

# Examples of increasing herd profit by using genomic selection

Jehan Ettema, Jørn Rind Thomasen, Morten Kargo, Søren Østergaard,  
Line Hjortø, Anders Christian Sørensen

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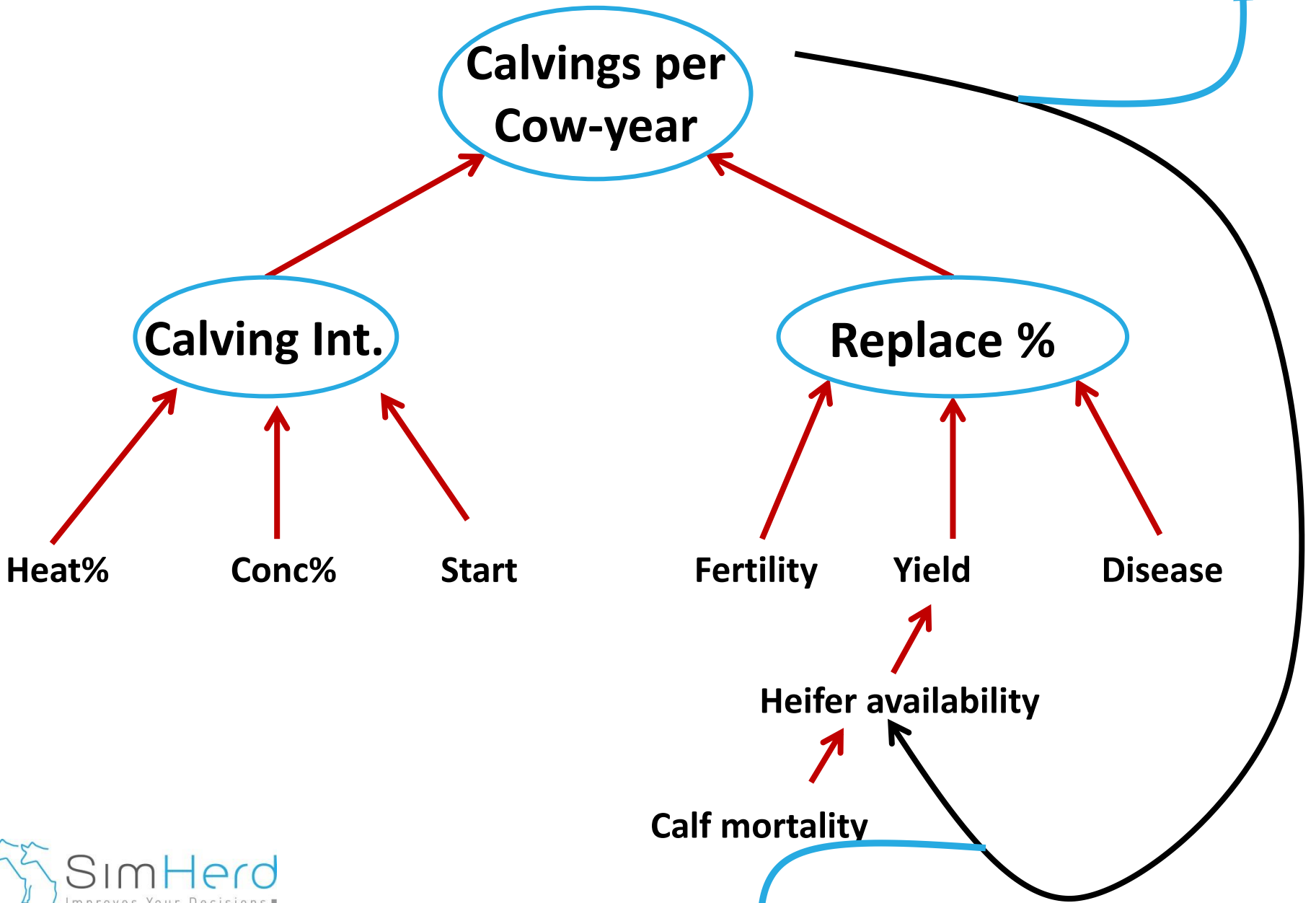


# Presentation

- Intro: Dynamics in a herd and Genetic lag
- Method: two simulation models working together
- Results
- Discussion
- SimHerd in Danish advisory Practice

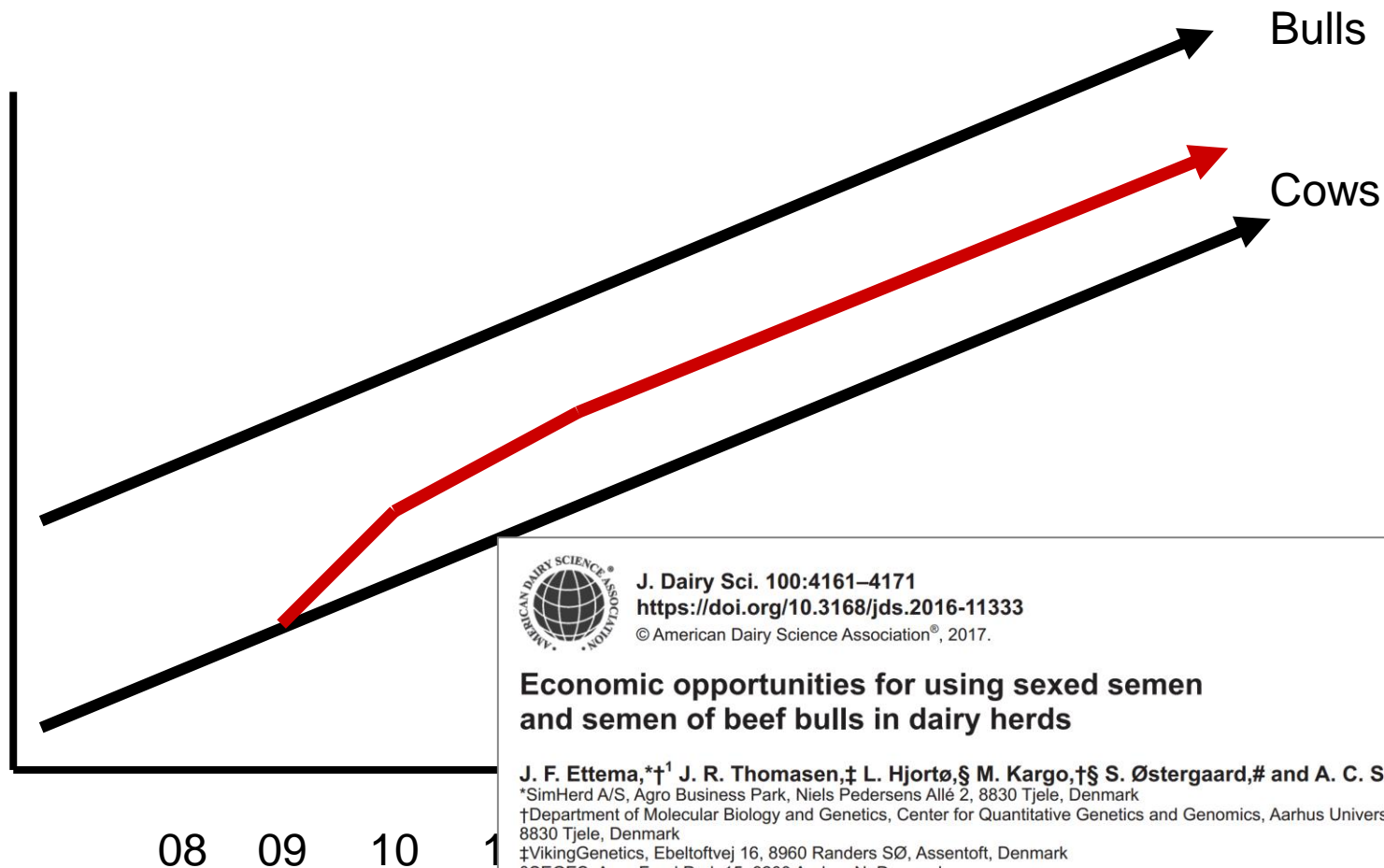


Cross-bred calves



Heifers

## Genetic potential of using sexed and beef semen



J. Dairy Sci. 100:4161–4171  
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### Economic opportunities for using sexed semen and semen of beef bulls in dairy herds

J. F. Ettema,\*†<sup>1</sup> J. R. Thomasen,‡ L. Hjortø,§ M. Kargo,†§ S. Østergaard,# and A. C. Sørensen†

\*SimHerd A/S, Agro Business Park, Niels Pedersens Allé 2, 8830 Tjele, Denmark

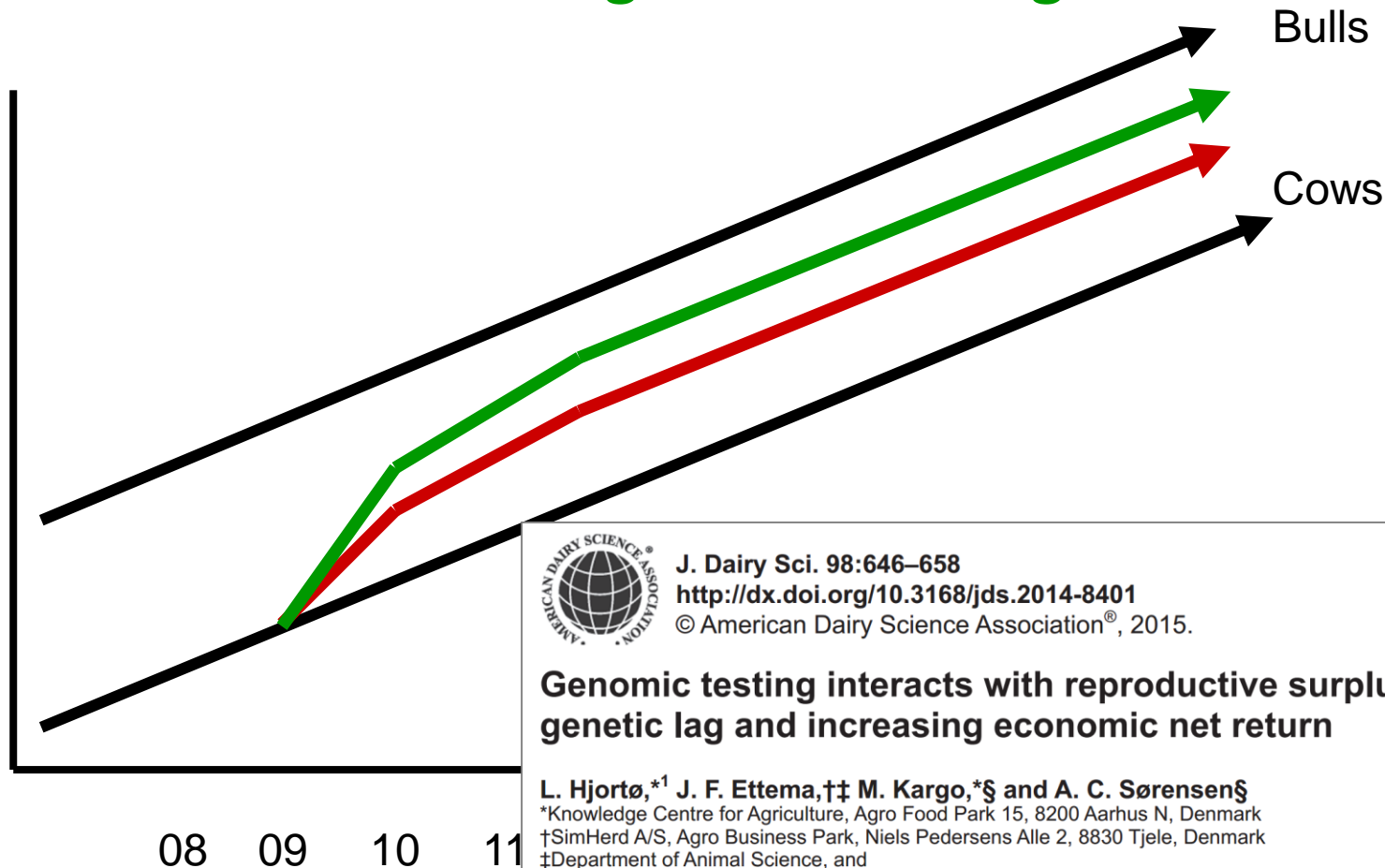
†Department of Molecular Biology and Genetics, Center for Quantitative Genetics and Genomics, Aarhus University, Blichers Allé 20, PO Box 50, 8830 Tjele, Denmark

‡VikingGenetics, Ebeltoftvej 16, 8960 Randers SØ, Assentoft, Denmark

§SEGES, Agro Food Park 15, 8200 Aarhus N, Denmark

#Department of Animal Science, Aarhus University, Blichers Allé 20, PO Box 50, 8830 Tjele, Denmark

## Genetic potential of using sexed and beef semen In combination with genomic testing



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**Genomic testing interacts with reproductive surplus in reducing genetic lag and increasing economic net return**

L. Hjortø,<sup>\*1</sup> J. F. Ettema,<sup>†‡</sup> M. Kargo,<sup>\*§</sup> and A. C. Sørensen<sup>§</sup>

<sup>\*</sup>Knowledge Centre for Agriculture, Agro Food Park 15, 8200 Aarhus N, Denmark

<sup>†</sup>SimHerd A/S, Agro Business Park, Niels Pedersens Alle 2, 8830 Tjele, Denmark

<sup>‡</sup>Department of Animal Science, and

<sup>§</sup>Department of Molecular Biology and Genetics, Center for Quantitative Genetics and Genomics, Aarhus University, PO Box 50, 8830 Tjele, Denmark

## Method: two simulation models work together

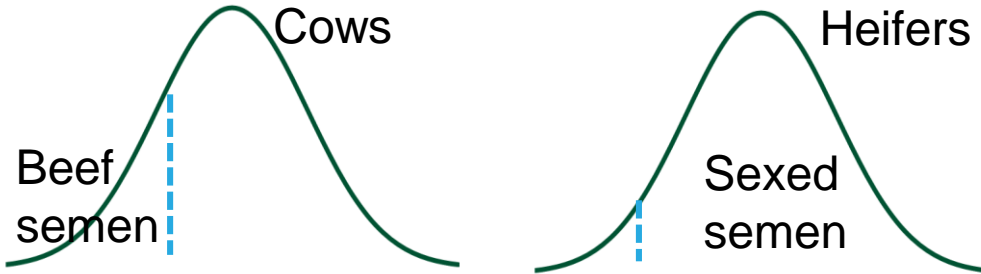
**SimHerd** (Østergaard et al. 2005):

Simulation of management: effect of improving health, reproduction and milk yield in a dairy herd

**ADAM** (Hjortø et al. 2014):

Simulation of genetic progress: effect of selection and generation interval on genetic progress in a dairy herd





Sexed semen on 90% of the heifers  
 Beef semen on 35% of the cows

**SimHerd**

65% Calves born from best heifers  
 3% Calves born from *worst* heifers  
 32 % Calves born from best cows

**Income**  
 -Milk  
 -Crossbred calves  
 -...  
  
**Expenses**  
 -Feed  
 -Semen  
 -Genomic tests  
 ...

**ADAM**

Income – Expenses = **Operational Return** + **Genetic Return** = **Total Return**

## Important assumptions

Reliability breeding value with genomic testing: 50 %

Price per genomic test: € 24

10% lower conception rate for sexed semen

Prices and costs represent Danish practice





## Results per cow per year

38% replacement, 38 heifers tested per 100 cows  
good reproduction (21-day pregnancy rate = 25%)

	1	2	3
Sexed semen on heifers	0%	<b>40%</b>	40%
Sexed semen 1st parity cows	0%	0%	<b>40%</b>
Beef on cows	<b>28%</b>	38%	43%
Genetic Return, traditional BV	€10.3	€19.6	€20.1

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Additional Genetic Return with GT			
- Standard Deviations	0.137	0.141	0.172
- € per cow-year	€12.2	€12.5	€15.3

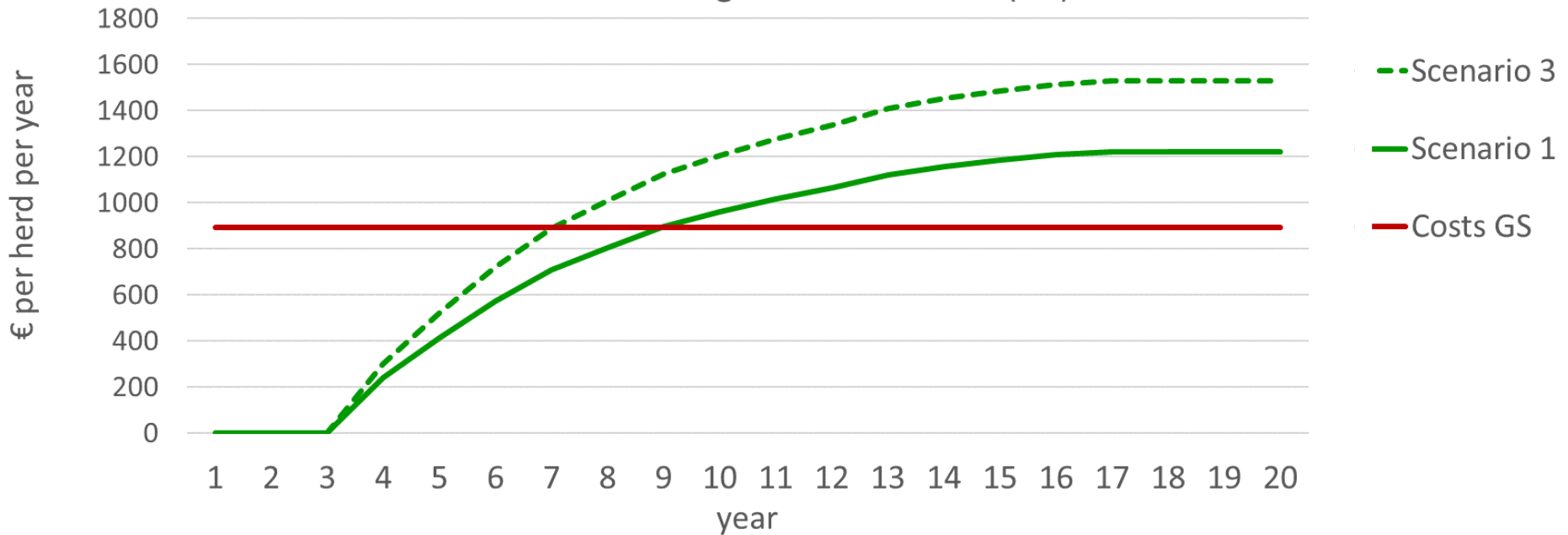
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Testing costs per cow-year	€9.1	€9.1	€9.1
<b>Benefit from testing</b>	<b>€3.1</b>	<b>€3.4</b>	<b>€6.2</b>

## Development over time in a 100-cow herd

Annual value of genetic return due to genomic selection in scenarios 1 and 3 and costs of genomic selection (GS)



## Discussion

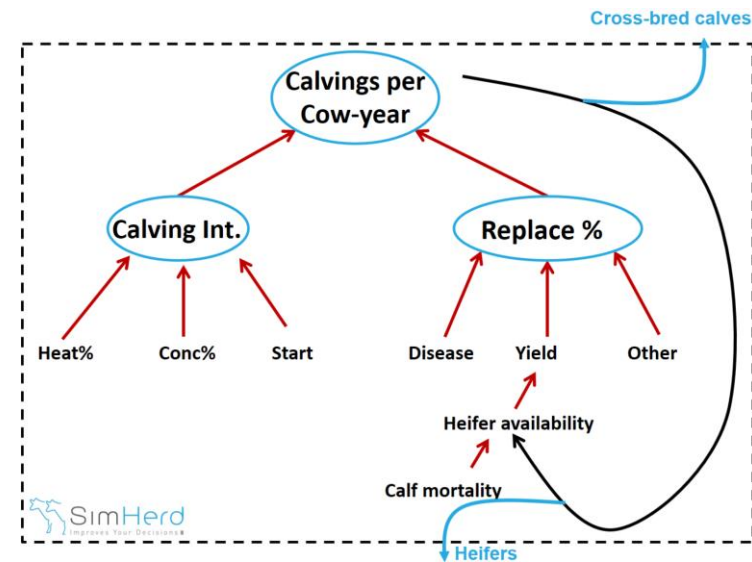
**SimHerd + ADAM:** quantify progress due to increased certainty of the breeding value for Total Net Merit (NTM).

Not included:

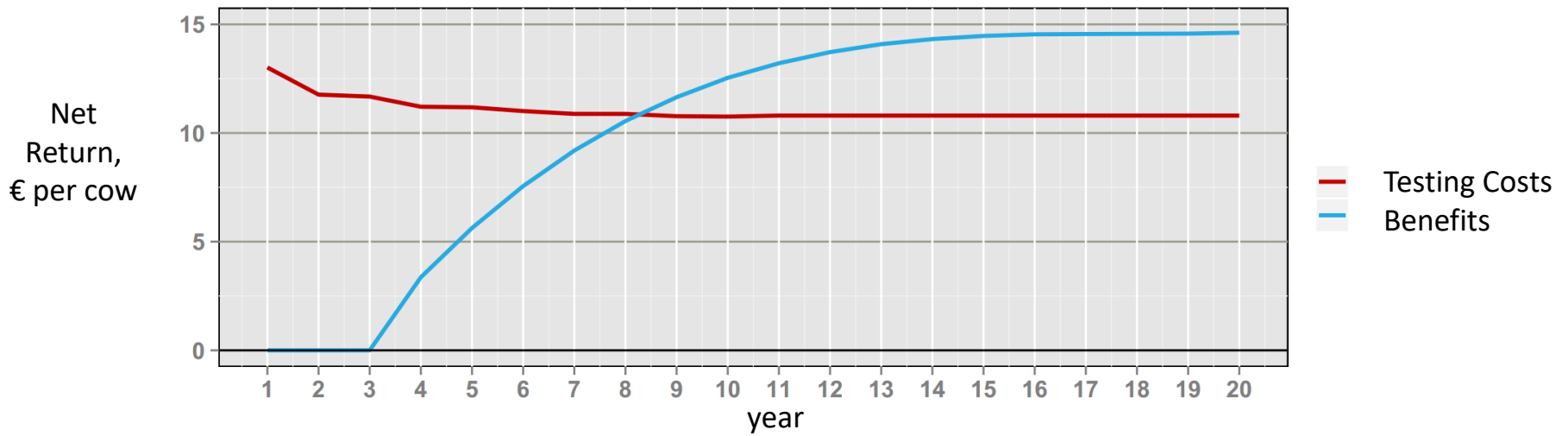
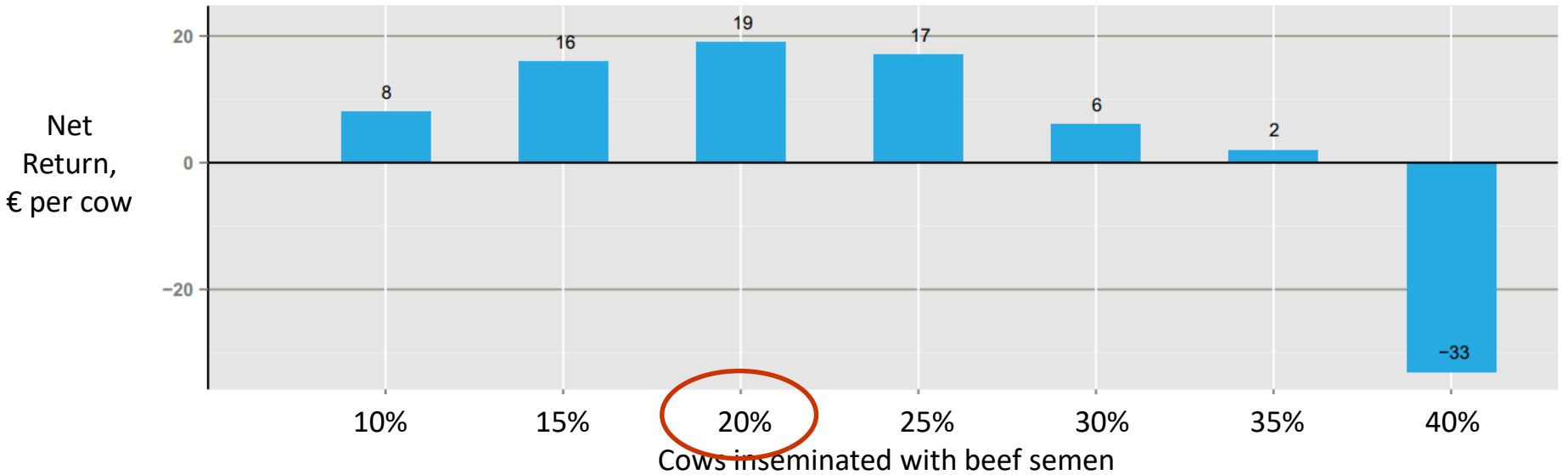
- Improved mating
- Identification of lethal recessives
- Identification of sire dams

Not studied:

Sell heifers instead of using beef semen



# SimHerd + ADAM in Danish advisory practice



# Conclusion

## Economic potentials

- Sexed + beef semen, without genomic test: +€20/cow/year
- Additional value genomic test: +€6 - €10/cow/year
- Benefit > cost in year 7

## Conditions for a positive Net Return

- Good management
- Intensive use of sexed semen and beef semen

