
UHC

Udder hygiene analysis tool

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Table of content

1. Introduction.....	2
2. Background information about antibiotics	3
3. Wiki's	5
3.1. (Sub) Clinical Mastitis	5
3.2. Immunity	7
3.3. Housing.....	9
3.4. Infection pressure.....	14
3.5. Milking.....	15
3.6. Breeding for udder health	24
4. Checklist	25
5. Decision trees	28
Cow hygiene	28
Bedding.....	29
Udder maintenance.....	31
Use of hand gloves during milking	32
Pre treatment.....	33
Waiting time before connecting milk machine with the udder	34
Position of milking machine	35
Disconnecting milking machine from the udder	36
Managing cows with (sub) clinical mastitis	37
Dipping/spraying post milking.....	38
6. Advice	39
7. Epilogue	51
8. References.....	52
Annex 1 Score card teats.....	53
Annex 2 Results of questionnaires	54
Annex 3 Evaluation	57

1. Introduction

UHC is a specialized consultancy in udder health that is focused on the dairy cow sector in the Netherlands. The company is owned by four females who have equal rights. UHC focusses on udder health because approximately 25% of the cows in the Netherlands have clinical mastitis. One case of clinical mastitis costs a farmer about €275 (Piepers, S. 2007). Through implementation of the advice of UHC, cows will be healthier. Therefore, the milk production will increase, which finally results in a higher profit for the farmer. Nowadays, antibiotics are used to cure cows from mastitis, but antibiotic use should be reduced with 50% compared to the use in 2009 (productschap vee en vles, 2011). To help farmers do this and keep doing this, UHC wants to develop decision trees to make farmers more aware of the procedure of using antibiotics more efficient. These decision trees are used to give farmers an advice to use antibiotics more efficient and if this advice is used sufficient, the antibiotic use will reduce.

In this report, the pilot of UHC is described. The main objective of the pilot is to make farmers more aware of how to increase udder health in dairy herds. This goes through changing management aspects related to hygiene.

This report firstly provides general information about antibiotics and the processes that influence udder health. Secondly, six subjects are described related to udder health. Thirdly, the tools (checklists and roadmap) are shown and fourthly, advises that are written by UHC are presented. Finally, the evaluation of the farmers is included.

For this pilot and in this report the following questions are answered:

1. How to make farmers aware of how to increase udder health in dairy herds?

- 1.1. Which knowledge and information is needed develop the tool, supporting the advice (for the farmer) about increasing udder health and preventing mastitis?
 - Which factors influence the occurrence of clinical and subclinical mastitis on a farm?
 - What are different ways to increase udder health on a farm?

2. Background information about antibiotics

Antibiotic use in the Netherlands

Antibiotic use is an actual subject in animal husbandry (May, 2013). At the end of 2013, cattle farmers should have reduced their antibiotic use with 50% compared to their use in 2009 (Productschap Vee en Vlees, 2011). An improved udder health on farms will lead to a reduced amount of antibiotics needed to treat mastitis.

The Netherlands observed an increase in the therapeutic use of antibiotics in farm animals until 2007. This increase was partly related to the ban on the use of antimicrobial feed savers. The increase in the use of antibiotics raised concerns in the sector, the society, the government and policies. It gave a potential risk to public health, because an increase of resistance against more and more antibiotics was observed.

Keeping the increase of raised concerns in mind, the Minister of Agriculture at that time, Gerda Verburg, set a task force for livestock antibiotic use. There is a task force for the following, different species:

- Cattle
- Pig
- Veal
- Poultry

The government has the responsibility to reduce the use of antibiotics largely deposited to the sectors themselves. The government and the various stakeholders in the sectors above have signed an agreement. The different sectors have drawn up a plan of action.

PVV (Productschap Vee & Vlees – Product Board Livestock & Meat)

The livestock sectors would take the responsibility for the agreement themselves. However, the sectors asked the PVV to assist with the central registration and regulation of the farm health plans and the farm specific treatment plans (in cooperation with the farmer and the veterinarian).

Antibiotic registration

The PVV has taken the responsibility to assist the sectors with the central registration and regulation of farm health plans and farm specific treatment plans. The PVV formulated a regulation and accountability for the antibiotic use in the cattle sector. Since 29 August 2011, all cattle farmers (keeping more than 5 heads), are required to register and report the use of antibiotics. As a result, cattle farmers ensure that the each delivery of antibiotics is recorded electronically. The registration of antibiotics in a central database (MediRund) is, in practice, carried out by the veterinarian. This registration gives an insight into the (average) use of antibiotics and the underlying reasons for this use.

Control requirement

Periodically, the registration of the antibiotic use in MediRund (database for the central registration of antibiotics in the cattle sector) must be controlled. This is done by qualified quality systems and/or by qualified control authorities. The farmer is responsible for this and has to pay this periodically control moments. The controls are intended to ensure the accuracy and completeness of the central registration. The control moments particularly consider the registration in MediRund and the presence of a fully developed farm health plan and farm specific treatment plan. Logically, the farmers needs to act as described in the plans.

Dairy sector

As previously indicated, at the end of 2013, dairy farmers should have reduced their antibiotic use with 50% compared to their use of antibiotic use in 2009. Udder health plays an important role in the reduction of antibiotics in the dairy sector. Antibiotics are often used to treat mastitis, as well as for drying off cows with injectors. An improved udder health on dairy farms will lead to a reduced amount of antibiotics needed to treat mastitis and to dry off cows.

Animal Day Dosage (Dier Dag Dosering, DDD)

The animal day dosage (per year) is a way to express how many daily dosages per animal are used. This indicator represents the use per annum. For example, if the animal day dosage of a dairy farm is 5, then the average individual animal was treated for 5 days with antibiotics. The average animal day dosage in the Dutch dairy cow sector is 5.(AMT, 2012)

3. Wiki's

3.1. (Sub) Clinical Mastitis

Mastitis is most of the time well treatable with antibiotics. A precondition to make a treatment successful is to use the right antibiotics for the bacteria that are sensible for those antibiotics. The specific treatment plan is the first step towards an efficient use of antibiotics, successful treatment, healthy cows and food safety.

Clinical mastitis

Mastitis is an inflammation of the udder tissue. Every herd has cases of mastitis. It is a disease which is always present on the farm and cause serious problems. In clinical mastitis visible symptoms can be seen as well as a higher SCC. A couple of visible symptoms are clots in the milk, a red swollen udder, reduced milk production, loss of appetite and slower cows.

Mastitis causes great financial loss to farmers. This is about €275, - per mastitis case (milk losses included) (Piepers 2007). In the circle diagram, the specific costs and losses per mastitis case can be seen.

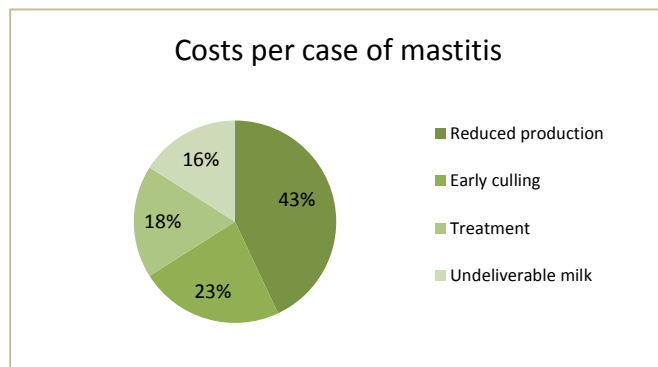


Figure 1: costs per case of mastitis (Udder health management, CRV, 2011 and UGCN, behandelen and controle)

Subclinical mastitis

Thirty percent of all mastitis cases happen without visible symptoms. Subclinical mastitis can only be recognized through higher somatic cell counts and somewhat lowered production. Because of this, the farmer has to use other methods to find out if udder tissue is infected. The cell count is essential to diagnose sub-clinical mastitis (>150,000 for a heifer, >250,000 for a cow). If the cow has an on-going increase of white blood cells, the farmer should take action. The success of treating subclinical mastitis strongly depends on the type of pathogen and the length of the infection. If the infection is present for a longer time, it is harder to treat the cow successfully. To decide to treat or not, this can be taken into account:

- Parity
- Age
- Gestation
- Number of infected quarters
- Mastitis history

Older cows that have a SCC that is high for a long time can best be culled. If this is not possible, the farmer has to make sure that the infected cows do not infect the non-infected cows. The cycle of cross-contamination needs to be broken to prevent further contamination. A possibility to break the cycle is to make groups of cows that have a high SCC.

California Mastitis Test (CMT scan)

For both clinical and subclinical mastitis it is possible to do a California Mastitis Test (CMT scan). It is important to diagnose the cow right. The CMT scan can be very useful when a cow has an increased somatic cell count (SCC), but shows no or minor visible symptoms. The CMT scan works as follows:

1. Strip 2 or 3 streams of milk from each quarter into the four cups (do not use the first stream of milk in which there are always more cells present)

2. Add equal amount of substance in each cup
3. Mix the substance and the milk, then stir it for half a minute
4. Leave the mixture for 10 seconds to settle
5. It is possible to observe the thickening of the four samples after 10 seconds

When there is a change in substance, the S.C.C. might be more than 500.000 cells/ml milk. CMT scores are shown in the table below:

Mixture	Cells/ml milk	Score	Mastitis
Liquid, no thickening	100.000-300.000	0	No
Slight thickening (within 10 seconds)	300.000-400.000	T(race)	No
Distinct thickening	400.000-1.000.000	1	Yes
Thickness immediately, gel formation	1.000.000-2.500.000	2	Yes
Gel is formed immediately, viscous and thick substance	>2.500.000	3	Yes

Table 1: CMT scores according

Farm specific treatment plan

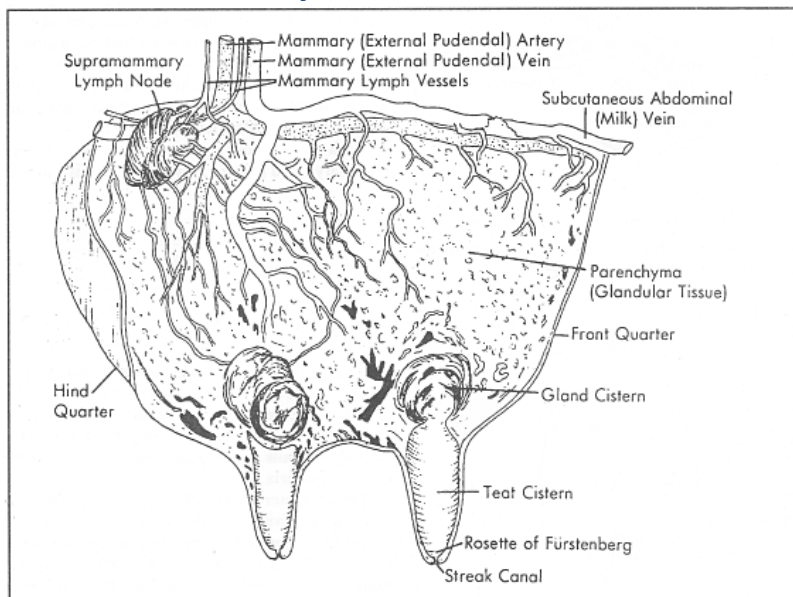
An efficient way of treating cows is through a farm specific treatment plan. This plan can be set up with the farmer's veterinarian based on the laboratory results on the most present bacteria in cases of mastitis on the farm. By using this plan, farmers will get clear protocols and this makes the treatment of mastitis more efficient. This farm specific treatment plan is a continuation of the advice of UHC. The farmer can, with the specific treatment plan, continue to specify the treatment of mastitis together with the veterinarian.

Dry-off period

The dry-off period can give an advantage on udder health if the transition between lactation and dry-off period is managed well. It is healthier for the udder to stop milking when the cow has reached the dry-off period instead of skipping several milking sessions and then stop milking. It is only responsible to stop milking if the milk yield has decreased to 15 l a day. This can be succeeded by adjusting the ration. During the last milking session, the farmer gives a dry-off preparation to the four quarters. This consists most of the time of antibiotics. Preparations without antibiotics are only for cows which have healthy udders. Indicators are a low somatic cell count and no mastitis during the last lactation. Another point that is important to consider is the hygiene measures during the insertion of the dry-off preparation in order to prevent contamination.

(Udder health management, CRV, 2011 and UGCN, behandelen en controle)

3.2. Immunity



Picture 1: The udder (UGCN, 2011)

Defence

In this chapter the factors which are important for the immunity and defence against mastitis are described, starting with the prevention of entry of bacteria into the udder. The teat skin provides a hostile environment the multiplication of bacteria. Besides that, there are fatty acids present on the skin that prevent the growth of bacteria. However, these fatty acids can be removed by continual washing. If cuts, cracks, chaps, bruising, warts, pox lesions etc. appear on the skin of the teat, bacteria can grow on the surface of the skin. To maintain an intact and healthy teat skin a teat dip can be used (Blowey, R. and Edmondson, P. 2010).

Besides the teat skin, also the closure of the streak canal by the sphincter muscle is a defence against bacteria coming in to the udder. Next to that, the streak canal is fully closed by keratin. This is a wax-like product, which inhibits the growth of bacteria. Keratin is made by cells on the inside of the streak canal. During the dry off period keratin accumulates in the teat canal and functions as a plug. However, a relatively high percentage of cows have a slowly production of this keratin plug. Therefore a teat sealer can be used to create a plug to prevent pathogens of coming in to the udder (UGCN, 2011).

If the streak canal is damaged, the chance of an infection of the udder will increase. A scoring card of the UGCN can be used to score the teats and look if there is a risk of infection or not. In annex 1 the teat scoring card can be seen. A maximum of 10% of the cows may have a problem with the teats (UGCN, 2011).

Although some pathogens still get in to the udder, mostly they are flushed out of the udder during milking. If this does not happen, the pathogens (mostly bacteria) attach to the cells within the udder. However, there are several substances (such as lactoferrin) that prevent bacteria from growing and immunoglobulin's that also prevent the growth of bacteria and destroy them, some bacteria still manage to grow. Lactoferrin removes the iron from udder secretions, this prevents bacteria multiplication because iron is required for bacterial growth. Lactoferrin only removes iron from the udder secretions during the dry period because during lactation there is a very low concentration of lactoferrin present in the milk.

The result of an inflammatory reaction depends to a large extent on the effectiveness of the interaction between leukocytes (white blood cells) and the invading bacteria. The quality of the leukocytes is important. Stress and a negative energy balance have a negative impact on the quality of the leukocytes. To destroy bacteria leukocytes need oxygen radicals, for this process vitamin E and selenium are important. The bacteria can destroy leukocytes by releasing lysozymes. This results in the production of hydrogen peroxide. This needs to be destroyed immediately (otherwise the leukocytes will be destroyed), and this is done by glutathione peroxidase which is an enzyme that is depended on selenium. Vitamin E reduces the rate of hydrogen peroxide and selenium increases the activity of glutathione peroxidase.

3.3. Housing

In relation to housing, several points need to be controlled. The housing system needs to be dry and clean to decrease the infection pressure on a farm. To control housing of dairy cattle, several subjects arise. Therefore, the slatted floor needs to be clean and dry because otherwise the cows are spreading manure through the entire stable including the cubicles. If cubicles become dirty there is a higher change of problems related to infection of the teats because a microorganism has an easier excess towards a teat. It is very important that there are enough cubicles pertaining to the number of cows. Another, way to have a cleaner udder is to shave or burn hair on the udder which means a lower risk for attaching filth.

In dairy farming there are different housing systems. Related to udder health is a deep pit stable not the ideal situation because microorganisms can survive easier in the straw bedding. Therefore, cubicle housing is more ideal because in cubicles, mattresses, sawdust or a sandy bedding can be used which is less susceptible for microorganisms. The climate in the stable should be controllable with help of an optimal temperature (5°C and 18°C) and humidity between 50% and 60%.

Cubicles

Explanation design decision tree bedding

In the choice for bedding different aspects are involved. Therefore, it is not possible to state which bedding is the best choice in matter of mastitis. The risk of mastitis in relation to bedding, is closely related to the management of the boxes, udder maintenance and the overall environment in the barn. That is why the decision tree of bedding gains insight in the advantages and disadvantages of a particular bedding. To gain knowledge about the ideal procedure around management of the boxes and udder maintenance, see part of the checklist hygiene stable and the roadmap udder maintenance.

Bedding management

Depending on which material is chosen, it is essential that a cubicle is kept dry and any manure or damp bedding is removed at least twice a day. Fresh bedding should be added daily to ensure cows stay dry and clean. Passageways should be scraped 2 times a day to reduce the occurrence of manure and slurry being transferred into the cubicle bedding through the claws of the cows.

(DiaryCo technical information, 2013)

Bedding

Organic materials like straw in free housing are a power source for microorganisms. The fastest increase in microorganisms depends on the sort of bedding, cleaning management, daylight raid and the overall housing climate of the barn. Soft woods for example such as pine and spruce are consisting of more resinous substances that helps brakes the increase of the microorganisms. That is why the hardwood and oak are less suitable for bedding also because it can cause more traumas on the udder. Sand consists of less nutrients for the microorganisms compared to other types of bedding. That is why sand is a good related to mastitis. However, sand is not ideal in barn with a slatted floor because of congestion. The importance of proper bedding is that it is not susceptible for microorganisms. That is why it is important that the bedding is stored dry and that it is dry in the barn to decrease the risk of increasing of microorganisms. For a good quality of comfort and a lower risk of trauma on the udder, it is important that the bedding is from a soft material and that there is enough bedding in the cubicles. The cm of bedding is depending on the flooring in the cubicles.

(UGCN, 2011)

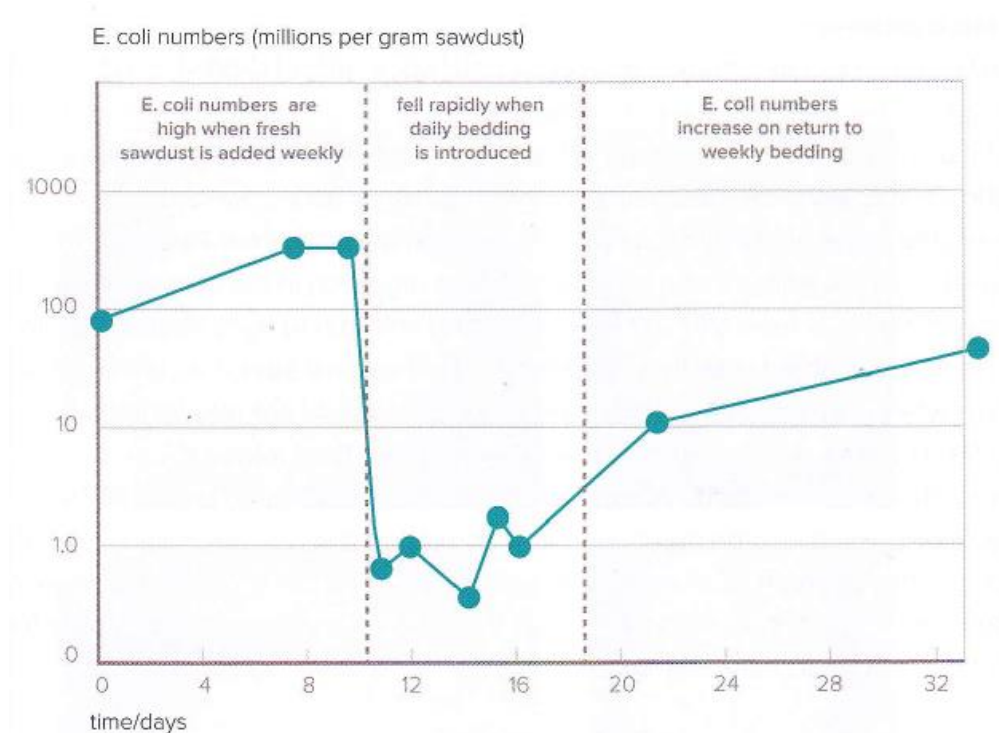


Figure 2: E. coli numbers (millions per gram sawdust)

Hygiene

Slurry management

Slurry and manure is an excellent environment for many bacterial and viral species. Pathogens in manure can enter through injuries or damage to hooves, legs and udder. In cubicle-housed systems, the frequency of alleys cleaning can make a great difference to the hygiene of the cows and can offer important benefits in terms of reducing the potential for cows to slip, fall or be pushed by other cows. This may cause injuries and teat/udder contaminations. Alleys should be scraped at least twice per day.

(DiaryCo technical information, 2013)

Disinfect cubicles

When there are many cases of mastitis it is advisable to disinfect the cubicles against spreading. The best procedure for disinfect the cubicles is removing all the bedding. The following step is spraying the cubicle with a mixture of water and 3-4% formalin. This mixture need to have half an hour to kill the residual germs. After a half hour remove the remnants and when the underground is totally dry new bedding can be added to the cubicle.

(UGCN, 2011)

Cow hygiene

To get an impression about the germs in a barn it is important to judge the overall hygiene of a herd. A clean cow indicates that the barn is well cleaned. A dirty cow indicates that the barn is not well cleaned. Research indicates that there are three assessments points for judging the hygiene of a cow:

1. Udder
2. Thighs
3. Lower legs/ claws

For scoring these assessments points the cows need to stand close to the assessor. In total approximately 50 cows are needed to get an impression about the overall hygiene of the barn. The dry cows and young stock are also important in this way of scoring.



Score1= Clean

Score2 = slightly soiled

Score3 = soiled

Score4 = severely soiled

Picture 2: UGCN, cow hygiene score card

Decision tree cow hygiene

Udder

Score 3/4 ≤ 10%

Observe the udder from the rear and the side if possible. The presence of visible manure near the teats is a risk factor for udder infection. Score 1 is no manure present. Score 2 is minor splashing of manure near the teats.

Score 3/4 ≥ 10%

Score 3 is distinct plaques of manure on the lower half of the udder and Score 4 is confluent plaques of manure encrusted on and around the teats. Manure may be transferred to the udder either by lying on a filthy surface or by resting the udder on manure contaminated lower leg.

Upper legs and thighs

Score 3/4 ≤ 15%

Score 1 is no manure. Score 2 is minor splashing of manure.

Score 3/4 ≥ 15%

Score 3 is distinct plaques of manure with hair showing through, and Score 4 is confluent plaques of manure. This zone maybe contaminated either by lying on a filthy surface as would occur in a poorly managed stanchion barn stall, or by a manure encrusted tail swishing around the rump area.

Lower legs/ claws

Score 3/4 ≤ 20%

The scoring system aims to track the amount of manure present and the distance it extends proximally up the leg. Score 1 is little or no manure above the coronary band. Score 2 is minor splashing above the coronary band.

Score 3/4 ≥ 20%

Score 3 is distinct plaques of manure above the coronary band, but with leg hair visible. Score 4 is a solid plaque of manure extending high up the leg. Typically stanchion / tie stall cows have clean legs and free stall cows have a high degree of leg contamination from walking through manure filled alleyways.

(Cook, N.B.)

If the udder, thighs, lower legs and claws are in the score around 3 or 4 then different percentages are acquired for improving the hygiene. If the udder is around 3/4 there needs to be a decrease in this scoring of 10 % if the thighs are around 3/4 there needs to be a decrease of 15% and the lower legs and claws need to decrease with 20%.

Research has shown that the somatic cell count indicates if a company has high hygiene scores or low. Farms with a cell count above 250.000 cells showing five times more cows with hygiene score around 3/4 which indicates that the cell count is closely linked to the hygiene in a barn. Overall is the chance for dirty cows 1.5 times more to get a sub clinical mastitis then for clean cows. However, when the scoring of hygiene is around 3/4 then it is important that the farmer changes the hygiene in the barn for example bedding, cubicles, manure cleaning and shaving.

A big infection risk is manure. Especially, diarrhoea which can be caused by a not well performed ration composition which means overfeeding of concentrates and not enough fibre in the ration can causes diarrhoea. Also, bacteria can cause diarrhoea for example salmonella.

Cows with mastitis are taking care of an increase in infection pressure. Especially, cow bound germs such as:

- Streptococcus agalactiae (SAG)
- Staphylococcus aureus (SAU)
- Coagulase negative (CNS)
- Staphylococci (STEC)
- Streptococcus dysgalactiae (SDY)

The infection pressure is high if more than 10% of the MPR has a raised somatic cell count. In situations where the quota is not full, the milk price is high and the herd is expanded then problem cows are not replaced. If the cows with mastitis are not replaced the infection pressure becomes higher which can cause long term problems at company level. For decreasing the infection pressure in this situation a solution can be to separate the infection cow through quarantine. An important tool to get insight in the microorganisms involved and there transmission index is the R Value. If one cow is able to infect another cow then the R value is 1. The more animals are infected by one infected cow indicates how infectious the involved microorganism is and an increase in R value is presented. A high R value indicates that in a short period of time many animals are infected. The bacteria Streptococcus aureus (SAU) is one of the bacteria with a high R value so a high infection pressure chains of the (SAU) can have a R value above 7. Beside germ characteristics, milking management is also responsible for the transmission of germs and the R value involved. For example, during milking the infection pressure can become high because of poor disinfection or the hygiene of the farmer himself.

Udder maintenance

Udder hair singeing is advisable because if the hair on the udder is removed the filth out of the stable cannot easily connect to the udder. Filth on the udder is of risk because the germs out of the filth can enter the udder. With hair singeing of the udder, hair on the udder is removed with a propane torch using a cool flame. The flame is passed quickly under the udder to burn the hair off. In hair singeing of the udder it is important that it is done correctly and thoroughly without burning the skin on the udder or the teats.

Although, the idea of using a flame around the udder of a high production cow may seem strange in the beginning of the innovation. However, in practice this innovation was tested safe, very effective and time saving. Farmers have found hair singeing much more easier than shaving of the udder. The main benefits are taking less investment in equipment and less time. Singeing of the udder can be done at different places in the barn for example the milking parlour or in the feed rack. It only takes a couple of minutes per cow and it needs to be done every 4 and 6 weeks.



Picture 3: Hair singeing



Picture 4: Before hair singeing



Picture 5: After hair singeing

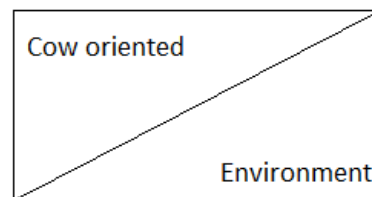
(M. Gamroth, T. Downing and A. Peters Ruddell, Oregon state University, extension service)

For an additional movie about hair singeing see link:

<http://www.youtube.com/watch?v=nPZX8rgoMiM>

3.4. Infection pressure

The infection pressure in a barn is related to two aspects. The first step is the pressure of the environment and housing where the cows live in and the second pressure is about direct or indirect contact with other cows. In the barn several mastitis microorganisms are occurring. These microorganisms are also divided into cow-oriented germs and environment-oriented germs. For example, a germ which is really related to cows is *Streptococcus agalactiae*; this transmission of germs is therefore only expressed in milking. *E. coli* are the germs related to the environment, for example in the manure and bedding. For decreasing the infection pressure there are two ways of approaching cow-oriented and environment-oriented germs; therefore, only by treating both germ parties the overall infection pressure can be controlled.



3.5. Milking

Milking is an important aspect in the prevention of mastitis. The milker and the milking machine are of great influence on udder health. The factors that make the milking successful are a sufficient working milking machine, a sufficient milking technique and clean, quiet cows.

Mastitis specialists state that 50% of all new udder infections on farms can be associated with imperfections in milking. During the milking, mastitis pathogens cannot only be transferred, but also enter the teat. The teat condition may be affected by the milking, which makes it easier for the pathogens to enter and eventually cause problems.

This chapter includes the aspects that are important in the relation between udder health and milking.

Milking method in conventional milking

Hand gloves

UGCN (Uier Gezondheids Centrum Nederland) researched the use of hand gloves during milking. The result of this research indicates that the number of bacteria present on hand gloves is lower than the number of bacteria present on the hands of the milker. Furthermore, hand gloves are easier to clean, and the hands of the milker stays in a better condition. Many milkers carry *Staphylococcus Aureus* on their hands without knowing. Milkers have to get used to the hand gloves, but the research also indicated that they get used to it and that the milkers become more aware of the effect of using hand gloves. It is recommended to clean the hand gloves during milking and use the only one pair of hand gloves per milking.

(UGCN, 2011, CRV, 2011)

Disinfection of teats before milking

Research has shown that the cleaning of teats before milking reduces the number of new infections with mastitis pathogens. However, the result of the cleaning depends on the infection pressure and the way the cleaning is performed. The rough dirt needs to be removed firstly, the teats need to be disinfected secondly, the disinfectant needs to stay for 30 seconds before it can be removed again. This procedure might be helpful in the prevention of mastitis, although, dairy companies are not pleased with this method. It has been proven that residues of the disinfectant stay in the milk, as soon as the removal of disinfectant is omitted. This is why the dairy companies are not in favour of disinfecting teats before milking.

(UGCN, 2011)

Pre-treatment

The pre-treatment is important for the cleaning of the teats, the control of the udder on mastitis and the stimulation of milk letdown.

Hygiene in the stable

Hygiene in the stable is not really a pre-treatment, but more or less the start of pre-treatment. The basic is in here. Farms with a hygienic stable have averagely seen less udder health problems. Cows with dirty udders can be affected by mastitis pathogens before milking. Therefore, cleaning dirty udders in the pre-treatment, might not always be enough to prevent the affection by mastitis pathogens. Environmental bacteria in the cow and bulk milk are an indicator for insufficient hygiene in the stables.

Cleaning of the udders

Udders can be cleaned with paper disposable cloths, disinfection cloths or cotton cloths. The standard rule is that maximal one cloth is used per cow. For the cotton cloths is the exception that there may be a maximum of 4 cows cleaned with one cloth. The cotton cloths need to be cleaned in a hot wash (95°C), in order to kill the bacteria present and to prevent transmission. Most bacteria are killed at 85°C. Cows having mastitis need to be cleaned with a separate cloth, that is for sure not used for other cows.

Dirty udders need to be cleaned with clean water and dried with clean, dry cloths. The drying is, next to the hygiene, also important for the milking technique. Wet teats may connect less easily to the teat, which in the end leads to slower and less complete milking and teat problems.

Pre-milking and pre-treatment

Pre-milking is important in the early detection of clinical mastitis. Cases of clinical mastitis are easier treatable and decrease the risk of spread. Pre-milking and pre-treatment stimulates the milk letdown and helps to remove possible mastitis pathogens in the teat canal. In pre-milking, the so-called keratin plug is removed. The keratin makes it hardly possible for bacteria to cause disease. Keratin has an inhibitory effect on the development of bacteria because they become trapped in the layer of keratin.

It is important to keep hands, cloths and teats dry to prevent the spread of bacteria. It is recommended to milk out 3 streams, followed by cleaning the teat tip perfectly with a dry and clean cloth, then massage the teat and udder at least 15 seconds before connecting the milking machine with the udder.

(UGCN, 2011, Hulsén, 2007)

Waiting time before connecting milking machine with udder

It is important that the cow is 'letting the milk go' before the milking machine is connected with the udder. The optimal waiting time is 60-90 seconds after the first contact with the teat. The waiting time of 60-90 seconds has a positive effect on the total and fast milking.

(UGCN, 2011, Hulsén, 2007)

Connecting the milking machine with the udder

Connecting the teat cups of the milking machine cluster to the udder is done with the hand which is most closely positioned to the hind legs. The suction of 'false air' is not desirable because of the variations in vacuum under the teat. Variations in vacuum under the teat may increase the risk of new infections, because the milk can be absorbed via other teat cups back in the teat canal (cross contamination).

(UGCN, 2011, Hulsén, 2007)

Position of the milking machine under the udder

It is important that the milking machine is located equally under the udder. The milk tubes should not be turned. The equal position of the milking machine under the udder reduces the risk for the suction of 'false air'. Restless behaving cows is an indication of uncomfortable milking. There is a risk that the udders are not totally milked out, possibly because in stressful situations, Adrenalin is released. Adrenalin has an inhibitory effect on the release of Oxytocin, a hormone that is necessary to release milk. This increases the risk for developing mastitis. It is recommended to check the milking machine if this occurs, as well as in situations in which more than 1 out of 10 milking machines disconnects with the udder during milking.

(UGCN, 2011, Hulsén, 2007)

Disconnecting the milking machine from the udder

The disconnection of the milking machine with the udder should take place at the moment that the release of milk stops. A milk release of max. 0.5 liter per minute per cow is an acceptable moment to disconnect. The procedure of disconnecting the milking machine from the udder is recommended to follow, in order to reduce the risk for mastitis. The procedure of disconnecting the milking machine from the udder is as follows:

- Firstly, the vacuum should be locked. Then, the milker needs to remove the milking machine. Finally, the milker needs to check the teats and the udder.

Nowadays, automatic disconnection is used more and more. Research of UGCN has shown that the automatic disconnection is often too slow. This is a risk for a decreased udder health. The take-off moment can be set at 350-400 grams per minute (these characteristics can be alerted to individual preferences in most milking systems). Long blind milking is a disadvantage because it often involves suction of false air and damage to the teat condition. Too long blind milking is not only a matter of incorrect adjustment of the automatic reduction. It is also important that all the teats of the cow are smoothly, equally milked out. Always check whether the cows are fully milked out. Cows with residual milk (not fully milked out) have a higher chance to leak milk in the cubicles. This milk is an ideal basis for bacteria to grow. Leaking of milk may therefore increase the infection pressure in the herd. If there is any doubt about cows not being fully milked out, always check if this is the case. (UGCN, 2011, Hulsen, 2007)

Restless behavior/hitting while disconnecting might be an indication for discomfort and/or pain. Certainly less than 1 out of 10 cows may do so.

The milker checks for the following post milking:

- Wet teats: wet teats after disconnection may indicate a too slow disposal of the milk in the milking cluster. Milk in the milking tube might be absorbed back in the teat. This increases the risk for infection from bacteria of the skin, bacteria in the milk and/or bacteria from the skin of the previous milked cow.



- Bumper ring/red teat: the vacuum in the bumper ring is way lower than under the teat as long as the teat cup liner fits around the teat. With for example small teats (heifers) or too large teat cup liners, the vacuum might increase and the milking machine might creep up. This often leads to a painful blood flow in the teat tip, what makes the cow showing restless behavior. The development of bumper rings might be induced by wet pre-treatments.



- Hemorrhages/concussed teat : a too high vacuum around the teat tip causes hemorrhages in the skin of the teat. This goes together with blood flow in the teat tip, which induces restless behavior of the cow.



- 'Flat teats' : this happens when the teat has been blocked while milking. The cause of the blocking is a rigid/wide teat cup liner or a too long pause of the pulsator.



(Hulsen, 2007)

Dipping/spraying – teat disinfection post-milking

Teat disinfection reduces the risk for new udder infections. The teat canal stays open for a while after milking. Dipping/spraying kills bacteria around the sphincter. Besides that, disinfection is important for the care of the teat's skin. Mastitis pathogens do have a lower chance to multiply on a skin which is in a good condition (to do a teat score, see teat score cards UGCN, annex 1). It is important that the disinfectant covers at least 2/3 of the teat, therefore dipping might be more effective. Spraying needs to be done very precisely.

It is recommended to make it impossible for cows to lie down immediately after milking because of the opened teat canals and thereby the easy access for bacteria to enter. The teat canals are open for approximately 20-30 minutes post-milking (see figure #). The keratin, removed during milking, needs this time to position itself back again in the teat canal. It is possible to provide fresh feed in the feed rack after milking in order to prevent cows lying down immediately after milking.

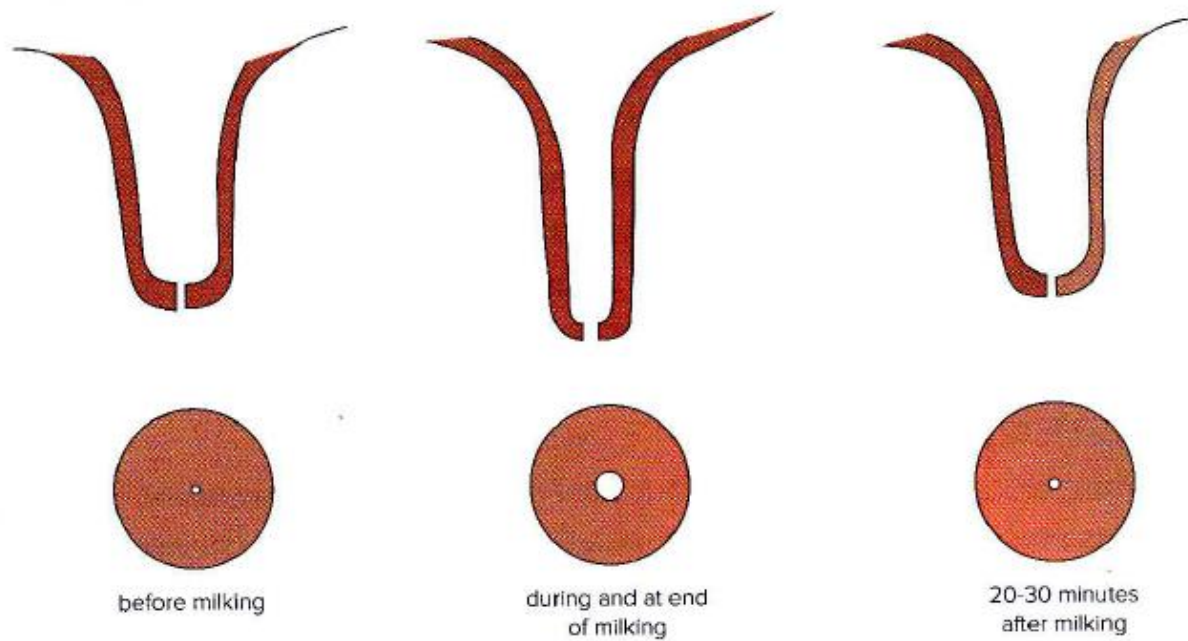


Figure 3: teat canals pre- during and post milking (Source: Udder health management, CRV BV, 2011)

(UGCN, 2011, Hulsen, 2007)

Managing cows with (sub)clinical mastitis

Notice the cows with an increased risk

The milker should immediately notice the cows with an increased risk for clinical mastitis (sub clinical mastitis according to MPR). These cows are a risk for the other cows in a herd. The milker should judge the condition of the cows and the udders every milking. The milker should adapt the treatment following the farm specific treatment plan.

The best way to reduce the risk is to keep the mastitis cows together at the end of the milking. This lowers the chance for transmission of mastitis pathogens and it does not desist the milking routine.

Cleaning the milking machine

Remaining milk in the teat cup liner and in the milking machine can transfer mastitis pathogens from cow to cow. To reduce the risk of transmission, it is important to clean the milking machine and the teat cup liners after the mastitis cow/cows with high somatic cell counts have been milked. The milking machine and the teat cup liners should be flushed during 5 seconds with hot water (85 °C) in order to get the best result, because most bacteria die in an environment of 85 °C.

Checking the filter post-milking

The filter should be clean after milking. In cases in which the filter is not clean, milkers might be confronted with the fact that they did not clean precisely enough or that they did not notice the cows with flakes in the pre-milking.

(UGCN, 2011, Hulsen, 2007)

Automatic milking in relation to udder health

The well-known measures to prevent mastitis on farms with a conventional milking system also apply for farms with a robotic milking system. Milking with an Automatic Milking System (AMS) had also other aspects that influence udder health on dairy farms. It is not only about the milking system that is different comparing to the conventional systems, but also the frequency of cows being milked. Besides that, cows with udder health problems are detected in a different way.

Good start as the basis for successful milking

Research has shown that the somatic cell count already increases before the milking system is actually taken in practice. Factors such as construction traffic and the less attention to the cows during this busy period influence the increase of the somatic cell count. The cows are the first time in the robotic milking system with an increased somatic cell count, which is logically not favourable.

Practice has shown that dairy farmers, who start milking cows with a healthy and active herd, have a better start and a more successful milking than farmers with cows with an increased somatic cell count. However, culling cows with insufficient health for introducing them to a new milking system, helps to make a better start. It is important that the cows are able to move to the robotic milking system easily and that the waiting time before milking is limited. This keeps the cows willing to visit the robotic milking system.

Research has also shown that the occupation degree plays an important role in the behaviour of the cows and the willingness to visit the robotic milking system. Farms starting with a low occupation degree, averagely see a better start after introducing the cows to the new way of milking. An insufficient start in the milking will have an effect on the total milking period. It is therefore essential that the circumstances are optimal at the beginning of the milking with the new system.

Sufficiently working milking system

The AMS is a constantly working milking system. In case problems in the system are discovered 24 hours later, around and about 150 milkings might have already taken place. It is not always the case that the milking system indicates mistakes. It is therefore essential that farmers check the milking system data and the functioning of the system regularly (3 times per day) in order to notice problems in an early stage. The major indicators to check the robotic milking system on in relation to udder health are as follows:

- The pre-treatment
- The connection of the teat cups with the udder
- The milk technical adjustment
- The effectiveness of the spraying (check teats after spraying)
- The sufficient cleaning of the teat cups

Effectiveness of the pre-treatment and the importance of stable hygiene

It is important that the pre-treatment brush of the robotic milking system is connected properly to the teat. Due to tuning errors, long udder hair and insufficient position of the teats may lead to problems. Unclipped tails can also disturb the pre-treatment. However, it has been noticed that dirty teats and udders are not always sufficiently cleanable by the AMS. Cows that are milked frequently are often more clean and easier to clean. Teats in bad conditions are more difficult to clean.

According to the above, it might seem logical that a good udder and stable hygiene is of major importance in farms making use of AMS. Important actions to take are the regularly cleaning of the boxes. Besides that, hygiene of the slats and the stable climate play an important role. Bacteriological research gives an indication of udder hygiene, as well as bacteriological research of the bulk somatic cell count.

Failed connections

Failed connections lead to incomplete milkings and the release of milk while staying in the boxes. This is not contributory to udder health. Causes of failed connections might be:

- Too long hair on the udders
- Low milk production
- Position of the teats
- Dirty detectors

- Restless cows

It might be helpful to set the milk interval for cows with a low milk production and wrong teat positions longer, in order to help the teats coming back in a 'normal' position. It is important for farmers to check the failed connections, in order to milk the cows as soon as possible. It might be that cows with failed connections may temporarily have a higher conductivity. The increased conductivity normally lowers once the cows have been milked. The failed connections should be checked daily.

Milk technical adjustment and maintenance of the robotic milking system

The milk technical adjustment of the robotic milking system should be checked twice a year (minimum). Besides that, it is important to replace the teat cup liners in time. It is important for the farmer to check the rubber and closed air cavities in order to prevent possible problems. Cleaning the robotic milking system belongs to this daily routine as well. The milking speed, the milking time, restless cows, bad teat conditions and incomplete milkings are indicators for an insufficient milk technical adjustments. Farmers should be aware of this.

Cleaning of teat cup liners

Transmission of mastitis bacteria can take place via the milking machine. All AMS are flushed with cold/lukewarm water. Research in conventional milking systems has shown that this reduces the number of mastitis bacteria present on teat cup liners with 60-75%. Flushing the milking machine with water of 85°C can reduce this to 100%. Therefore, producers of AMS provide (optional) steam cleaning of teat cup liners in their systems.

Besides the cleaning of the teat cup liners, cleaning of the main pipe to the bulk takes place. This cleaning of the main pipe should take place 3 times a day(24 hours) with hot water.

Teat disinfection post-milking

Practice has shown that the teat disinfection of the AMS is not optimally working all times. In some cases, the settings of the system are not sufficiently adjusted which results in spraying the teat not optimally but the legs of the cow for example. There can be problems with the sprayers or for example by an empty bottle, clogged hoses or clogged sprayers. The AMS does not give an alarm in cases the teats are not sprayed well. It is therefore recommended to check the spraying system once a day.

Milking frequency and udder health

The milking frequency per cow differences, because the cows have the possibility to visit the robotic milking system themselves. The question is, what is the effect on udder health?

Drawbacks of low and high milking frequencies

A low milking frequency is a drawback for udder health and for the milk production. A too high milking frequency is a drawback because of the higher risk of fatty acid cleavage in milk. High milking frequencies can lead to a reduction of the milk capacity due to lower milk production and lower milking speed. Low milk productions per milking induce a higher risk for increasing somatic cell counts. The minimal milking intervals are based on the prospected milk productions of minimal 8-14 kg milk per milking. The maximum of milking intervals is determined by adjusting the attention list for cows that have to be picked up.

Optimal milking frequency

Frequent milking means regular milking, higher productions and a better udder health. A good aim for farmers is to have on average more than 2.5 milkings/cow/24 hours. The optimal milking

frequency is based on the production of the individual cow. Cows in the beginning of their lactation have more possibilities to visit the robotic milking system than cows in later production, in order to reach the peak production. It is recommended to check the average milking frequency of the herd. It is also recommended that cows in the end of their lactation are milked at least twice a day.

Factors influencing milking frequency

Active cows are important for an optimal milking frequency. Good claw health, a fresh, hygienic stable and optimal feeding are important aspects to obtain this. Research has shown that low structure/tickling of the feed has a negative effect on the milking frequency. The most important reason for cows to visit the robotic milking system, is eating concentrates. A too rich basic ration at the feed rack does not invite the cows to visit the robotic milking system.

In addition to the activity of cows, the accessibility of the robot plays an important role. Good accessibility of the robot means short distances to the robot, spacious alleys, low barriers and no failures in the way to the robotic milking system and a not too high robot occupation. If the occupation on the robotic milking system is too high, cows will wait too long and eventually the cows will visit the robot less. One indication of the robot occupation is the so-called free space; the time that the robot is not in use. A minimum of 15% is used as a directive.

Detection and managing mastitis cows

The conductivity is an important factor to get an idea of the general udder health on a farm. The conductivity is normally measured several times a day. For selecting attention cows, conductivity is often combined with measurements such as milk production and milk colour. Milk production reduction is an early indicator of the occurrence of mastitis. On-line milk measurements are in development. With some automatic milking systems it is already possible to measure the cell count of each quarter of the udder.

The Milk Production Recording (MPR) data is still a very important indicator of udder health on farm level. The MPR is a good support to get an indication of udder health on farms, especially in detection of long-term, chronically infected cows.

Adequate reactions on attention cows is important to prevent the situation from getting worse.

Therefore, the following protocol can be followed:

- Check the list with (net) attentions twice a day
- Check attention cows in the stable (milk, udder, temperature of the cow)
- Cows with clinical mastitis
 - o Take a milk sample and freeze it in
 - o Adequate treatment according to farm specific treatment plan
 - o Control results (conductivity, CMT, somatic cell count, milk production)
- Chronic problems
 - o Bacteriological culturing of freezed milk samples
 - o Adapt farm specific treatment plan according to results of bacteriological culturing
- Cows with subclinical mastitis
 - o Supporting activities, such as totally milking out cows
 - o Tracking the cows with subclinical mastitis → check conductivity, CMT, somatic cell count, milk production
 - o In cases the somatic cell count stays too high → CMT scan 4 hours post milking
 - o Take a milk sample and treat according to farm specific treatment plan

Cows with acute mastitis

Cows with symptoms of acute mastitis are often not early enough detected with the mastitis detection system in the robot. This is not only because of the fact that mastitis developed rather quickly, but also because cows with (acute) mastitis do not visit the robotic milking system themselves due to a decreased general health. For farmers it is very important to be aware of the fact that these cows may be there in a herd. Temperatures of suspected cows that are slow moving and eating less can be measured in the stable. In cases in which the temperature is increased, it is recommended to call the veterinarian. Fast detection of cows with acute mastitis and treating them automatically means a better result of the treatment and a lower risk of spread.

Treating mastitis cows

It is important to treat the mastitis cows directly after milking, because then the cows are fully milked out and the teats are clean. It is recommended to treat the cows on a safe and clean place, for example in the selection room or the claw trimming box. It is recommended to disinfect the teats before treatment and treat according to the farm specific treatment plan. It is important to mark the cows in the computer, in order to prevent the milk of the treated mastitis cows in the bulk tank. It is recommended to check the result of the treatment, not only according to visible aspects, but also the conductivity, the somatic cell count and the CMT scan are important.

(UGCN, 2011)

3.6. Breeding for udder health

Udders that most likely will function properly for a longer time have in short strong and wide attachments, a strong central ligament and teats that are placed in the middle of the quarters (Hardenberg C. at all, 2011). A shallower, more firmly attached with short teats reduces the risk of mastitis (UGCN, 2011). The breeding value for udder health is the udder health index (UHI). This is build up from the breeding values about sub-clinical mastitis and clinical mastitis. Besides, there are also breeding values for somatic cell count (SCC). The individual values are: SCC (60%), udder depth (13%), fore udder attachment (6%), teat length (4%) and milking speed (10%).

Although the somatic cell count is included in the UHI, it is useful to take it in account when selecting bulls as SCC is directly related to udder health. For example, when a bull has a SCC value of 104, his daughters will have 10,000 cells fewer in their milk than daughters from a bull with a SCC value of 100. Besides the SCC, the conformation is also important for udder health, but not as directly related to it as the SCC. Finally, milking speed is included in the UHI. Cows with a high milking speed have a higher chance of leaking milk in the cubicles, which increases the risk of mastitis. Cows that have a slow milking speed will endure longer milking times, which can lead to over-milking and this increases the risk of mastitis too.

4. Checklist

Criteria	Farm analysis	How it should be
Herd		
- # of cows <ul style="list-style-type: none"> ○ Heifers ○ 2nd calving ○ >3rd calving ○ Lactating cows ○ Dry cows 		-
- Young stock <ul style="list-style-type: none"> ○ <1 year ○ >1 year' 		-
- Purchasing cows		Attention: make sure these are not cows at risk for mastitis.
- Breed		Focusing on udder health in breeding can influences the number of mastitis cases. Read more

Table 2: Herd information

Criteria	Farm analysis	How it should be
Production		
- BSK		Average the Netherlands: 40.1
- Rolling average per cow per year		8.150 kg milk/cow/year
- 305 day production		Average the Netherlands: 8.542 kg milk/cow/year 4.30% fat 3.47% protein
- Calving interval		423 days
- Age at first calving		24 months
- Non-return percentage (after 56 days)		67%
- Milking (entrance and exit)		Milking system # of times/day

Table 3: Herd production information

Criteria	Farm analysis	How it should be																								
Udder health																										
Sub clinical mastitis																										
<ul style="list-style-type: none"> ○ B.S.C.C. ○ S.C.C. Farm <ul style="list-style-type: none"> ▪ Heifers ▪ 2nd calving ▪ >3rd calving ○ # of cows with increased S.C.C. 		<p>Thirty per cent of all mastitis cases happen without visible symptoms. Subclinical mastitis can only be recognized through higher somatic cell counts and somewhat lowered production.</p> <p>Read more</p> <p><400.000 cells/ml Aim: <250.000 cells/ml</p> <p><10%</p>																								
Clinical mastitis																										
<ul style="list-style-type: none"> - # of cows with clinical mastitis - Which symptoms of clinical mastitis do you see on your farm? <ul style="list-style-type: none"> ○ Clots in the milk ○ A red swollen udder ○ Hard udder tissue ○ Reduced milk production ○ Deviant milk (watery) ○ Fever (up to 40 degrees and higher) ○ Loss of appetite ○ Lower rumen activity ○ Raised pulse ○ Dehydration ○ Slow cows ○ Cows with mastitis are often the latest in the milking parlour 	<table border="1" data-bbox="715 1406 1043 1841"> <tbody> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> <tr><td>Yes</td><td>No</td></tr> </tbody> </table>	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	<p>Mastitis is an inflammation of the udder tissue. Every herd has cases of mastitis. It is a disease which is always present on the farm and cause serious problems.</p> <p>Read more</p> <p><25%</p>
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
Yes	No																									
<ul style="list-style-type: none"> - # of cows with teat problems 	<p>Use score card UGCN</p>	<p>If the streak canal is damaged, the chance of an infection of the udder will increase.</p>																								

	A maximum of 10% of the cows may have a problem with the teats. Read more
- What is the animal day dosage?	(depends on regulations each year)
- Do you do bacteria culturing	Once per year, min. 10 cows with clinical mastitis and 10 cows with high somatic cell count.
- California Mastitis Test (CMT scan)	A California Mastitis Test can be used to identify which quarter might be infected. This can be very useful when a cow has an increased somatic cell count, but shows little or little visible symptoms. Read more
- Replacement of teat cup liners	After 2500 passages

Table 4: Udder health

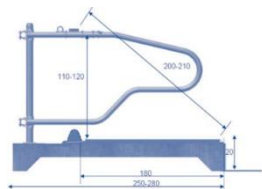
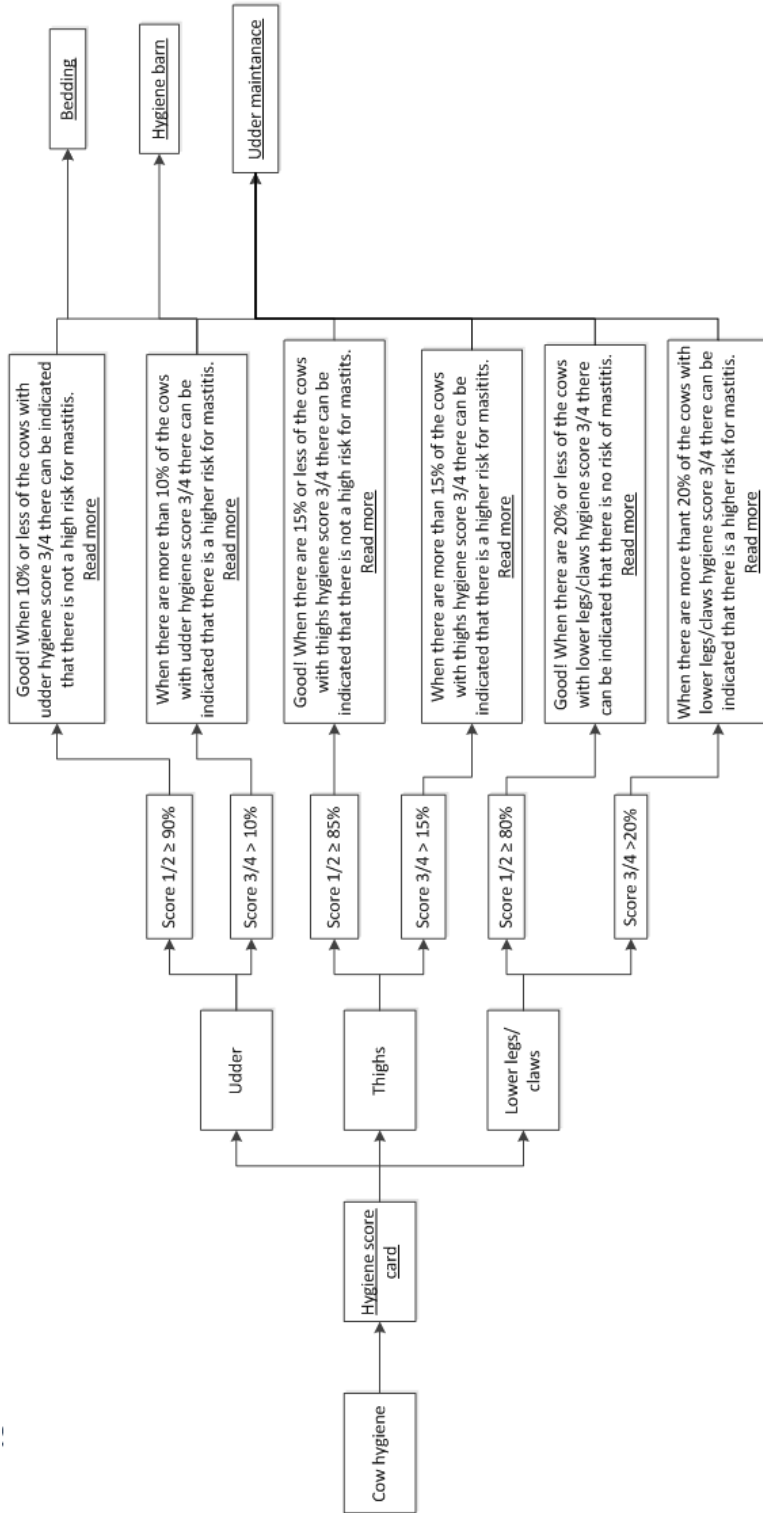
Criteria	Farm analysis	How it should be
Hygiene stable		
- Cleaning cubicles - Size cubicles		Min. 2 times per day 
- Number of cubicles pertaining number of animals present - Road map bedding		
- Cleaning system	By hand Robotic Manure slide	
- Cows inside/outside		

Table 5: Hygiene stable

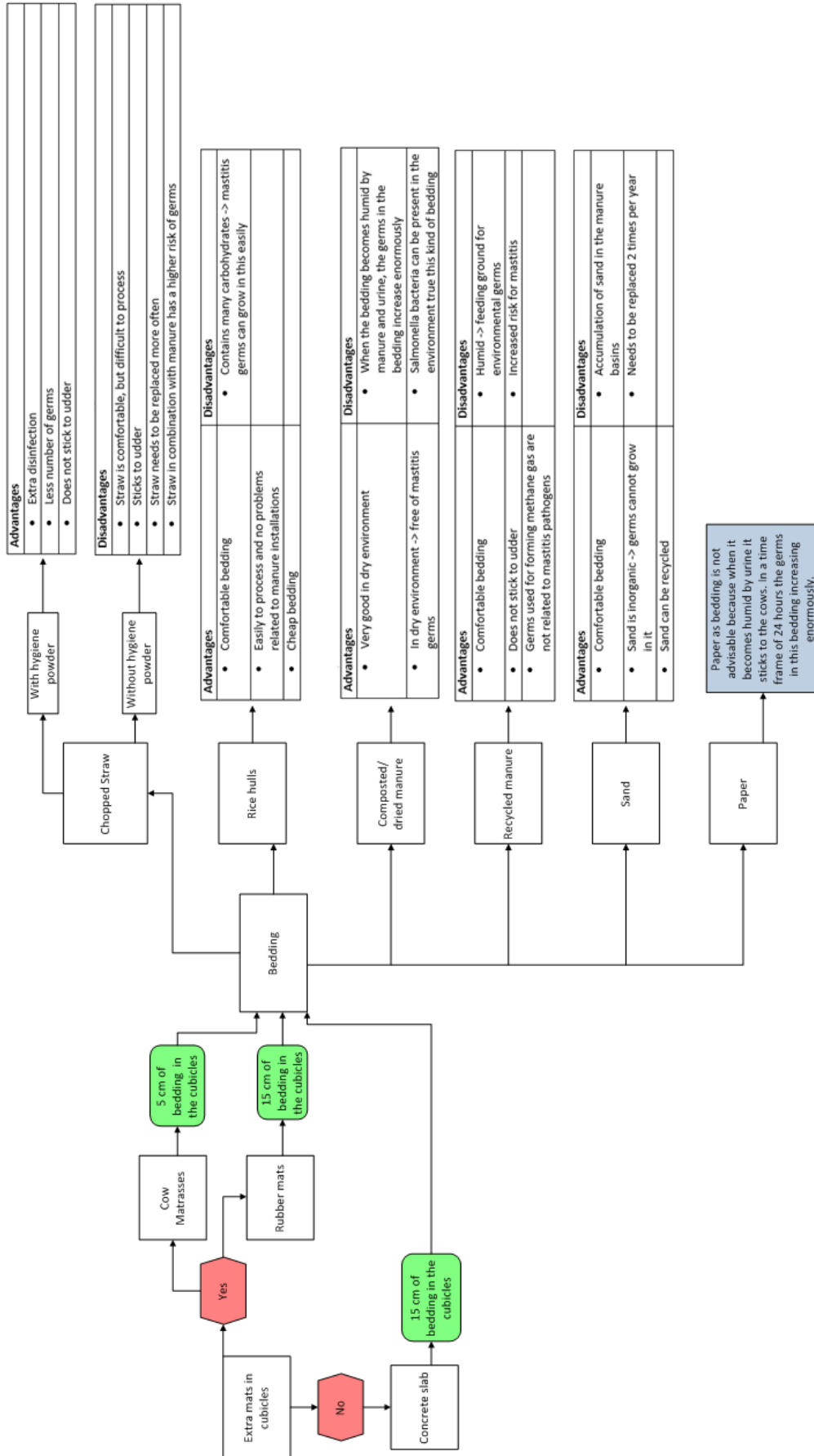
5. Decision trees

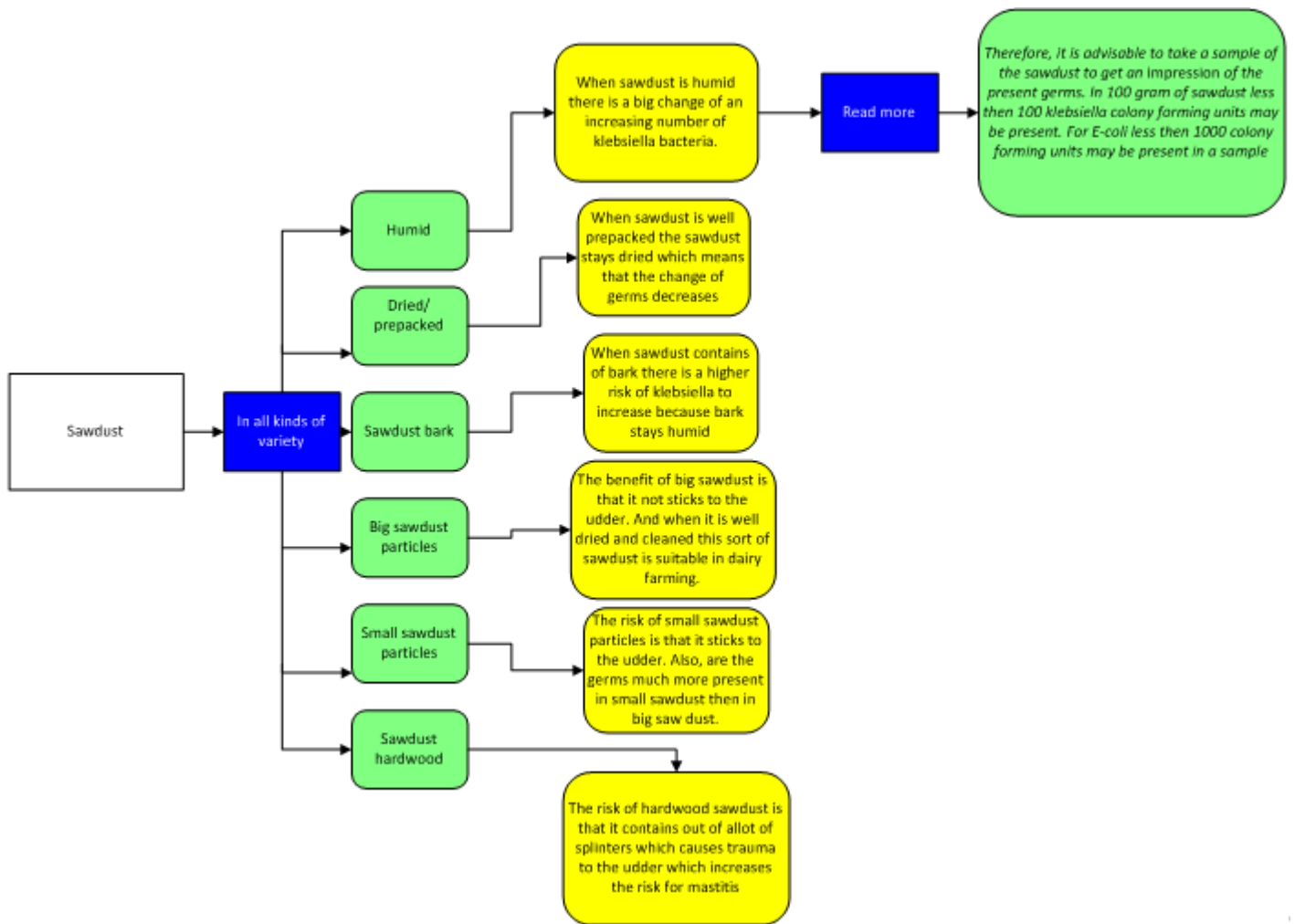
Cow hygiene



Link to cow hygiene: <http://dairyhealth.groenkennisnet.nl/Cow-Hygiene-1.ashx>

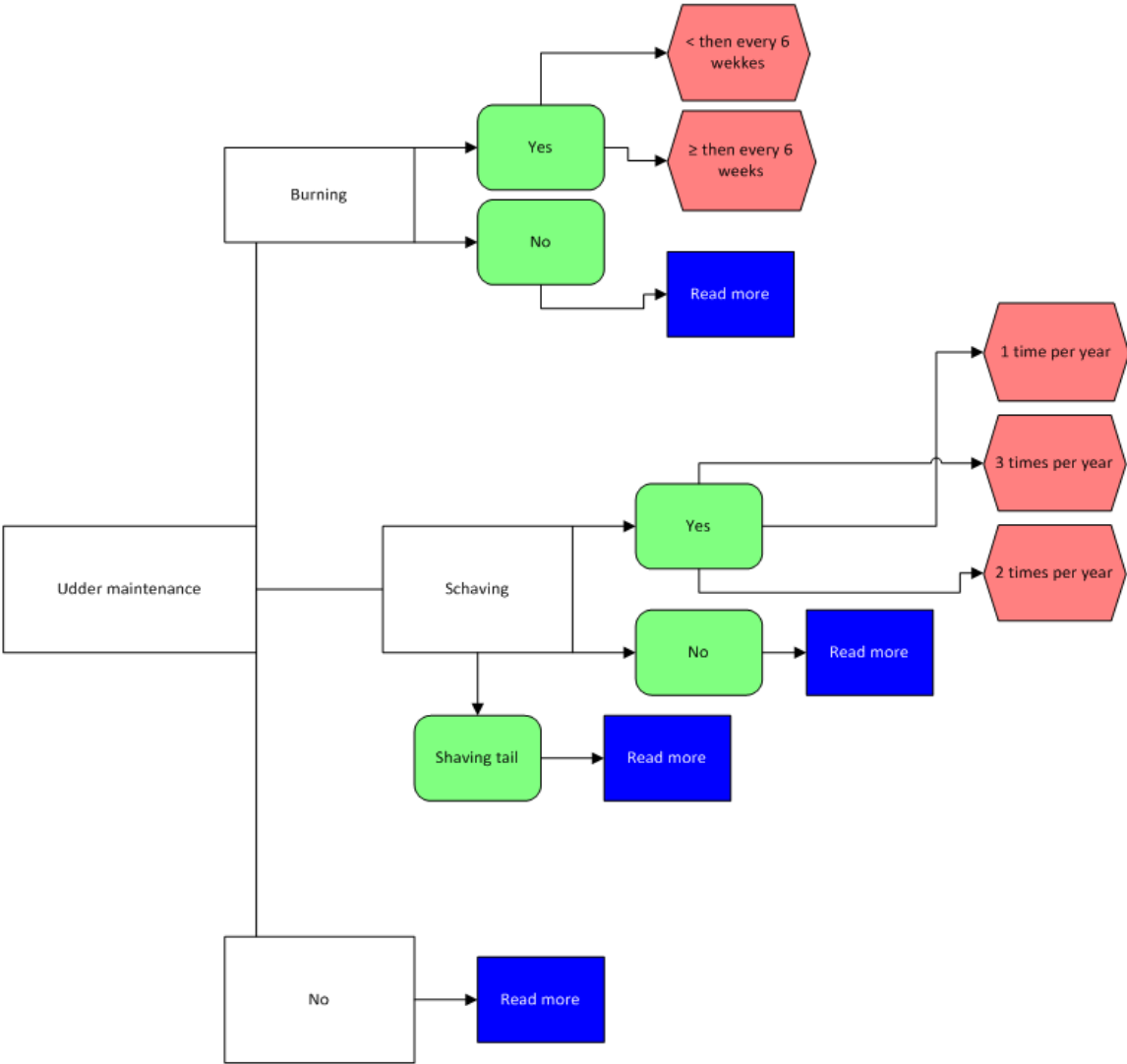
Bedding





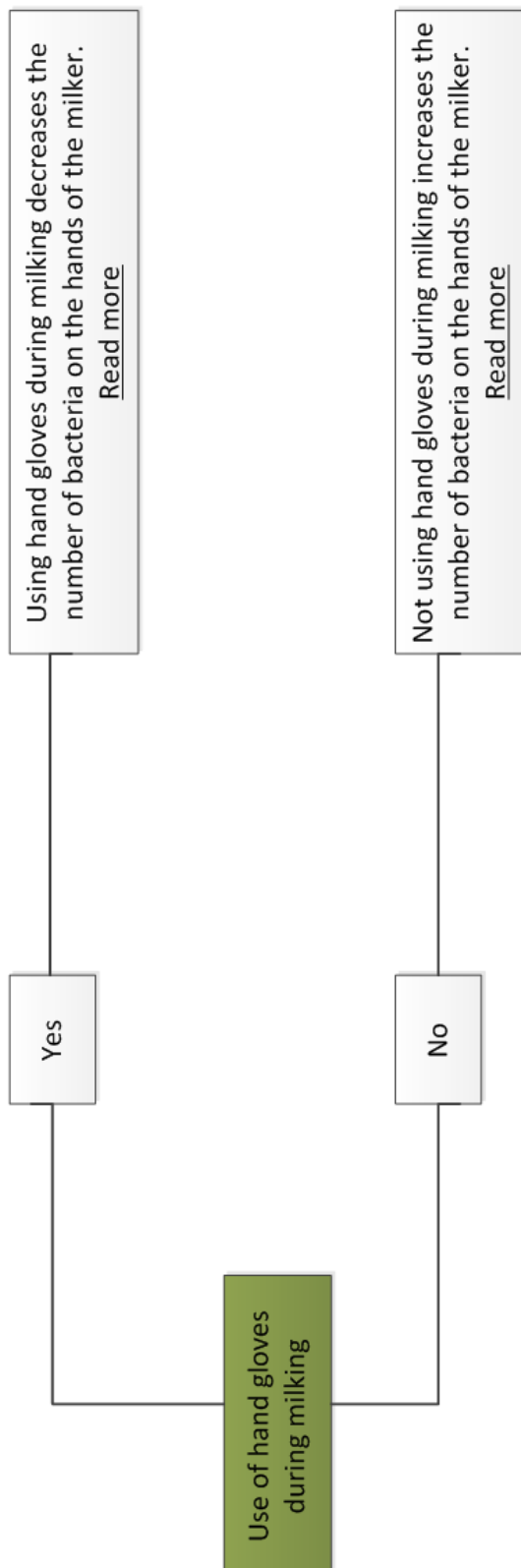
Link to bedding: <http://dairyhealth.groenkennisnet.nl/Cubicle-Housing.ashx>

Udder maintenance



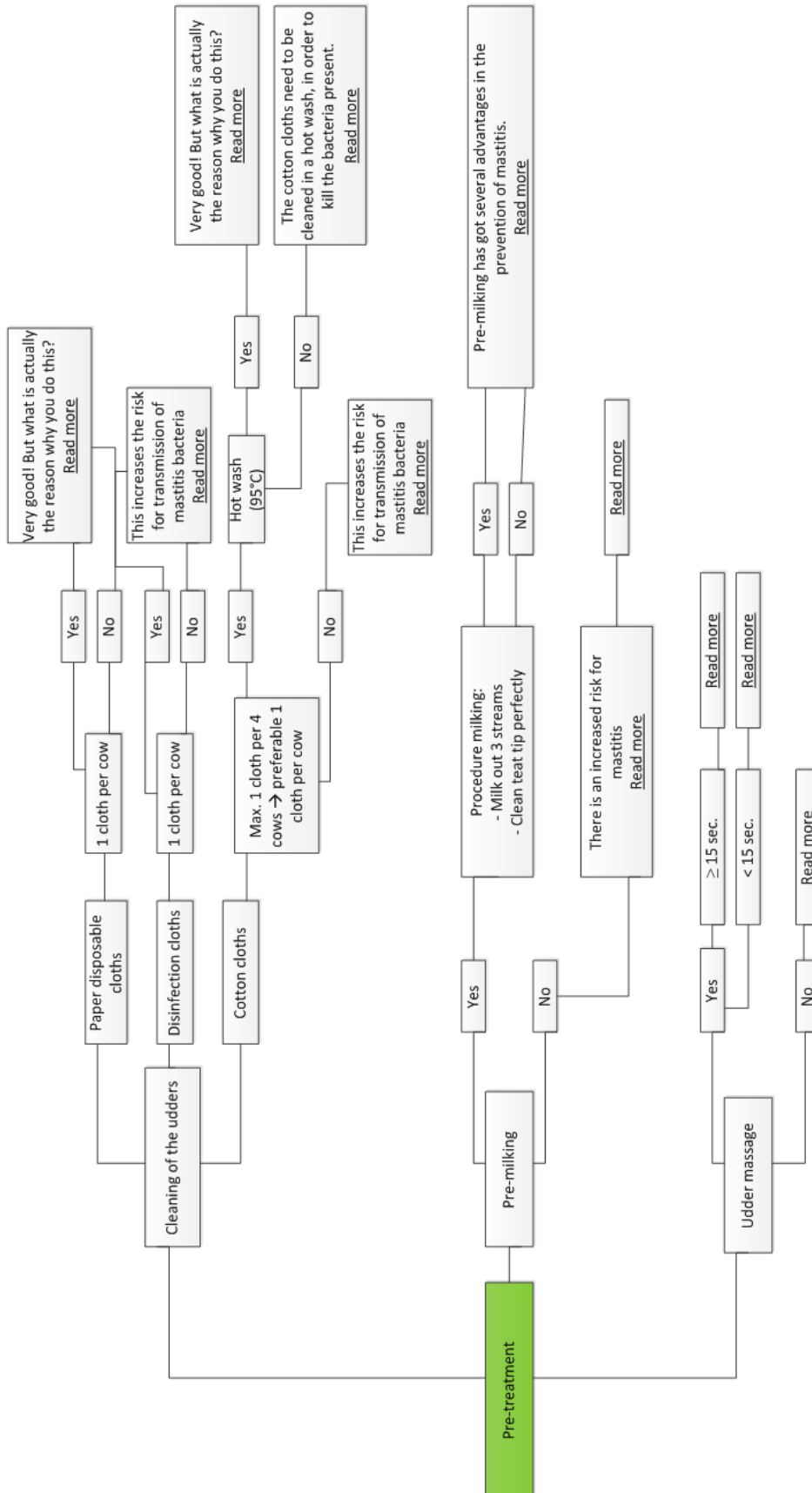
Link to udder maintenance: <http://dairyhealth.groenkennisnet.nl/Udder-maintenance1.ashx>

Use of hand gloves during milking



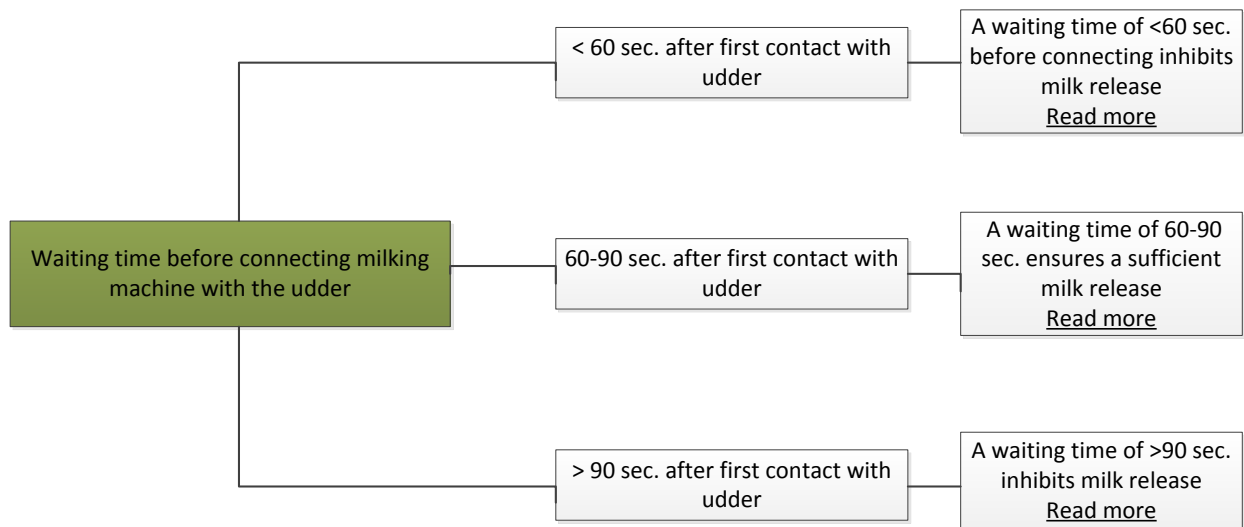
Link to use of hand gloves during milking: <http://dairyhealth.groenkennisnet.nl/Handgloves.ashx>

Pre treatment



Link to pre treatment: <http://dairyhealth.groenkennisnet.nl/Pre-treatment.ashx>

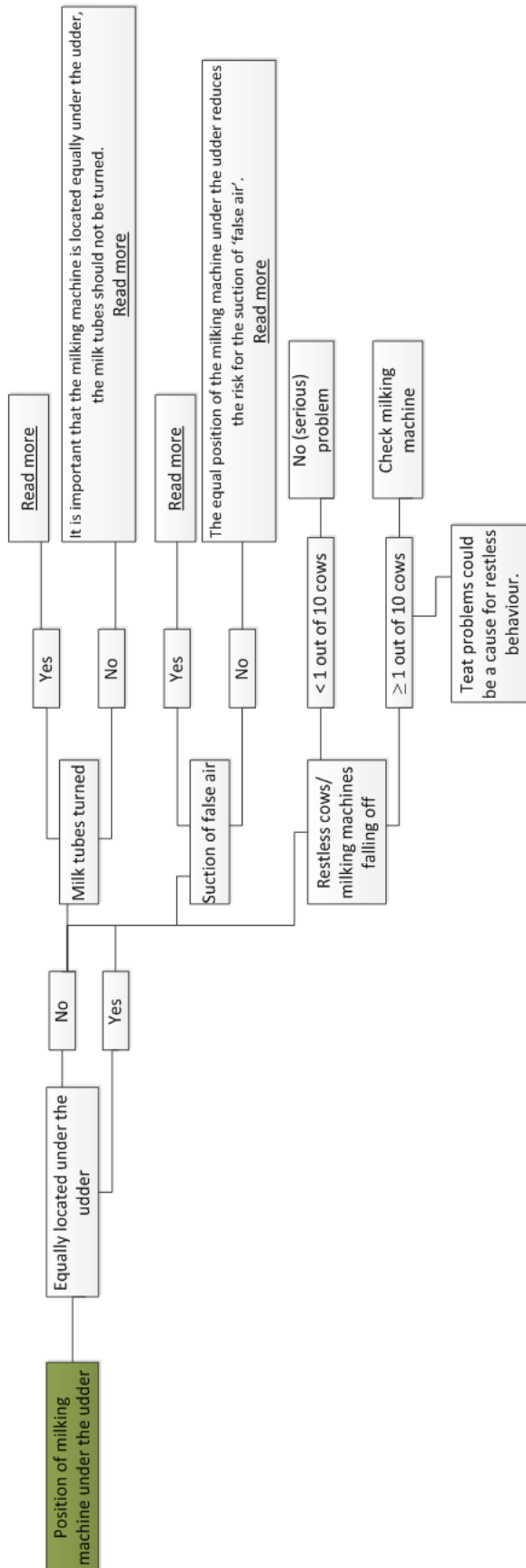
Waiting time before connecting milk machine with the udder



Link to waiting time before connecting milk machine with the udder:

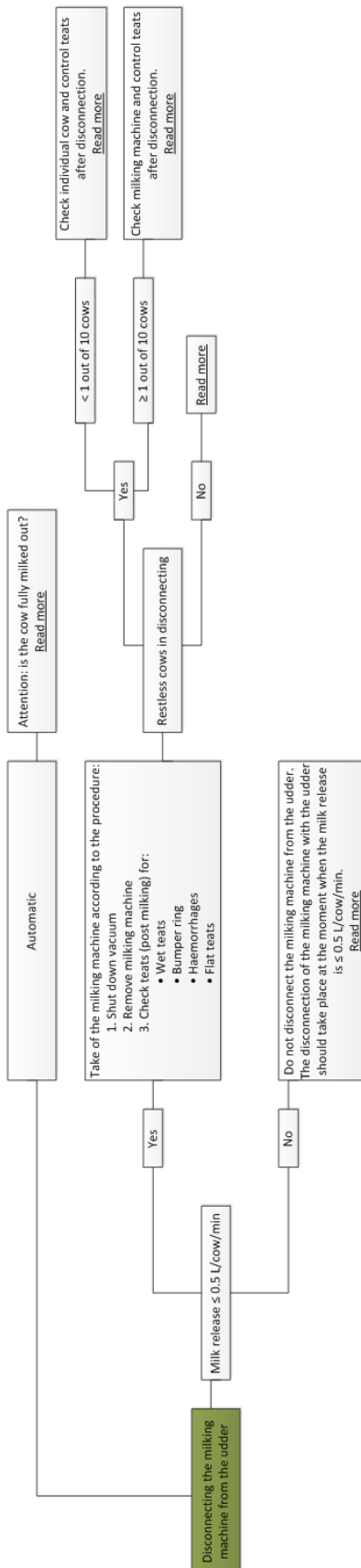
<http://dairyhealth.groenkennisnet.nl/Waiting-time.ashx>

Position of milking machine



Link to position of milking machine: <http://dairyhealth.groenkennisnet.nl/Position-of-Milking-machine.ashx>

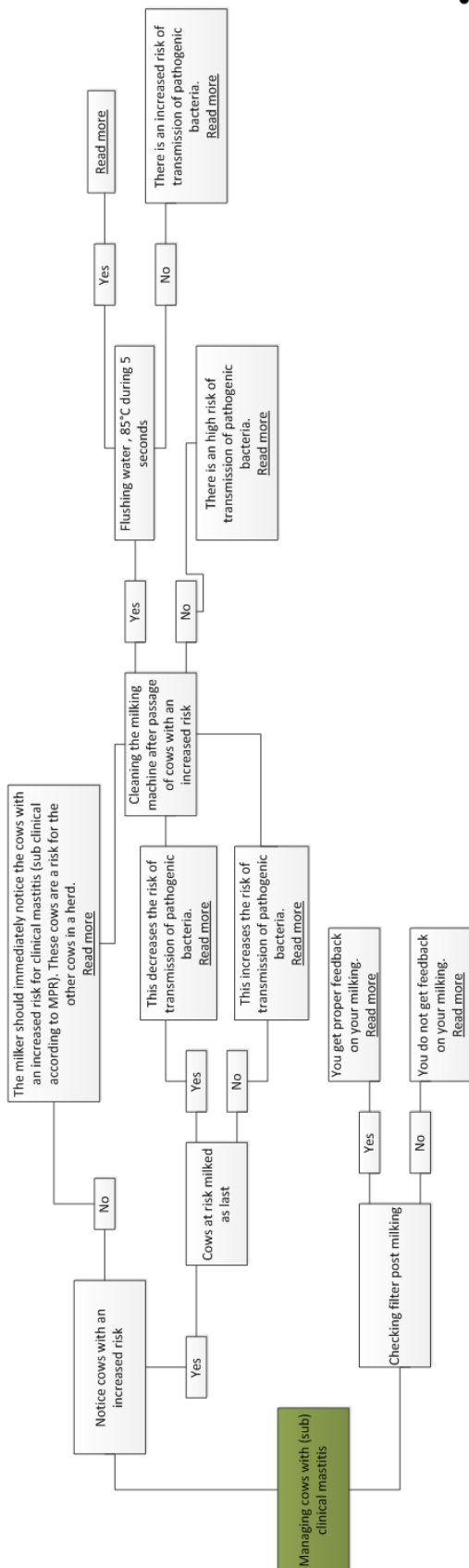
Disconnecting milking machine from the udder



Link to disconnecting milking machine from the udder:

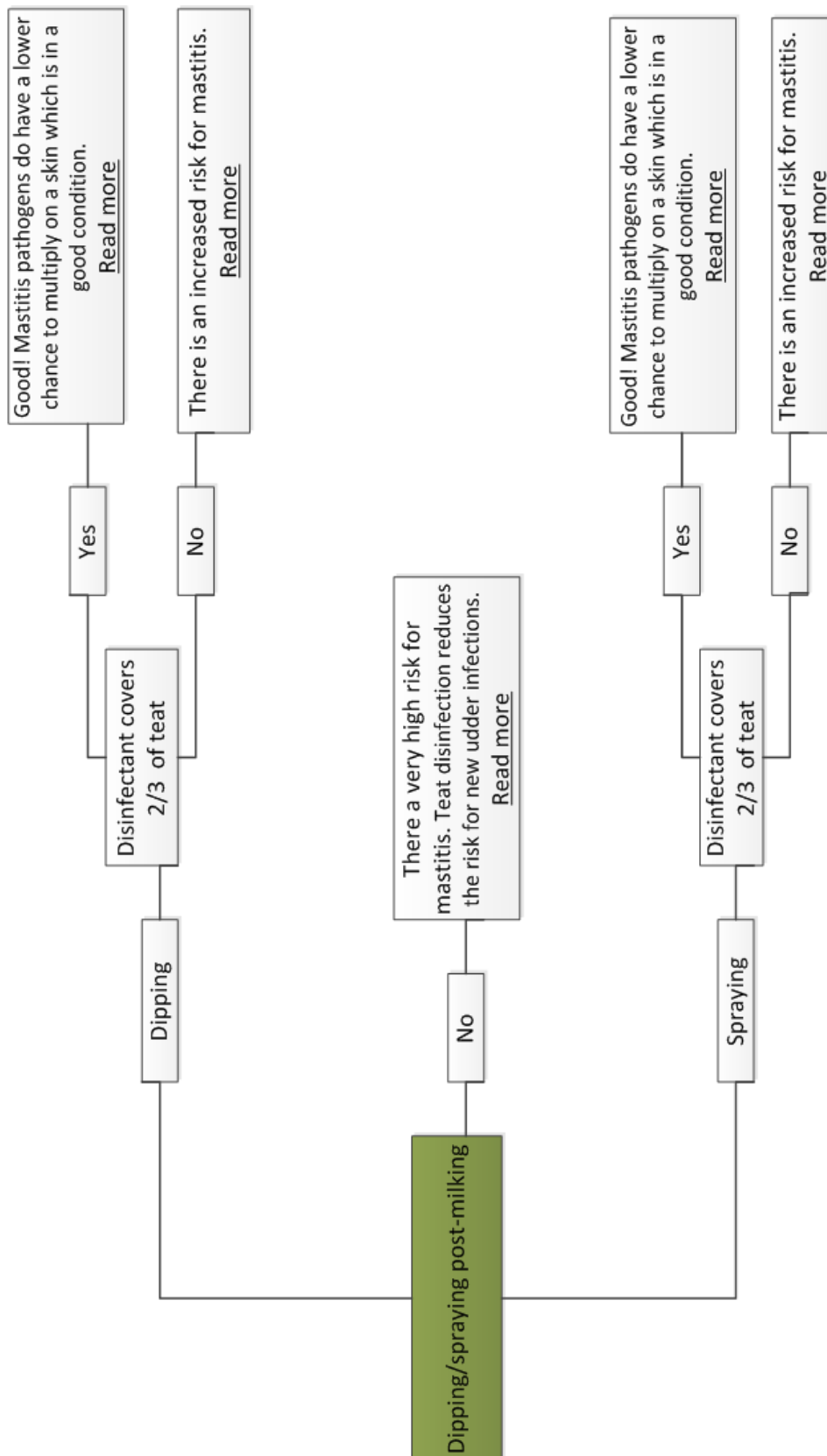
<http://dairyhealth.groenkennisnet.nl/Disconnection-of-the-milking-machine.ashx>

Managing cows with (sub) clinical mastitis



Link to managing cows with (sub) clinical mastitis: <http://dairyhealth.groenkennisnet.nl/Managing-cows-with-sub-clinical-mastitis.ashx>

Dipping/spraying post milking



Link to dipping/spraying post milking: <http://dairyhealth.groenkennisnet.nl/Dipping-Spraying-post-milking.ashx>

6. Advice

Advice – Farmer 1

Date of visit: 23-05-2013

Given by: Harmke Borkent, Iris bos, Milou Fleuren and Marleen Middeldorp

On farm 1 there are 55 red HF milking cows and 40 heads of young stock, which are all managed by the farmer. The cows are replaced by own young stock and young stock is raised on the farm itself. A 6x2 fishbone milking parlour is used on the farm. The cows are milked two times a day, at 7.00 am and 5.30 pm. There is an milk intervention of 1,5 hours this is quite long and therefore, UHC advises to take less time between the last milking time and the first milking time. The milking cows are housed in a cubicle barn and from April to October the cows are outside during day time.

The production on this farm is 7598 kg milk per cow per year. The somatic cell count is 256.000 cells per ml milk and 25% of the cows have a raised somatic cell count.

Breeding

On farm 1 there is no focus on udder health in breeding. Udders that most likely will function properly for a longer time have in short strong and wide attachments, a strong central ligament and teats that are placed in the middle of the quarters. A shallower, more firmly attached with short teats reduces the risk of mastitis. It is useful to take the SCC in account when selecting bulls as SCC is directly related to udder health. Cows with a high milking speed have a higher chance of leaking milk in the cubicles, which increases the risk of mastitis. Cows that have a slow milking speed will endure longer milking times, which can lead to over-milking and this increases the risk of mastitis too.

Use of hand gloves during milking

The farmer does not use hand gloves during milking, this increases the number of bacteria on the hands of the milker. Besides that, hand gloves are easier to clean and the hands of the milker stay in better condition. However, milkers have to get used to hand gloves. Farmer 1 has indicated that he already tried to use hand gloves during milking. Although this was indicated, UHC still advises to use hand gloves during milking. Research has shown that you have to get used to using hand gloves during milking. To see differences in udder health, hand gloves need to be used for a longer time period.

Pre treatment

The farmer uses cotton cloths, there are 6 cows cleaned with on cloth. At the moment the washing machine cannot do a hot wash of 95°C. Because the farmer cleans too many cows with one cloth and the hot wash does not work. Our advice is to use to clean a maximum of 4 cows per cloth. Another option is to use another type of cloth, for example paper disposable cloths or disinfection cloths. The standard for these cloths is to use one cloth per cow.

The farmer does not pre-milk the cows, therefore UHC advises to pre-milk at least the cows at risk and in an ideal situation pre-milk all the cows. Although, it has its advantages and disadvantages, cases of clinical mastitis are early detected and easier treatable and decreases the risk of spread (only if milk is cleaned away after pre-milking). Pre-milking helps to remove possible mastitis pathogens in the teat canal. In pre-milking, the so called keratin plug is removed. The keratin makes it hardly possible for bacteria to cause disease; it has an inhibitory effect on the development of bacteria because they become trapped in the layer of keratin.

In an ideal world it is advised to do an udder massage before connecting the milk machine. Farmer 1 does not do this because it costs him time. UHC's advisers understand this. The advantage of an udder massage is that the milk letdown is better.

Waiting time before connecting milking machine to udder

The farmer does not deliberately wait for 60 seconds or more before connecting the milking machine. However, the way of working in the milking pit does take about a minute from the first touch of the farmer to connecting the milking machine. First the farmer let them walk into the fishbone, cleans the udder with only water of all the six cows, goes back to the first one and cleans them all with a cotton cloth and then again goes back to the first one and connects the milking machine.

Position of milking machine under the udder

The milking machine is equally located under the udder. About 7% of the cows have suction of false air per milk time, but this is noticed and resolved immediate. There are less than 10 cows that are restless or that the milking machines fall of. The farmer selects his cows on this in breeding. This is very positive management aspect.

Disconnecting the milking machine from the udder

This is automatically done by the machine itself. The farmer checks if cows are fully milked out. To make this more optimal, after milking the farmer could check the following points:

- Wet teats: wet teats after disconnection may indicate a too slow disposal of the milk in the milking cluster. Milk in the milking tube might be absorbed back in the teat. This increases the risk for infection from bacteria of the skin, bacteria in the milk and/or bacteria from the skin of the previous milked cow.
- Bumper ring: the vacuum in the bumper ring is way lower than under the teat as long as the teat cup liner fits around the teat. By for example small teats (heifers) or too large teat cup liners, the vacuum might increase and the milking machine might creep up. This often leads to a painful blood flow in the teat tip, what makes the cow showing restless behavior. This can also be induced by wet pre-treatments.
- Hemorrhages: a too high vacuum around the teat tip causes hemorrhages in the skin of the teat. This goes together with blood flow in the teat tip, which induces restless behavior of the cow.
- 'Flat teats': this happens when the teat has been blocked while milking. The cause of the blocking is a rigid/wide teat cup liner or a too long pause of the pulsator.



Managing cows with (sub) clinical mastitis

The farmer notices the cows with an increased risk of mastitis. These cows are marked. The cows at risk are not milked as last, but after these cows are milked the milking machine is cleaned with water, however, this water is not 85°C. Therefore, UHC advises to use hot water to clean the milking machine after cows that are at risk are milked. To reduce the risk for transfer of bacteria, it is important to clean the milking machine and the teat cup liners once the mastitis cow/cows with high somatic cell counts have been milked. The milking machine and the teat cup liners should be flushed during 5 seconds with hot water (85 °C) in order to kill bacteria present.

After milking the farmer checks the filter. This is good because this way the farmer gets proper feedback on milking the cows. The filter should be clean after milking. In cases in which the filter is not clean, milkers might be confronted with the fact that they did not clean precisely enough or that they did not notice the cows with flakes in the pre-milking.

Dipping/spraying post-milking

The farmer dips the cows after milking and he makes sure that the disinfectant covers 2/3 of the teat. Teat disinfection reduces the risk for new udder infections. The teat canal stays open for a while after milking. Dipping/spraying kills bacteria around the sphincter. Besides that, disinfection is important for the care of the teat's skin. Mastitis pathogens do have a lower chance to multiply on a skin which is in a good condition.

Hygiene animals and barn

Research has shown that farms with a somatic cell count higher than 250.000 cells per ml milk have a five time higher risk for more cows with hygiene score 3/4 than farms with a somatic cell count lower than 150.00 cells per ml milk. The udder hygiene score on this farm was score 2, this is an indication that the barn is clean and dry. The farmer indicated that the cows were less clean in autumn/winter.

In spring/summer the farmer cleans the barn 2 times per day by hand and one time per day with a manure slide. For this time of the year, this is good, but UHC advises to clean more often in autumn/winter time.

Udder maintenance

The farmer uses burning to remove the hair on the udder, this is done once a year. UHC advises to remove the hair of the udder by burning every 4-6 weeks or by shaving every year. To remove the hair from the udder is important because this way dirt does not easily stick to the udder.

Bedding

On farm 1 a sawdust bedding is used, this is high quality and dry packed which is very important. The sawdust is chopped in small particles. This tends to stick to the udder easier than bigger particles. Also, there are more bacteria present in small particle sawdust compared to bigger particle sawdust. Therefore, UHC advises in an ideal world, to use bigger particles sawdust, but the bedding is already quiet good.

Conclusion

In conclusion, farm 1 has a relatively good udder health. To optimize this, several advices are given related to breeding, use of hand gloves during milking, pre-treatment, cleaning milk machine after cows at risk are milked and udder maintenance. The following suggestions are made:

- Shorten the milking intervention
- Focus on udder health in breeding
- Use hand gloves during milking
- Use other type of cloths or clean a maximum of 4 cows per cotton cloth and wash them with hot wash of 95°C

- Do pre treatment
- Use water of 85°C to clean the milking machine after risk cows
- Remove udder hair every 4-6 weeks by burning or shave every year

Overall, the farm is well managed, these suggestions are only made to optimize the management on the farm. Furthermore, it is important to keep up the good work.

Advice – Farm 2

Date of analysis: 28-05-2013

Given by: Harmke Borkent, Iris Bos, Milou Fleuren and Marleen Middeldorp

Farm two consists of 450 milking cows and is managed by one herd manager, who we talked to, and four farmhands. They milk two times a day with a carousel (40 stands). The cows are milked at 4.00 am and again at 3.00 pm. It will take 6 hours per day to milk all the cows. The bedding that is used is flax fibre. This bedding gives better bed formation but they get thick heels. The cow hygiene is between 2/3.

The manager of the farm told UHC that the overall udder health was and is still increasing. This is due to changes in and more attention to udder health management. The production on this farm is 8.500 kg milk per cow. 20% of the cows have clinical mastitis per year. The somatic cell count is 220.000 cells per ml milk and 13% of the cows have an increased somatic cell count. The animal daily dosage on this farm is unknown, this is very important to monitor the antibiotic use on the farm. Therefore, UHC advises to know this data about your herd. Bacterial culturing is not done on this farm.

Breeding

On the farm they are focussing on udder health. This is good because udders that most likely will function properly for a longer time have in short strong and wide attachments, a strong central ligament and teats that are placed in the middle of the quarters. A shallower, more firmly attached with short teats reduces the risk of mastitis. Cows with a high milking speed have a higher chance of leaking milk in the cubicles, which increases the risk of mastitis. Cows that have a slow milking speed will endure longer milking times, which can lead to over-milking and this increases the risk of mastitis too.

Buying stock

The herd manager does buy cows. This can increase the risk of bringing in infected stock. However, he is aware of it and does check if the cows are healthy. But UHC is advising not to do it because it is still a risk of bringing in mastitis.

Use of hand gloves during milking

UGCN (Uier Gezondheids Centrum Nederland) researched the use of hand gloves during milking. The result of this research indicated that the number of bacteria present on hand gloves is lower than the number of bacteria present on the hands of the milker. Furthermore, hand gloves are easier to clean, and the hands of the milker stays in a better condition. It is recommended to clean the hand gloves during milking and use the only one pair of hand gloves per milking. All the employees are using hand gloves during milking which is very good

Pre-treatment

Cleaning of the udders

The milkers are using one paper disposable cloth per cow to clean the udder. This is positive because the standard rule is that one cloth should be used for one cow. This prevents cross-contamination.

Pre-milking

The milkers normally do not pre-milk the cows. 50% of the cows are pre-milked; these are the cows with an increased risk of mastitis. But because pre-milking is important in the early detection of clinical mastitis, cases of clinical mastitis are not found earlier and this decreases the easiness of treating and decreasing the risk of spreading mastitis. Pre-milking and pre-treatment also stimulates the milk letdown and helps to remove possible mastitis pathogens in the teat canal. So, an advice

would be to pre-milk all the cows although it gives more work. The manager also told UHC that they do use one cloth per cow. Therefore, there is a change of cross-contamination decreases.

Udder massage

The milkers do not massage the udders. This can decrease the milk let-down. However, the carousel does have a system that gives stimulation when cow is connected with the milking system. The system does not give full vacuum causing stimulation to let-down the milk.

Waiting time before connecting milking machine with the udder

It is important that the cow is 'letting the milk go' before the milking machine is connected with the udder. This normally happens 60-90 seconds after the first contact with the teat. The waiting time of 60-90 seconds has a positive effect on the total and fast milking. On this farm the waiting time before connecting milking machine with the udder is less than 60 seconds because the milker is cleaning the udder and directly connect the milking machine with the udder. This can negatively influence the milk let-down. However, the manager told UHC that it is almost impossible to wait before connecting because of the carousel.

Position of milking machine under the udder

The herd manager told UHC that, when the milking machine sucks false air, the milk cannot go into the other teat cups because of the milk claws. This is very good because this decreases the risk of cross-contamination between the four quarters.

Disconnecting the milk machine from the udder

The disconnection of the milking machine with the udder should take place at the moment that the release of milk stops, on this farm, this is automatically done by the machine itself. A milk release of max. 0.5 liter per minute per cow is an acceptable moment to disconnect. The procedure of disconnecting the milking machine from the udder is recommended to follow, in order to reduce the risk for mastitis. There is a warning lamp on the machine when abnormal milk yield is seen.

Managing cows with (sub)clinical mastitis

The milker should immediately notice the cows with an increased risk for clinical mastitis. These cows are a risk for the other cows in a herd. The milker should judge the condition of the cows and the udders every milking. The milker should adapt the treatment following the farm specific treatment plan. The best way to reduce the risk is to keep the mastitis cows together at the end of the milking. This lowers the chance for transmission of mastitis pathogens and it does not desist the milking routine.

The manager does notice cows with an increase risk. The cows which are at risk for the rest of the herd or/and have mastitis are milked last. Besides this the risk cows are separated in a group from the rest of the herd. This reduces the risk of contamination of mastitis to the rest of the herd. So, this is a very positive management aspect. The milkers are cleaning the milking machine after passage of cows with an increase risk. This also decreases the risk of contamination of mastitis. However, the milker does clean the milking machine with cold water. It would be better to use water at a temperature of 85°C and flush for at least 5 seconds. This would kill bacteria and therefore decreases the risk of contamination of mastitis.

Dipping/spraying post milking

Teat disinfection reduces the risk for new udder infections. The teat canal stays open for a while after milking. Dipping/spraying kills bacteria around the sphincter. Besides that, disinfection is important for the care of the teat's skin. Mastitis pathogens do have a lower chance to multiply on a skin which is in a good condition. It is important that the disinfectant covers at least 2/3 of the teat, therefore dipping might be more effective. Spraying needs to be done very precisely.

On the farm they are spraying direct after disconnection with the milking machine manually. The disinfectant covers 2/3 of the teat. The milkers check that to look if there is a drop of disinfectant on the teat. So, this is very good.

Management post milking

It is recommended to make it impossible for cows to lie down immediately after milking because of the opened teat canals and thereby the easy access for bacteria to enter. It is possible to provide fresh feed after milking in order to prevent cows lying down immediately after milking.

It is impossible to make sure that the cows do not lie down after milking because there are not enough feeding places for all the cows to eat at the same time. The herd manager does not want to give extra feed after milking because he is afraid that all the cows are going to eat at the same time and there are not enough feeding places for all cows.

The advice from UHC is to prevent overcrowding in the groups because cows can than all eat at the same time and this prevents cows from lying down immediately after milking.

Hygiene animals and barn

Research has shown that farms with a somatic cell count higher than 250.000 cells per ml milk have a five time higher risk for more cows with hygiene score 3/4 than farms with a somatic cell count lower than 150.00 cells per ml milk. More than 90% of the cows on this farm have an udder hygiene score of 2 . More than 85% of the cows on this farm have a thighs hygiene score of 2 . More than 80% of the cows have a lower leg/claw score of 2. The barn is cleaned with different cleaning systems. The cubicles are cleaned 3 times per day manually. They also use a shovel to clean the slatted floor (2 times per day). In one group the floor is closed. A manure slide is cleaning that floor every two hours.

Udder maintenance

Through burning and/or shaving the udder and shaving body of the cow less manure will stick to the skin of the cow. This can prevent infection. The burning of the udder should be done at least every 4-6 weeks. On the farm they are burning the hair of the udder every month so this is good.

The employees are shaving the cows once per year. High productive cows which are not going outside are not shorn. Shaving is done one time per year, which is enough for this farm because the cows are clean. This also applies to udder maintenance in the previous paragraph.

Bedding

On farm two the cubicle sizes meet the requirements. In the cubicles flax fibre is used. This gives better bed formation but they get thick heels because there are hard particles in it which puncture the skin. This is also bad for the udder because these hard particles also puncture the udder. The herd manager indicated that they were already thinking of a different kind of bedding.

Conclusion

The overall udder health is well managed. The manager of the farm told UHC that the overall udder health was and is still increasing. This is due to changes in and more attention to udder health management. Through concentrating on udder health aspect in breeding, using hand gloves during milking, cleaning the udders well, milking the cows last which are at risk to contaminate the rest of the herd with mastitis, awareness of how to spray and good udder maintenance.

To optimize the already good udder health management, a couple of suggestions are developed:

- Prevent buying cattle
- Flush the milking machine with water of 85°C, instead of cold water

- Pre-milking should be done

Although the couple points to optimize the udder health, the overall udder health management on the farm is good. So, keep up the good work!

Advice – Farm 3

Date of analysis: 29-5-2013

Given by: Harmke Borkent, Iris Bos, Milou Fleuren and Marleen Middeldorp

On farm 3 there are 80 HF milking cows and 70 heads of young stock, which are all managed by two farmers (mainly by the younger son). The cows are replaced by own young stock and young stock is raised on the farm itself. Two robots are used to milk the cows, the cows are averagely milked 3 times per day. The milking cows are housed in a cubicle barn and do not go outside. This farm was analysed on 29-05-2013 by UHC, the focus is on improving udder health in relation to hygiene on the farm.

The production on this farm is 10.554 kg milk per cow per 305 days. Forty five per cent of the cows have clinical mastitis per year (this percentage was from last year and has reduced rapidly, there were only 3 cases of mastitis this year). The somatic cell count is 128.000 cells per ml and 9% of the cows have an increased somatic cell count. The animal day dosage on this farm is 5,5 and the farmer does not use bacterial culturing.

The management on farm 3 is good, also the management related to milking and the milking robot. The farmers know their cows well. The robot is checked on every point according to the UGCN protocol. There is no overcrowding on this farm and a manure robot is used to clean the barn. The manure robot works 39 times per day and has different rounds. The hygiene of the cows is very good, on average score 2. Shaving is done when needed, so cows have always short hair. This is on average 1 to 2 times per year. Recycled manure is used as bedding, the milk of the cows at risk and milk of cows that did get antibiotics does not come in the manure pit that is used to recycle manure for bedding. Because the bedding is cleaned 3 times per day, it stays clean.

In conclusion, this farm is the “ideal farm” according to UHC related to udder health and the subjects analysed. The mastitis cases has reduced rapidly in the past year and the management is very good.

Advice – Farm 4

Date of analysis: 29-5-2013

Given by: Harmke Borkent, Iris Bos, Milou Fleuren and Marleen Middeldorp

On farm four there are 100 red HF milking cows, which are all managed by the farmer. The cows are replaced by own young stock and young stock is raised on the farm itself, sometimes some cows are purchased. There is a 16 stands carousel as milking system. The cows are milked two times a day. The milking cows are housed in a cubicle barn. This farm was analyzed on 29-05-2013 by UHC, the focus is on improving udder health in relation to hygiene on the farm.

The production on this farm is 9.000 kg milk per cow per year. Sixteen per cent of the cows have clinical mastitis per year. The somatic cell count is 156.000 cells per ml. The animal daily dosage on this farm is 4.42 and the farmer does use bacterial culturing. This is done after every milk recording. Bacterial culturing is done by five cows on average, which are more at risk for mastitis.

Breeding

On farm four there is a focus on udder health in breeding. Only bulls with an udder health value of 100 or more are used in breeding. This is important because with focusing on udder health in breeding udders will function properly for a longer time and have in short, strong and wide attachments, strong central ligament and teats that are placed in the middle of the quarters. More firmly attached with short teats reduces the risk of mastitis.

Use of hand gloves during milking

The farmer does use hand gloves during milking, this decreases the number of bacteria on the hands of the milker. Besides that, hand gloves are easier to clean and the hands of the milker stay in better condition. Because there are less bacteria on the hands of the milker, less bacteria can enter the udder. This is a positive management aspect on this farm.

Pre treatment

The farmer uses cotton cloths, there are 6-7 cows cleaned with one cloth, but the farmer does use a hot wash of 95°C to clean the cloths. Because the farmer cleans too many cows with one cloth, our advice is to use more cloths. In an ideal world this is 1 cloth per cow, but a maximum of 4 cows per cloth is also right. Another option is to use other types of cloths. For example paper disposable or disinfection cloths. The standard for these cloths is to use one cloth per cow.

The farmer does not pre-milk the cows, this because the somatic cell count is very good on the farm. The farmer indicated that he would does pre-milk when somatic cell count rises. Because pre-milking is not done, the farmer will notice in a later stage that there are more cows with clinical mastitis.

In an ideal world it is advised to do an udder massage before connecting the milk machine. Farmer 4 does not do this because it costs him time. UHC's advisers understand this. The advantage of an udder massage is that the milk letdown is better.

Waiting time before connecting milking machine to udder

It is important that the cow is 'letting the milk go' before the milking machine is connected with the udder. This normally happens 60-90 seconds after the first contact with the teat. The waiting time of 60-90 seconds has a positive effect on the total and fast milking. On this farm the waiting time before connecting the milking machine with the udder is less than 60 seconds because the milker is cleaning the udder and directly connecting the milking machine with the udder. This can negatively influence the milk let-down.

Position of milking machine under the udder

The milking machine is equally located under the udder. About 5% of the cows have suction of false air per milking, but this is noticed and resolved immediately. There are less than 10 cows that are restless or that the milking machines fall of. This is a positive management aspect.

Disconnecting the milking machine from the udder

This is automatically done by the machine itself. The farmer checks if cows are fully milked out. To make this more optimal, after milking the farmer could check the following points:

- Wet teats: wet teats after disconnection may indicate a too slow disposal of the milk in the milking cluster. Milk in the milking tube might be absorbed back in the teat. This increases the risk for infection from bacteria of the skin, bacteria in the milk and/or bacteria from the skin of the previous milked cow.
- Bumper ring: the vacuum in the bumper ring is way lower than under the teat as long as the teat cup liner fits around the teat. By for example small teats (heifers) or too large teat cup liners, the vacuum might increase and the milking machine might creep up. This often leads to a painful blood flow in the teat tip, what makes the cow showing restless behavior. This can also be induced by wet pre-treatments.
- Hemorrhages: a too high vacuum around the teat tip causes hemorrhages in the skin of the teat. This goes together with blood flow in the teat tip, which induces restless behavior of the cow.
- 'Flat teats': this happens when the teat has been blocked while milking. The cause of the blocking is a rigid/wide teat cup liner or a too long pause of the pulsator.



Managing cows with (sub) clinical mastitis

The milker should immediately notice the cows with an increased risk for clinical mastitis. These cows are a risk for the other cows in a herd. The milker should judge the condition of the cows and the udders every milking. The milker should adapt the treatment following the farm specific treatment plan. The best way to reduce the risk is to keep the mastitis cows together at the end of the milking. This lowers the chance for transmission of mastitis pathogens and it does not desist the milking routine.

The farmer notices cows with an increased risk of mastitis. These cows are milked with a different milking cluster. These cows are not milked last but the place where they have been milked is cleaned with water that is 85°C. After each milking the filter is checked, therefore a proper feedback on the milking is given. So, this is a good management aspect on this farm.

Dipping/spraying post-milking

Farmer 4 sprays the cows after milking and he makes sure that the disinfectant covers 2/3 of the teat. Teat disinfection reduces the risk for new udder infections. The teat canal stays open for a while after milking. Spraying kills bacteria around the sphincter muscle. Besides that, disinfection is important for the care of the teat skin. Mastitis pathogens do have a lower chance to multiply on a skin which is in a good condition.

Hygiene animals and barn

Research has shown that farms with a somatic cell count higher than 250.000 cells per ml milk have a five time higher risk for more cows with hygiene score 3/4 than farms with a somatic cell count lower than 150.00 cells per ml milk. More than 90% of the cows on this farm have an udder hygiene score of 2. More than 85% of the cows on this farm have a thighs hygiene score of 2. More than 80% of the cows have a lower leg/claw score of 2. These hygiene scores indicate that the barn is clean and dry enough. The barn is cleaned with a manure slide, every 3-2 hours.

Udder maintenance

Through burning and/or shaving the udder and shaving body of the cow less dirt and bacteria will stick to the skin of the cow. This can prevent infection. The burning of the udder should be at least every 4-6 weeks, this is mainly done in the dry period. The tail is shaved 6-7 times per year and the body of the cows is shaved once a year.

Bedding

On farm 4 recycled manure is used as bedding. The problem is that the milk of risk cows and cows with antibiotics is not separated from the manure that is used for the bedding. This is a high risk to bring mastitis back into the herd. Therefore, UHC advices to prevent milk of risk cows and cows with antibiotics coming into the manure pit, by separating it and throwing it away else ware.

Conclusion

In conclusion, farm 4 has a relatively good udder health. To optimize this, several advices are given related to hygiene at the farm. The following suggestions are made:

- Use one cotton cloth per 1-4 cows or use other types of cloths
- Longer waiting time before connecting the milk machine
- Prevent milk of risk cows and cows with antibiotics coming into the manure pit

Furthermore, it is important to keep up the good work.

7. Epilogue

In the beginning of this semester the following questions have been asked:

1. How to make farmers aware of how to increase udder health in dairy herds?

- 1.2. Which knowledge and information is needed develop the tool, supporting the advice (for the farmer) about increasing udder health and preventing mastitis?
 - Which factors influence the occurrence of clinical and subclinical mastitis on a farm?
 - What are different ways to increase udder health on a farm?

Several activities have been executed to get answers on these questions. In chapter three, all the desk research is described. This information is used to set up the checklist and decision trees. The checklist and decision trees are used to analyse the farms and through the outcome of the decision trees an advice is written.

The overall team work went really well. We did not encounter major team work problems. However, there were some other problems, such as: the main assignment was in the beginning not clear because of KIGO project, getting no test farms from ForFarmers, changing concept and no clear role of the coach during this term. Although these difficulties during this term, we did manage to get through it and deliver a great project.

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Annex 1 Score card teats



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Scorekaart Speenpuntvereeling

Goede spenen



- ▣ Scoor het aantal dieren met afwijkende spenen. Noteer hetzelfde dier slechts eenmaal, ook indien meerdere spenen vereelt zijn. Zet dus één streepje per koe.
- ▣ Aantal koeien met afwijkende spenen (a):
.....
.....
.....

Afwijkende spenen



- ▣ Aantal koeien met afwijkende spenen (a) =
 - ▣ Totaal aantal beoordeelde dieren (b) =
- Uw score **a : b** = (norm 0,10 = 10%)
- Rekenvoorbeeld**
- ▣ Aantal koeien met afwijkende spenen = 25
 - ▣ Totaal beoordeelde dieren = 100
- Score = 0,25 = 25 %

Datum: Naam Veehouder:

Raadpleeg uw dierenarts of melkwinningsadviseur als meer dan 10% van uw dieren afwijkende speenpunten heeft.

Annex 2 Results of questionnaires

The following figures are presenting the results of the questionnaires. These questionnaires are sent to 60 farmers. Twenty-five per cent has replied. The comments of the farmers are presented under each figure.

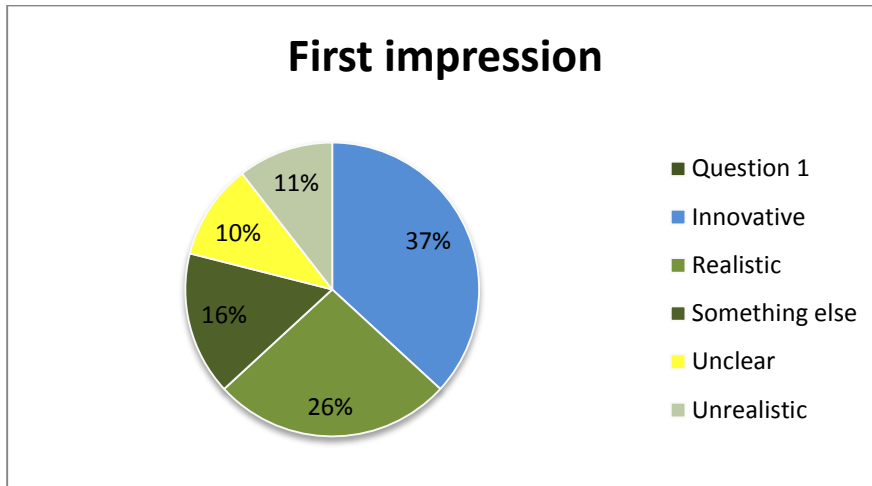


Figure 4: What is your first impression of our company?

Something else:

- It will be difficult to get a place in the market
- There are already many consultancies that give the same advice or the veterinarian.

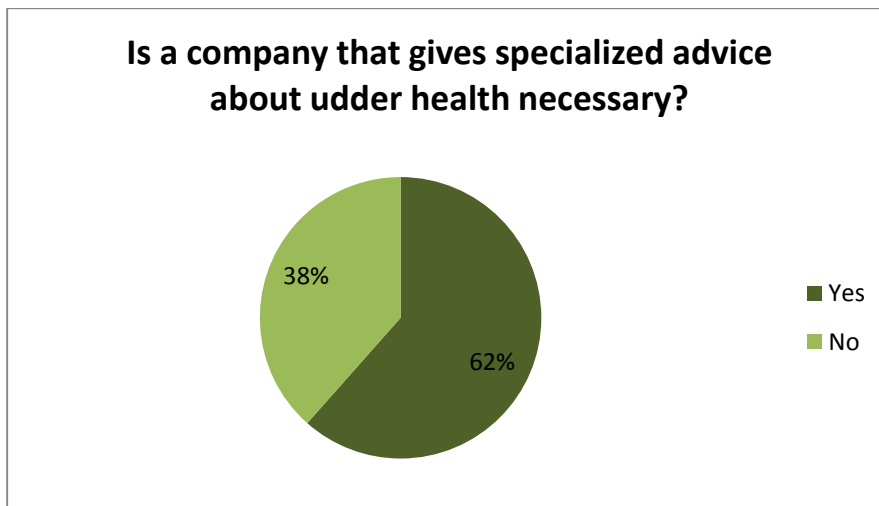


Figure 5: Is a company that gives specialized advice about udder health necessary?

- In the future, many aspects of udder health can be improved. Maybe it is advisable for UHC to cooperate with the vet, feed advisor and GD
- Yes, it will be beneficial for our farm because the chance of mastitis will decrease.
- No, I think it would be better to combine all the knowledge about animal health in one company because all the health issues are combined with each other. Better teamwork leads to better solutions.
- Out of a specific udder health consultancy much efficiency can be reached.

Is a company that gives specialized advice about udder health in relation to antibiotics necessary?

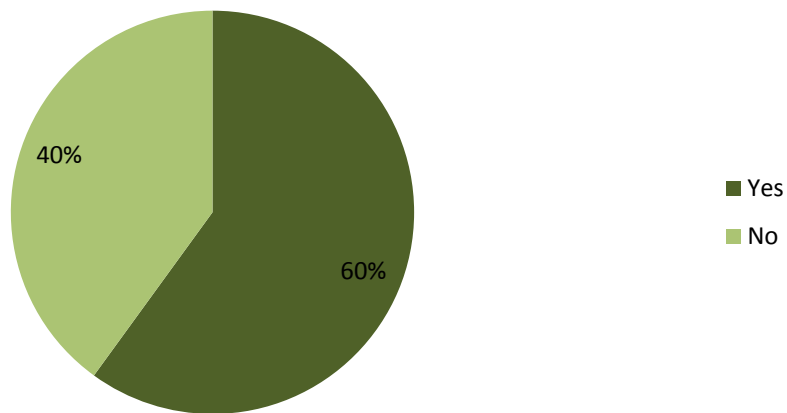


Figure 6: Is a company that gives specialized advice about udder health in relation to antibiotics necessary?

- No, the tests of the GD about antibiotic sensitivity are nowadays so complete and with the current antibiotic regulations is specialized antibiotic advice not necessary.
- Yes, it is necessary. But there are already many consultancies working on this aspect.

Would you hire our company when your cows have udder health problems?

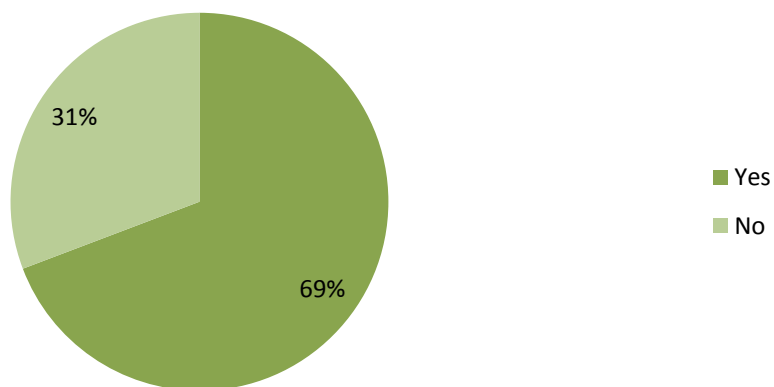


Figure 7: Would you hire our company when your cows have udder health problems?

- If there are too many mastitis cases, I would. It would be sometimes better to hire an independent adviser instead of always advice from the same vet or feed adviser.
- Yes, it would probably beneficial for our farm
- Another approach can help against company blindness.
- If my vet/GD does not help, I would consider hiring UHC

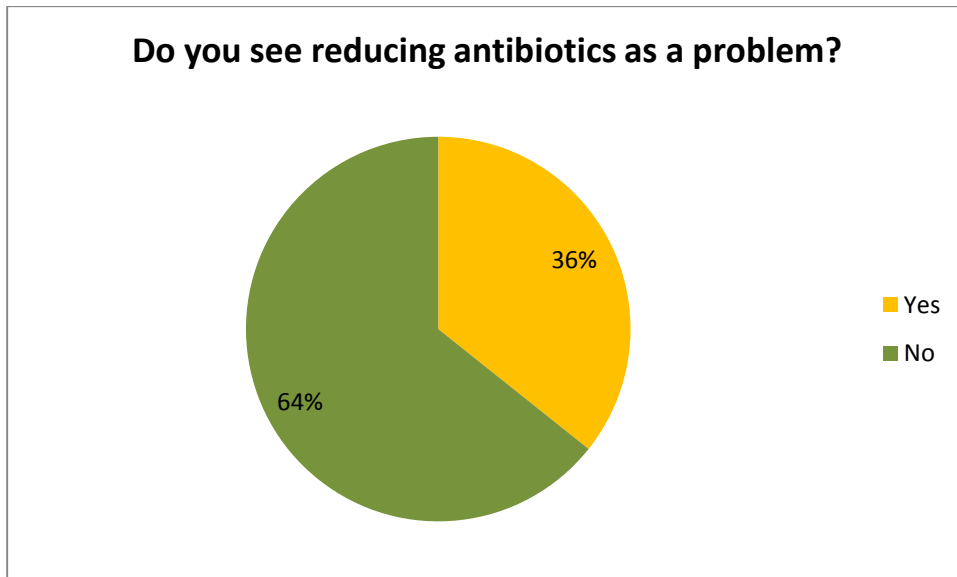


Figure 8: Do you see reducing antibiotics as a problem?

- No, however this depends on the regulation of antibiotics around drying off.
- Yes, high risk for an increased bulk somatic cell count.

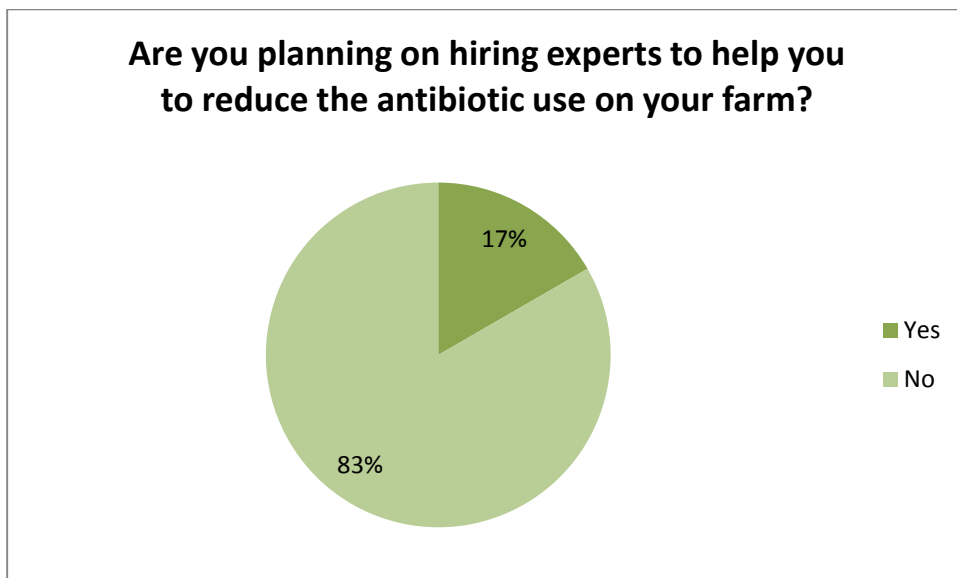


Figure 9: Are you planning on hiring experts to help you to reduce the antibiotics use on your farm?

- No, we know what the problems are on our farm and can still work on that. We also have good faith in our vet. If this would not work, we can always think of hiring UHC.

Annex 3 Evaluation

Boer 1

EVALUATIE DOOR DE ONDERNEMER (OF EIND GEBRUIKER) OVER DE GEPRESENTEERDE HYGIËNE BESLISBOOM EN CHECKLIST OMTRENT UIERGEZONDHEID PLUS HET UITEINDELIJKE RESULTAAT EN ADVIES			
Naam Student <u>UHC</u>			
Naam Ondernemer <u>Boer 1</u> 2013		Datum <u>12-06-</u>	
		Assessment	
De verschillende punten om te evalueren: Zou u alstublieft uw mening willen beargumenteren doormiddel van voorbeelden of ervaringen?		A= onvoldoende	B= voldoende
1. Advies presentatie/ producten Is het advies gepresenteerd op een professionele manier?			C= Goed X
2. Advies/ onderwerp van de producten Waardeert u het onderwerp van het advies en het product dat is gepresenteerd?			C= Goed X
3. Antwoorden op de vragen Waren de studenten in staat om eventuele vragen omtrent het advies en product te beantwoorden?			C= Goed X
4. Atmosfeer Creëerde de studenten een prettige sfeer onder de contact uren?			C= Goed X

5. Organisatie Hoe vond u dat de studenten contact met u hebben opgezocht omtrent het maken van een afspraak?			X
6. Eind resultaat Heeft u extra kennis/ informatie opgedaan doormiddel van dit project? <i>Ik heb geen extra kennis opgedaan, maar het is wel goed dat iemand je weer even met de neus op de feiten gaduht voord.</i>			
Overige opmerkingen: <i>geen.</i>			
Assessment: A= Onvoldoende; B= Voldoende; C= Goed			

Boer 2

EVALUATIE DOOR DE ONDERNEMER (OF EIND GEBRUIKER) OVER DE GEPRESENTEERDE HYGIËNE BESLIJBOOM EN CHECKLIST OMTRENT UIERGEZONDHEID PLUS HET UITEINDELIJKE RESULTAAT EN ADVIES

Naam Student Iris Bos

Naam Ondernemer Jan de Ruyter Datum 13-6-13
2013

De verschillende punten om te evalueren: Zou u alstublieft uw mening willen beargumenteren doormiddel van voorbeelden of ervaringen	Assessment		
	A= onvoldoende	B= voldoende	C= Goed
1. Advies presentatie/ producten Is het advies gepresenteerd op een professionele manier? <u>Het advies is professioneel gepresenteerd</u>			✓
2. Advies/ onderwerp van de producten Waardeert u het onderwerp van het advies en het product dat is gepresenteerd? <u>Ja.</u>		X	
3. Antwoorden op de vragen Waren de studenten in staat om eventuele vragen omtrent het advies en product te beantwoorden? <u>volledig</u>			X
4. Atmosfeer Creëerde de studenten een prettige sfeer onder de contact uren? <u>interesseval</u>			X

G=Goed B=Voldoende A=onvoldoende

5. Organisatie Hoe vond u dat de studenten contact met u hebben opgezocht omtrent het maken van een afspraak? <u>Spontaan</u>	X		
6. Eind resultaat Heeft u extra kennis/ informatie opgedaan doormiddel van dit project? <u>Nee, afgelopen jaar veel informatie v/d gezondheidsdienst gehad.</u>			
Overige opmerkingen: <u>Prettig ervaren /ontspannen gesprek. uakliedig gebracht.</u>			
Assessment: A= Onvoldoende; B= Voldoende; C= Goed			

Boer 3

EVALUATIE DOOR DE ONDERNEMER (OF EIND GEBRUIKER) OVER DE GEPRESENTEERDE HYGIËNE BESLIJBOOM EN CHECKLIST OMTRENT UIERGEZONDHEID PLUS HET UITEINDELIJKE RESULTAAT EN ADVIES			
Naam Student <u>Milou Fleuren (WIC)</u>			
Naam Ondernemer <u>Mrs. Lames (Boer 3)</u> 2013		Datum <u>17-06-13</u>	
Assessment			
De verschillende punten om te evalueren: Zou u alstublieft uw mening willen beargumenteren doormiddel van voorbeelden of ervaringen?	A= onvoldoende	B= voldoende	C= Goed
1. Advies presentatie/ producten Is het advies gepresenteerd op een professionele manier? <u>Ja de taakverdeling was goed</u>			X
2. Advies/ onderwerp van de producten Waardeert u het onderwerp van het advies en het product dat is gepresenteerd?			X
3. Antwoorden op de vragen Waren de studenten in staat om eventuele vragen omtrent het advies en product te beantwoorden?			X
4. Atmosfeer Creëerde de studenten een prettige sfeer onder de contact uren?			X
5. Organisatie Hoe vond u dat de studenten contact met u hebben opgezocht omtrent het maken van een afspraak? <u>Telefonisch</u>			X
6. Eind resultaat Heeft u extra kennis/ informatie opgedaan doormiddel van dit project? <u>Heb kennis gemaakt met het product.</u>			
Overige opmerkingen: <u>Een goed initiatief omtrent de uiergezondheid is in de melkveehouders nog veel winst te behalen.</u>			
Assessment: A= Onvoldoende; B= Voldoende; C= Goed			

Boer 4


EVALUATIE DOOR DE ONDERNEMER (OF EIND GEBRUIKER) OVER DE GEPRESENTEERDE
HYGIËNE BESLISBOOM EN CHECKLIST OMTRENT UIERGEZONDHEID PLUS HET UITEINDELIJKE
RESULTAAT EN ADVIES

Naam Student Harmke en Marleen (UHC) en Milou en Iris

Naam Ondernemer Peter Boer 4
2013

Datum 13-06-2013

<i>Assessment</i>			
<i>De verschillende punten om te evalueren: Zou u alstublieft uw mening willen beargumenteren doormiddel van voorbeelden of ervaringen?</i>	A= onvoldoende	B= voldoende	C= Goed
1. Advies presentatie/ producten Is het advies gepresenteerd op een professionele manier?			X
2. Advies/ onderwerp van de producten Waardeert u het onderwerp van het advies en het product dat is gepresenteerd?			X
3. Antwoorden op de vragen Waren de studenten instaat om eventuele vragen omtrent het advies en product te beantwoorden?			X
4. Atmosfeer Creëerde de studenten een prettige sfeer onder de contact uren?			X

<p>5. Organisatie Hoe vond u dat de studenten contact met u hebben opgezocht omtrent het maken van een afspraak?</p>			
<p>6. Eind resultaat Heeft u extra kennis/ informatie opgedaan doormiddel van dit project?</p> <p><i>Dat hoop ik nog te ontvangen. Je wordt weer even herinnert aan hoe het moet.</i></p>			
<p>Overige opmerkingen:</p>			
<p><i>Assessment: A= Onvoldoende; B= Voldoende; C= Goed</i></p>			