RESPONSIBLE ANTIBIOTIC APPLICATION IN THE DUTCH DAIRY SECTOR; INITIATIVES OF VETERINARY PRACTICES

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SUMMARY

This paper describes the latest developments in the Dutch bovine veterinary and dairy sector concerning the on-farm usage of antibiotics issue. Both communication on responsible medicine application (i.e. workshop) and providing farmers with the insight into their on-farm antibiotic usage, motivates and encourages farmers to reduce antibiotic usage and discuss on and/or change management that increase the risk of the usage of antibiotics.

INTRODUCTION

In human and veterinary medicine, the use of antibiotics is important for the treatment of bacterial infections in both animals and humans. Most of the antibiotics used in veterinary practice are identical to human therapeutics and may play a role in the development of co- or cross-resistance. The concern of the development of antimicrobial resistance caused by veterinary use of antibiotics, has been risen over the last years. Especially the overlap in critically important antibiotics for both human medicine and veterinary, highlights the importance of prudent use. (FAO/WHO/OIE, 2008)

The WHO already in 1997 recommended that national policies on the use of antibiotics should be reviewed, and also that resistance surveillance programmes and antibacterial drug usage monitoring in the livestock sector should be established. A good example of a herd-level monitoring program is VetStat for all drug usage in production animals implemented by the Danish Government in 2000. (Stege et al., 2003)

The Dutch livestock sector reached in 2008 a voluntary agreement to act on the issue of antibiotic resistance. Currently, although the use of antibiotics in the Dutch dairy sector is relatively limited, dairy farmers are facing those reduction targets of 20% in 2011 and 50% in 2013 (2009 reference year). The goal of our study was to determine whether a reduction of the use of antibiotics could be achieved via communication on effective and responsible use of antibiotics in the first place and secondly by giving farmers easy and clear insight into their antibiotic usage.

MATERIAL AND METHODS

In the end of 2009 and begin 2010, workshops "Responsible Medicine Application" for farmers were organised in the veterinary practice Van Stad tot Wad dierenartsen (Loppersum, The Netherlands). We tried to motivate farmers to participate in the workshops in different ways by highlighting the importance of the subject “responsible medicine application” in different news letters, conversations at farm visits and during consults by phone.

The key focus points of the workshops were: practicality, easy accessible and bottom up approach at the level of the farm(er). Nearly 120 out of 220 dairy farmers in our practice area attended voluntarily the commercially workshops (farmers had to pay), which were giving by 2 different vets.

Following the workshops a practical tool has been developed on our website to enable farmers to evaluate their usage of antibiotics on farm-level over a period of 2 years. The usage of antibiotics is evaluated using the parameter: "animal daily doses (ADD) per year" for the categories milking cows, young stock aged between 2 weeks and the age at first calving and calves aged 0-2 weeks and the "Total sum" (see also figure 1 below). 1 ADD represents the therapeutic daily dose that a standard animal receives for the treatment according to the label (weights: milking cow 650 kg; young stock 150 kg; calves within 2 weeks of age 50 kg. The "Total sum" is a new defined parameter that differs from the Total ADD-figure that is calculated for dairy cows on the national level.

For example; 8,5 ADD per year for milking cows means that such an animal receives antibiotics for 8,5 days on average per year. The "Total sum" is calculated as the sum of the antibiotic use in all categories over one year and represents a rolling year average.

The ADD figures are based on sales data instead of real data on on-farm usage. In order to calculate ADD figures
we have categorised the antibiotics as follows: an antibiotic with a withdrawal period for milk and meat is used in milking cows; an antibiotic with a withdrawal period for just meat (not registered for milking cows) is used in young stock and a couple of oral antibiotics is used for calves.

By the end of 2010 the new website of our practice was launched, giving farmer clients the insight into their antibiotic usage in their own private login area. From the 120 farmers that has been registered on our website by May 1st 2011, the data of 98 farmers turned out to be reliable for statistical analysis. (48 farmers have been attending the workshop and 50 have not been attending in the workshop on responsible medicine application). The statistical program R was used to analyse the data. A linear mixed effect model was used to identify the effect of "participant" in the workshop or not and if "month" did differ or had an effect.

![Figure 1: Example of a trend in ADD on a farm. The bar “Mei10” represents the “Total sum” of the antibiotic usage of June ’09 - May ’10 in total (ADD of milking cow, young stock and calves summed up) (Total-som 2010 / 2011)](image)

### RESULTS

In our practice, 120 out of 220 farmers attended the workshops so far. The main reasons for attendance were: easy accessible (low cost and open atmosphere that allowed asking “stupid questions”) and relevant practical information. From the data we can identify large differences in antibiotic use between farms (Total sum of ADD for individual farms varies from 2 – 30); both in the participant group as well as in the non-participants group. The average antibiotic use per month for participants and non participants can be seen in Table 1.

<table>
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<th>Mei 10</th>
<th>Jun 10</th>
<th>Jul 10</th>
<th>Aug 10</th>
<th>Sep 10</th>
<th>Okt 10</th>
<th>Nov 10</th>
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<th>Jan 11</th>
<th>Feb 11</th>
<th>MRT 11</th>
<th>Apr 11</th>
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<td>Non - Participants</td>
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<td>6,5</td>
<td>6,7</td>
<td>6,7</td>
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<td>6,8</td>
<td>6,5</td>
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<td>6,7</td>
<td>6,2</td>
</tr>
<tr>
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<td>10,2</td>
<td>8,8</td>
<td>8,9</td>
<td>8,2</td>
</tr>
</tbody>
</table>

The farmers which have not been participating in the workshop are likely to differ from the ones who have been participating and have significant lower antibiotic usage (p=0,0261) but here was no significant difference between months (p= 0,1976).

### DISCUSSION

The reliability of the ADD-figures of the farmers in our practice-area depends on the fact whether they buy their antibiotics at our practice, or not, or partly. For 95% of the farmers it is clear that they only order antibiotics at our practice, but no guaranties, since the concurrence with other practices on the market of veterinary therapeutics is rising. Another possibly bias in the data has been caused by the categorization of the antibiotics per animals group. Some antibiotics are used as well in milking cows as in calves or young stock. So, in some farms the figures of calves and young stock compared to figures from milking cows are an underestimation of the real situation and vice versa. This problem can be solved when real antibiotic usage data out of farm management programmes. The most reliable data source would be the management programme of the
farmer; note that the reliability of these data depends on
how strictly the farmer is recording the application of
antibiotics. Unfortunately an easy and cheap connection
with the management programmes from farms is not yet
accessible for us.

The calculation of the parameter "Total sum of ADD" we
defined in our practice, differs from the ADD which is used
to measure the usage of antibiotics in the Dutch dairy
sector. In the national ADD figure for dairy cattle, the
antibiotic usage in total kilograms in young stock and
calves, is converted into ADD for milking cows. This
standard assumption of 0,2-0,3 ADD is added to the ADD
of milking cows. We think that in this way the antibiotic
usage in calves and young stock is underestimated by the
farmers, since they have no insight into the real ADD of
calves and young stock.

By means of the "Total sum of ADD" (rolling year average)
the buying peeks in the separate categories are leveled
out and the trend in antibiotic usage over time gets
visible. The next step is to divide the Total sum of the
ADD in the usage per therapeutic indication (e.g. mastitis,
drying off, lameness etc.)

From the results can be seen that non participants had a
significant lower antibiotic use, but we must be cautious
with causality here. An explanation why participants have
a higher antibiotic usage could be that this group of
farmers are more eager to learn more on this subject
because they have a higher usage of antibiotics in the first
place. Or that higher usage of antibiotics and participation
in the workshops are both results of a not yet defined
combined cause. Other parameters like herd size, animal
health status, mastitis incidence, replacement rate should
be taken into account. More data over a longer period is
needed to compare trends in the usage of antibiotics of
participants and non-participants.

The reduction of the use of antibiotics on dairy farms can
not be an target by itself. The use of antibiotics is a result
of the animal health status of individual cows in the first
place. If animals (i.e. cows) stay healthy is influenced by
the management of the farmer, environment conditions
the animals live in and the infection pressure of the most
important cattle diseases. In order to change the
management that leads to the usage of antibiotics,
farmers first need to gain or up-date practical knowledge
about how to create a situation that prevents the need for
antibiotics. And secondly they need to know what their
level of antibiotic usage is, in order to provide them with a
monitoring and benchmarking parameter to measure the
effect of changed (preventive) management and motivate
them to do better. We already notice in practice that
insight in the ADD of the farm, triggers farmers to discuss
the causes (farm management) which lead to antibiotic
usage on the farm. Further, this initiative, the workshop
"Responsible Medicine Application", is now adopted by
Royal Friesland Campina (RFC), and will be rolled out for
RFC farmers in 2011. Our practice will be responsible for
the accreditation workshops for Dutch bovine
veterinarians in which they learn about our experiences in
training and motivation of dairy farmers.

CONCLUSIONS

The bottom-up approach starting at the level of the
farmer (news letters, conversations at farmvisits, consults
by phone) motivates farmers to attend to workshops. This
forms one of the two pillars to change or optimise their
medicines application routines. More effective and
responsible medicines application routines should result in
a diminishing use of antibiotics in the dairy sector,
contributing to less resistance to antibiotics in general
(public health concern). So far we have not been not able
to demonstrate this. However we did learn that farmers
are highly motivated by their ADD-figures and more open
to discuss the causes (farm management) which lead to
antibiotic usage on the farm.

REFERENCES