

Economic impact of selective dry cow therapy – a tool

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Based on the work published by
Hommels et al. (2021)

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V1 – 02/14/2022

INTRODUCTION

This tool is based on the work published by Nina Hommels and co-authors in the Journal of Dairy Science ([https://www.journalofdairyscience.org/article/S0022-0302\(21\)00570-1/fulltext](https://www.journalofdairyscience.org/article/S0022-0302(21)00570-1/fulltext)). Details about the calculations, economic inputs, and other assumptions can be found in the original publication.

The **objective of this tool** is to allow farmers, veterinarians, managers, and others **to evaluate the potential economic impacts of implementing a selective dry cow approach (SDCT)** in their herds.



INSTRUCTIONS

USERS' INPUTS

Throughout the tool, users can change the inputs used to calculate the results. Ideally, **users should use their inputs**. Reference inputs based on the published literature are provided.

1 - The **first step** is to click on the sheet “**DATA – Farm inputs**”. Only the **blue cells can be changed**. Users can change the number of primiparous and multiparous in their herd, their cull rate, their average bulk tank somatic cell count (BTSCC), milk price, feed price, antibiotics, and teat sealant prices, labor cost, and overall mastitis management. Step-by-step instructions are provided on the following pages.

2 – Users **must define their mastitis inputs**, or use the ones provided for reference based on the work of Hommels et al. (2021). Users must **group their cows according to their parity** (primiparous or multiparous) and **their last test-day somatic cell score (SCS)**. Each group will have a few cows, and cows in that specific group can be treated or not with an intramammary antibiotic at dry-off.

3 – Users must **also input their incidence of clinical and subclinical mastitis in the subsequent lactation** for primiparous and multiparous if cows are treated with antibiotics at dry-off. Reference is provided in the sheet “Incid. mast. by SCS last test”.

4 – Users must **add their risk for mastitis in the subsequent lactation if cows do not receive antibiotics**. A risk of 1 means no difference in the incidence of mastitis in the subsequent lactation.

DATA – Farm inputs

1 – Add your farm inputs and costs. **Important:** users **MUST choose the unit of analysis (kg or pounds)**. By default, the inputs and analysis are done with the units in kg. **If this step is not done correctly, the results will be wrong.**

Farm inputs	My inputs	Reference
Number of primiparous cows	350	
Number of multiparous cows	650	
Replacement rate	35%	
% of replacement not dried off	90%	
Total number of cows	1000	
Annual average bulk tank comatic cell count (BTSCC - cells/mL)	150,000	220,000
Farm costs		
Milk price unit	Kg	IMPORTANT
Milk price (per kg or pound)	\$ 0.40	
Milk price (per kg or pound)	\$ 0.40	
Labor cost (\$/hour)	\$ 15.00	\$ 15.00
Feed cost (per kg or pound of dry matter)	\$ 0.28	\$0.28/kg or \$0.13/lbs
Feed cost (per kg or pound of dry matter)	\$ 0.28	
Dry matter intake to produce 1 unit of milk (kg or pounds)	0.4	0.40 if kg or 0.18 if lbs
Dry matter intake to produce 1 unit of milk (kg or pounds)	0.40	
Marginal milk price	\$ 0.29	

2 – Select if you **are using teat sealant or not** at dry-off.

Are you using teat sealant at dry-off?

Yes

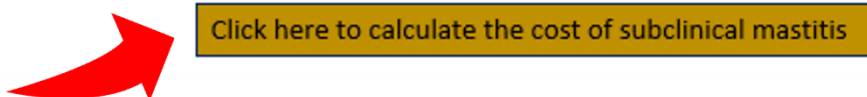
3 – Add the **costs of intramammary antibiotics**, the average number of **minutes spent per cow to apply the antibiotics** and the teat sealant (if used) (labor), and the costs of teat sealant and intramammary dry cow antibiotics.

Are you using teat sealant at dry-off?	Yes	Yes
Cost of each tube of teat sealant (\$/tube)	\$ 2.00	\$ 2.00
Estimated time spent to apply the teat sealant (min/cow)	1	1
Total cost of using teat sealant (\$/cow)	\$ 8.25	\$ 8.25
Antibiotics at dry-off		
Cost of each tube of dry-off antibiotics (\$/tube)	\$ 3.30	\$ 3.30
Estimated time spent to apply the dry-off antibiotics (min/cow)	1	1
Number of tubes used at dry-off (tubes/cow)	4	4
Total cost of using antibiotics at dry-off (\$/cow)	\$ 13.45	\$ 13.45
Average number of days a quarter with clinical mastitis is treated	3	3

DATA – Farm inputs

4 - Users **must inform the cost of one case of clinical and subclinical mastitis**. We have provided reference costs based on the publication from Hommels et al. (2021). However, users also can calculate their costs.

Cost of mastitis in the subsequent location (up to 30 DIM)			
Cost of one case of clinical mastitis	\$	295.26	\$ 295.26
Cost of one case of subclinical mastitis	\$	21.30	\$ 21.30



For **clinical mastitis**, users can use [this calculator](#) available on the UC Davis VMTRC website to calculate their own costs for a case of clinical mastitis.

For **subclinical mastitis**, users can **browse the sheet “Cost of Subclinical Mastitis”** (or click on the button provided) **and add their inputs**. The calculations for losses due to a case of subclinical mastitis were based on the work of Lam et al., 1997; Halasa et al., 2009; Scherpenzeel et al., 2018; and Hommels et al., 2021.

Mastitis inputs (0.1 or 0.5)

1 - Users should add **their own mastitis inputs**. These values can be found in the DHIA reports, on their farm management programs, or in collaboration with their veterinarians.

Mastitis inputs are the **expected incidence risk of mastitis in the subsequent lactation** if farms use BDCT. For instance, if 100 cows are dried-off with the last test-day SCS of 3.0, and from this group, 10 cows get clinical mastitis in the subsequent lactation, the incidence of clinical mastitis in the subsequent lactation is 10%. If out of these 100 cows 30 get high SCS in the first test-day of the subsequent lactation, the incidence of subclinical mastitis for this group is 30%.

The **number of cows in each category of the last test-day SCS** should also be inputted.

If users want to use the information from Hommels et al. (2021) as a reference, they should use the **“Mastitis inputs 0.1”**. Below there is a description of how to use it. In the next pages, we will describe how to report more summarized data.

Users also need to change **the risk of mastitis in the subsequent lactation** if SDCT is used instead of BDCT. A reference based on Hommels et al. (2021) is provided, but other publications have reported different values. We advise users to evaluate different values (sensitivity analysis).

Change the incidence risk of mastitis in the subsequent lactation if SDCT is used

Change the number of PRIM and MULT cows in each group according to their last SCS before dry-off

Incidence risk if cows do not receive antibiotics at dry-off, subclinical mastitis										Incidence risk if cows do not receive antibiotics at dry-off, clinical mastitis									
Subclinical mastitis										Clinical mastitis									
Category of SCS at dry-off	Reference for SCC	Primiparous			Multiparous			Reference	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)	Reference	Primiparous			Multiparous			Reference	Incidence of clinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS)	Reference
		Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of primiparous dried-off per category, per year	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of multiparous dried-off per category, per year	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)				Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of primiparous dried-off per category, per year	Incidence of clinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS)	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of multiparous dried-off per category, per year	Incidence of clinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS)			
0.1	13,397	0	50	11.6	11.6	0	13	16.2	16.2	4.2	4.2	4.3	4.3	0	5	17.5	17.5	7.6	7.6
0.2	14,359	0	6	12.6	12.6	0	5	17.5	17.5	7.5	7.5	7.6	7.6	0	7	17.5	17.5	7.6	7.6
0.3	15,339	0	15	11.6	11.6	0	7	16.1	16.1	11.5	11.5	11.7	11.7	0	5	15.2	15.2	10.3	10.3
0.4	16,494	0	5	10.9	10.9	0	5	15.2	15.2	10.1	10.1	10.3	10.3	0	3	17.0	17.0	13.5	13.5
0.5	17,678	0	4	12.2	12.2	0	3	17.0	17.0	10.8	10.8	11.0	11.0	0	10	17.1	17.1	11.0	11.0
0.6	18,946	0	11	12.3	12.3	0	10	17.1	17.1	10.8	10.8	11.0	11.0	0	3	16.8	16.8	11.6	11.6
0.7	20,306	0	5	12.1	12.1	0	3	16.8	16.8	11.4	11.4	11.6	11.6	0	6	16.4	16.4	11.4	11.4
0.8	21,764	0	4	11.2	11.2	0	6	16.4	16.4	11.1	11.1	11.4	11.4	0	0	0	0	0	0

Mastitis inputs (0.1 or 0.5)

2 – For every category of last test-day SCS (or SCC), users should add the number of cows in that group. For instance, in the screen shot below, there are 50 primiparous and 13 multiparous cows in the category 0.1, 6 primiparous and 5 multiparous in the category 0.2, etc.

Category of SCS at dry-off	Primiparous				Multiparous			
	Reference for SCC	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of primiparous dried-off per category, per year	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)	Reference	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of multiparous dried-off per category, per year	Incidence of clinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)
0.1	13,397	0	50	11.6	11.6	0	13	13.5
0.2	14,359	0	6	12.6	12.6	0	5	13.5
0.3	15,389	0	10	11.5	11.5	0	5	11.7
0.4	16,494	0	15	11.6	11.6	0	7	10.3
0.5	17,678	0	5	10.9	10.9	0	5	13.5

3 – Users should choose if cows will receive antibiotics and teat sealant at dry-off (1), or not (0). For that, they should change the column “Treatment with antibiotics at dry-off (1=treat; 0 = not treat)”. They can play with different groups being treated or not to evaluate the impact of their decision-making on the economics of their herds.

Category of SCS at dry-off	Subclinical mastitis				Clinical mastitis							
	Reference for SCC	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of primiparous dried-off per category, per year	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)	Reference	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of multiparous dried-off per category, per year	Incidence of subclinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)	Reference	Treatment with antibiotics at dry-off (1=treat; 0=not treat)	Number of multiparous dried-off per category, per year	Incidence of clinical mastitis in the first 30 DIM of the subsequent lactation (per category of SCS) (%)
0.1	13,397	0	50	11.6	11.6	1	13	16.2	16.2	4.2	4.2	4.3
0.2	14,359	0	6	12.6	12.6	1	5	17.5	17.5	7.5	7.5	7.6
0.3	15,389	0	10	11.5	11.5	1	5	15.9	15.9	7.1	7.1	7.3
0.4	16,494	1	15	11.6	11.6	1	7	16.1	16.1	11.5	11.5	11.7
0.5	17,678	1	5	10.9	10.9	1	5	15.2	15.2	10.1	10.1	10.3
0.6	18,946	0	4	12.2	12.2	0	3	17.0	17.0	13.3	13.3	13.5
0.7	20,306	0	11	12.3	12.3	0	10	17.1	17.1	10.8	10.8	11.0

4 – If users prefer to group their cows in categories of 0.5 changes in SCS (or SCC), they can choose this option on the tab “DATA – Farm inputs”, or navigate using the spreadsheet tabs.

All costs and antibiotics use calculations

Click here to see the detailed calculation for **all costs (0.1)**

Click here to see the detailed calculation for **all costs (0.5 SCS)**



Mastitis inputs 0.1	Mastitis inputs 0.5
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5 – REMEMBER: once you decide how to group your cows (0.1 or 0.5), be consistent! And edit ONLY THE BLUE CELLS!

Once the user edits all the items below, they can check on the final cost of their chosen program.

Users should choose:

- **From tab “DATA – Farm inputs”**
 - The unit of analysis (kg or pounds)
 - How they are going to group their cows (0.1 or 0.5)
 - All the economic costs
 - The costs of subclinical and clinical mastitis.

- **From tabs “Mastitis inputs 0.1” or “mastitis inputs 0.5” (depending on the users’ choice for grouping cows)**
 - Incidence risk of subclinical and clinical mastitis in the subsequent lactation of cows receive only teat sealant, or nothing at all
 - The number of cows in each group of last test-day SCS (or SCC)
 - Which group will be treated or not at dry-off
The incidence of subclinical and clinical mastitis in the subsequent lactation **if cows receive antibiotics at dry-off**

6 – To see the final calculations, click on the tab “DATA -Farm inputs”. See below.

Farm details	
Percentage of cows replaced before dry-off	41%
Number of primiparous replaced before dry-off	23
Number of multiparous replaced before dry-off	25
Cows that will be dried-off (cows/year)	70
Primiparous	33
Multiparous	37
Risk of mastitis in the subsequent lactation if antibiotics are not used at dry-off	
Relative risk of subclinical mastitis if antibiotics is not used	1.6
Relative risk of clinical mastitis if antibiotics is not used	1.7
Overall incidence of subclinical mastitis in primiparous	13%
Overall incidence of subclinical mastitis in multiparous	19%
Overall incidence of clinical mastitis in primiparous	10%
Overall incidence of clinical mastitis in multiparous	11%
Total cost of mastitis around the dry period	
Total cost of mastitis around the dry period, PRIM	\$ 3,077.24
Total cost of mastitis around the dry period, MULTI	\$ 3,562.33
Total cost of mastitis around the dry period	\$ 6,639.56
Total cost of mastitis around the dry period (\$/lactating cow)	\$ 56.27
Total use of antibiotics (ADDD/year)	
Total antibiotics use PRIM (ADDD/year)	241
Total antibiotics use MULT (ADDD/year)	268
Total antibiotics use (ADDD/year)	509

The first two boxes in the example above are a summary of the mastitis related data for the farm. Economic analyses are shown on the orange, bottom part of this box. For instance, on the example above, the total cost of mastitis around the dry period was \$6,639.56 (\$56.27/lactating cow). This included the dry-off protocols and the costs of subclinical and clinical mastitis in the beginning of the subsequent lactation.

Users can also evaluate how much antibiotics is used (ADDD/year).

If users want to compare these costs with different strategies (for instance, treating all cows, or treating different groups of cows), they can repeat the analysis changing which cows will be treated or not, the incidence risk of mastitis, etc. Then, they can compare the costs of their strategies.

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