Improve mastitis detection through better decisions

Alfonso Zecconi

UNIVERSITÀ DEGLI STUDI DI MILANO
DIPARTIMENTO MEDICINA VETERINARIA

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

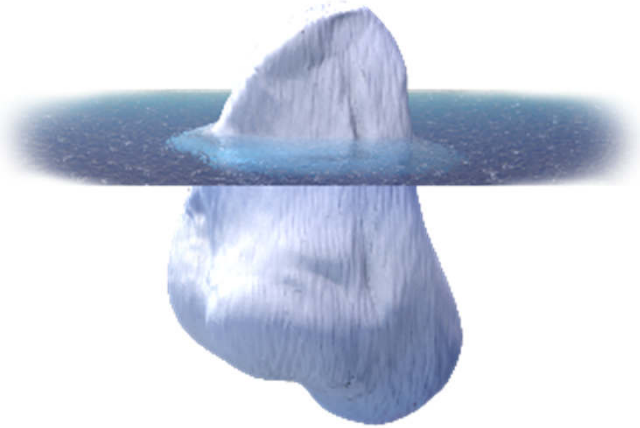
The answer

- 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**



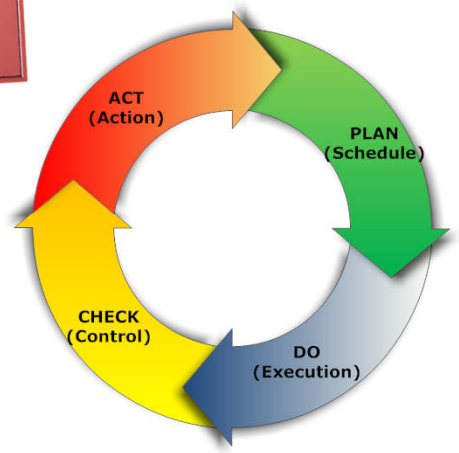
Monitoring

To monitor:

Watch and check a process carefully for a period of time in order to discover something about it

Benchmarking

(Early) Diagnosis



Early diagnosis

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Early diagnosis

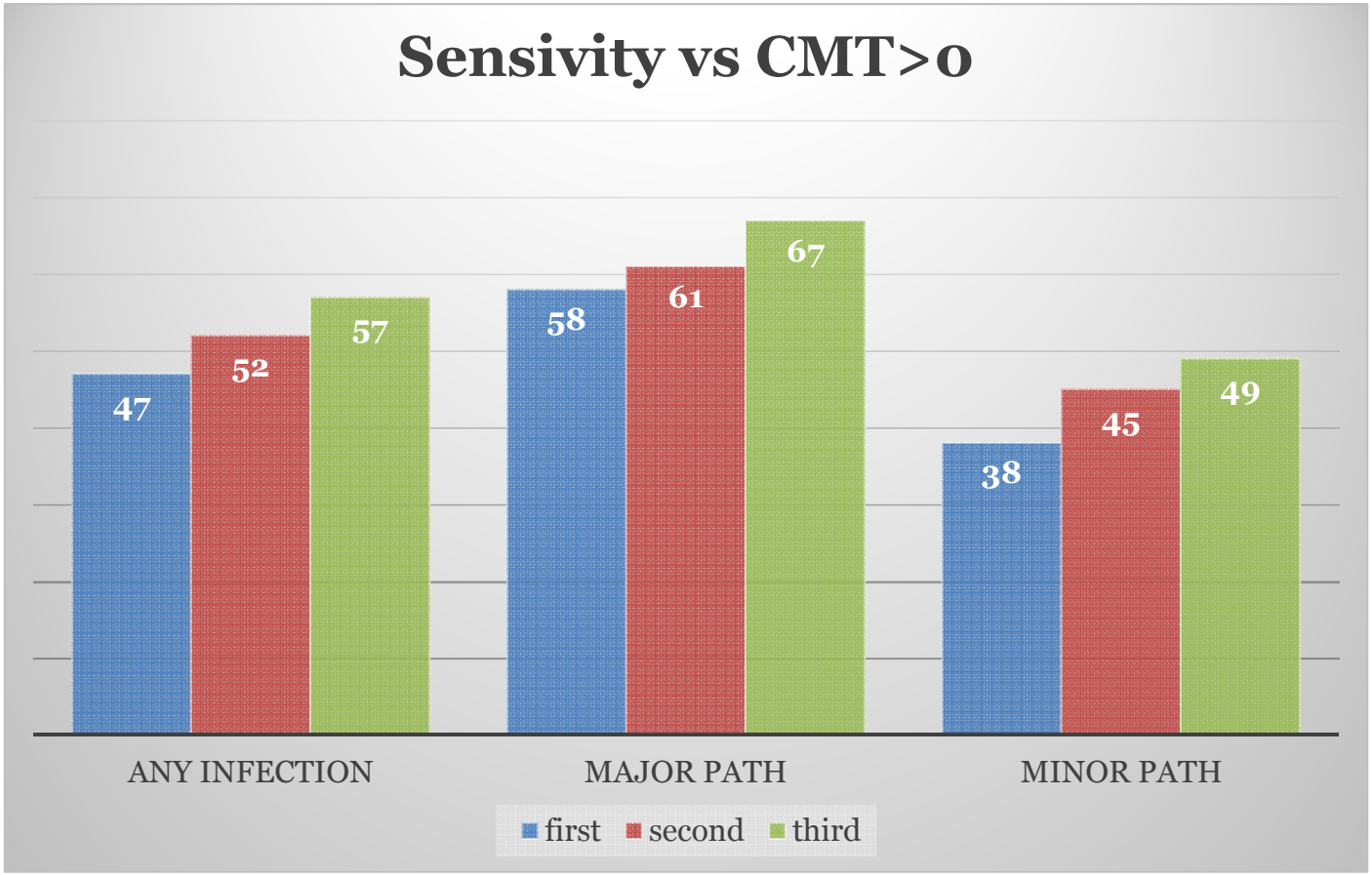
- Early diagnosis aims
  - To identify diseased cows
  - To identify cows at risk
- Classical methods
  - CMT
  - SCC
- New methods
  - Sensors
  - Pattern identification (quality control curves)

E.D. example: SCC

- There are pros, but also cons

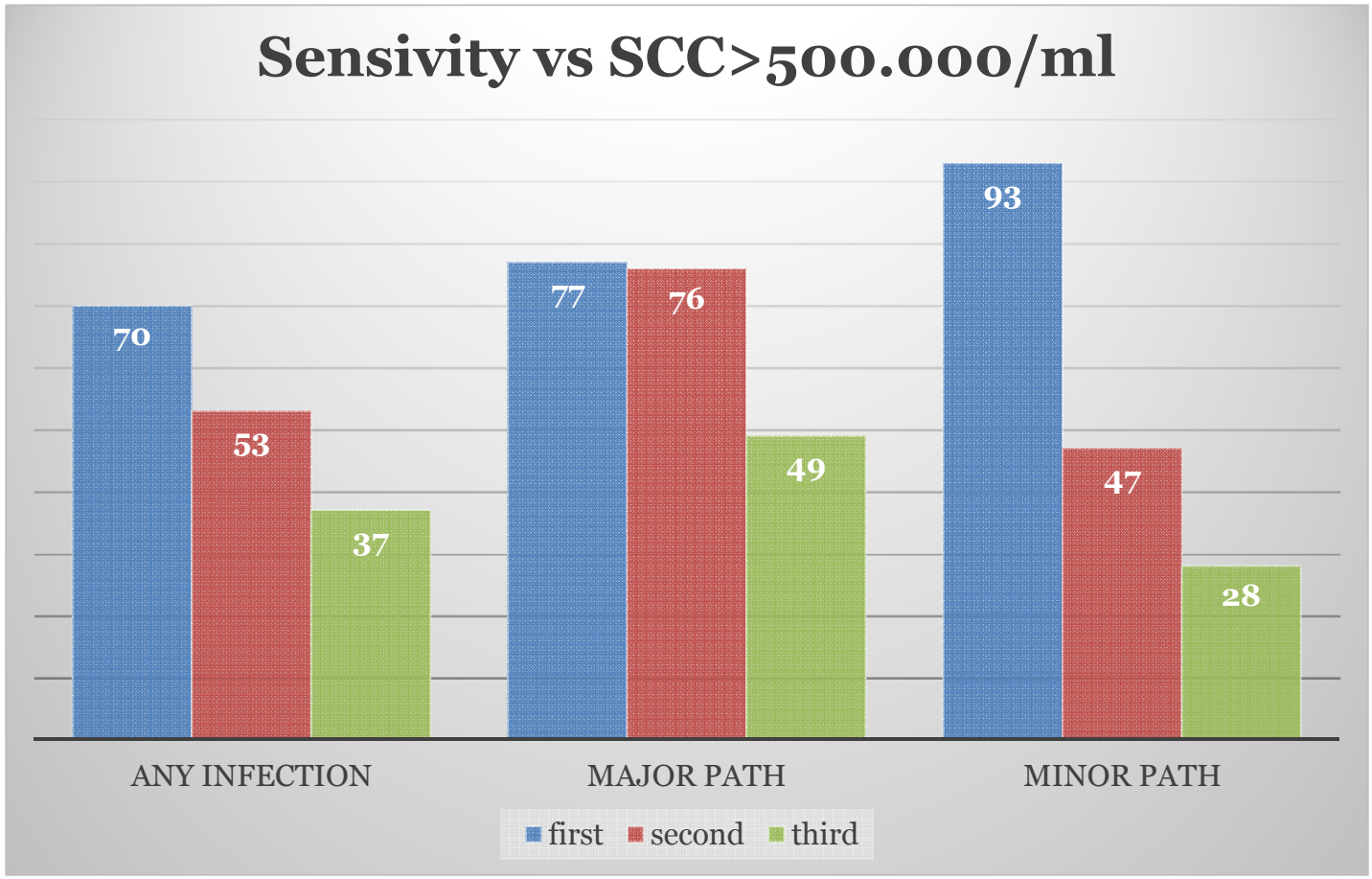
- Oldest and most applied procedures
  - Selection of cows to sample
  - Selection of cows to treat
  - Identification of problem cows

E.D.example: CMT



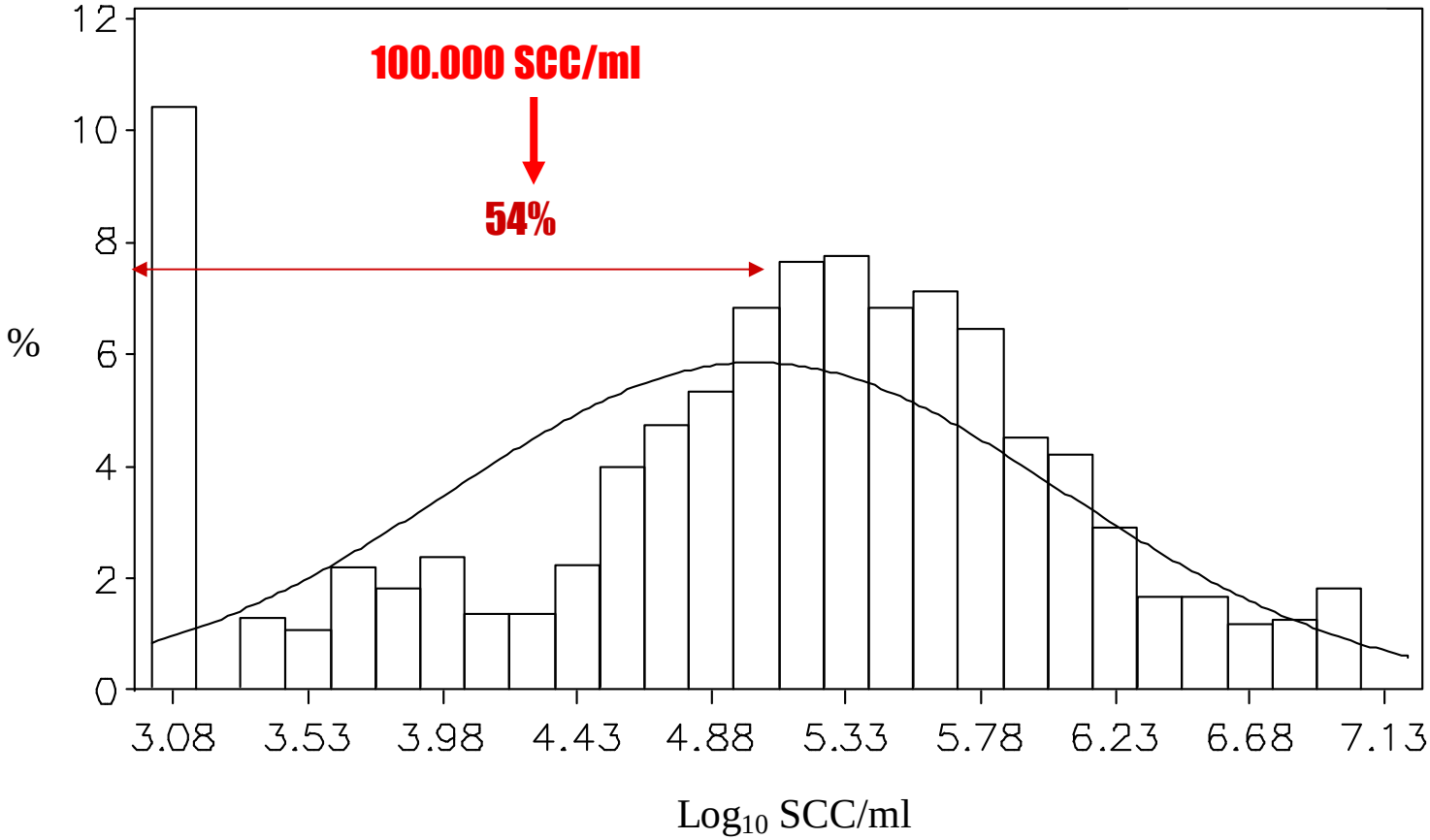
Sargeant, et al. 2001, Journal of Dairy Science *84, 2018-2024.*

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

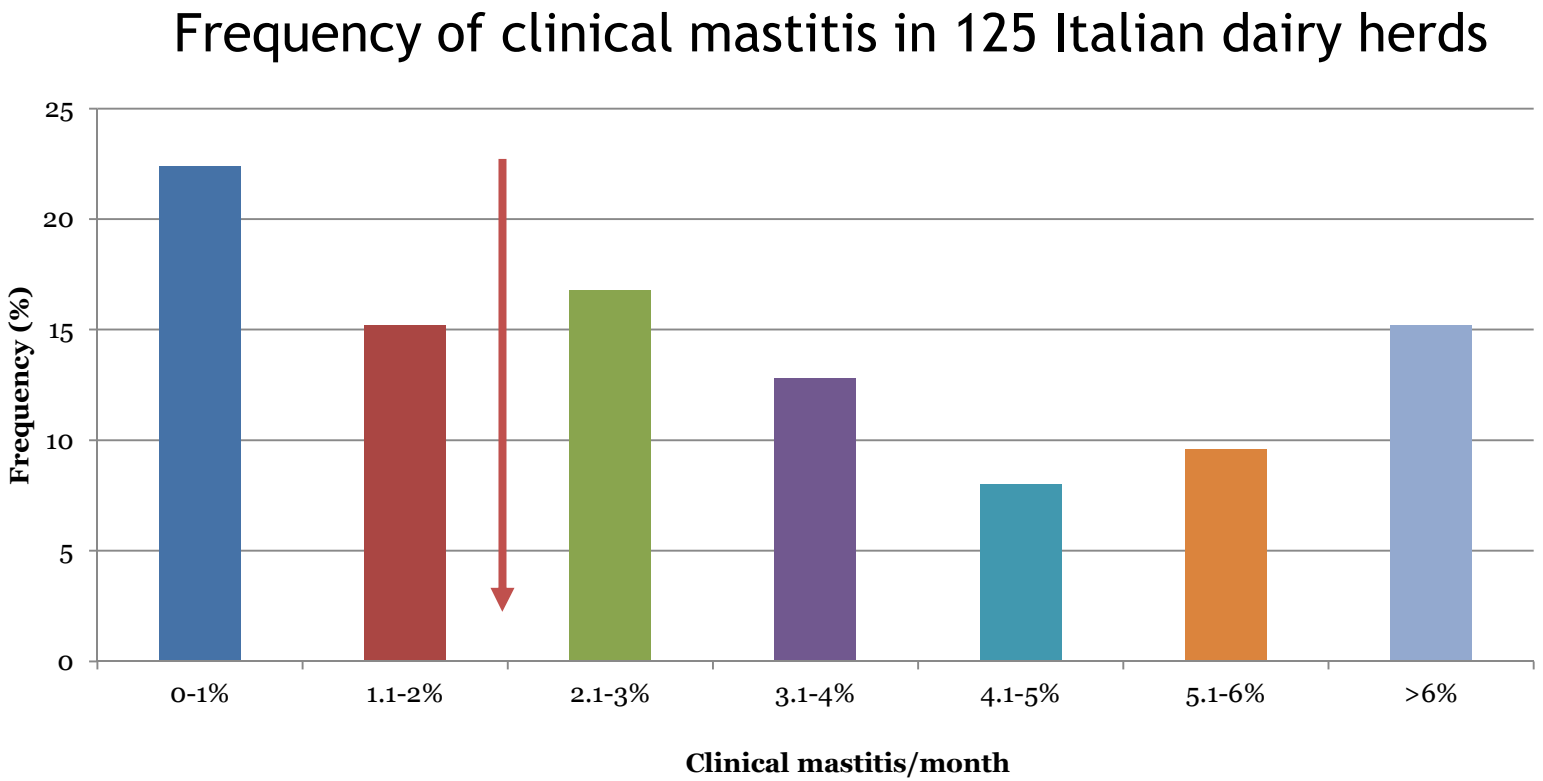
- Benchmark: *a level of «quality» which can be used as a standard to compare performances.*
- The terms «objective», «threshold», «target», «level» are also often used.
- A benchmark can be:
  - Legal (i.e. SCC 400.000 cell/ml EU)
  - Local (i.e. SCC levels to determine milk price)
  - Practical (i.e.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

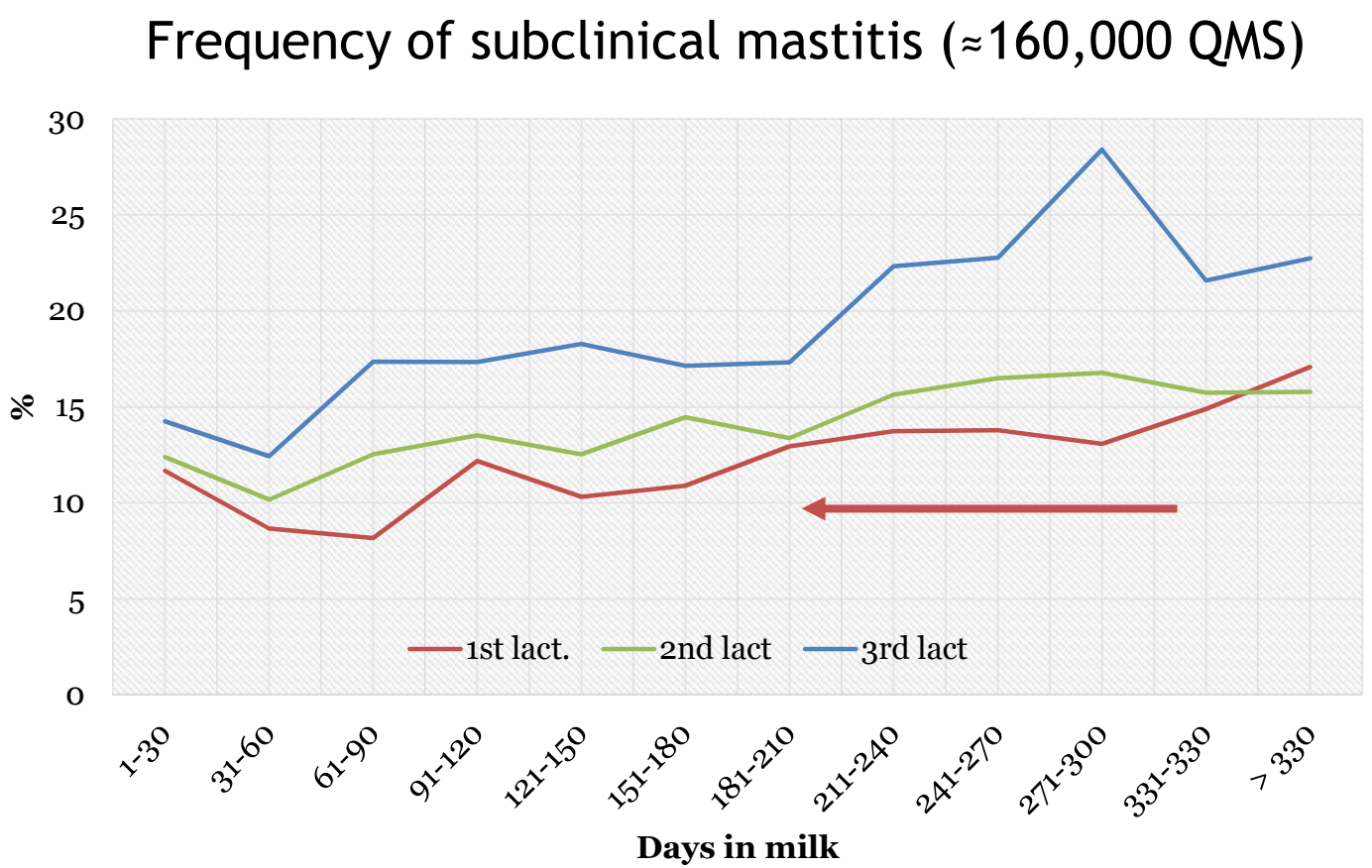
Bradley et al, 2012 *Dairy Herd Health*

Benchmark/target: clinical mastitis



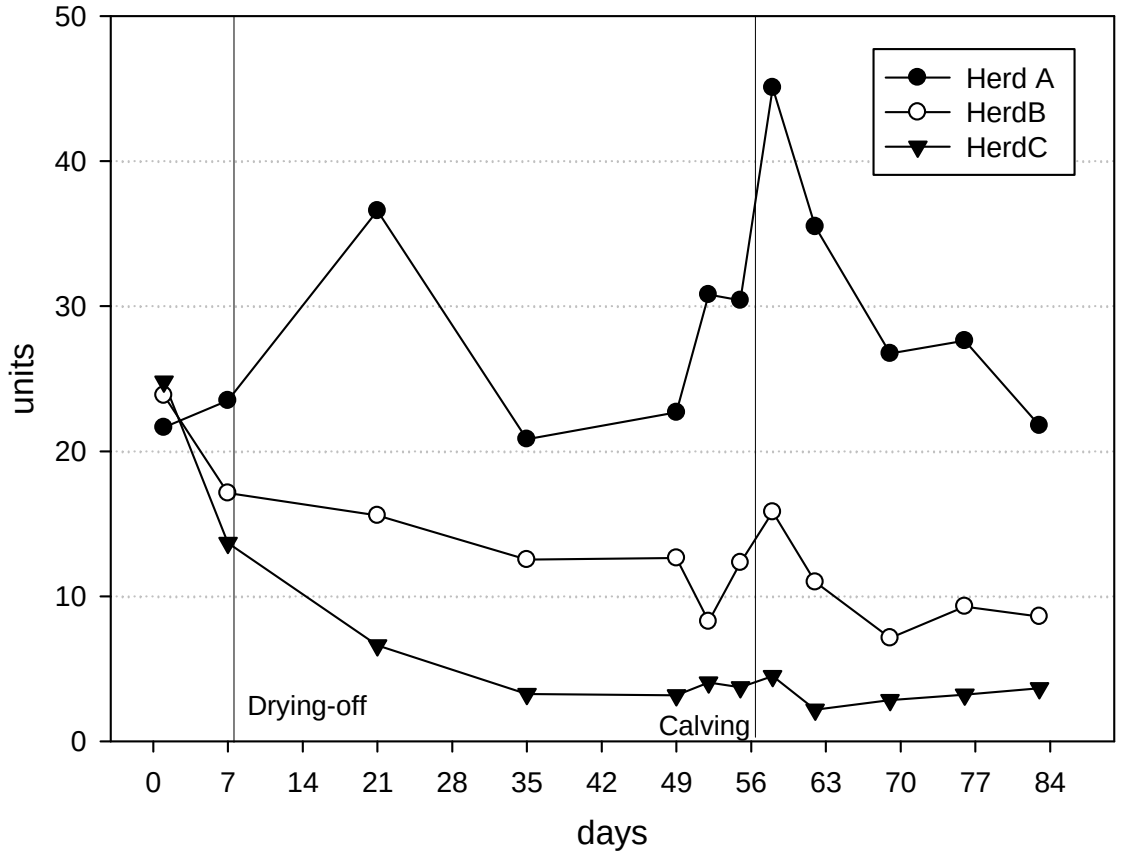
Zecconi, 2016, Summa veterinaria, *11, 12-16*

Benchmark/target: subclinical mastitis



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

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

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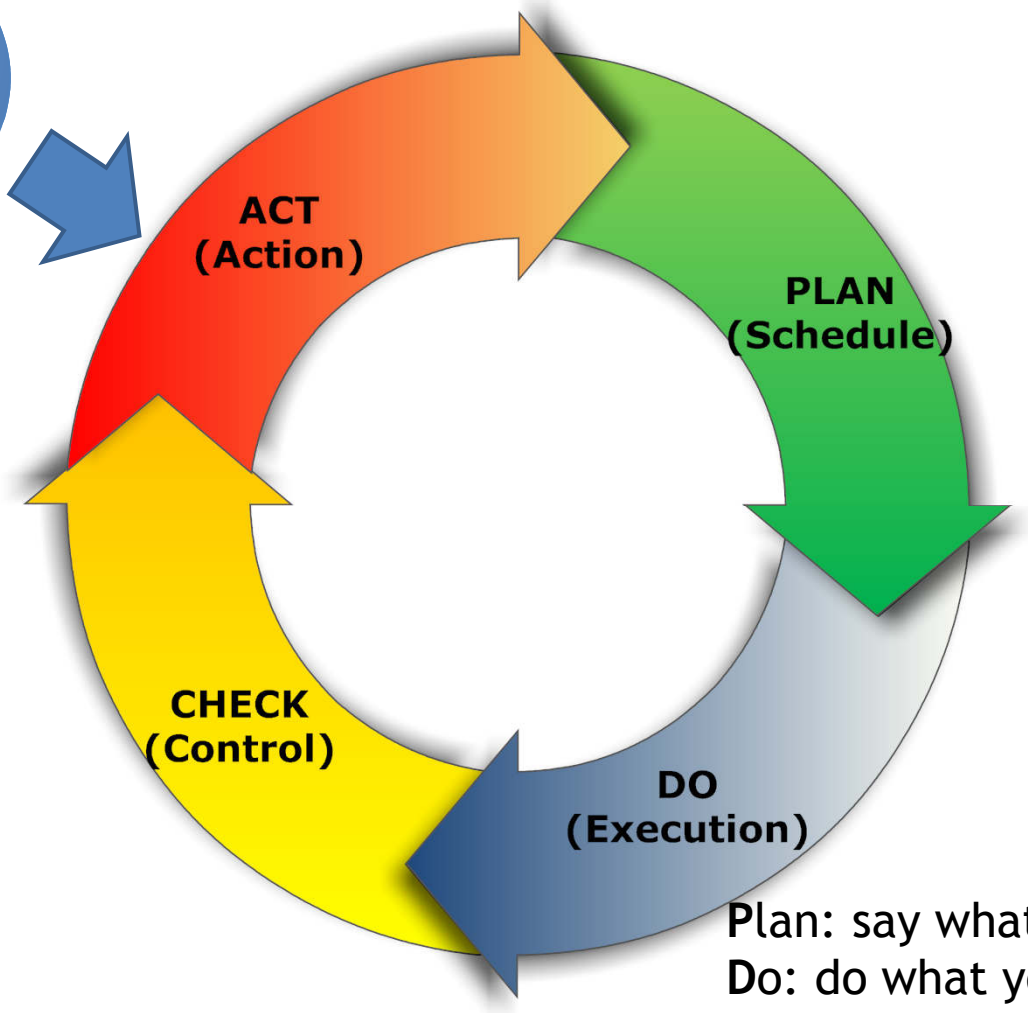
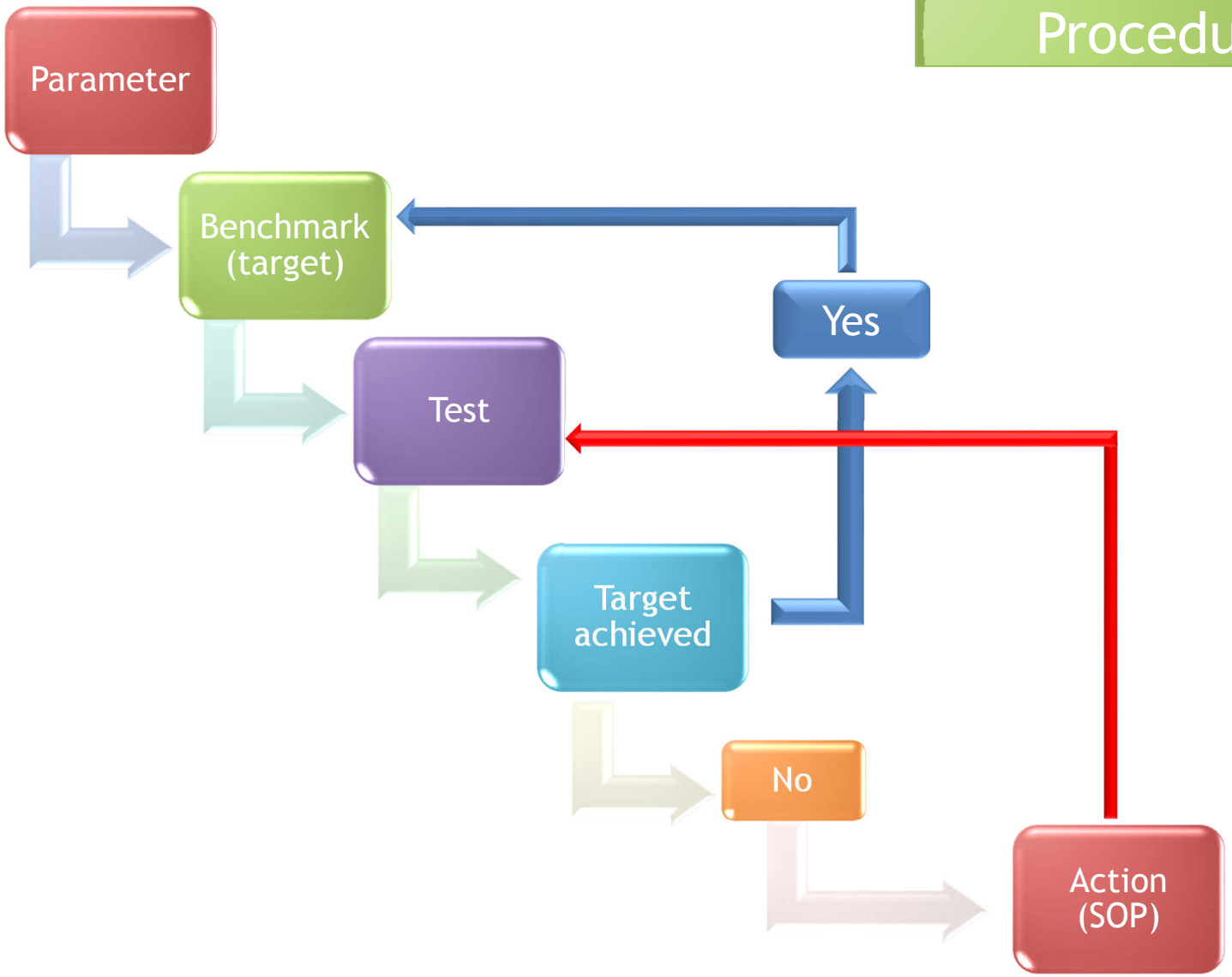
Continuos improvement process

Monitoring

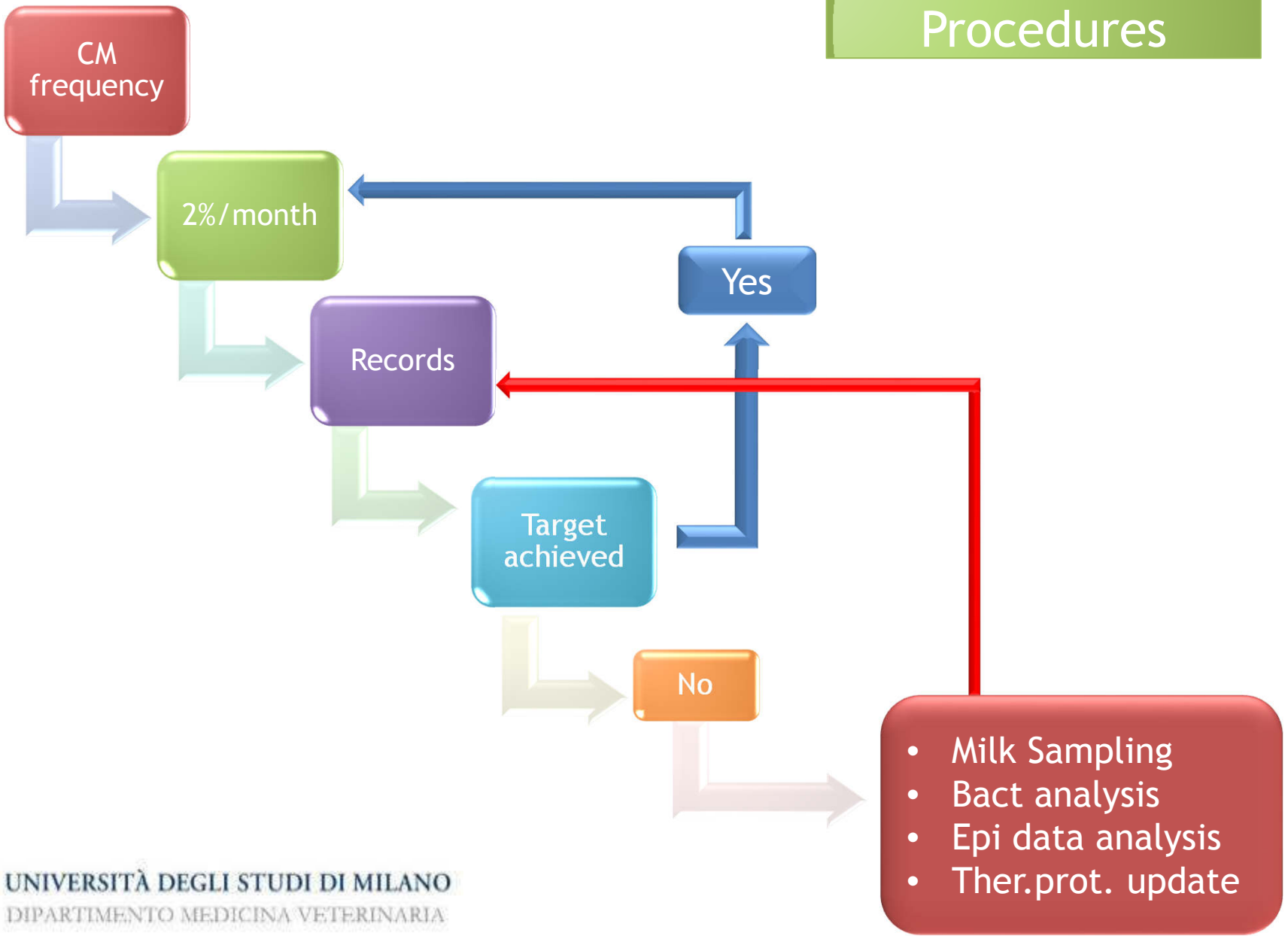


Plan: say what you do
Do: do what you said
Check: record what you have done
(re)**A**ct: repeat a new cycle based on results

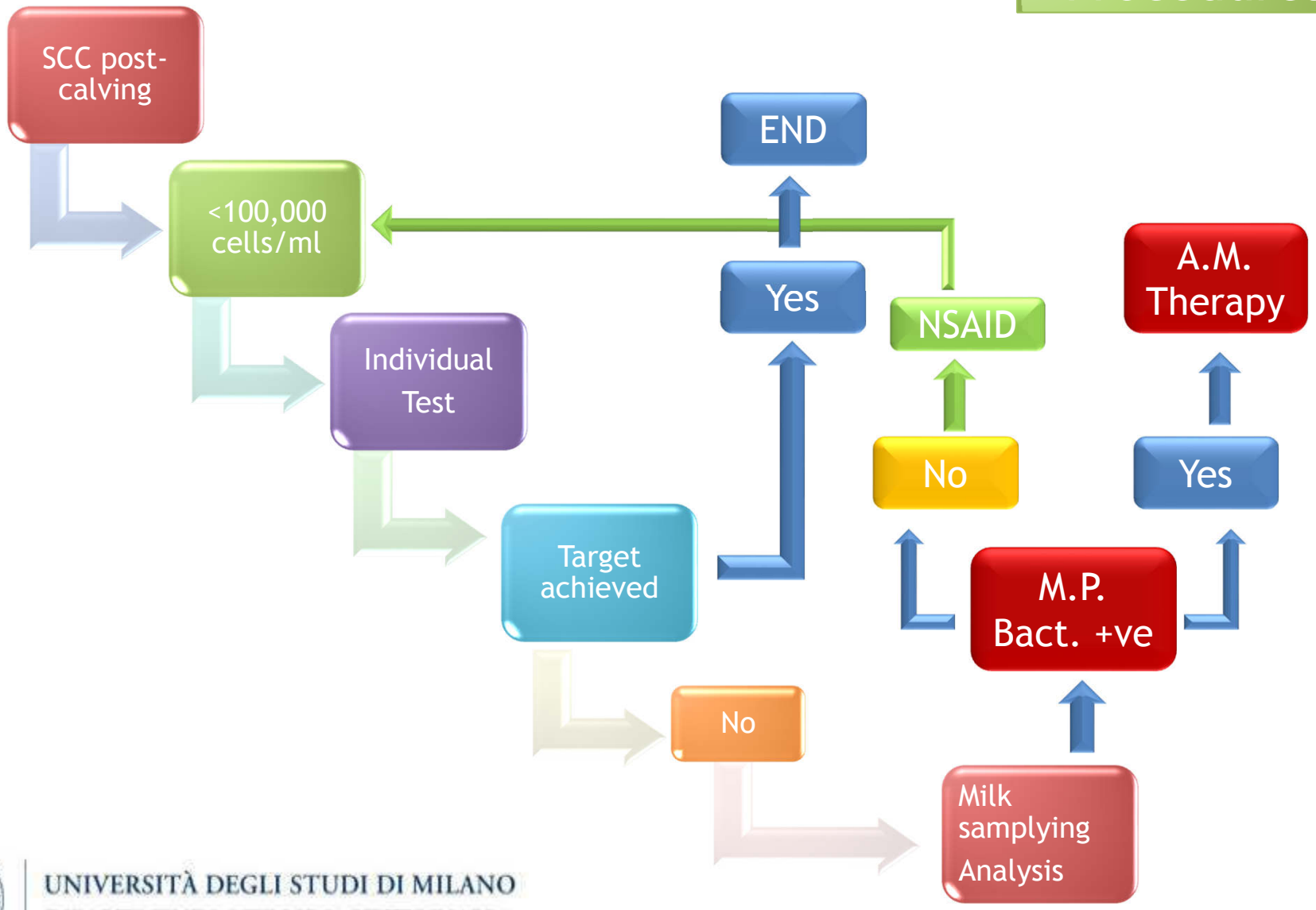
Procedures


Parameter
Benchmark (target)
Test
Target achieved
Yes
No
Action (SOP)

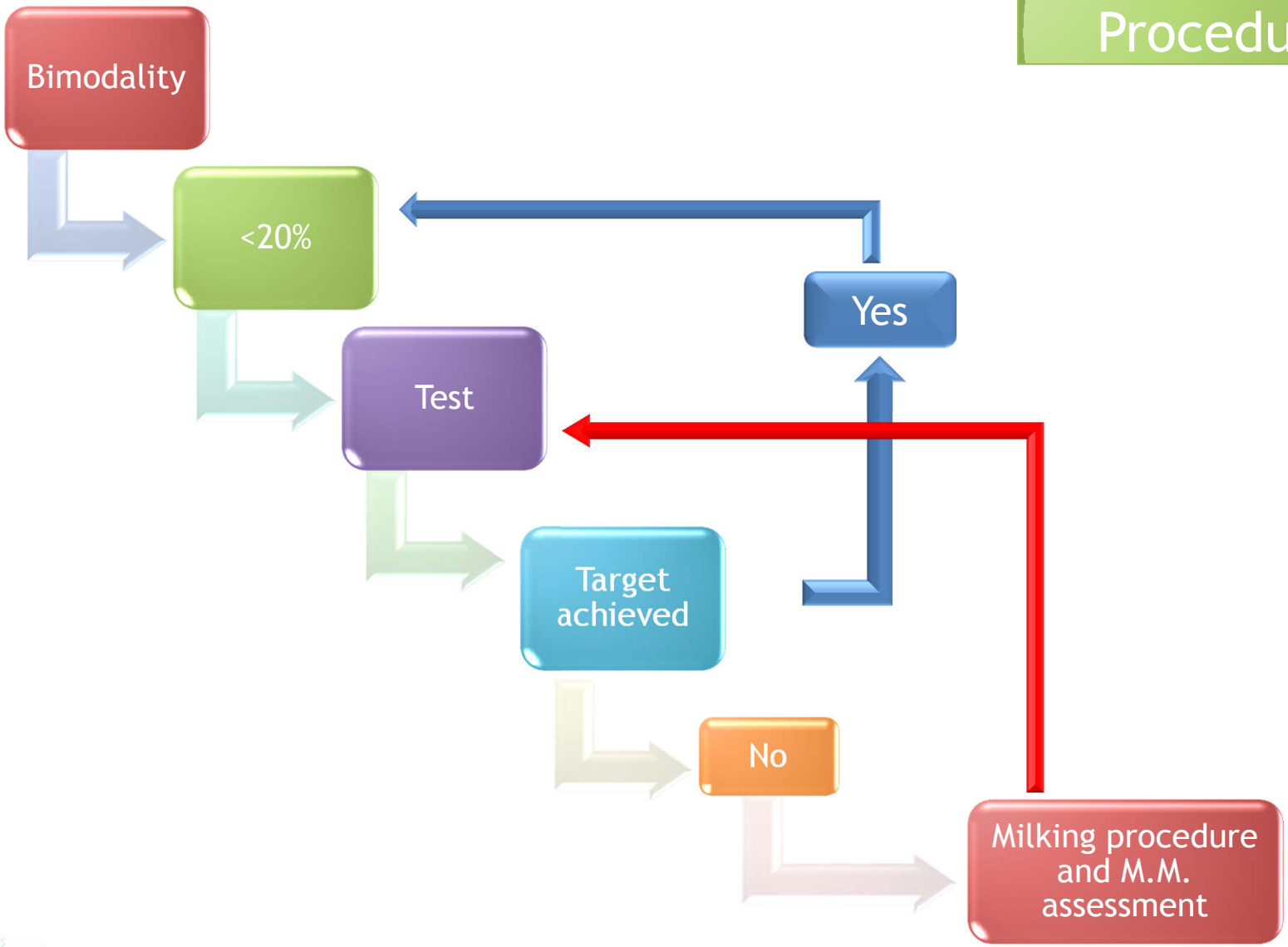
Procedures


CM frequency
2%/month
Records
Target achieved
No
Yes
• Milk Sampling
• Bact analysis
• Epi data analysis
• Ther.prot. update

Procedures


SCC post-calving
<100,000 cells/ml
Individual Test
Target achieved
No
Milk samplying Analysis
M.P. Bact. +ve
No
Yes
A.M. Therapy
NSAID
Yes
END

Procedures


Bimodality
<20%
Test
Target achieved
No
Yes
Milking procedure and M.M. assessment

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!