

SimHerd - exercises

10-12-2020

You are now about to perform exercises with SimHerd. This means that you will be simulating scenarios and answering questions about the simulated results.

- 1. www.simherd.com, click on user login (in the top)
- 2. enter username and password and click on *log in* (remember to tick the box).
- 3. click on "Education" see below

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4. Select the *average herd* (*red arrow, see below*) *and choose your country*. When you select your country, the currency and exchange rate will automatically be adjusted. Then press upload (*red circle*).

Education ×
Management level Average (repro, health and yield) ✓ Choose Country Germany ✓ Currency Exchange rate for Danish kr. For € enter 7,45 (=7,45 kr. / €) 7,45 Enter symbol (€) or abbreviation (EUR) of currency: €
Cancel Upload

After uploading this *average herd*, you *are in the scenario* straight away. In the road map below (shown at the top of your screen), you can always see where you are in the process.





Exercise 1: Estimate the economic impact of reducing the risk of Mastitis Reduce the risk of Mastitis with 50 %.

You will be guided through the process with this first scenario. The other scenarios (exercises) are executed in the same way.

See the screen shot below

- 5. Click on the category "*Disease*"
- 6. Enter the lower value for *base risk* for *Mastitis* (the number you entered turns green) and the *"Save"* button pops up.
- 7. click on Save and the Run (the Run button appears after clicking on Save)
 - a box pops-up that asks you to describe your scenario with a few words; do that or else it gets difficult to identify the different scenarios in the *Overview*

Overview Herds Average boost Edit 7			01 10 Data	Calibration	Overview	Prices	Report	>		Standard ID: SHI Created by: Jeha Date: 9/10/2014 1 HERD1 Herd file: Scanar SHI_27954 Created by: Jeha Date: 9/10/2014 1
Save Simulation :		5				Comments				
Scenario Prices	/		Report							
		Key figure						Standard	Scenario	Unit
Youngstock	6	Milk fever					0	4.9	4.9	base risk 6
Disease	7	Dystocia			De .		0	0.7	0.7	base risk
Reproduction and Culling	8	Retained placenta					0	9.2	9.2	base risk
Milk yield	9	Metritis					0	8.9	8.9	base sk
-Control and Settings	10	Displaced Abomesum					0	1.9	1.9	bage risk
-Repro	11	Ketosis						10.8	10.8	ase risk
-Feeding	12	Mastitis					0	42	21	base risk
-Yield	13	Digital Dermatitis					0	40	40	base risk
-Youngstock	14	Foul in the foot					0	5.5	5.5	base risk
-Milk fever	15	Claw and leg problems					0	24	24	base risk
-Dystocia	16	Mortality risk					0	2.5	2.5	base risk
-Retained placenta -Metritis	17	Somatic Cell Count					0	240	240	cells per ml (x 1000)

Now the model is running, see below (the stochastic model is simulating all calves, heifers and cows (and thereby the entire herd) over a period of 10 years and this simulation is replicated 100 times).



Now the simulation is finished (red circle, below) and you are in your Report (red arrow).



SimHerd				Language	e English 🗸]	You are	e logged in as: rbd@simherd.con	o Overview Herds [Log out]
Overview Herds Average 11111 Edit					l Data Calibr	Overview Coverview Coverview Coverview Coverview Coverview Coverview	o Prices	Report	Standard ID: SHI_27664 Created by: rbd@smherd.com Date: 12: Scanario no: Created by: Created by: Date: 12:9/2020 12:30:45 PM Date: 12:9/2020 12:30:45 PM
Print report	Simulation : status	$\mathbf{>}$							✓ <u>Comments</u> 50% mastitis //
Gross margin (GM)	after 5 years	(average of sir	nulation years	s 6 to 10)					
GM per year	€ 365.623	€ 377.407	€ 11.784						
GM per cow-year	€ 1.826	€ 1.884	€ 58						
GM per kg ECM	€ 0,164	€ 0,168	€0,004						
Milk yield and feed	ing (average o	f simulation y	ears 6 to 10)						
			Standard	Scenario	Difference				
Milk yield per cow-y	ear, kg ECM		11119	11230	111				
Milk yield per cow-y	ear (only milking o	lays)	12293	12420	128				
Bulk tank somatic ce	eii count, deliverei	3	245216	226439	-18///				
Delivery percentage	st 24 wac first r	arity	97,7	98,0	0,3				
Daily yield during fir	st 24 w.a.c., ill St p	cows	41.2	416	0.4				
Daily yield during an	tire lactation all c	ows	33.8	3/1	0.4				

The results are shown for years 6-10 because that way we can be certain that all short term but also longterm effects of an improvement have been expressed. The different graphs at the end of the report show the development from years 1 to 10.

Find the relevant tables (their names are printed in blue) in the report and answer the questions below.

- a. How much does *Milk yield per cow-year* increase (in the table *Milk yield and feeding*)?
- b. In SimHerd, cows can be culled voluntarily or involuntarily (+mortality). Explain what happens to these 2 *forms* of culling (both can be found in the table *Herd dynamics*) do they go up or down and explain why they go up or down?
 - involuntary culling
 - voluntary culling
- c. How much does Gross Margin per year increase? (in the first table of the report, Gross margin (GM) after 5 years).

SimHerd exercises



New questions, new scenario!!

8. Click on "overview" at the top of your screen, see below

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Overview Herds Average xoox1 Edit					Data	Overview	Prices	Report	2	Standard ID: SH_18966 Created by: Jehan Date: 10/24/2018 8:11:11 HERD1_00199:1 Herd file: Scanario no.: SH_129701 Created by: Jehan Date: 10/24/2018 8:11:12 F
					Standard		Scenarie			
Print report	Show/hide	e graphs fo	or years 1 to	o 10	Simulation : status	 ✓ 			✓ <u>Comments</u> Mastitis	
Gross margin (GM) after 5 years	(average of si	mulation year	rs 6 to 10)						
	Standard	Scenario	Difference							
GM per year	€ 339.638	€ 351.961	€ 12.323							
GM per cow-year	€ 1.699	€ 1.759	€ 60							
GM per kg ECM	€ 0,168	€ 0,172	€ 0,004							
Milk vield and feed	ling (average o	f simulation v	(ears 6 to 10)							
	ing (aronago a	,	Standard	Sconario	Difference					
Milk vield per coww	eer ka ECM		10122	10251	120					
Milk yield per cow-y	ear (only milking (lave)	11183	11330	157					
Milk yield per cow-y	our (only minking (aya)	11103	11335	101					

9. Click on "Create new scenario" (red arrow). As you can see, your first scenario is still there (red circle) and will not disappear. You can always *go back into this scenario* by clicking on "Report" (blue arrow) or go back into the Scenario to change other parameters (green arrow) where after you can run the scenario again.

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Calibration NEW scenario	Create PDF	\bigcirc

SimHerd exercises



Exercise 2: Reduce the risk of the three diseases that cause lameness Reduce the risk of Digital Dermatitis, Foul in the Foot*and Claw and leg problems** (parameters 13, 14 and 15 in the category *Disease*) by 50%. Click on Save and Run again.

a. How much does milk yield per cow-year increase? And is it especially the first parity cows or the older cows that increase in milk yield in this scenario (also in the table *Milk yield and feeding)*? How come?

Obs: w.a.c. = weeks after calving

b. What happened to the mastitis incidence in this scenario (see the table *Disease treatments*)? And why? The answer can be found in the table *Herd dynamics*.

c. How much does Gross Margin per year increase? (in the first table of the report, Gross margin (GM) after 5 years) Write the answer down!

* Footrot or Interdigital Phlegmon or tussenklauw ontsteking in Dutch

** An aggregation of disease to the claw and legs: Sole ulcer, hock lesions, white line disease



d. For the following exercise you need to use your calculator / smartphone:

Below, two hypothetical action plans for mastitis and lameness are described. Calculate what these two *action plans* cost (with your calculator) and compare the costs of these plans with the increase in Gross Margin that you simulated for mastitis in questions 1c and for lameness causing diseases in question 2c.

Action plan 1: reducing Mastitis (hypothetical!)

...the farmer can reduce the risk of mastitis by using a more expensive teat-dip (\in 5 per cow-year* more expensive than the product he uses today (the herd has 200 cow-years*)) and by using 1 hour per day (every day of the year, \in 15 per hour) on improving milking practices (milking *high-cell-count-cows* separately)

- Calculate the costs of this plan:
- Benefit of reducing mastitis risk (answer to question 1c):
- **Profit** = Benefit costs =

Action plan 2: reducing lameness (hypothetical!)

...the farmer can reduce the risk of lameness causing diseases by buying a hoof wash (annual costs of interest, depreciation, water and energy are €5000) and by using half an hour every day (€15/hour) on trimming cows that need acute treatment.

- Calculate the costs of this plan:
- Benefit of reducing lameness risk (answer to question 2c):
- **Profit** = Benefit costs =

When comparing the calculated costs of the two action plans with the simulated benefits ...what action plan should the farmer implement? **Mastitis or lameness?**

* cow-year means the average number of cows present in the herd during the year. In case you have 90 cows during summer and 100 during winter, you have 95 cow-years.



New questions, new scenario!! Repeat step 8 and 9 (see page 4)

Exercise 3: Increase Heat Observation Rate

Increase Heat observation rate with 20% (+20, not multiply by 1,20) in the category *Reproduction and culling* (parameter 20). Click on Save and Run.

a. What happens with the replacement rate (table *Herd dynamics*)? and why? Use the illustration below.



- b. Try to explain why the number of dry cows increases (table *Animals in different categories*). It is **NOT** because the cows get a longer dry period!!
- c. When increasing heat observation rate, a lot of things happen. It affects milk yield in many ways. Milk yield increases due to some mechanisms and other mechanisms have a negative effect on milk yield. SimHerd presents you the *overall effect;* both the positive and negative effects. Look at the figures in the tables Herd dynamics, Disease treatments and *Animals in different categories:*

Identify 2 aspects (differences between the *scenario* and the *standard*) that have a **positive effect** on milk yield.

Identify 2 aspects that have a <u>negative effect</u> on milk yield. **Hint:** question b contains the key to one of the mechanisms.



d. How much does Gross Margin per year increase? (in the first table of the report, Gross margin (GM) after 5 years) Write the answer down!

"Where does the money come from?" what are the most relevant changes in revenues and expenses? (table **Revenues** and **Expenses** (average of simulation years 6 to 10)).

e. Now we are going to evaluate whether buying electronic heat detection equipment is a good idea.

Assumptions on the investment in electronic heat detection equipment

- Price of heat detection equipment (investment amount): €13.000
- Productive life of the investment: 6 years
- Interest rate: 5%
- Annual insurance and maintenance of the investment: 3%



There is a spreadsheet in the teaching material on <u>www.simherd.com</u>. See below:

Use this spreadsheet (see next page) to find out whether the increase in Gross Margin in years 6 to 10 (answer to question 3d) is enough to finance the investment amount.



Spreadsheet for calculating the maximum investment amount		
Difference in Gross Margin between scenario and standard (GM)	€** 6.000	Find the simulated difference in your SimHerd report
Number of <u>extra</u> cows in the scenario compared to the standard Extra marginal capital costs per cow-year * Change in other annual costs Change in annual costs, total (C)		Only relevant in exercise 5
Disposable amount for depreciation and payment of interest (GM-C)	€ 6.000	
Productive life of the investment Interest rate		These assumptions
Maximum investment amount	€ 39.140	exercise
 Approximate amount which is not representative for all herds and for all situations of herd expansions. ** The sheet uses €, but you can use it for any currency. When entering USS-values in the sheet, the unit of th 	e result is also \$	
Interpretation of this sheet: with an increase in annual Gross Margin o an investment can be financed and depreciated, if the investment amo	of 6.000 ount is below 39.140	
SimHerd A/S can't be held accountable for the way the SimHerd model and this spreadsheet is used	SimHerd	

Is this a good investment? Why?

What if interest rate is 8%?

f. Create a summary of these three scenarios (optional)

Click on Overview (see below)

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Gross margin (GM) after 5 years	(average of si	mulation year	s 6 to 10)							
	Standard	Scenario	Difference								
GM per year	€ 339.638	€ 351.961	€ 12.323								
GM per cow-year	€ 1.699	€ 1.759	€ 60								
GM per kg ECM	€ 0,168 ling (average c	€ 0,172	e 0,004 rears 6 to 10) Standard	Scenario	Difference						
Milk yield per cow-y	ear, kg ECM		10122	10251	129						
Milk yield per cow-y	ear (only milking o	days)	11183	11339	157						



- Put tick-marks in the three scenarios (red arrows, see below)
- Click on Create-PDF (blue arrow)
- A box appears where you can enter your e-mail address (green circle). Enter your address and click on "OK"
- A new window pops up in your browser AND you receive an e-mail with a pdf that contains a summary of these three scenarios.

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• If the summary is in Danish and you want it in your own language, click on Edit (see below, red arrow) and change the country (blue arrow) and Save (blue arrow). Now Click on "Create PDF (General)" again.

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New questions, new <u>herd</u>!!

The next questions are performed in a herd with good reproduction.

11. Click on "Overview herds" (see below)

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12. Click on "Education"

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13. Select the herd with "good repro" and press upload.

Education ×	
 Management level Good health (av. repro and yield)	
Choose Country Germany ~	
Currency Exchange rate for Danish kr. For € enter 7,45 (=7,45 kr. / €) 7,45]
Enter symbol (\in) or abbreviation (EUR) of currency: \in]
Cancel Upload	•



Exercise 4: Heifer sale strategy and beef semen

Change the strategy for heifer sale (parameter 25 in the category *Reproduction and Culling*) by setting the parameter from 0 to 2. Read the "question mark" to understand what you are doing now. Click on Save and Run.

- a) Why does milk yield increase (see the table *Herd dynamics*)? 2 reasons.
- b) What happens with the incidence of milk fever? why?

c) Use the table **Revenues and Expenses** (all the way down in your Report) to find out what the good and bad aspects are (pros and cons) of this strategy.

Good aspects:

Bad aspects:

Since this herd has enough heifers, it might also be an idea to use beef semen on the lowest performing cows.

DON'T CREATE A NEW SCENARIO, CONTINUE IN THIS ONE, GO STRAIGHT BACK TO THE SCENARIO (see below)





d) Go to the category "-Repro" and specify that you use 30 % beef semen on the cows by setting parameter 53, 54 and 55 to 0.30. Click on Save and Run.

Look at the figures in the table **Herd dynamics** and judge whether the herd *gets into trouble* when using beef semen on 30% of the cows?

e) Use the table Revenues and Expenses to find out what the good and bad aspects are (pros and cons) of this strategy.
 Good aspects:

Bad aspects:

What is the difference in gross margin (write down your answer)

f) Go to Prices (arrow 1) and change the price of a springing heifer to €1000 (arrow 2).
 Click on "Use price changes..." (arrow 3) and go back to the report (arrow 4).
 Write the difference in gross margin down. Explain the difference with question e.

Overview Herds Good repro 50006 Edit	3 Jata	Overview Calibration Idard Scenario		Standard ID: SHL 5760 Created by: Jehan Date: 91/0/2014 12:33:39 PM HERO1_00199 b0 Herd file: Scanario no.: SHL 27359 Created by: Jehan Date: 9/10/2014 3:04:54 PM
Use price changes in report	on : 🏈	✓ <u>Comments</u> beef on 30%	1	
Scenario Prices	Report			
Milk and livestock	Save to userprofile User. Standard	✓ Upload System: Standard ✓	Upload	
Feed Disease treatment (veterinary)	Prices	L∉	:	Use different prices in scenario and standard Standard and Scenario Unit
Other	kg ECM	0	2	0,40 €
Reproduction	kg price of a cull cow	0		1,11 €
Specific mastitis pathogens	Dead cow	0		-100,67 €
Balance values	Springing heifer	0		1000 €
Labour Requirement	Non-pregnant heifer	0		583,89 €
Alle	Year-old heifer (balance value)	0		536,91 €
	Bull calf	0		80,54 €
	Cross-bred heifer calf	0		86,58 €
	Cross-bred bull calf	0		174,50 €



- a. How much does the number of young stock decrease (table *Animals in different categories*)?
- g) How much is Labor Requirement affected by this scenario (last table in the report)?
- h) The economic implications of labor requirements are not included in the Gross Margin, since labor is considered a fixed cost, not a variable cost. Get your calculator and calculate what the saved labor costs are if the hourly wage is €15?
- i) Go back to Scenario (see below) and increase the proportion of beef semen use from 30 % to 50 %. Look at the figures in the table Herd dynamics and Milk yield and feeding and judge whether the herd gets into trouble when using beef semen on 50% of the cows?



Scroll down to the graphs at the bottom of the report, to see development of number of cow-years and number of youngstock.



- **j)** Go back to Scenario again and now use sexed semen on 50% of the heifers (parameter 44 in category *Repro*). How does this change the result?
- k) Scroll down to the table "Economics and Genetics" and see how this scenario influences the genetic progress in the herd. Name two reasons for the increase in genetic progress.

New questions, new scenario!!

Exercise 5: herd expansion - evaluate the investment

Imagine the following: a farmer considers investing in calving facilities:

- Investment: "extra dry-cow pen and welfare boxes for calving cows"
 - Technical assumptions:
 - Risk for stillbirth is halved (first parity cows are housed separate from older cows during the dry period; less stress)
 - Risk for ketosis, retained placenta and metritis is halved
 - Risk for mastitis is lowered by 10% (multiply the risk by 0,90)
 - Maximum number of cows that can be in the herd increases with 15.
 - Economic assumptions:
 - Building costs (investment amount): €70.000
 - Productive life of the investment: 25 years
 - Interest rate: 5%
 - Annual insurance and maintenance of the investment: 5%



Create a scenario in which you simulate the technical assumptions of this investment: Maximum number of cows can be specified in the category *Reproduction and Culling*. Use the same spreadsheet from **exercise 3** to validate this investment. Remember that you

have to enter that you have **extra cows** in your scenario, compared to your standard.

- a. Is this a good investment? Why?
- b. As stated above, the productive life of this investment is 25 years, this is the typical productive life for buildings. However, the extra facilities are built inside an existing barn which is already 15 years old. So the remaining productive life of the entire stable (and therefore the new dry-cow and welfare facilities), is only 10 years. How does this influence your conclusion?
- c. Assume again that productive life is 25 years. But now look at the increase in Gross Margin in simulation year 1 (see the table Gross Margin per Year)? Does this cause a problem?
- d. What if the investment only makes room for 5 extra cows?
 Go back to Overview and copy the scenario (see the red arrow below), the entire scenario (all parameters) are copied, adjust maximum number of cows and run it again.

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Is it still a good investment if there is only room for 5 extra cows?



New question, new scenario!

Exercise 6: Increase milk yield

Info box:

When increasing peak yield of healthy cows with 1 kg (parameters 27-29 in the category *Milk yield*), the entire lactation curve is moved upwards. Daily yield in the simulated herd will be around 0,90 kg higher (the potential of healthy cows increases with 1 kg the realized increase will be lower due to the occurrence of diseases).



Increase peak yield of healthy 1st, 2nd and older parity cow cows by 1 kg (parameter 27, 28 and 29 in the category *Milk yield*). Answer question a before you run the model?

- a. How much do you expect milk yield per cow-year to increase when increasing peak yield by 1 kg?
- b. Find the increase in Milk yield per cow-year in the report (table *Milk yield and feeding*) and write it down.

Go back to the sheet scenario and adjust the persistency of parity 1, 2 and older cows (parameter 30, 31 and 32). Adjust the persistency to the level of the 25% best herds (point at the question mark for information on the 25% best herds).

- c. Find the increase in Milk yield per cow-year in the report (table *Milk yield and feeding*) and write it down.
- d. How much does Gross Margin pr. cow-year increase? Write the answer down.

SimHerd exercises



e. Increase the price of feed in the scenario (not in the standard, see below) by $\notin 0,02$.

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Feed					🕑 Use diffe	rent prices in scenario and standard
Other	Prices				Standard	scenario Unit
Reproduction	Price per Feed	ing Unit (FE), for the TMR of cows in winte	er.		0,20	0,22
Specific mastitis pathogens	Price for altern	ative feed 2		0	0,00	0,00) €
Balance values	Price for altern	ative feed 3		0	0,00	0,00) €
Labour Requirement	Price per Feed	ing Unit (FE), for the TMR of dry cows		0	0,20	0,20) €
Alle	Price per Feed	ing Unit (FE), for the TMR of cows in sum	imer.	0	0,20	0,20) €

What is the difference in Gross Margin per cow-year now?

What is your conclusion on the profitability of a higher milk yield level?



New question, new scenario!

Exercise 7: longevity

Info: The costs of heifer rearing in SimHerd only includes the variable costs: feeding costs, inseminations costs and other costs (see all these costs on the sheet Prices). The total variable costs of heifer rearing are approximately €1 per day. The fixed costs (housing, labor, insurance, electricity) are not included, but they also amount to approximately €1 per day. In this exercise we study how important the total heifer raising costs are, when simulating a better longevity of cows.

Reduce the base risk for mortality to 0 (Category Disease) and reduce the base risk for Other culling to 2,5 (Category Reproduction and Culling)

- a. How much does Gross Margin per year (not per cow-year!) change? Write the answer down.
- b. Now you are going to include the fixed costs of heifer rearing. You should increase "other costs per heifer-year" by €365 (365 days, €1 per day). Remember to <u>add</u> €365 to the number that was already shown in the cell.

Overview Herds Good repro evelser 30006 Edit	.3	Data Calibration - Standard	Overview	Report	Standard ID: SHI_5291 Created by: Jehan Date: 51/52014 23:08 PM HERDI_00199 bot HERDI_00199 bot HERDI E: Senario no.: SH_28016 Created by: Jehan Date: 9/13/2014 8:23:57 PM
Use price changes in report	Simulation : status	1	▲ <u>Comments</u> reduce cow p	mort and culling	4 2
Scenario	Prices	Report			
Milk and livestock Feed Disease treatment (veterinary)	Pr	Save to userprofile User. Standard • Upto	System: Standa	rd 🔻 Upload	Use different prices in scenario and standard Standard and Scenario Unit
Other	0	ther costs per cow-year	0		21,75 €
Reproduction	0	ther costs per heifer-year	0		450 €
Balance values	Int	terest %	0		4,00 %
Labour Requirement					

How much does Gross Margin per year increase? Write the answer down.

c. Explain the difference between the answer to question a and b?



Change the price of "other costs per heifer-year" back again (subtract €365 again).

Go back to Scenario (see below) and now specify that you use beef semen by setting parameter 53, 54 and 55 to 0.20. Click on Save and Run.



- d. How much does Gross Margin per year (not per cow-year!) increase? Write the answer down.
- e. Now you are going to include the fixed costs of heifer rearing again. Increase "other costs per heifer-year" by €365 (365 days, €1 per day) again.

How much does Gross Margin per year increase now? Write the answer down.

- f. Why is the increase in Gross Margin now larger compared to question d?
- g. Can you formulate a conclusion on how the most money can be earned on cows that live long?



New question, new scenario!

Exercise 8: young stock management

Info box:

In SimHerd we do not represent diseases for calves (diarrhea, pneumonia) but we can simulate different risks of dying. It is however possible to simulate improved heifer management by assuming improved reproduction of heifers and a higher yield of first parity cows. Diarrhea is for example known to reduce 305-day milk yield in first lactation by approximately 4% (Svensson and Hultgren, 2008, JDS number 91)

Simulate a 50% reduction in the risk for dying after birth (parameter 2 in the category *Young stock*)

- a. Does a decrease in calf mortality also result in higher Expenses?
- b. Write down the increase in number of young stock (table Animals in different Categories)
- c. Write down the increase in Gross Margin per cow

Copy this scenario (Go back to Overview and copy the scenario, see also the illustration on the previous page) and simulate within the same scenario that you start breeding the heifers one month earlier (parameter 3 in the category Youngstock) in order to represent a better development of heifers which makes earlier breeding possible.

- d. Write down the increase in number of young stock. Explain the difference with question b.
- e. Write down the increase in Gross Margin per cow.

Copy this scenario again and now increase milk yield with 1 kg for first parity (parameter 27 in the category Milk yield) representing better first parity cows due to better development.

f. Write down the increase in Gross Margin per cow.



New question, new scenario!

Exercise 9: Reduce the risk of retained placenta to 0 (category *Disease*)!

- a. Go to the table **Disease treatments** and observe the differences. Why does the number of metritis treatments also decrease?
- b. What happened to the herd's conception rate (table *Reproduction*)?

Info box:

In SimHerd it is assumed that a cow with retained placenta (or metritis), has a reduced chance of conception, represented by a risk ratio of 0,75. That means, that the cow's conception rate equals <u>0,75 x [conception rate of a healthy cow]</u>. The cow's conception rate is reduced during 119 days after occurrence of the disease.

c. Given a conception rate of 45% for healthy cows, what is the cow's conception rate in case she has had a retained placenta?

A simplified interpretation of the results of this scenario:

In the scenario, the incidence of retained placenta and metritis has dropped by 0,1 cases per cow-year. That means that if we have a herd with <u>100</u> cows, the *scenario* has 10 fewer diseased cows, compared to the *standard*.

- 10 sick cows have a conception rate of 34% (=answer to question c)
- 90 healthy cows have a conception rate of 45%
- d. What is the average conception rate of the **100** cows (10 sick and 90 healthy cows)?
- e. In the report in the table *Reproduction*, it is presented what the conception rate is of all inseminations (first insemination, second...last insemination). Does retained placenta reduce the conception rate of all inseminations (see info box)?



Before using SimHerd with real-life data of a real-life herd:

The next three exercises illustrate different ways of reducing the replacement rate. Do these exercises in the herd with **Good Reproduction.** These exercises are designed to give the user a good understanding of model behavior, necessary when using SimHerd with a real herd.



Exercise 10: Reduce the risk for *other culling* from 7.5 to 4.5 (Category *Reproduction and culling*). The arrow with #10 in the network above, illustrates what underlying cause of replacement you are adjusting.

In the column "Difference Ex. 10", you should enter the differences for the various keyfigures that you can find in your report. The column "Standard" is already filled out. The other columns you are going to fill out in the next two exercises.

	Standard	Difference	Difference	Difference
		ex. 10	ex. 11	ex. 12
Replacement rate ¹	31	-3	-3	-3
Number of calvings ¹	225			
Third and older parity cows ²	99			
Milk yield per cow-year ³	9681			
Claw and leg problems ⁴	25			
GM per cow-year ⁵	17.872			

¹ Table *Herd dynamics*

² Table Animals in different categories

³ Table *Milk yield and feeding*

⁴ Table *Disease treatments*

⁵ In the first table of the report, *Gross Margin after 5 years*



New scenario!

Exercise 11: Change the disease risks. Reduce the risk of all diseases (in the category Disease) by 50%, except for the Mastitis, Mortality and Somatic cell count). The arrow with #11 in the network on the previous page, illustrates what underlying cause of replacement you are adjusting.

In the column "Difference Ex. 11", you should enter the differences for the various keyfigures that you can find in your report.

- a. Milk yield increases hardly in exercise 10. What aspect affects milk yield positively when reducing replacement rate as done in this exercise (find the answer in the table on the previous page).
- b. What 2 aspects affect milk yield negatively?
- c. Why does not number of calvings decrease in scenario 10 and 11 (look at the *network* on the previous page)?
- d. Explain why the increase in Gross Margin is about 5 times larger in exercise 11 compared to exercise 10.



New scenario!

Exercise 12: Prolong the insemination period from 11 to 12 (parameter 22 in the category Reproduction and culling). The arrow with #12 in the network on the previous page, illustrates what underlying cause of replacement you are adjusting. Enter the difference for the various key-figures in the column "Difference Ex. 12".

- a) Why does calving interval increase (in the table *Reproduction*)?
- b) When looking at the 3 columns you filled out, can we draw a conclusion on what the economic benefit is of reducing replacement rate with 1%?
- c. For scenario 12, reduce the milk price with €0,10. Write down the difference in Gross Margin (GM) per cow-year. How and why is it different from the change in GM that you entered in the table on page 23?

Beware: we are looking at **the difference in GM between** the scenario and the standard...not at the GM of the scenario or the GM of the standard

SimHerd exercises

New question, new scenario!

Exercise 13: Set the risk for "mortality" (in the category disease) to 0!!

- a. What is the level of cow-mortality in the scenario (see table Disease treatments)?
- b. Why is the answer **not** 0?
- c. Go back to the scenario, enter the sub-category "–Claw and leg problems" (red arrow, below) and specify that the risk of a mild case is 1 (blue circle). Click on Save and Run. Now point at the 2 *question marks* with your mouse (blue arrows) in order to find out what you are doing.

Overview Herds		Overview								Standard Created b Date: 9/1
ava			91 10		-Q-	3				Herd file:
lit			Data	Calibration	Scenario	Prices	Report			SHI_28018 Created b Date: 9/1
			Sta	indard	1	Scenarie				
-Yield	980	Number of effective c	ontacts in F	Reed Frost			0	0	0	number
-Youngstock	981	Relative risk sub clinic	al (severity	=1) in lactating p	eriod		0	0	0	relative risk
-Milk fever	982	982 Relative risk sub clinical (severity=1) dry period					0	0		relative risk
-Dystocia	983	Risk mild case (severity=2)					0	1	risk	
-Retained placenta	Risk severe case (severity=4)					0	0		risk	
-Metritis	Risk of chronic/reduction in vield capacity (severity=5)					0	0		risk	
-Displaced abomesum	986	Mode for effect of a si	ubclinical ca	350	-/		0	0		0 or 1
-Ketosis	007	Effect of cub clinical of	200	150			0	0.5		oronaction
-Mastitis	907	Effect of sub clinical case					0.5	0.5	proportion	
-Digital dermatitis	988	Effect of mild cases					-0	0.5	0.5	proportion
-Foul in the foot	989	Effect of severe cases	S				0	2	2	proportion
-Claw and leg problems	990	Effect of cronic cases	on yield ca	apacity			0	0	0	proportion
-Somatic cell count							-			

What is the level of cow-mortality now?