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Trends in the Percentage of Doses of Modified Live, Killed, and Combination Respiratory Viral Vaccines Administered to Beef Calves Offered for Sale in Summer Video Auctions From 2000 Through 2018

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Abstract

Data from the Superior Livestock Video Auction services were used to identify trends in the percentage of doses of modified live, killed, and combination respiratory viral vaccines administered to lots of beef calves over a nineteen-year period (2000–2018). There was an increase ($P < 0.05$) in the number of modified live viral vaccine doses given to beef calf lots from 2000 through 2018. The number of doses of both killed and combination respiratory viral vaccines administered to beef calves declined ($P < 0.05$).

Introduction

There has been strong debate regarding the perceived protection, efficacy, and safety of modified live vaccine usage in nursing calves over the past several years; however, progressive cattle producers have long recognized the benefits of modified live vaccine usage in nursing calves. In 1990, a severe strain of Bovine Viral Diarrhea type 2 entered the United States by way of Canada. As a result, many producers found that calves that had been vaccinated with a killed viral vaccine were much more susceptible to infection when compared to those calves vaccinated with a modified live viral vaccine (Nordstrom, 2013).

Throughout the 1990s and into the early 2000s, animal health companies began pursuing approval for a label for modified live use in suckling calves nursing pregnant cows (Nordstrom, 2013). This research led to the addition of safety claims across numerous modified live vaccine labels, further supporting the idea of safety in the use of modified live viral vaccines in nursing calves. The objective of this study was to quantify trends in the percentage of doses of types of respiratory viral vaccines administered to beef calves offered for sale in summer video auctions from 2000 through 2018.

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Experimental Procedures

Information describing factors about lots of beef calves marketed and sold nationwide through a livestock video auction service (Superior Livestock Video Auction, Fort Worth, TX) were obtained from the auction service in an electronic format. These data were collected for all lots of beef calves offered for sale from 2000 through 2018. Named 4- or 5-way respiratory viral vaccines, number of treatments, and number of head per lot listed within the lot description were utilized to calculate the type of respiratory viral vaccine and the number of doses administered to beef calves. Named 4- or 5-way respiratory viral vaccines were classified into three groups based on the type of antigens they contained: all modified live antigens, all killed antigens, and a combination of modified live and killed antigens. The Cochran-Armitage Trend test was used to quantify potential trends in the usage of each respiratory viral vaccine type with a $P < 0.05$ considered significant.

Results and Discussion

There were 59,762 lots of single-gender beef calves (7,167,352 total calves) offered for sale in 145 summer video auctions through Superior Livestock Auction from 2000 through 2018. Over the nineteen-year period, 11,787,935 total doses of respiratory viral vaccine were administered to beef calves included within these data.

When examining the overall trend in total respiratory viral vaccine usage across all three types (Figure 1), a pattern of major growth was witnessed, showing an increase in respiratory viral vaccine usage from 2000 (292,377 doses) through 2018 (746,323 doses). There was an increase ($P < 0.05$) in the percentage of doses of modified live viral vaccine given to beef calf lots from 2000 (41.7%, 121,976 doses) through 2018 (90.3%, 673,862 doses) (Figure 2). The number of doses of both killed and combination viral vaccines administered to lots of beef calves declined ($P < 0.05$) (Figure 3 and Figure 4, respectively). In 2000, 31.2% (91,176 doses) and 27.1% (79,225 doses) of the total respiratory viral vaccines given to beef calf lots were killed or combination viral vaccines, respectively (Figure 5). By 2018, only 4.2% (31,325 doses) of respiratory viral vaccines were killed, and only 5.5% (41,136 doses) of respiratory viral vaccines were combination.

Implications

This dramatic shift indicates an industry trend towards increasing modified live viral vaccine utilization compared with declining usage of killed and combination respiratory viral vaccines. This trend may be a result of modified live viral vaccine approval for use in suckling calves nursing pregnant cows.

References

- Nordstrom, S. 2013. Risk and reward: Modified-live vaccines in pregnant cows. Progressive Dairy. <https://www.progressivedairy.com/topics/herd-health/risk-and-reward-modified-live-vaccines-in-pregnant-cows>.

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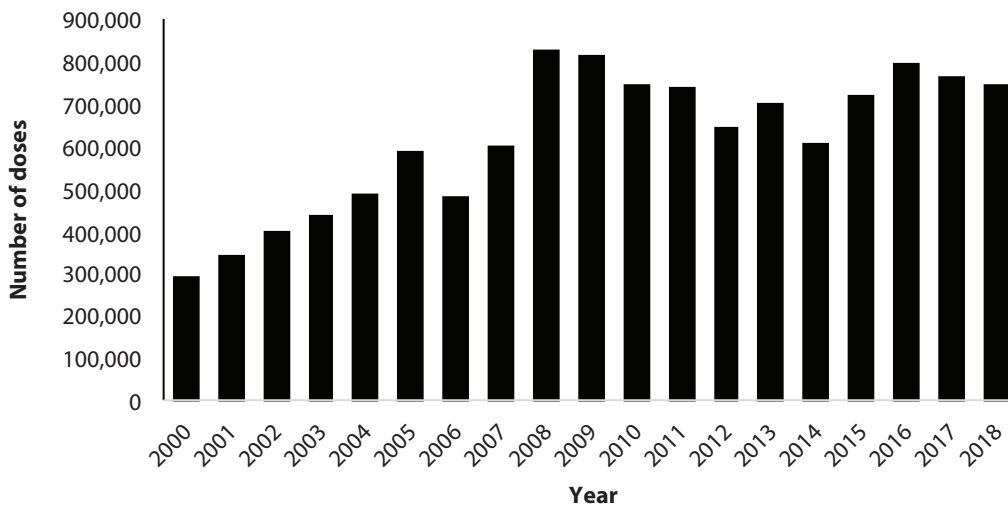


Figure 1. Trend in total respiratory viral vaccine usage in doses from 2000 through 2018.

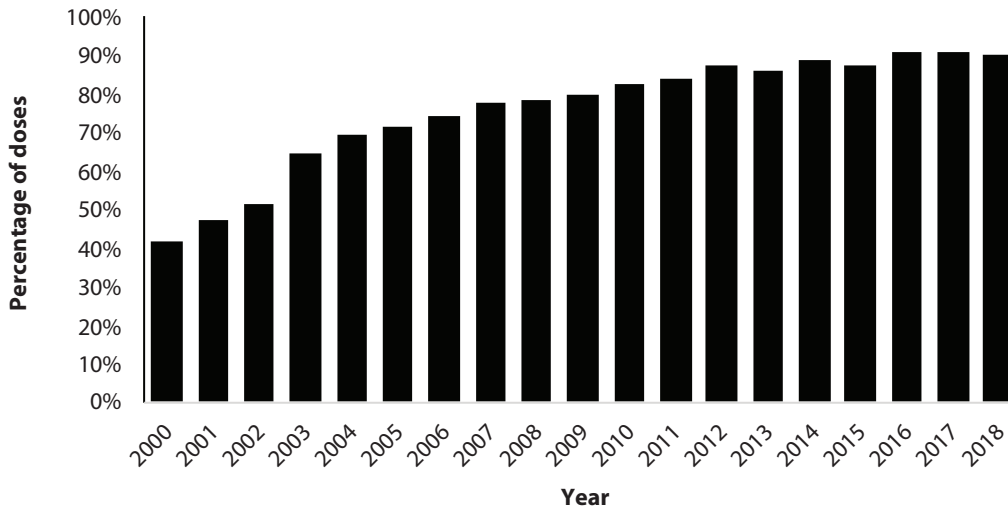


Figure 2. Trend in the percentage of doses of modified live respiratory viral vaccines.

*There was an increase ($P < 0.05$) in the use of 4- or 5-way respiratory viral vaccines that contained all modified live antigens from 2000 through 2018.

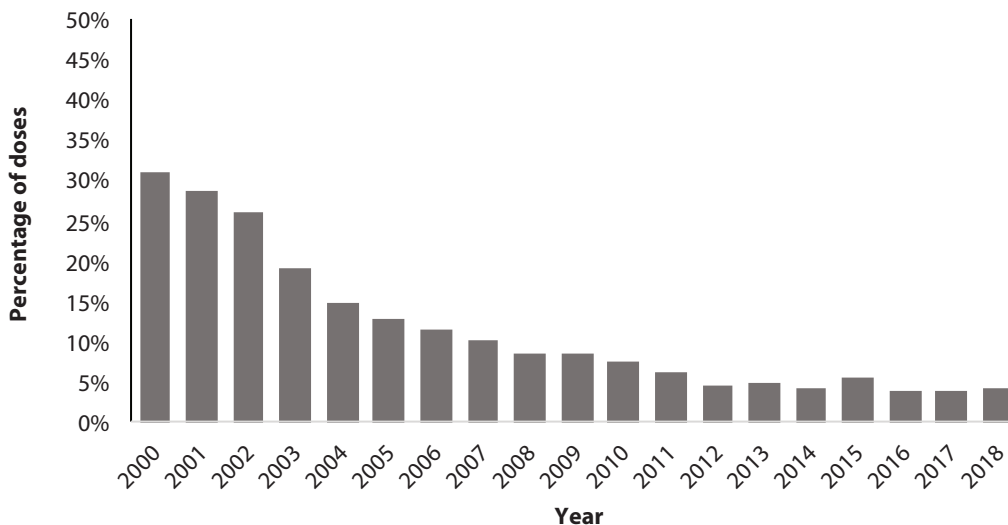


Figure 3. Trend in the percentage of doses of killed respiratory viral vaccines.
 *There was a decrease ($P < 0.05$) in the use of 4- or 5-way respiratory viral vaccines that contained all killed antigens from 2000 through 2018.

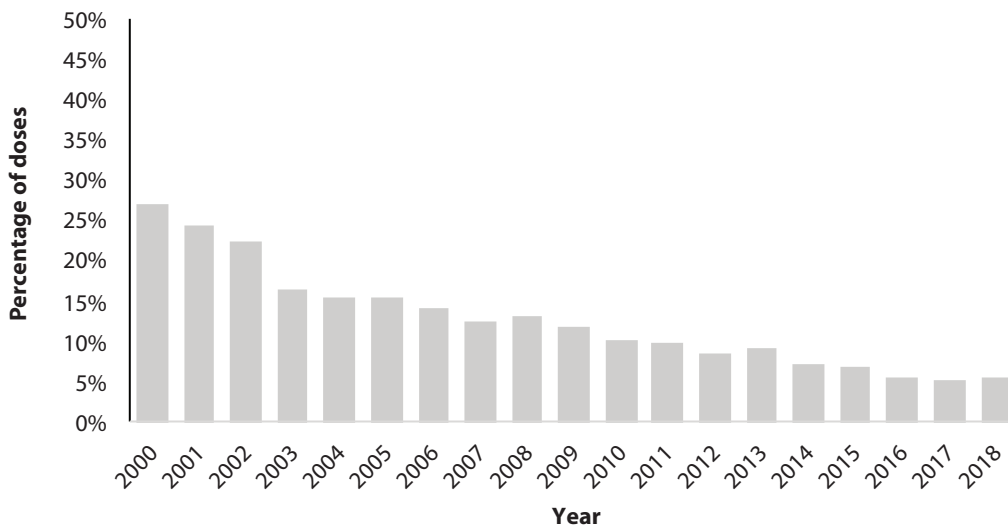


Figure 4. Trend in the percentage of doses of combination respiratory viral vaccines.
 *There was a decrease ($P < 0.05$) in the use of 4- or 5-way respiratory viral vaccines that contained a combination of modified live and killed antigens from 2000 through 2018.

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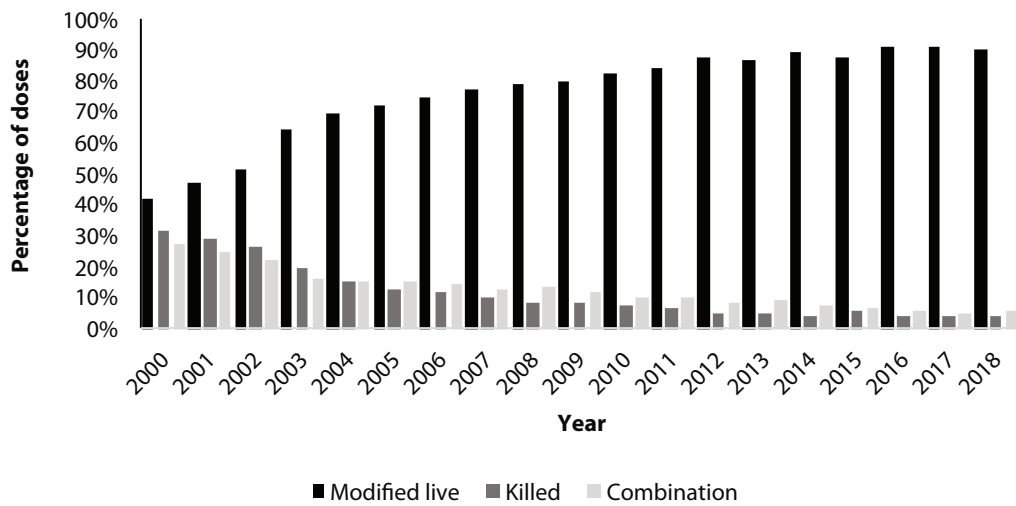


Figure 5. Trends in the percentage of doses of modified live, killed, and combination respiratory viral vaccines.