

Precise Milking Practices for improved udder health



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Date: Feb 18, 2021

Udder Health at UVAS Dairy



Udder Health Problems

Contagious Mastitis



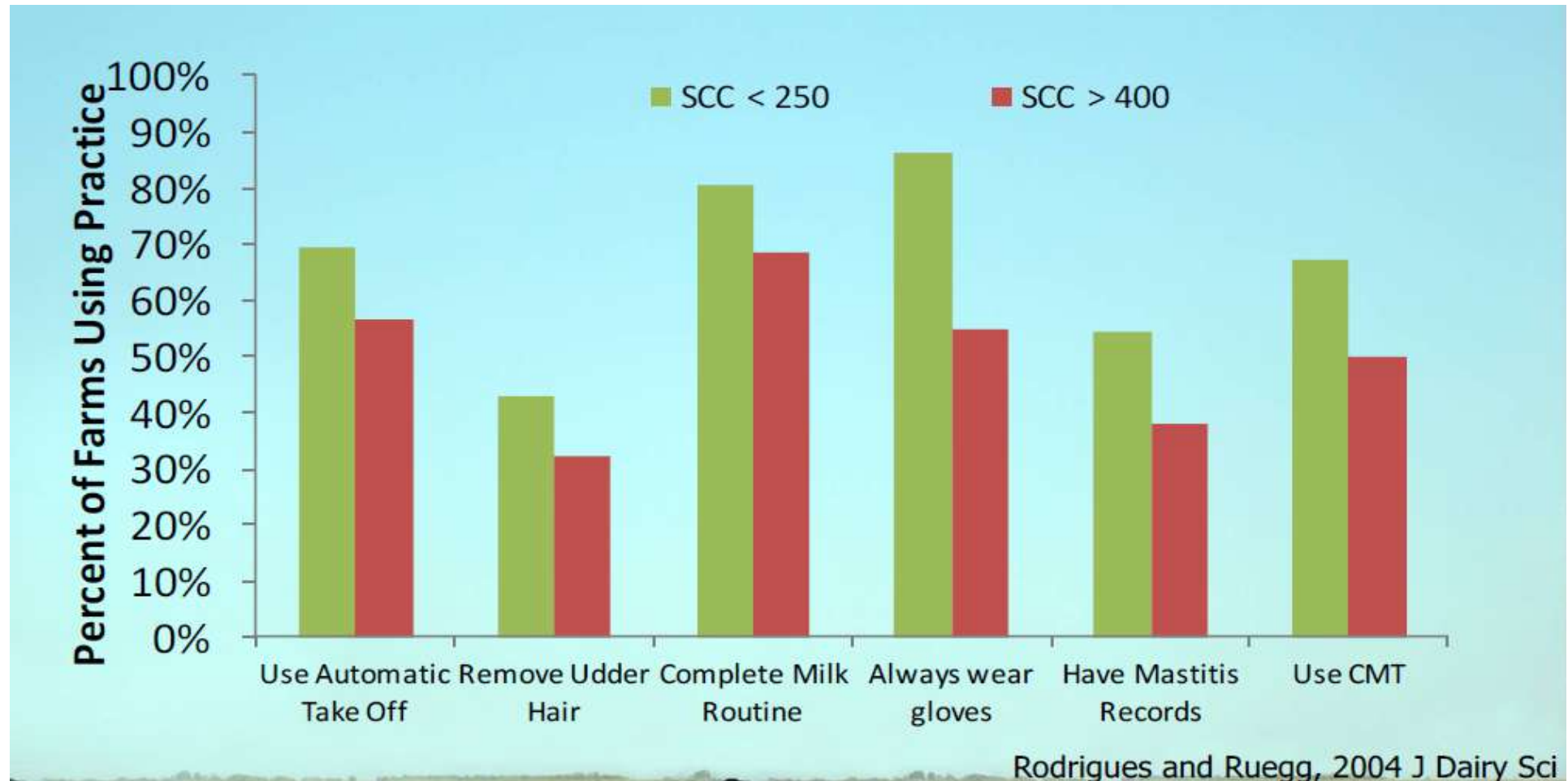
- Reservoir is infected udders
- Teat dipping is extremely important for control
- Results in increased SCC

Environmental Mastitis

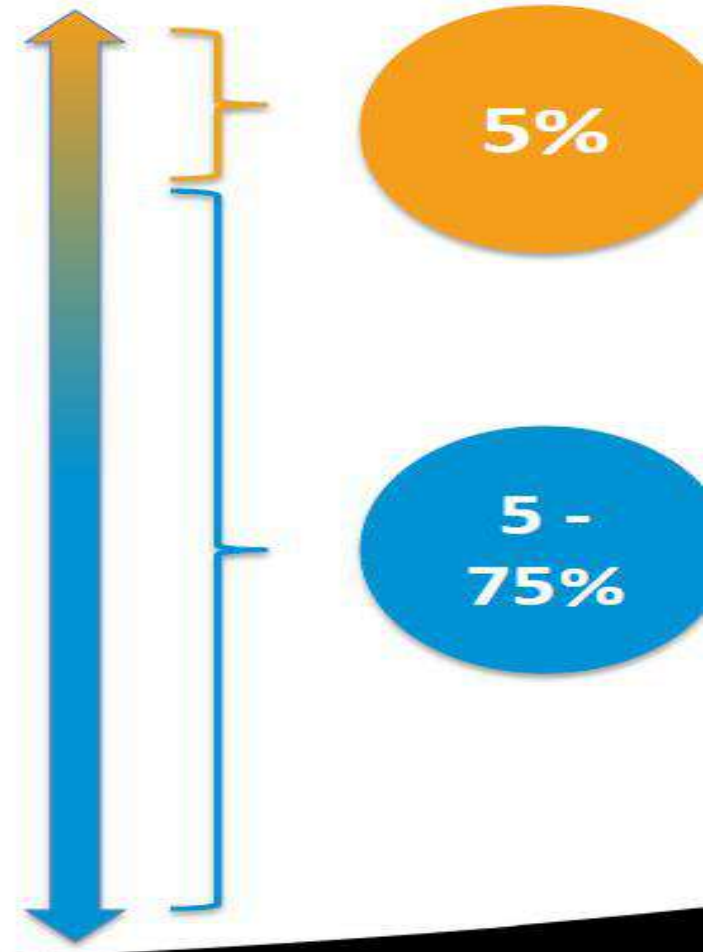


- Exposure occurs in cow housing areas
- Udder hygiene is extremely important for control
- Often results in increased number of clinical cases

Udder health is cumulative effect of adopting best management practices



Mastitis Manifestation



Consequence of subclinical and clinical mastitis

SCC	Loss of milk production (in %)
100 000	3
200 000	6
300 000	7
400 000	8
500 000	9
600 000	10
700 000	10,5
800 000	11
900 000	11,5
1 000 000	12

GOAL:

- 85% herd < 200.000 SCC
- <5% of the herd with new cases of subclinical mastitis

Source: DAIRY Herd improvement association et Dr PHILIPOT (1984)

Estimated milk production of 9000 kg milk and SCC = 500.000

→ 9000 kg - 9% = 8145 kg → a loss of 855 kg milk in this lactation !

Individual Sampler, Somatic Cell Counter and Cassette



Somatic Cell Count By DCC at UVAS Dairy



CMT and SCC Strips used at UVAS Dairy



Essential aspects of milking routine

- **Predipping**
 - Reduces bacteria on teats by 5X
- **Forestripping**
 - **Only** method to find mild clinical mastitis
- **Adequate drying of teats**
 - One dry towel per cow
- **Timely Attachment**
 - 1-2 minutes after stimulation
- **Effective post-milking teat disinfection**
 - 75% of teat skin covered with **GOOD** commercial teat dip

Predip, Forestrip, Drying and Unit Attachment at UVAS Dairy



Milking Procedure



Effective predipping

Effective predipping

- Reduced bacterial counts in milk by 5X

Procedure

- Proper formulation of dip
- Completely applied to debris free teats
- Sufficient contact time
 - 30 seconds

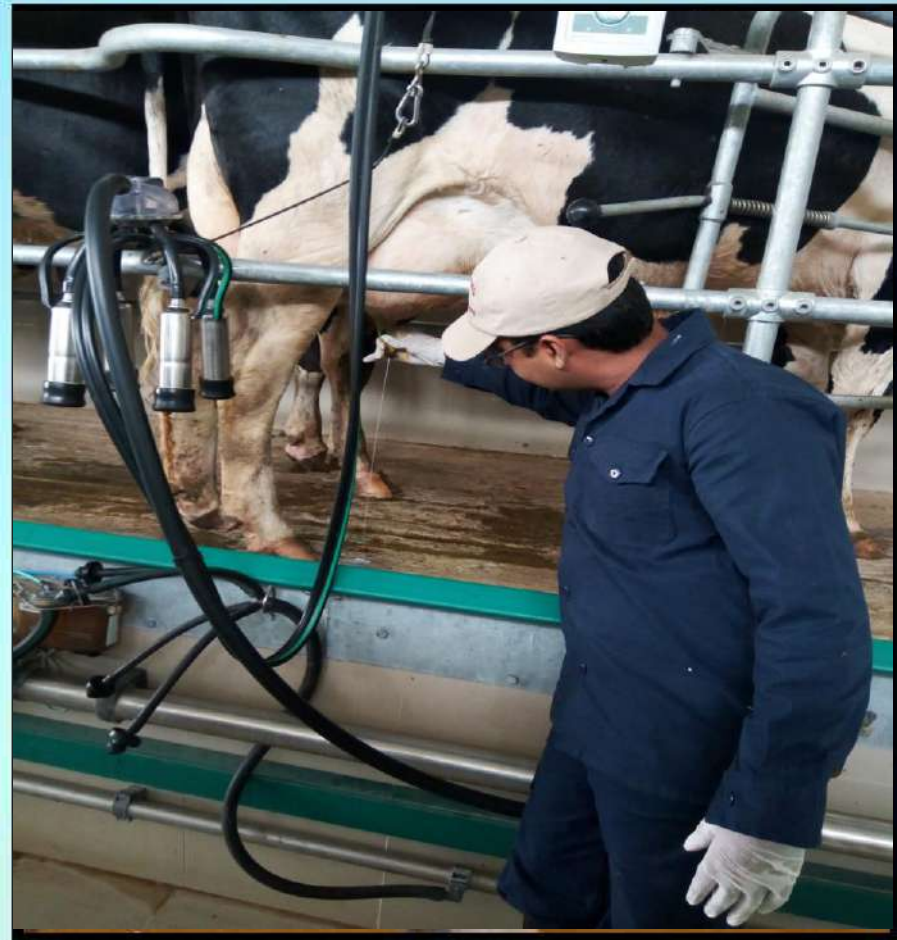
Effect of Udder Preparation on Bacterial Counts



Galton et al., 1986

Forestripping

- Only method to detect mild clinical mastitis
- Highest bacteria counts are in milk teat cistern
- Before or after predip?



Order of predip and forestrip

	Forestrip then Predip	Predip then Forestrip	P value
	N = 35	N = 53	
Milk per cow (kgs)	32.7	32.8	0.86
Cows/Hour/person	42.6	39.9	0.37
Clinical Mastitis Rate	5.7%	5.4%	0.73
New Subclinical Rate	11.0%	9.8%	0.13

Forestripping

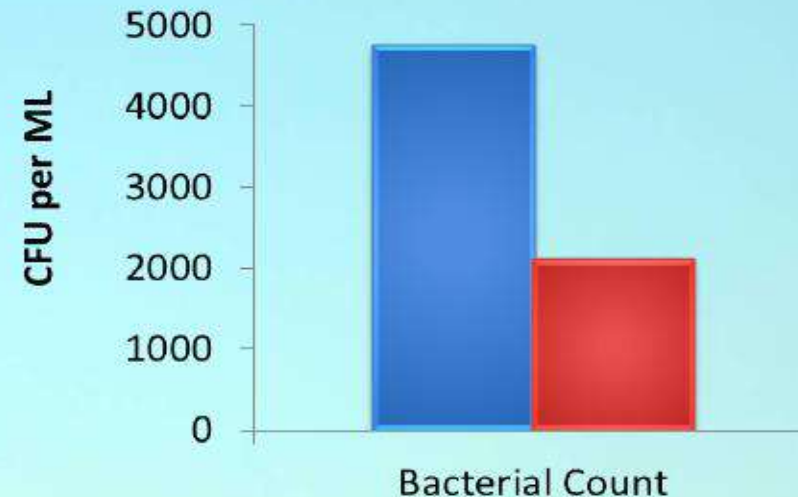
- When teats are clean
 - Forestrip first?
 - No chance to recontaminate already clean teats
- Wear gloves
 - Clean or change as needed



Adequate drying

- Most important step in premilking hygiene
 - Moisture is a growth requirement for bacteria
- Herds that dried teats had SCC 44,000 cell/ml lower than herds that did not
 - Moxley et al., 1978
- Wet towels can't adequately dry teats

Effect of Drying on Bacterial Counts of Milk



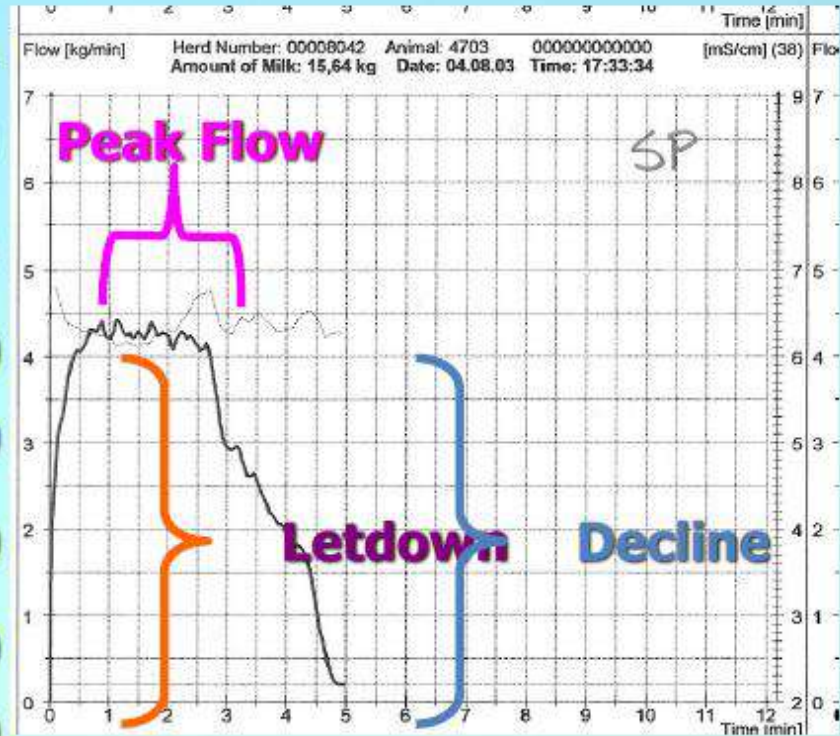
■ Wet Towel, Sanitizer, NO DRYING
■ Wet Towel, Sanitizer, DRYING

Galton et al., 1984

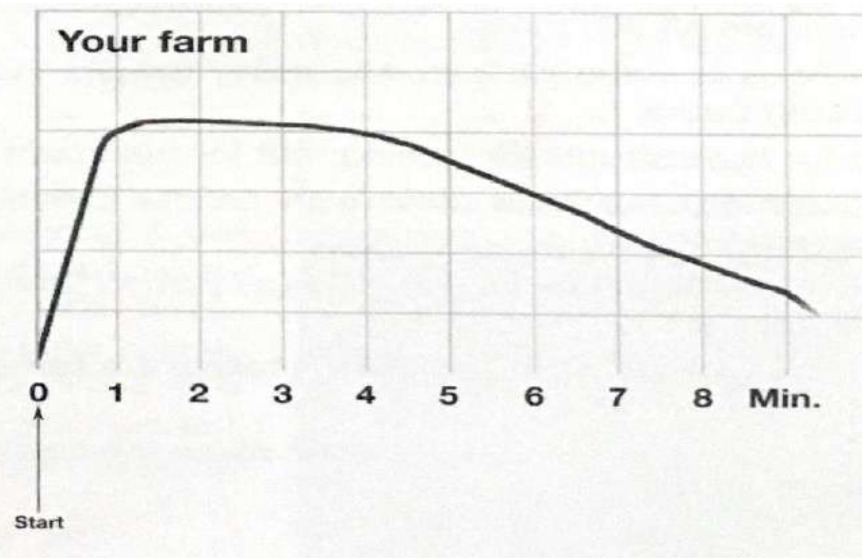
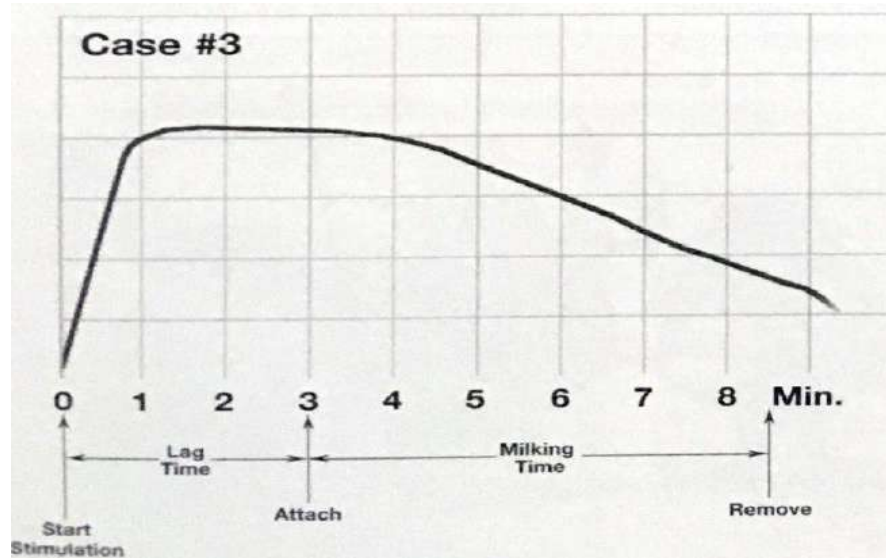
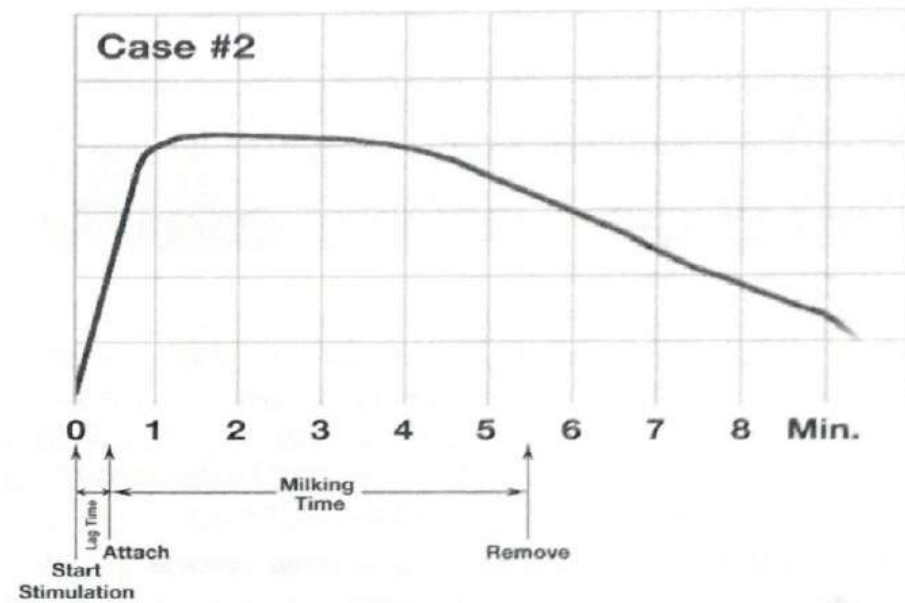
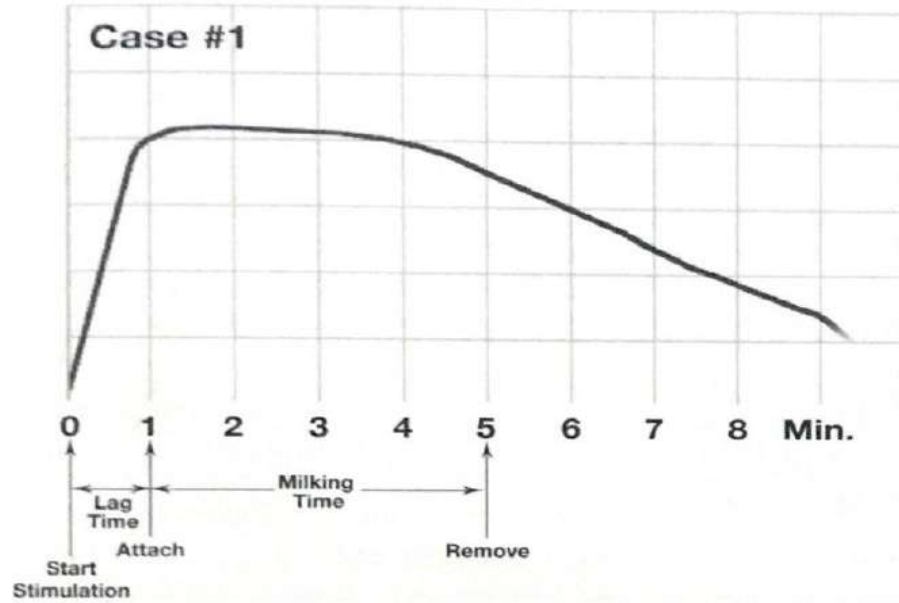
Timely application of unit

- Objective is to coordinate attachment with milk letdown
- Prep-lag time
 - 60- 90 second generally recommended
 - Negative consequences reported when > 3.0 minutes
- Need for stimulation varies
 - Breed
 - Yield
 - Stage of lactation

kgs per
Min
5.0
4.0
3.0
2.0
1.0
0.0



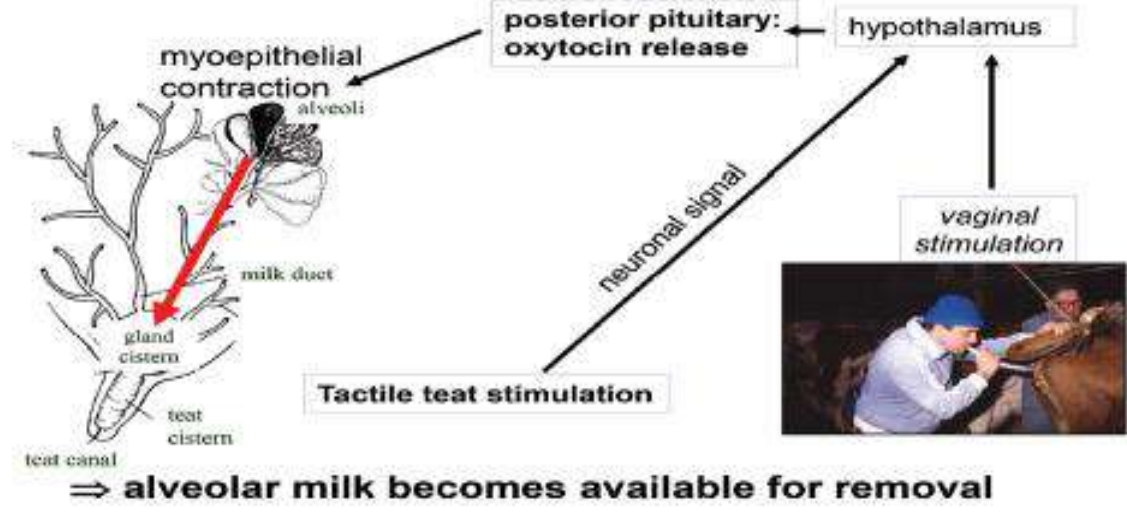
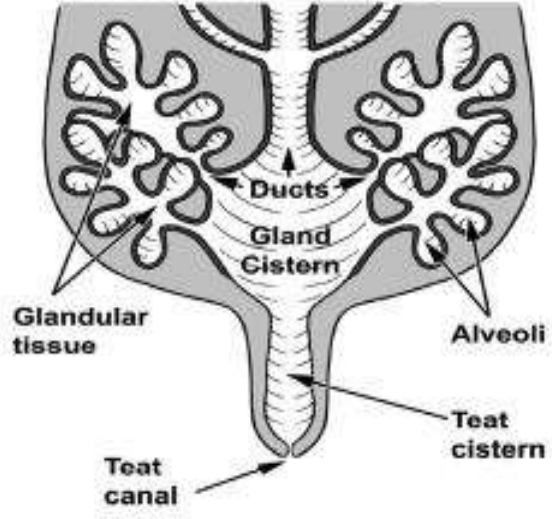
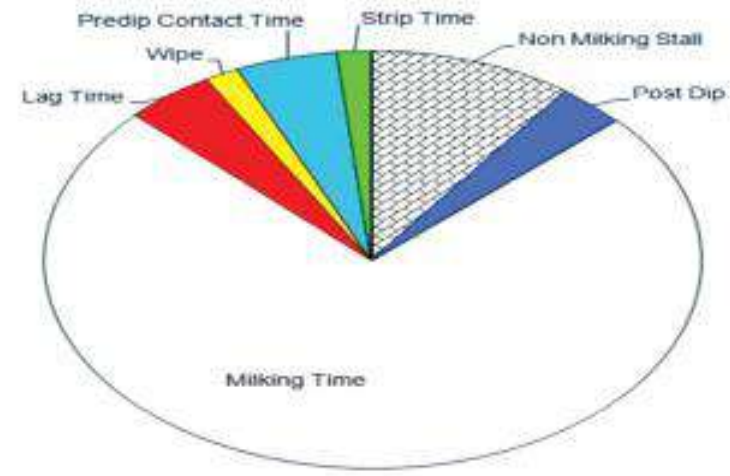
Oxytocin Curve



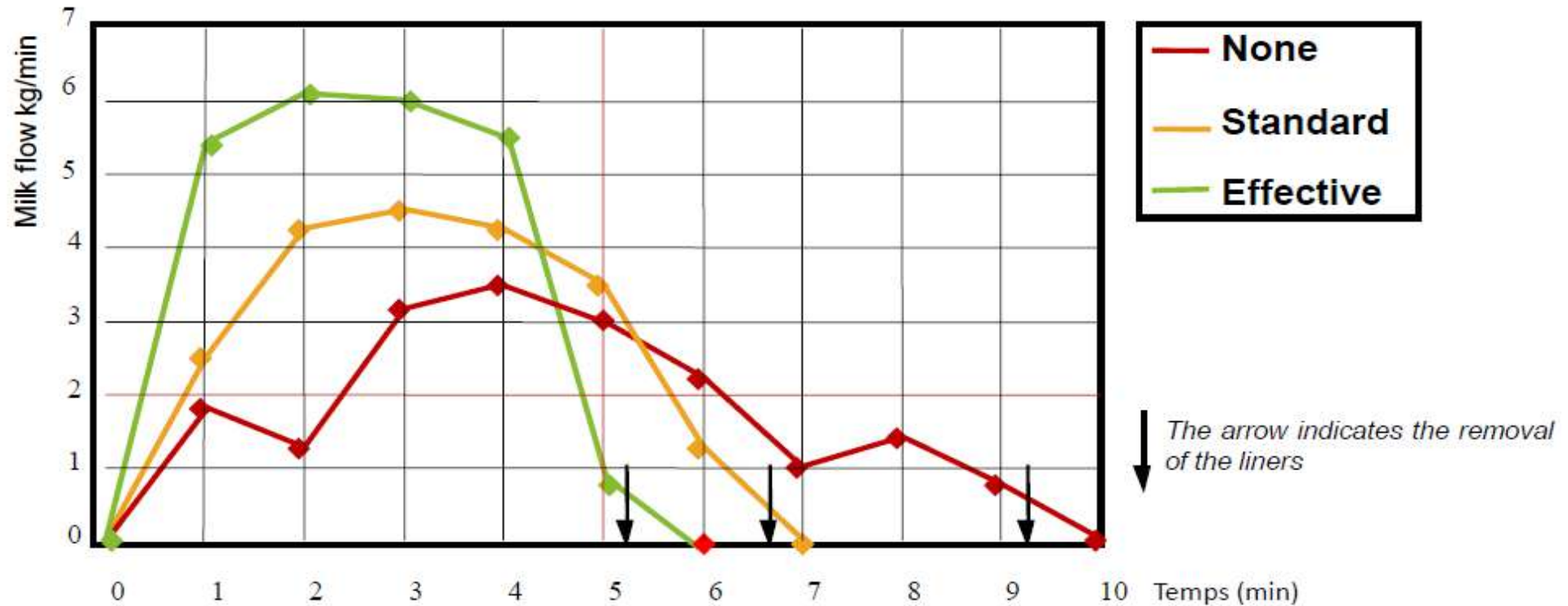


secretory tissue
storing alveolar milk
 fixed through capillary forces
 >80%

cisternal milk
 passively available
 <20%



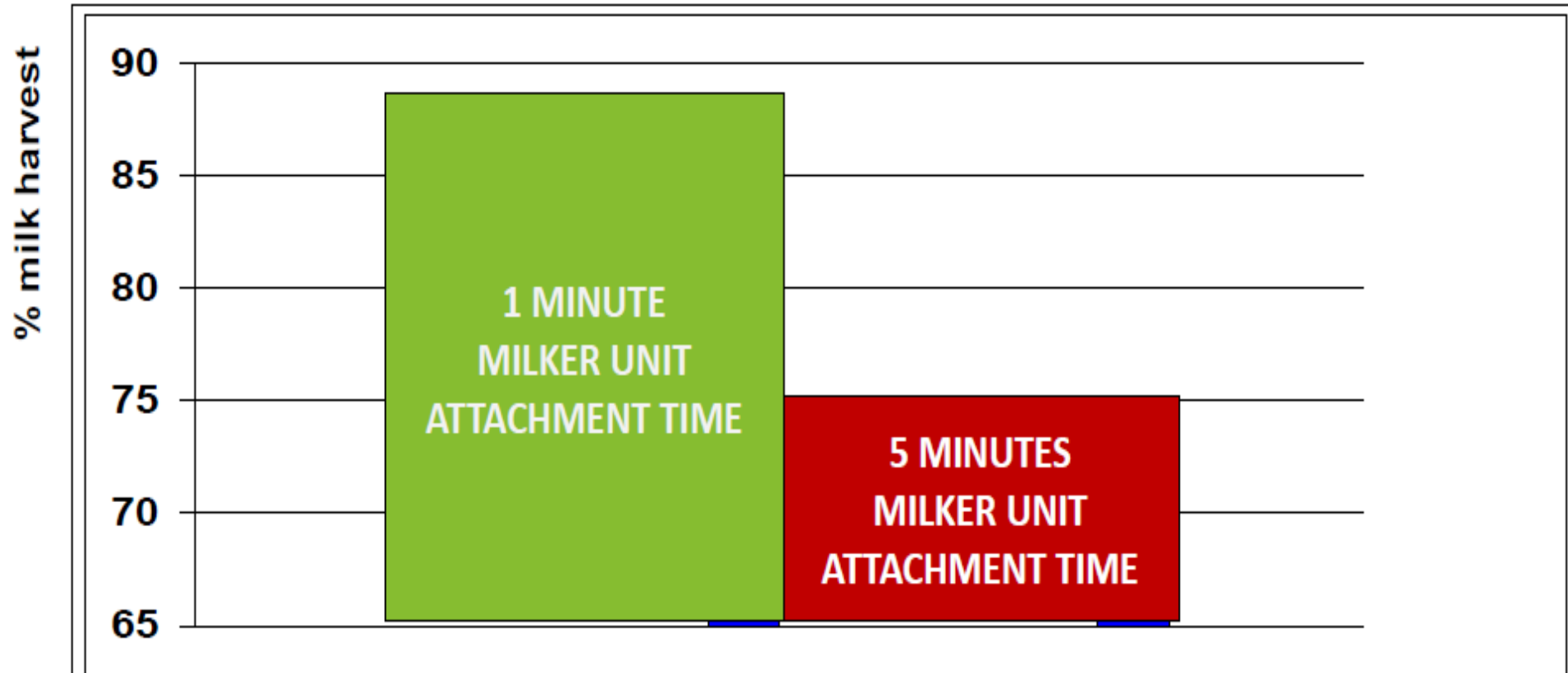
Don't lose peak oxytocin flow



Results according to the type of stimulation

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Peak oxytocin flow



Each minute the milker unit attachment is delayed, the milk harvest is reduced by approx. 3%

Parlor work routine

- Recommended premilking routine
 - Strip
 - Dip
 - ≥ 30 sec contact
 - Dry
 - Attach
 - Adequate prep lag
- Territorial routine of 3-4 cows in parlors



Effective post-milking teat dipping

Highly adopted practice

- >90% of farms usually report use

Final hygienic defense

Post milking Teat dipping
reduced SCC 70,300 (Moxley
et al., 1978)

Effective coverage of teat is
key to success

- Continued education of milking
staff



Teat dip doesn't work if it isn't applied to all teats



Milking procedure

Step 1
Pre-milking
Observations



Step 2
Forestripping



Step 3
Teat
Sanitation



Step 4
Attachment



Step 5
Adjustments



Step 6
End of Milking



Step 7
Removal



Step 8
Teat Disinfection



Measuring milking performance

Source	Indicator	Suggested Goal
Milking Machine	Average claw vacuum	35-42 kPa
	Maximum claw vacuum fluctuation	< 10 kPa
	Average milk flow	2.3 – 4.0 kg/min
	Use of manual mode of milking (when automatic detachers are used)	<5% of milkings
	“D” phase of the pulsation cycle	At least 150-200 ms
Milking Process	Premilking teat dip contact time	30 seconds before dry off
	Prep-lag time (time from stimulation to milking unit attachment)	60 to 120 seconds
	Milking unit attachment time	3 to 8 minutes (depending on milk production)
	% of teats with at least 75% coverage with post-milking teat dip	>90%

Assessing environment

- Animal cleanliness is related to a number of factors
 - Cow comfort
 - Size of animal
 - Conformation
 - Udder & legs
 - Fear of humans
- The most critical areas to keep clean are the udder & lower legs





1-866-TOP-MILK

DATE: 4-15-03
 FARM: _____
 GROUP: (1) High cows

UDDER HYGIENE SCORING CHART

Score udder hygiene on a scale of 1 to 4 using the criteria below.
 Place an X in the appropriate box of the table below the pictures.
 Count the number of marked boxes under each picture.

SCORE 1
Free of dirt

SCORE 2
Slightly dirty
2 - 10 % OF SURFACE AREA

SCORE 3
Moderately covered with dirt
10 - 30 % OF SURFACE AREA

SCORE 4
Covered with caked on dirt
>30% OF SURFACE AREA



X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20
21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25	21	22	23	24	25

Total Number of udder scores: 59
 Number of udders **scored 1**: 30
 Number of udders **scored 2**: 7
 Number of udders **scored 3**: 10
 Number of udders **scored 4**: 12

Percent of Udders Scored 3 & 4: $\frac{22}{59} = 37\%$

Udders scored 3 and 4 have increased risk of mastitis as compared to scores 1 & 2.



Udder Hygiene Scoring

SCORE 1

Free of dirt



SCORE 2

Slightly dirty

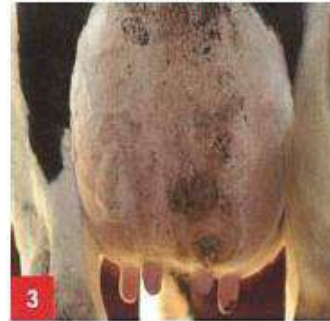
2-10% of surface area



SCORE 3

Moderately covered with dirt

10-30% of surface area



SCORE 4

Covered with caked on dirt

>30% of surface area







Score 3 and 4 :
1,5 times more risk of
mastitis

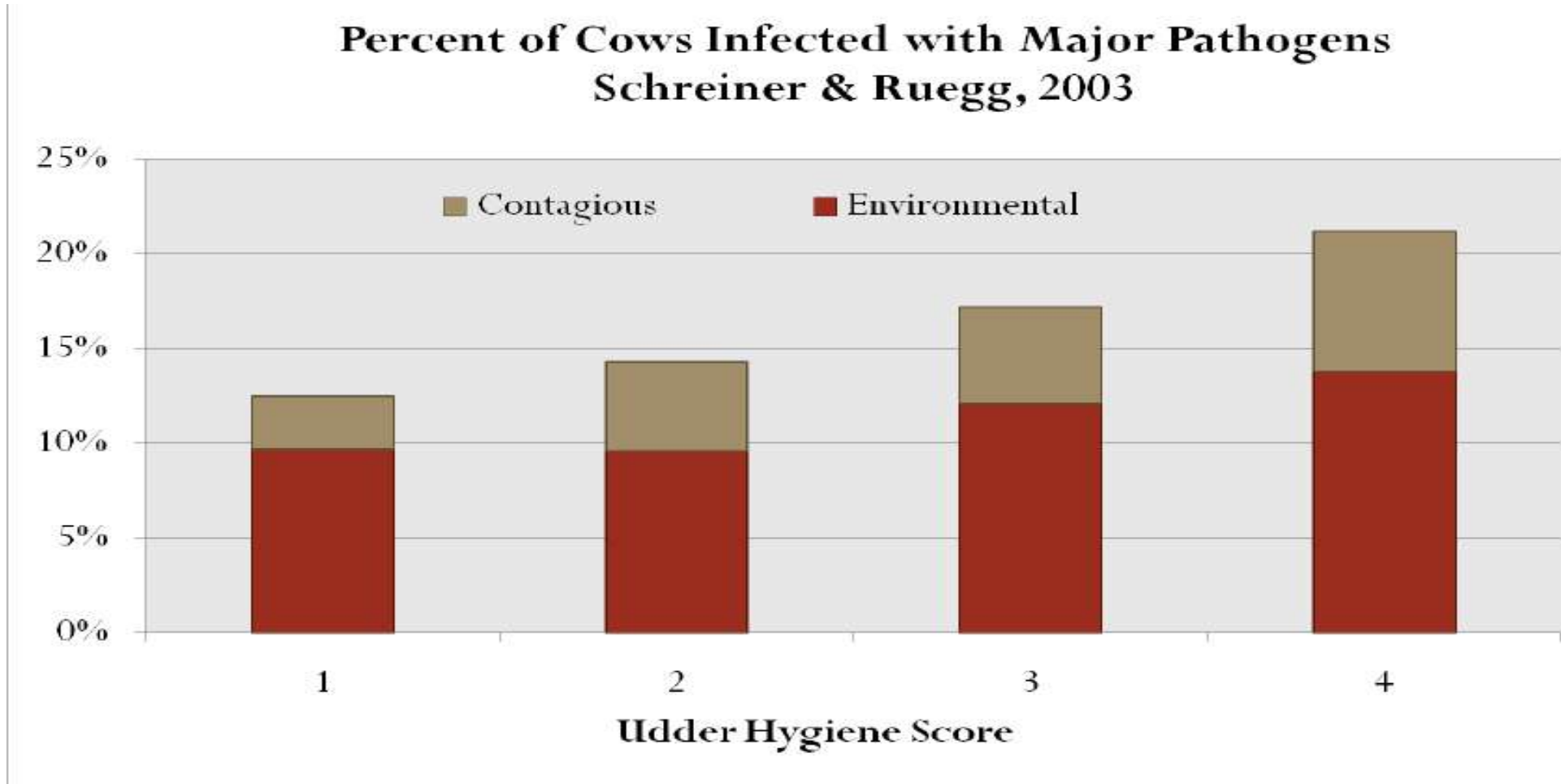
Udder Hygiene Score Chart

FIGURE 1

Hygiene scoring system

 <p>1</p>	 <p>2</p>	 <p>3</p>	 <p>4</p>
<p>Little to no manure above coronary band.</p>	<p>Minor splashing of manure slightly above dew claws but not up to hocks.</p>	<p>Manure above dew claws and up to hocks but no matted patches.</p>	<p>Legs mostly covered with manure along with matted patches above hocks.</p>

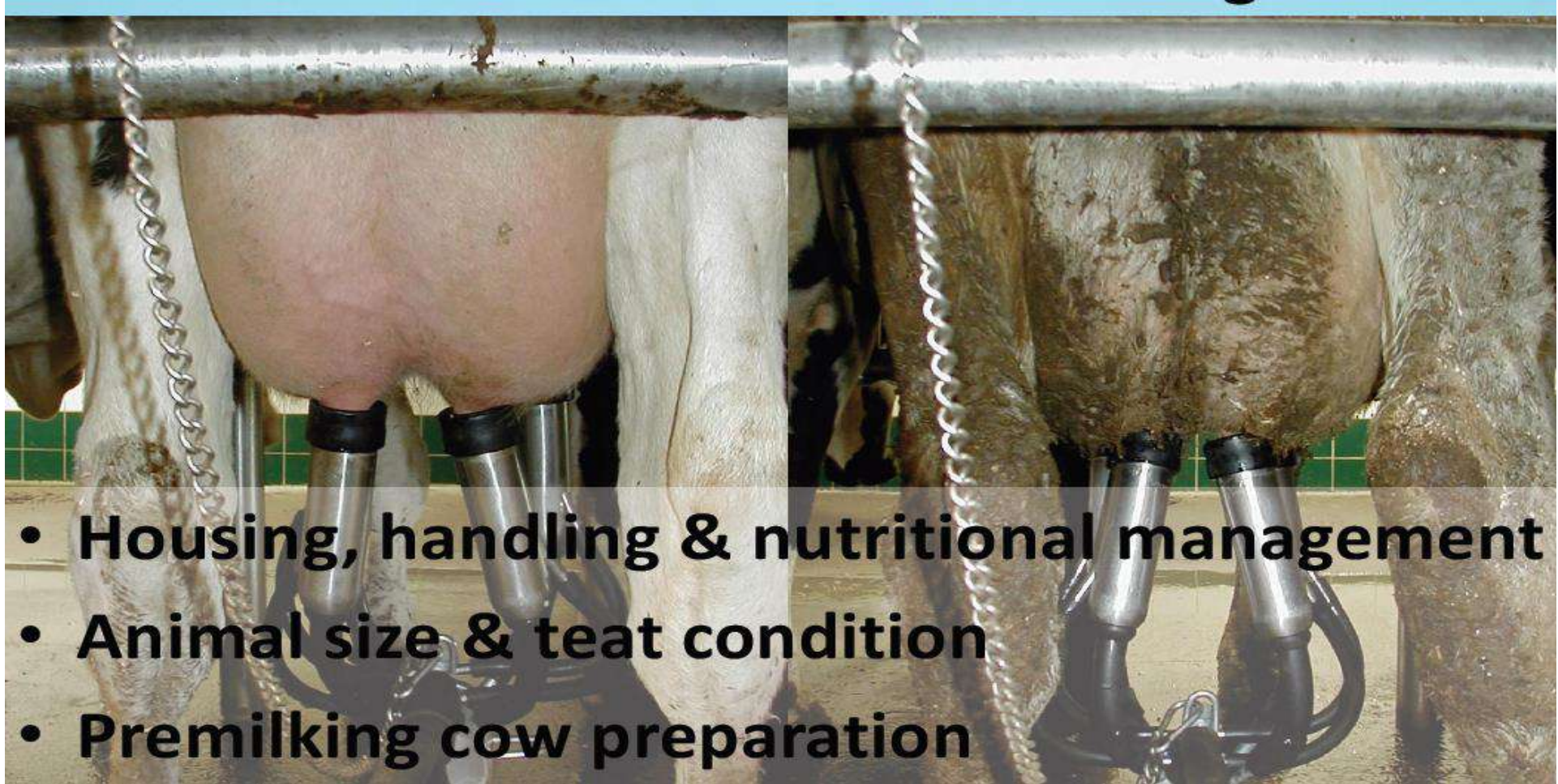
Relationship between udder hygiene and IMI



Factor influencing effectiveness of teat sanitation



Factors influencing exposure to environmental mastitis pathogens



Bedding types

- Highly influenced by options for waste management
- Options are primarily
 - Sand
 - Clean or Recycled
 - Wood products
 - Mattresses or compost
 - Manure (biosolids)

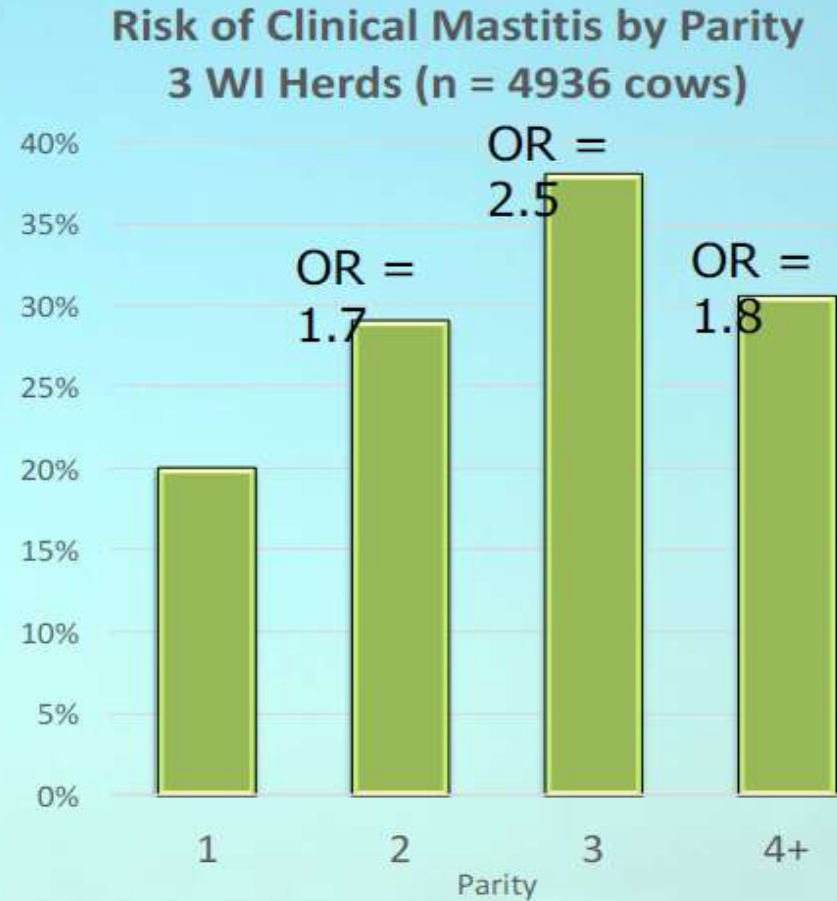


Herd using sand has less Mastitis

Outcome	Sand	Mattress & Bedding	Manure
Milk/cow/day (lb)	83 lb	76 lb	78 lb
Bulk milk SCC (cells/mL)	198,000	<u>220,000</u>	<u>248,000</u>
Cows with Milk not Sold (%)	1.6%	<u>1.9%</u>	<u>2.4%</u>
Cows milking <4 ¼ (%)	4.5%	4.8%	6.3%

Not all cows are at equal risk for infection

- Older cows have 2X increased risk of clinical mastitis
 - Larger udder = greater exposure
- Cows with a history of clinical mastitis in previous lactation have 4x greater risk
 - Pantoja et al., JDS 2009



Leaking milk increases risk

- Cows that leak milk have **greatly** increased risk of mastitis
 - Largest herd-level risk factor
 - Schukken, JDS 1990
- Immediate post-partum period is increased risk
 - First 7 days is high risk for clinical mastitis



Take back to the barn

- Mastitis should be easy to control
 - Keep Bacteria Away from Teats
- Control of Mastitis is a Result of the **Cumulative Effect** of many decisions
- Keep cow teats clean
- Reduce exposure to bacteria in housing areas
- Train personnel regularly to
 - Use a complete milking routine & handle cows gently

Thank You All

