milking times will lead to dissimprovement in teat end condition

3. Liner Slips

- Liner slips result in rapid airflow towards the teat end
- Can transfer bacteria from one quarter to another within a cow
- Slips can be minimised by using manufacturer recommended liners
- Removing clusters gently
- Watch cluster alignment !!!



Pulsation failure

- Where no liner compression is applied, congestion will develop quickly, followed by Oedema
- Where congestion is the dilation of blood vessels (Quickly relieved when blood flow is restored via liner compression)
- Oedema is the pooling of circulatory fluid in extra cellular areas, which takes longer to recover



Pulsation failure

- **High levels of congestion results in a delay in the closure of the teat canal after milking – pathway for bacteria to enter the mammary gland**



Normal, closed orifice



Within one minute of cluster removal, the teat end orifice shows more than 2mm in wide or deep

Summary of Milking Parlours

- 1. Appropriate change of liners, e.g. 2,000 milkings max for once a day milking.
- 2. Operating vacuum of 46 kpa is adequate.
- 3. With reduced frequency adequate removal of milk is crucial. (Watch slow milkers).
- 4. Compression factor important to optimise keratin function. Pulsation 65:35 ratio.
- 5. Triangle liners an option low compression factor and easy on the operator.

Teat dip guidelines.

- Dr Dave Gleeson and Sarah Fitzpatrick PhD Student.



Guidelines when choosing a teat disinfectant

- Check if product is registered (PCS or IMB)- cross compliance check
- Pre/post or post disinfection products only
- Correct dilution and water quality may impact on disinfectant efficacy (hard water)- RTU best
- Adding additional emollients may impact on product efficacy
- Iodine products can lead to high iodine levels in IMF- never pre-spray with iodine
- Disinfectant products based on chlorine dioxide contain chlorates- potential issue for IMF
- Never spray/disinfect teats pre-milking without drying teats with paper- residues

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- New Research project on comparing efficacy of teat disinfectant products underway at Moorepark (WF ref: 2016054, project 0006)-initial results:
 - List of registered products on the market on Teagasc website-
<https://www.teagasc.ie/animals/dairy/milk-quality/>

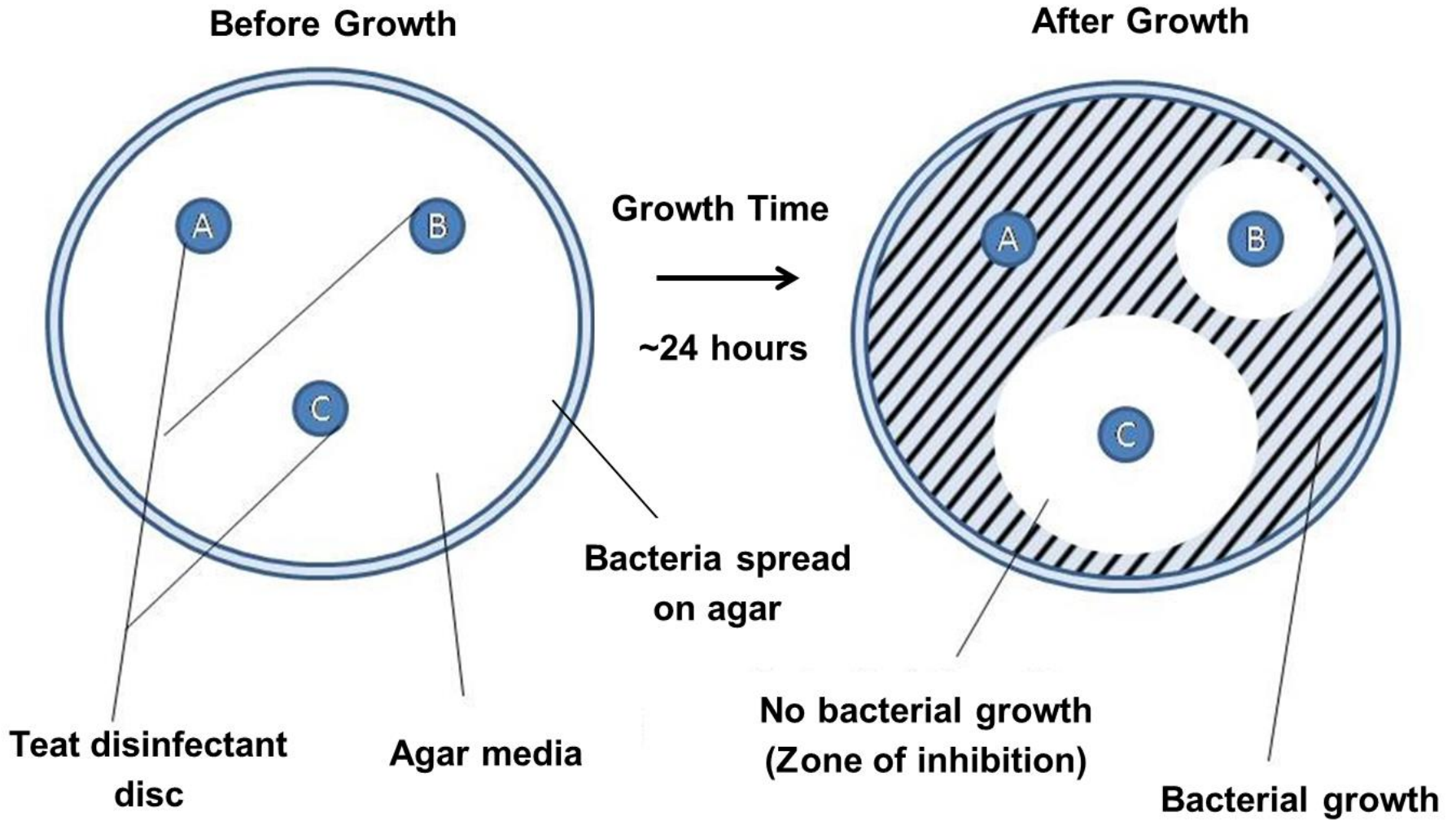
Method for evaluation of teat disinfectants

■ Disc Diffusion

- ❑ In lab test - Measures ability of antimicrobial agent to inhibit bacterial growth
- ❑ Strains placed on agar plates
- ❑ Discs soaked in teat disinfectant & applied to plate
- ❑ Zones of no growth around discs measured to determine efficacy (mm)

■ Strains tested from quarter milk samples:

- ❑ *Staphylococcus aureus*, *Streptococcus uberis*, *Escherichia coli*



Results

- High concentration Chlorhexidine (6000ppm) product 18% better than iodine based product
- Lactic acid and chlorhexidine and Lactic acid and salicylic acid products between 13-17% better than iodine based product
- 40% difference in efficacy between most effective and ineffective product
- Organic matter caused a 2% - 71% decrease in efficacy

Results

- Products containing Ammonium Lauryl Sulphate – most ineffective of all products tested
- High concentration Chlorhexidine and Lactic acid with Chlorhexidine or salicyclic acid products – most effective against a range of tested bacteria strains
- Best products had concentrations of
 - 5-12% lactic acid and 0.3-1.5 % chlorhexidine
 - 6000 ppm Chlorhexidine

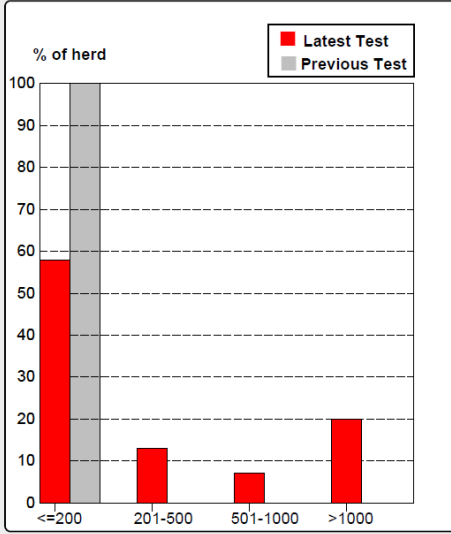
Results/Conclusions

- Products react differently in the presence of organic matter (pre-spraying dirty teats)
- High concentration Chlorhexidine and Lactic acid with Chlorhexidine most effective against *S. aureus*
- Post dipping with barrier dips proving very effective.

What Records are required:

- Cell Check Farm Summary
 - Mastitis incidence problem cow sheet.
 - Farm summary sheet
 - Mastitis records.
 - Culture and Sensitivity,
-

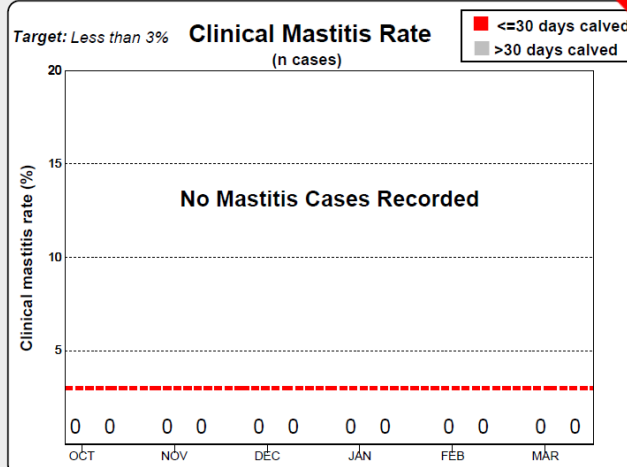
Herd SCC Distribution



Target: 85% of herd less than 200

Clinical mastitis

No mastitis cases



Note: Record treatments in the Record Events section of the ICBF web site www.icbf.com

Recording of cases of mastitis big weakness, text: cow id, mast to 089/4577663(back of white pocket herd book)

First recording is crucial for this calculation, to often first recording to late i.e. end of April.

Mastitis Control: Dry Period/Calving



Note: Cows with first recording >60 days after calving are not included.

	First Test since calving	All calvings in current lactation
New infection rate over the dry period		
Cows No. of cows calved that had a SCC <=200 in recording prior to calving (66) and >200 in the current recording (22).	33% Target: Less than 10%	33% 22/66 Target: Less than 10%
Heifers No. of heifers that had a SCC >200 in the current recording (15) as a percentage of all heifers calved (37).	41% Target: Less than 15%	41% 15/37 Target: Less than 15%
Cure rate over the dry period No. of cows calved that had a SCC >200 in recording prior to calving (11) and <=200 in current recording (2)	18% Target: Greater than 85%	18% 2/11 Target: Greater than 85%

New infection and cure rate over dry period can be assessed here.

Milk Recording - Summary Farm Report

MUNSTER A.I. & FARM SERVICES GROUP
BALLYVORISHEEN
MALLOW
CO. CORK
Tel: 022/43228

Herd owner: Sample Farmer
Herd No: IE1234516
Print date: 28/03/14
Test date: 21/03/14

Scheme A6

A

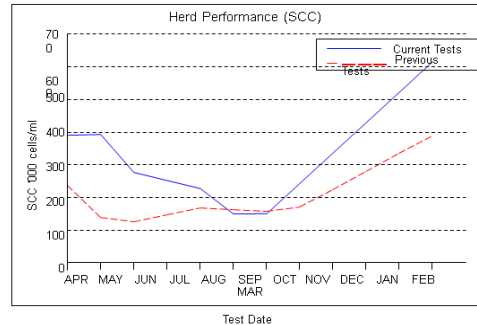
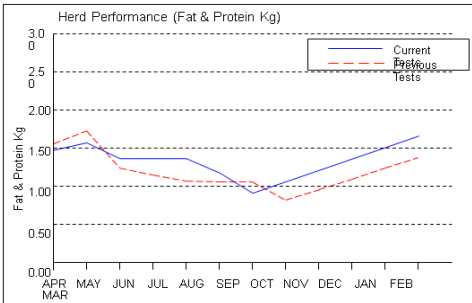


1. Production summaries

Group	Number of cows recorded	Average days in milk	M Kg	M Gall	Test Day / Yield to date / 305 day yield F%	P Kg	F+P Kg	Ave SCC	EBI (Euros)			
Overall	119	30	22.4	4.8	4.22	3.27	4.88	0.94	0.73	1.67	626	165
1st Lactation	39	35	17.9	3.8	4.30	3.26	4.95	0.78	0.59	1.37	637	185
2nd Lactation	29	31	22.4	4.8	4.17	3.21	4.94	0.93	0.72	1.65	387	
3rd Lactation	15	23	25.9	5.5	4.28	3.36	4.82	1.11	0.87	1.98	215	158
4+ Lactation	36	27	25.6	5.5	4.18	3.29	4.81	1.06	0.83	1.89	976	149
Dry Cows	34	264									0	145

- Average SCC per lactation
- Number of SCC>200,000
- Number of treatments if recorded
- Indicates potential contagious/Environmental mastitis

2. Comparative Herd Performance



3. Test day production history

Test date	Herd Performance										
	21-MAR'14	06-MAR'13	24-OCT'13	13-SEP'13	03-AUG'13	25-JUN'13	11-MAY'13	06-MAR'13	13-NOV'12	05-OCT'12	14-AUG'12
Number of cows	119	86	2	127	125	144	142	86	89	113	127
Milk kg	22.4	17.9	8.5	14	16.8	17.3	20.5	17.9	9.8	12.6	14.1
Milk gallons	4.8	3.8	1.8	3	3.6	3.7	4.4	3.8	2.1	2.7	3
Fat %	4.22	4.17	6.78	4.49	4.50	4.32	4.12	4.17	4.47	4.39	
Protein %	3.27	3.60	3.97	3.94	3.65	3.59	3.59	3.50	3.89	3.92	
Lactose %	4.88	4.79	4.26	4.63	4.89	4.75	4.85	4.79	4.52	4.51	
Fat kg	0.94	0.75	0.57	0.63	0.76	0.75	0.84	0.75	0.44	0.56	
Protein kg	0.73	0.63	0.34	0.55	0.61	0.62	0.74	0.63	0.38	0.5	
F+P kg	1.67	1.38	0.91	1.18	1.37	1.37	1.58	1.38	0.82	1.06	1.07
SCC	626	395	154	153	232	282	400	395	173	161	170

- Average SCC of previous 10 recordings
- Can identify trends over year
- Identify potential dry cow issue

B

Mastitis Incidence Problem - Cow Report

MUNSTER A.I. & FARM SERVICES GROUP
 BALLYVORISHEEN
 MALLOW
 CO. CORK
 Tel: 022/43228

Herd owner: Sample Farmer
 Herd No: IE1234516 Scheme A6
 Print date: 28/03/14
 Test date: 21/03/14 Page: 1(4)

Cow ID	Cow name	I&R-Tag Sire ID	Calv. Date	Lact. Age Group	Lact. Days	Mastitis Incidence History (Current Lactation)						Prev. lact. Ave. SCC Tests > 200 Mast Treats
						Tests > 200 Mast Treats	Latest SCC % Herd SCC Last treat	Previous SCC (*1000) herd tests mastitis treatments			Previous mastitis treatments	
						21-mar	24-oct	13-sep	03-aug	25-jun	11-may	
1774	GYK	IE-1412319-1-1774	06/02/14	2y 2m	43	1	3009	7.7				
947		IE-1412319-7-0947	19/02/14	8y 1m	30	1	3183	6.1				
1260	OGI	IE-1412319-8-1260	06/02/14	5y 2m	43	1	2672	5.9				572
1164	SJT	IE-1412319-2-1164	22/02/14	6y 1m	27	1	3183	5.6				1794
1855	HWY	IE-1412319-8-1855	06/02/14	2y 1m	43	1	5892	5.1				0
969		IE-1412319-4-0969	18/02/14	8y 0m	31	1	2825	4.3				191
1320	OGI	IE-1412319-1-1320	08/02/14	5y 1m	41	1	2504	4.3				2
1169		IE-1412319-7-1169	14/02/14	6y 1m	35	1	3131	4.2				0
1691	WLI	IE-1412319-1-1691	18/02/14	3y 1m	31	1	2468	4				46
1301	WKP	IE-1412319-7-1301	23/02/14	5y 1m	26	1	280	3.8				0
1682	WIU	IE-1412319-9-1682	22/02/14	3y 1m	27	1	3162	3.4				0
1278	MCG	IE-1412319-9-1278	08/03/14	5y 2m	13	1	2157	3				50
1257	AAP	IE-1412319-4-1257	28/02/14	5y 2m	21	1	2021	2.9				0

- SCC ranked in order of % contribution to herd average
- SCC and milk yield taken into account

- Average SCC for previous lactation
- Shows number of tests > 200,000
- No. of mastitis treatments
- Can identify potential dry cow/spring housing

C

D

2672
5.9

191
2
0
0
0
0

3 Main areas to address

- 1/3 Milking parlour
 - 1/3 Milking routine.
 - 1/3 Infection control/housing/hygiene
-

PARLOUR ISSUES

Mouthpiece chamber

Mouthpiece

Liner barrel

Shell

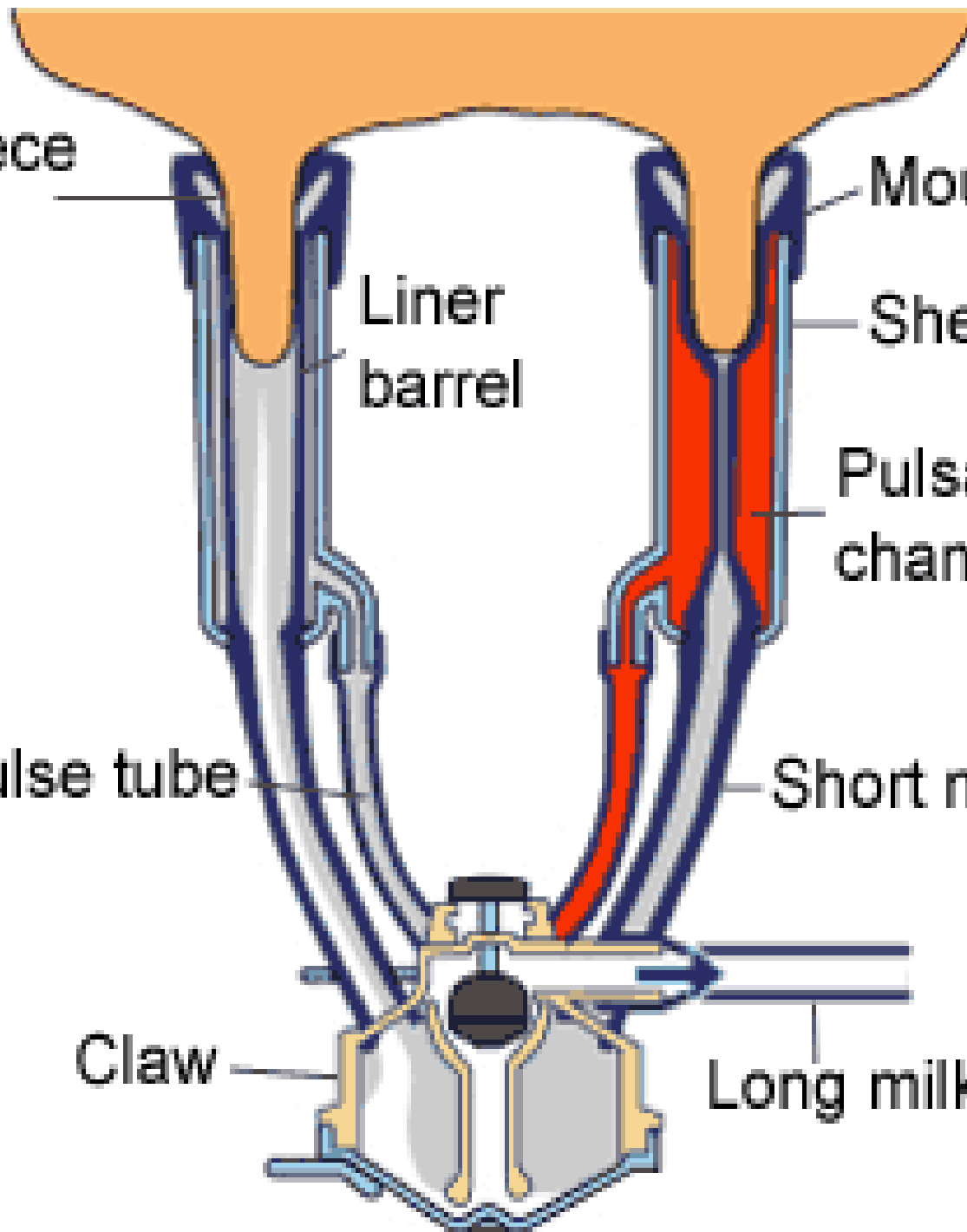
Pulsation chamber

Short pulse tube

Short milk tube

Claw

Long milk tube



Parlour tested and Voltage assessed

- Vacuum settings 48 Kpa
 - Pulsation Ratio 65:35
 - Pulsation rate 60 pulse per minute
 - Liners change every 2,000 milkings.
-

Cluster Removers: ACR settings 2.5 to 3 seconds



Liners are they inline and good quality.



Liner Indicators:



Thumb Test Pulsation Ratio 65:35 or
68:32 and a pulsation Rate 60 pulse/min



Blocked Air Bleeds:



Air Shut Off Buttons:



Cluster Alignment and Cluster Removers



Length of Long milk tubes, Short Air tubes



Vacuum Clock: Vacuum settings between 46 and 48 Kpa.



Vacuum Fault



Regulator Blocked (Common Problem)



Accurate Culling Policy Crucial

- Must cull chronic cows
 - 3 counts over 1 million.
 - Repeat cases of clinical mastitis.
 - Abnormal Quarter.
 - These cows will start well in recording.
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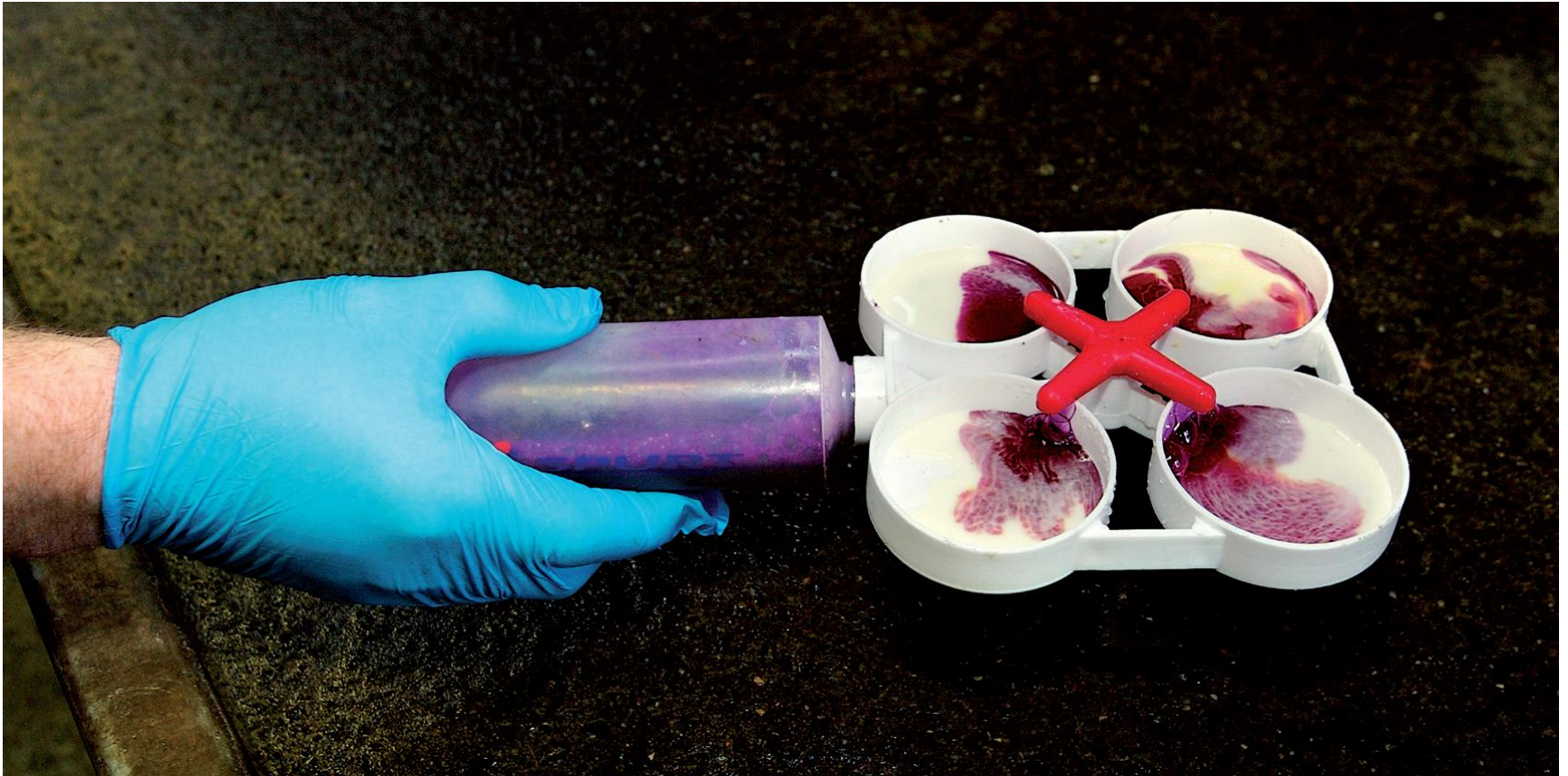
Milking Routine

- Crucially important.
 - Significant variation between farms.
 - Multiple milkers.
 - May have to recommend FRS milking course.
 - Don't under estimate impact.
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Proper Dipping post application: 15
mls per cow per milking



CMT KIT/Early Milk Recording





Lock off cubicles for 30 minutes.



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- Thank You
 - Best of luck with the season ahead!
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