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Statistical analysis 33 Dutch farms of several udder health KPIs and antibiotic usage before and after using a polyvalent mastitis vaccine (*against Staphylococcus aureus*, n*on-S. aureus Staphylococci*, Escherichia coli and coliforms)

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Objectives

Mastitis is a frequent and costly disease in dairy cattle. It has a negative impact on animal welfare, milk quality and increased use of antibiotics. The objective of this poster is to analyze the effect of polyvalent mastitis vaccine (STARTVAC®) against Staphylococcus aureus (S. aureus), non-S. aureus Staphylococci (NAS), Escherichia coli (E. coli) and coliforms vaccination in commercial dairy farms in the Netherlands.

Material and methods

Thirty-three commercial dairy farms were vaccinated with polyvalent mastitis vaccine (STARTVAC®) for 12 months. Then two periods were compared (12 months before and 12 months after the vaccination) using 17 different Key Performance Indicators (KPIs): number of cows, age of cows, milk production, % of fat and protein, BSK (standardised milk production value for each cow to the 50th day of the third lactation period), bulk tank somatic cell count (bSCC), % cows with high SCC, % of new cows with high SCC, number of cows treated for mastitis, number of mastitis treatments, Defined Daily Dose per Animal (ADDD) at farm level, ADDD of mastitis injectors, ADDD for dry cow therapy, % of culled cows, number of dead cows and cell count of culled cows. Due to the complexity and number of data, a statistical model of paired t-test for normal distribution data and Wilcoxon paired test for non-normal distribution data have been used.

Results

Statistical analysis revealed that polyvalent mastitis vaccine (STARTVAC®) had a positive effect on all measured KPIs. However, significant improvements have been observed in increased milk production (BSK +2.79%), lower bSCC (-5.41%), lower % of cows with high SCC (-8.98%), lower % of new cows with high SCC (-12.58%), fewer cows treated for mastitis (-33.52%), fewer mastitis treatments (-39.84%), lower ADDD at farm level (-17.63%), less ADDD mastitis injectors (-38.36%) and a positive economical return in correlation with mastitis reduction +1816€. (Figures 1, 2 and 3)

Figure 2: % of difference in negative considered KPIs

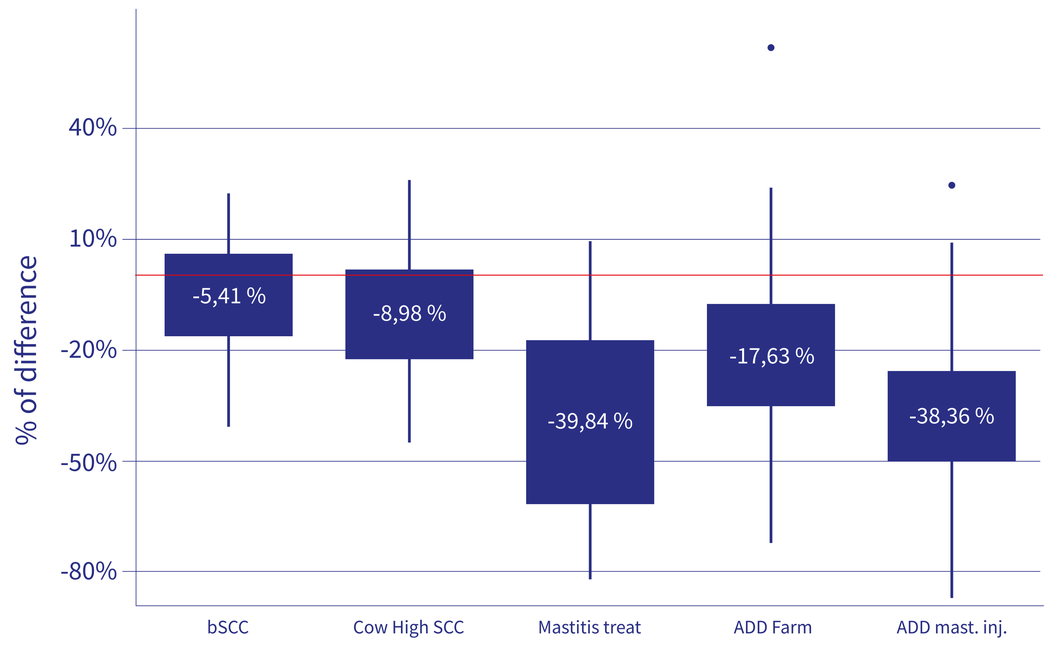
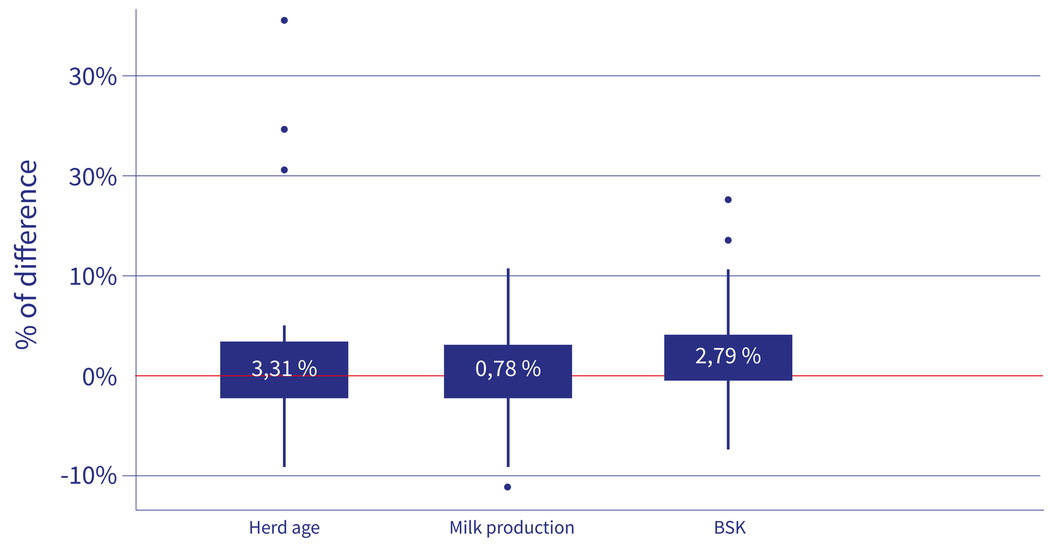


Figure 3: % of difference in positive considered KPIs



Conclusion

Along with other management practices for mastitis, vaccination with polyvalent mastitis vaccine (STARTVAC®) in these farms is having a positive impact, contributing to improved udder health, improved milk production and decreased antibiotic use, resulting in a high return on investment (ROI) 3.09:1.

PARAMETERS	PRE-VACCINATION	STARTVAC®	% OF DIFF	P-VALUE	Nº FARMS
Cows	104.22	104.09			
Age cows	4.42	4.52	**+3,31%**	0.134	27
Milk production	9248	9300	+0,78%	0.519	32
% of fat	4.31%	4.33%	+0,44%	0.436	27
% of protein	3.55%	3.57%	**+0.63%**	0.117	27
BSK*	43.60	44.53	**+2.79%**	0.033	23
bSCC (k)*	165.5	153.93	**-5,41%**	0.049	29
% cows with high SCC*	14.6%	13.2%	**-8,98%**	0.014	29
% of new cows with high SCC*	7.7%	6.8%	**-12.58%**	0.015	29
Cows treated for mastitis**	35.9	21.6	**-33,52%**	0.003	13
No. mastitis treatments***	43.1	25.4	**-39,84%**	0.0002	19
ADDD farm level***	3.31	2.66	**-17,63%**	0.0004	31
ADDD mastitis injectors***	1.00	0.55	**-38,36%**	$2.3^{*}10^{-5}$	30
ADDD dry cow therapy	1.28	0.29	-2.44%	0.195	30
% culled cows	33.8%	29.2%	-5.72%	0.162	25
Dead cows	4.45	3.52		0.196	21
Cell count culled animals	476.7	414.7		0.468	22

Figure 1: percentage of difference