

Improve mastitis detection through better decisions



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The mission

- *Whittlestone* (AU) said:

At this stage in the growth of the Dairy Industry, two things are important:

- A. The improvement in the efficiency of the dairy farm so that the cost of production can be lowered
- B. An increase in quality of the milk produced

Good quality dairy products cannot be made from poor quality milk, and in a competitive world, the highest quality at the lowest price must be the aim.

1958





The answer

- Many issues:
 - Cow welfare
 - Sustainability
 - Prudent use of antibiotics
 - Emerging pathogens
 - Food safety

- One answer:

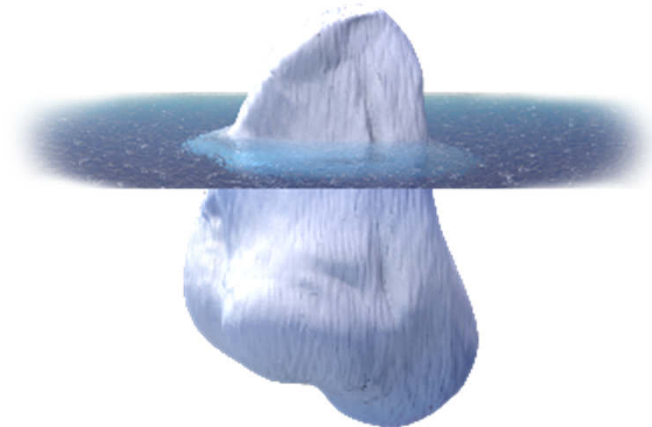
Prevention





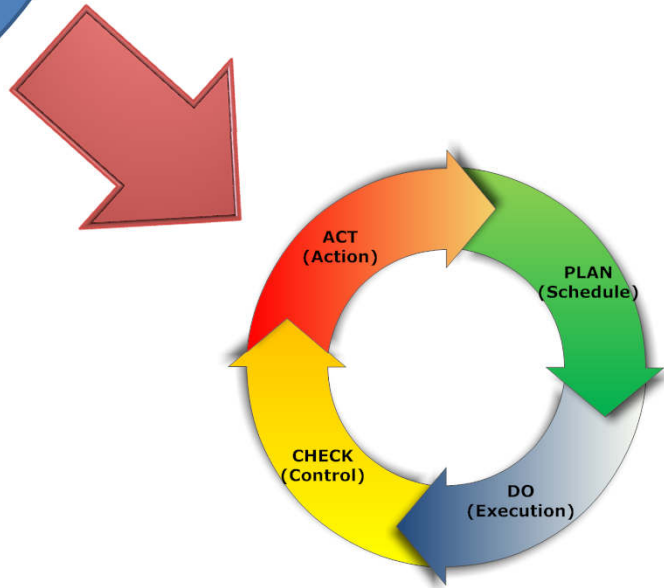
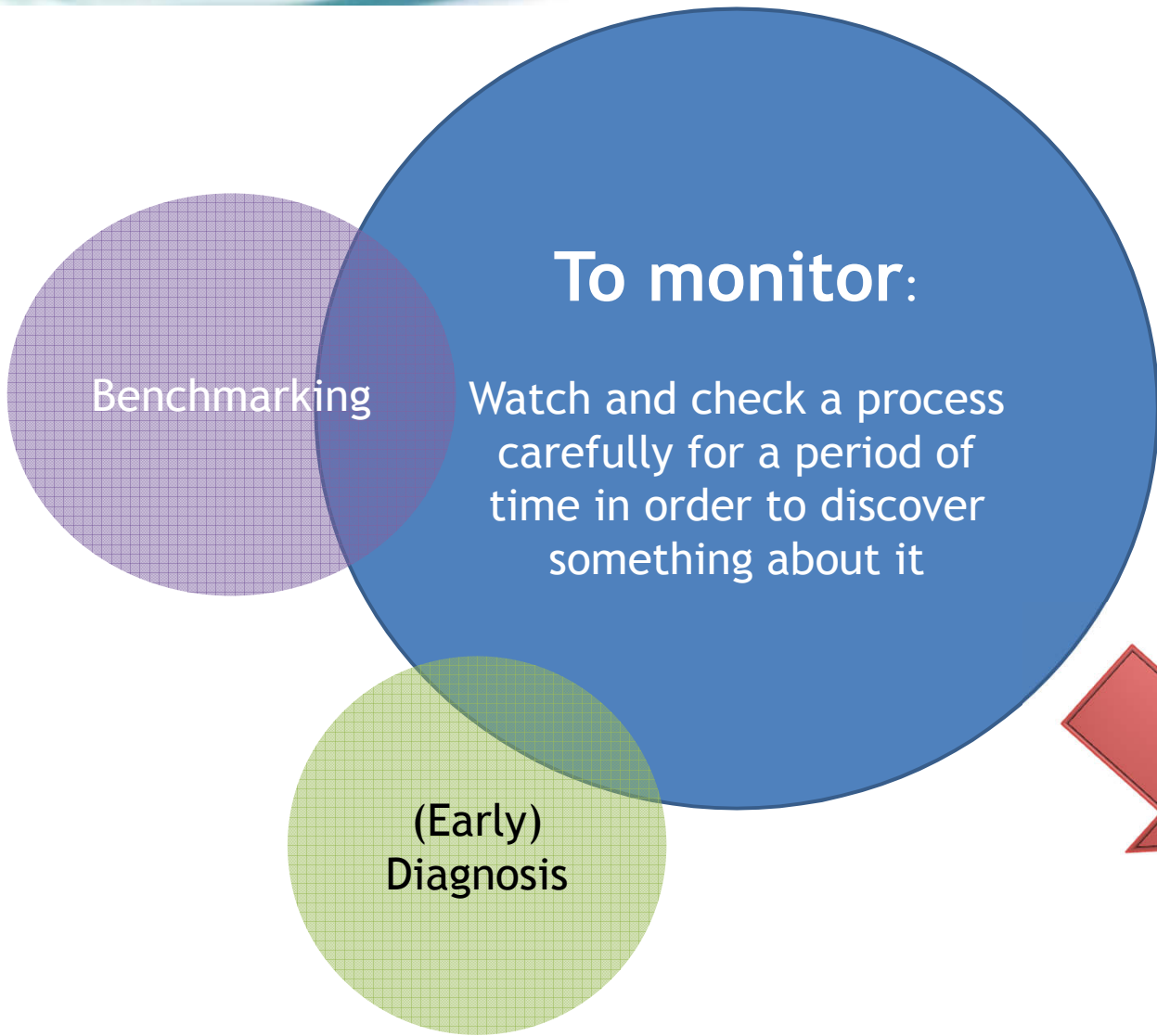
Prevention

- Application of pre- and post dipping
- Application of management practices decreasing risk of infections
 - Milking hygiene
 - Bedding hygiene
 - Proper nutrition
 - ...
- **Monitoring**





Monitoring





Early diagnosis



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Early diagnosis

- Early diagnosis aims
 - To identify diseased cows
 - To identify cows at risk
- Classical methods
 - CMT
 - SCC
- New methods
 - Sensors
 - Pattern identification (quality control curves)

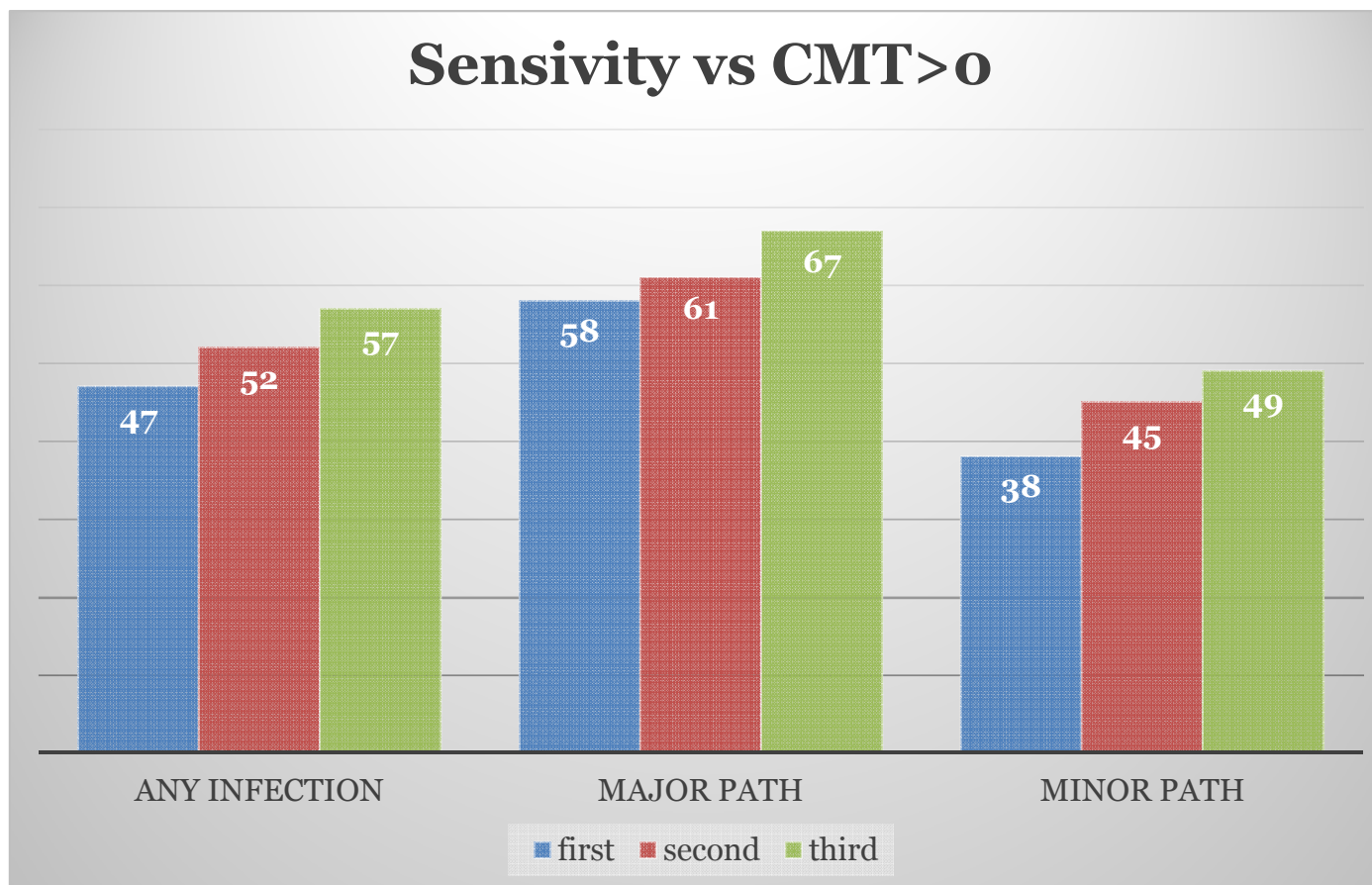


E.D. example: SCC

- There are pros, but also cons
- Oldest and most applied procedures
 - Selection of cows to sample
 - Selection of cows to treat
 - Identification of problem cows



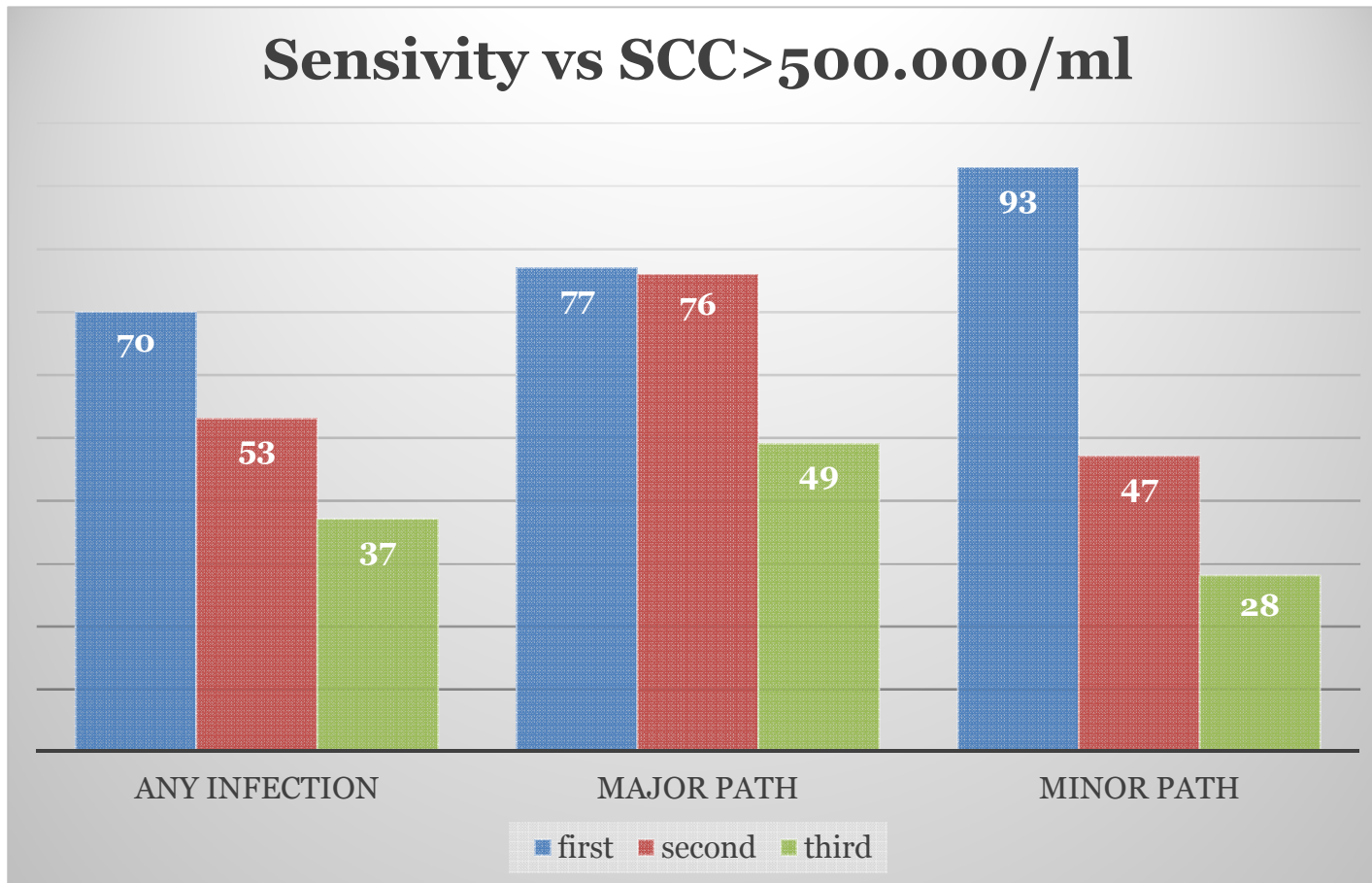
E.D.example: CMT



Sargeant, et al. 2001, Journal of Dairy Science 84, 2018-2024.



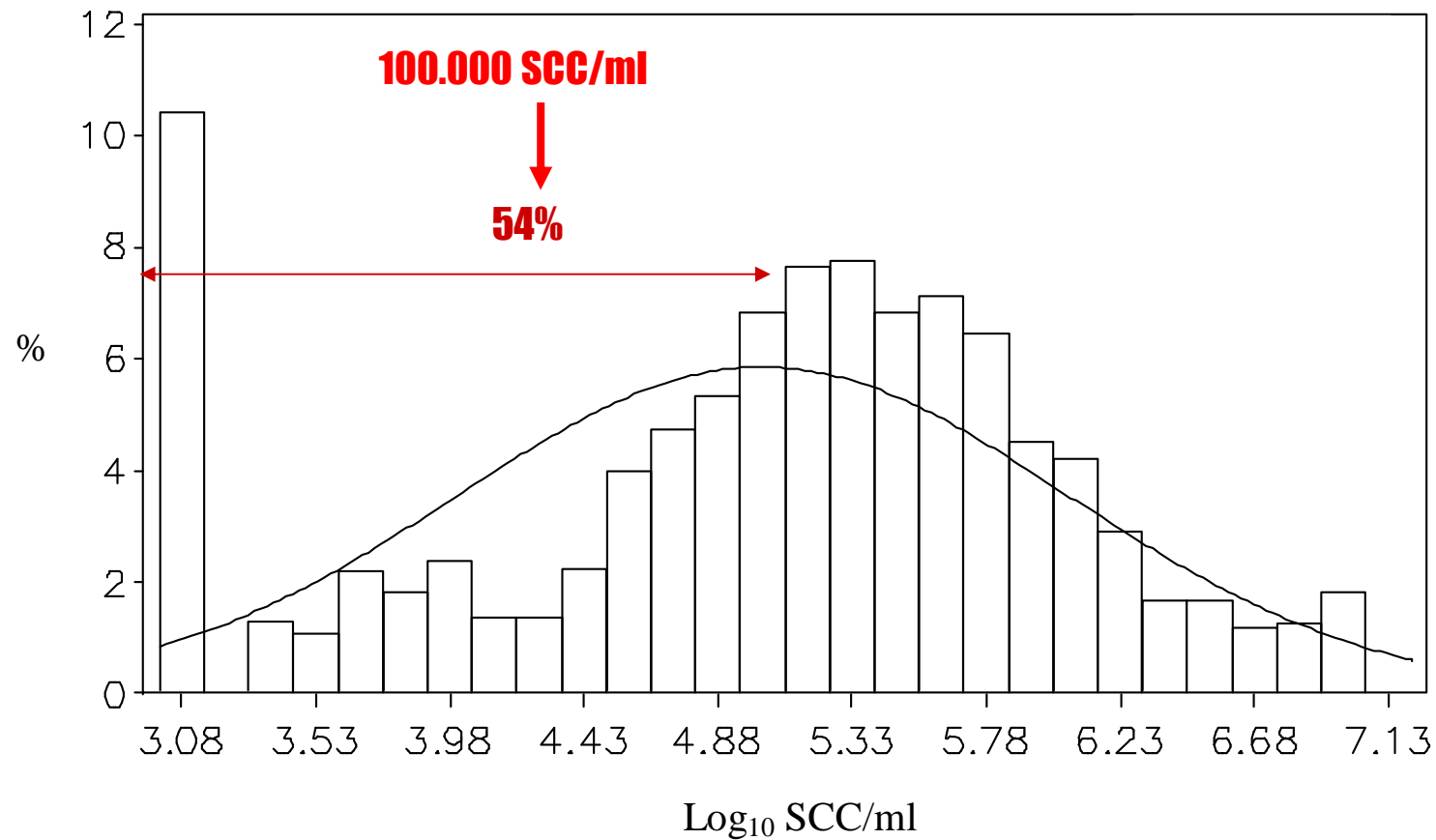
E.D.example: SCC



Sargeant, et al. 2001, Journal of Dairy Science 84, 2018-2024.



E.D.example: SCC contagious



Zecconi & Piccinini 2002, Recent developments and perspectives in bovine medicine, 346-359



Take home message 1

- Diagnostic tests are an essential component of monitoring.
- Sensitivity and specificity of each test should be known.
- How to select parameter to be monitored:
 - Cow side / on line
 - High Se (Sp)
 - Cheap to perform
 - Easy to record
 - Easy to interpret





Benchmarking



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Benchmarking

- Benchmark: *a level of «quality» which can be used as a standard to compare performances.*
- The terms «objective», «threshold», «target», «level» are also often used.
- A benchmark can be:
 - Legal (i.e. SCC 400.000 cell/ml EU)
 - Local (i.e. SCC levels to determine milk price)
 - Practical (i.e. acceptable levels for the frequency of a disease)



Benchmark/target

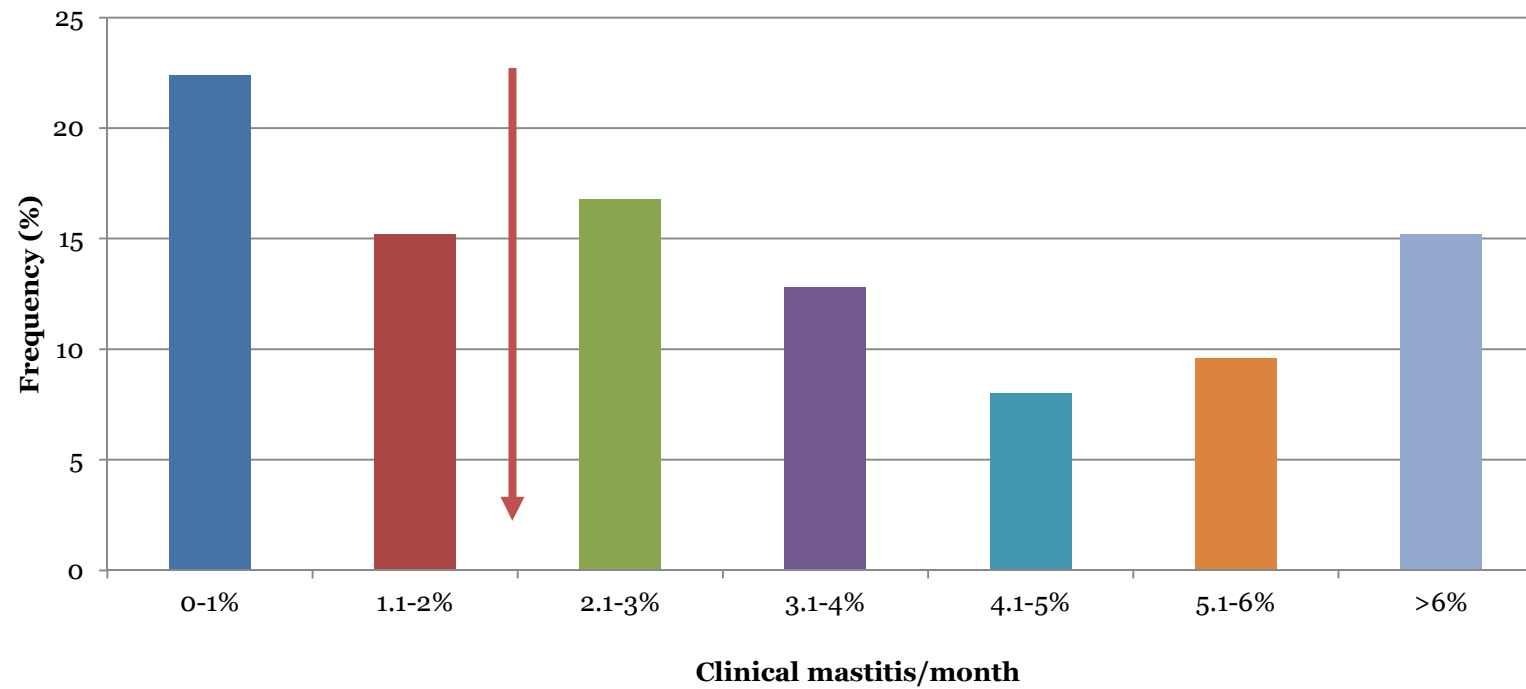
Parameter	Benchmark/Target
Lactational new IMI rate	<5-7%
% herd > 200,000 cells/ml	<15%
Fresh calver IMI rate	<10%
Dry period new IMI rate	<10%
Dry period cure rate	>85%
Incidence rate clinical mastitis (100 cow/year)	<25

Bradley et al, 2012 *Dairy Herd Health*



Benchmark/target: clinical mastitis

Frequency of clinical mastitis in 125 Italian dairy herds

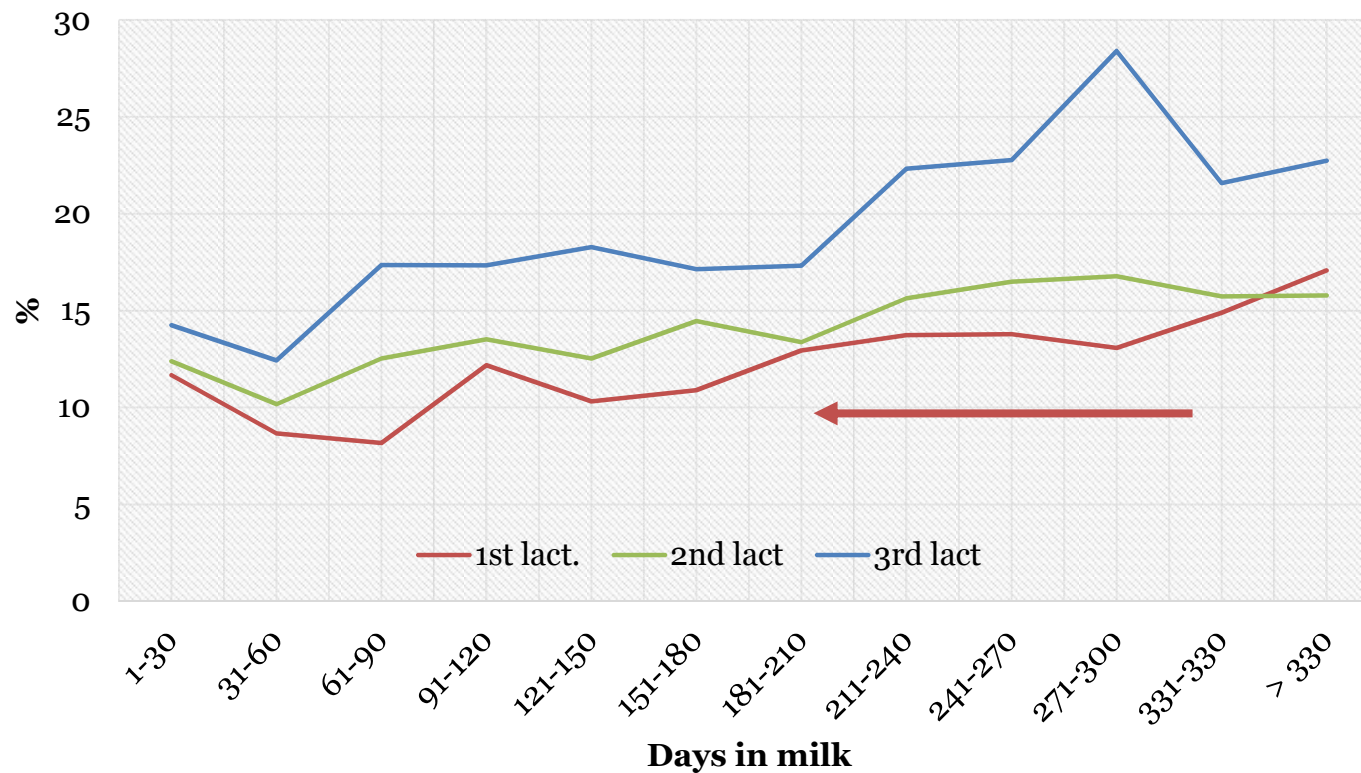


Zecconi, 2016, *Summa veterinaria*, 11, 12-16

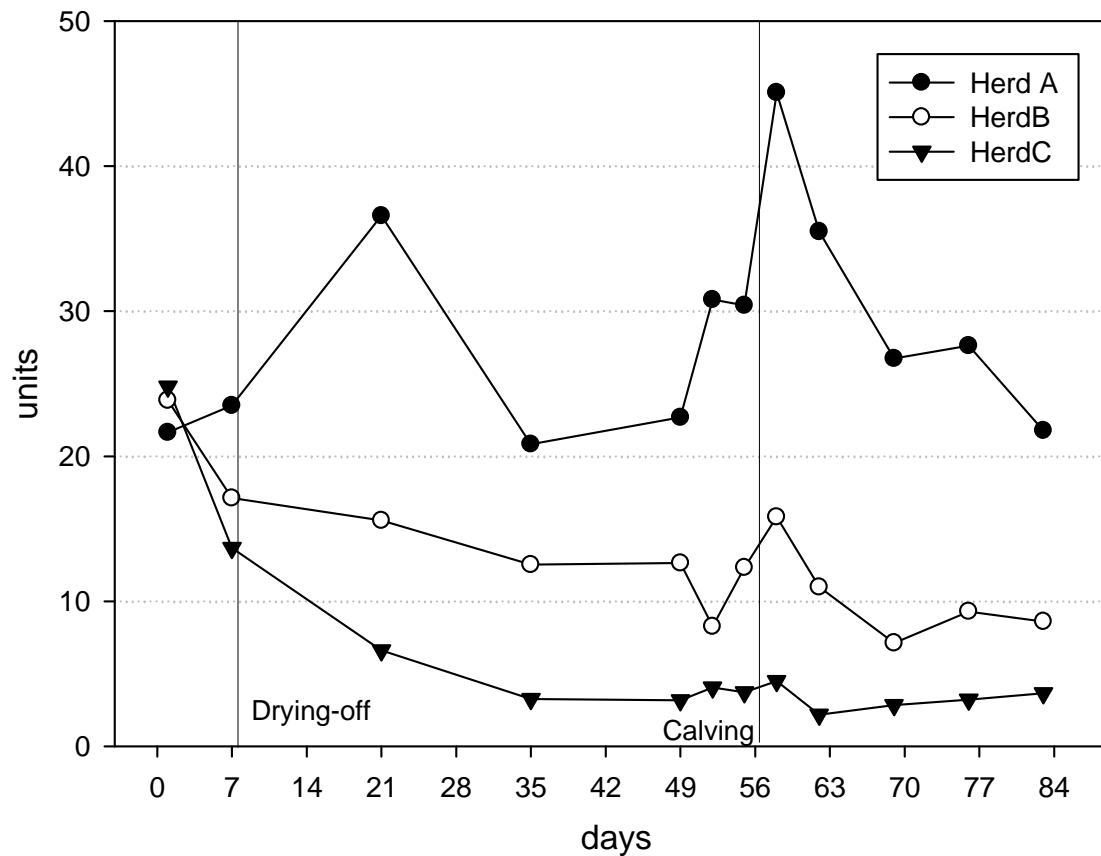


Benchmark/target: subclinical mastitis

Frequency of subclinical mastitis ($\approx 160,000$ QMS)



Benchmark/target: immune parameter



Blood NAGase pattern during the periparturient period in the three dairy herds

Albonico et al , 2016



Take home message 2

A benchmark/target should be:

1. Measurable
2. Fitted to herd characteristics
3. Credible
4. Achievable
5. Rewarding (economically or psychologically)
6. Flexible (when required)



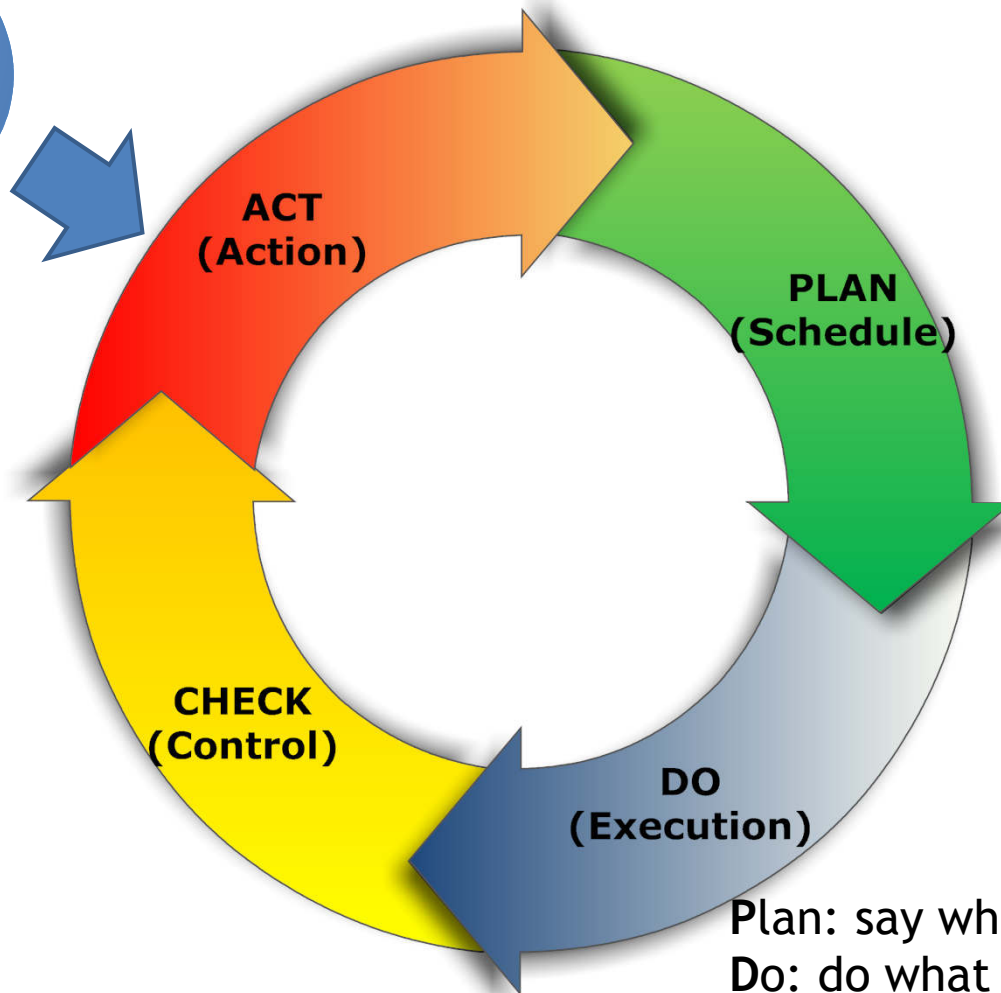


From benchmarking to action



Continuous improvement process

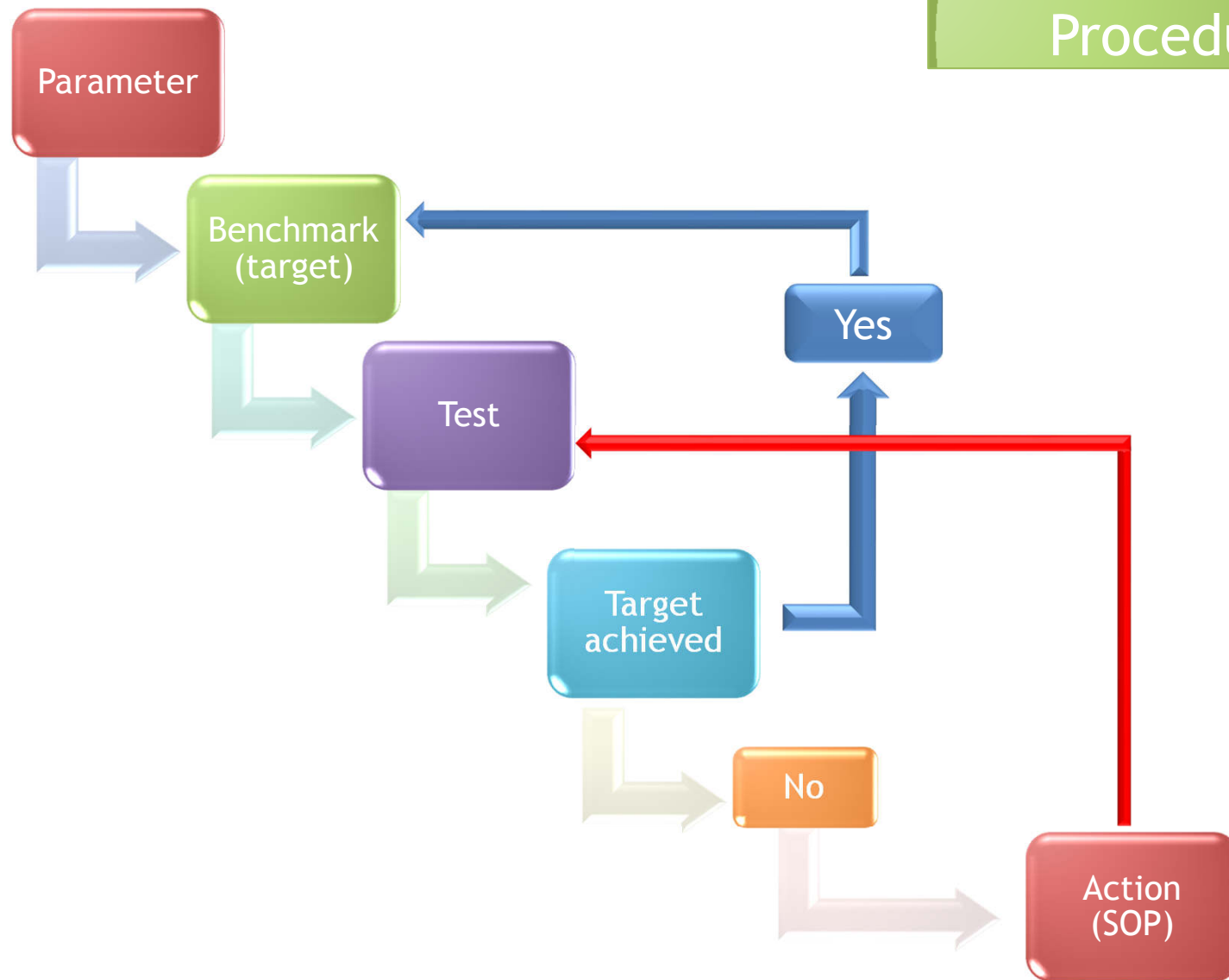
Monitoring



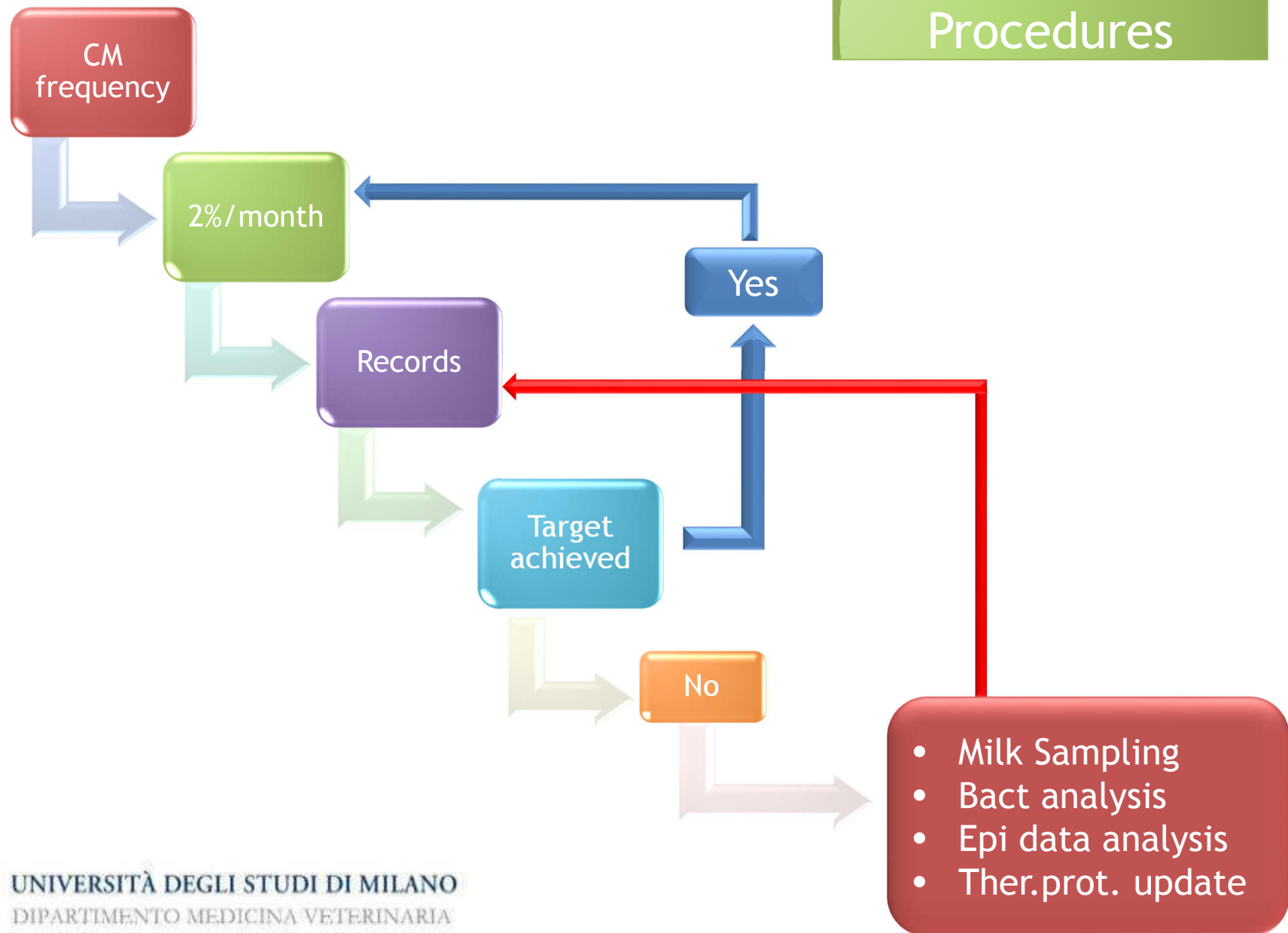
Plan: say what you do
Do: do what you said
Check: record what you have done
(re)Act: repeat a new cycle based on results



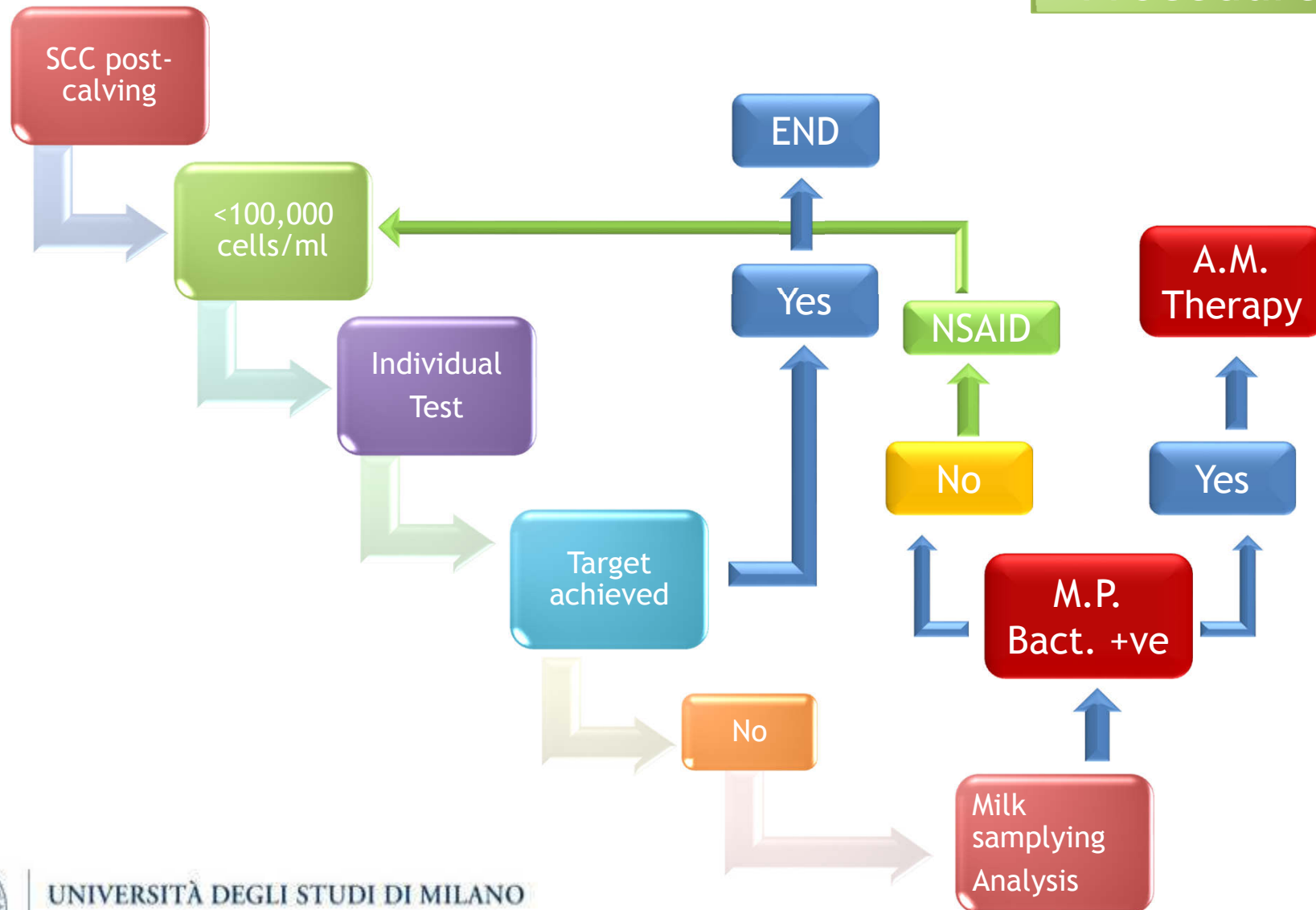
Procedures



Procedures



Procedures



Procedures



The 7 steps of effective monitoring

1. Monitoring is essential to assess production process in an effective way.
2. An effective and easy-to-retrieve recording system should be in place
3. Parameters should be selected among the ones that can be linked to a practical intervention (action).
4. Parameters which are frequently measurable (daily/weekly) should be preferred.
5. Benchmarks (targets) should be defined based on achievable results at herd level.
6. An operational procedure should implemented any time a significant change (or alarm) is observed.
7. Benchmarks should be changed as long as the targets are achieved and efficiency of the process improves.



CONCLUSIONS

- Milk production is a **continuous process** involving different factors (biological, economical, mechanical, psychological...).
- This process **must be monitored** like any other production process.
- Only when information (data) are collected and evaluated promptly and efficiently, **proper decisions** can be taken and positive results expected.





Thank you!