Review of the Michigan Upper Peninsula Bovine Viral Diarrhea Virus Eradication Project

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Objective—To evaluate the effects of a voluntary regional bovine viral diarrhea virus (BVDV) control project implemented in the Upper Peninsula of Michigan.

Design—Longitudinal study.

Sample—294 cattle producers and 11,917 cattle from the Upper Peninsula.

Procedures—Producer participation was assessed to determine the effectiveness of the project’s promotional and educational campaigns. Participating herds were screened for BVDV by real-time reverse transcriptase PCR assay on ear notch specimens from all newborn calves and cattle that did not calve (bulls and young stock) during the year of enrollment. Responses to a survey administered to producers 4 years after project initiation were evaluated to assess the project’s effect on BVDV management practices implemented by producers.

Results—294 of 495 (59%) known cattle producers in the Upper Peninsula participated in the project, and 11,917 cattle from 232 herds were tested for BVDV, of which 22 (0.18%) cattle from 9 (3.9%) herds were identified as PI with BVDV and euthanized or slaughtered. Of 140 survey respondents, 85 (61%) indicated they would test all new herd additions for BVDV, 83 (59%) would quarantine new herd additions for 30 days before introducing them to the main herd, and 81 (58%) would use the fact that their herd was free of cattle PI with BVDV for marketing purposes.

Conclusions and Clinical Relevance—Results indicated that the project enhanced producer knowledge about BVDV and led to changes in producer behavior regarding BVDV management. Stakeholder engagement was as critical to project success as was increased BVDV knowledge. (J Am Vet Med Assoc 2013;243:548–554)

Bovine viral diarrhea virus is associated with substantial economic losses in beef and dairy cattle operations worldwide. Losses result from BVDV-induced reproductive failure, hemorrhagic disorders, respiratory disease, and enteric disease. Additionally, BVDV-induced immunosuppression exacerbates concurrent infections, which enhances the pathogenicity of other common viral, mycoplasmal, and bacterial organisms. The deleterious effects of BVDV infections on meat and milk production have prompted several European countries to implement BVDV eradication programs. In the United States, the Academy of Veterinary Consultants, National Cattlemen’s Beef Association, and American Association of Bovine Practitioners have acknowledged the negative impact of BVDV on the cattle industry and the need for comprehensive BVDV control programs. To date, BVDV control programs in the United States are primarily initiated and maintained at the individual-herd level rather than at a regional or national level.

ABBREVIATIONS

BVDV  Bovine viral diarrhea virus
PI  Persistently infected
RT-PCR  Real-time reverse transcriptase PCR

At the herd level, BVDV control requires implementation of a program that includes producer education on BVDV transmission and the clinical signs of infected cattle, a biosecurity plan, removal of BVDV-carrier cattle, and, when necessary, a vaccination program. Control of BVDV at a regional level would likely require implementation of most, if not all, of the herd-level control practices on most herds within that region.

The key to control and eradication of BVDV is the elimination and prevention of cattle that are PI with BVDV, the primary carriers of the virus. Bovine viral diarrhea virus readily crosses the placental barrier and can infect the fetus of a susceptible pregnant cow. Infection of a fetus with a noncytopathic strain of BVD between approximately 1.5 and 4 months of gestation can result in the birth of a PI calf. All calves born to cows PI with BVDV are also PI with BVDV; however, most PI calves are the result of a fetal infection in a cow that was acutely and transiently infected rather than PI with BVDV. Fetal infection with a noncytopathic strain of either type 1 or type 2 BVDV can result in the birth of a PI calf, whereas fetal infection with a cytopathic strain of BVDV...
does not result in the birth of a PI calf.\textsuperscript{10–12} Outcomes for cattle PI with BVDV are variable and range from death at birth to survival to maturity. Many PI calves die early in life, but a few survive to reproduce.\textsuperscript{3} Mucosal disease, a severe manifestation of BVDV, develops when a calf PI with a noncytopathic strain of BVDV becomes superinfected with a cytopathic strain of BVDV, resulting in rapid destruction of the mucosal lining of the intestinal tract, severe diarrhea, and eventually death.\textsuperscript{13} Regardless of the clinical outcome for individual cattle that are PI with BVDV, these cattle are epidemiologically important because they are the primary source for BVDV transmission within and between herds.\textsuperscript{2–4} The prevalence of cattle PI with BVDV within a given population is generally < 0.5\% but can be higher in individual herds.\textsuperscript{14–16} Although cattle PI with BVDV are few in number, they are a constant threat to herd health and profitability because they typically shed large amounts of BVDV throughout their lives.\textsuperscript{2}

The mechanism by which transplacental transmission of BVDV occurs is unknown; however, it is known that even small amounts of BVDV in the bloodstream of the dam is sufficient to result in the birth of a PI calf that is immunotolerant to BVDV.\textsuperscript{17} Protection of a dam against clinical disease caused by BVDV (ie, vaccination) does not guarantee protection of the fetus against persistent infection if the dam becomes viremic during the susceptible period of gestation. Thus, prevention and control of BVDV require the elimination of cattle PI with BVDV.\textsuperscript{10}

In 2009, Ridpath and Fulton\textsuperscript{8} identified knowledge gaps that affect the development of comprehensive, state, regional, and national BVDV control or eradication programs in the United States. In that article,\textsuperscript{9} one of the primary gaps in knowledge discussed was whether cattle producers would regard time-limited investments in voluntary BVDV control measures as practical and cost-effective. The authors\textsuperscript{8} concluded that determining cattle producers’ attitudes toward adoption of voluntary BVDV control programs would require multiple research efforts directed at elucidating the economic effect of BVDV infections, establishing the efficacy of available diagnostic tests and vaccines, determining the effects of BVDV infections in wildlife, and defining the motivations and obstacles affecting producer compliance with BVDV control programs.

The objective of the study reported here was to demonstrate a workable model for the voluntary regional control of BVDV that could be adopted by other regions of the country and set the stage for the eventual eradication of BVDV. The project was conducted in the Upper Peninsula of Michigan because that region is relatively isolated geographically and cattle movement is limited, factors that minimized some of the challenges associated with BVDV control.\textsuperscript{9,18} The project was called the Michigan Upper Peninsula Bovine Viral Diarrhea Virus Eradication Project, and specific goals of the project were to develop a BVDV education program directed at producers, veterinarians, and allied industry personnel; initiate a testing strategy to identify cattle PI with BVDV so they could be removed from production; implement a biosecurity program to reduce the risk of BVDV introduction into a herd; initiate vaccination programs to reduce the risk of BVDV transmission; and longitudinally monitor program achievements. Project administrators included faculty from the Michigan State University College of Veterinary Medicine, educators from Michigan State University Extension, and personnel from the Michigan Department of Agriculture and the USDA.

**Materials and Methods**

**Project design**—All project protocols were approved by the Michigan State University Institutional Animal Care and Use Committee or Human Research Protection Program Institutional Review Board. The project was designed to be a voluntary program with low inputs and was divided into 2 phases. The first phase of the project consisted of recruitment of producers to participate and was primarily educational in nature. Educational efforts were designed to increase producer awareness of BVDV, infectious disease control in general, and biosecurity practices that are recognized as essential components of BVDV control and prevention initiatives.\textsuperscript{19} Those educational efforts were continued throughout the project, although they were more intense and frequent during participant recruitment early in the project than during the latter stages of the project. The second phase of the project was the identification and elimination of cattle PI with BVDV from participating herds.

**Recruitment of project participants**—The target audience for the project was cattle producers located in the Upper Peninsula of Michigan. The 2007 Census of Agriculture\textsuperscript{20} conducted by the National Agricultural Statistics Service estimated that there were 735 (585 beef and 150 dairy) cattle producers and 48,961 (31,335 [64\%] beef and 17,626 [36\%] dairy) cattle in the Upper Peninsula. All producers who could be identified and contacted were asked to participate in the project. Contact with producers was made by a variety of direct (educational meetings and mailings to producers on mailing lists maintained by the extension service) and indirect (word of mouth from other producers or industry stakeholders and articles in newspapers and other lay publications) methods.

Educational meetings began in the fall of 2007, and cattle producers as well as allied industry stakeholders (ie, feed sales and agriculture supply personnel, veterinarians, and livestock haulers) were invited to attend. Generally accepted management practices to reduce the risk of BVDV transmission were discussed and included topics such as testing herd additions for BVDV, isolation of herd additions for at least 21 days prior to introduction into the main herd, elimination of fence-line contact between the main herd and neighboring cattle, and acquisition of semen from suppliers who follow the guidelines of the National Association of Animal Breeders Certified Semen Services. Fifty-one meetings were held throughout the Upper Peninsula beginning in the western region and then proceeding to the eastern, north central, and south central regions (Figure 1). The western region has the fewest producers and cattle in the Upper Peninsula, and we intentionally selected that region as a pilot area for the project.
so that the educational materials presented during the meetings could be assessed and modified as necessary and the producer enrollment process streamlined as much as possible before introducing the project to the other 3 regions.

Other methods used to increase producer awareness of the project included publication of articles (n = 46) about various aspects of the project or BVDV infection and control in a monthly newsletter published by the extension service, which was distributed to 1,100 subscribers with agricultural interests in the Upper Peninsula. Articles featuring the project were also published in other lay publications. Marketing items that promoted the project were widely distributed throughout the Upper Peninsula and included project brochures and 3 X 5-inch refrigerator magnets. Producers who participated in the project received an 18-24-inch weatherproof farm sign that read, “BVDV Cooperator.” It was estimated that cattle producers in the Upper Peninsula received at least 19 pieces of direct mail regarding the project during the study. Study participants were cattle producers in the Upper Peninsula who volunteered to cooperate with project investigators.

Herd screening for BVDV—Project herds were screened for cattle PI with BVDV by use of RT-PCR assay on ear notch specimens. Project organizers supplied each participating herd with a 0.794-cm ear notcher to obtain the specimens, freezer bags, and prepaid shipping boxes with address labels for the appropriate regional extension office, which served as the sample collection site for all of the project herds located in a given region. Farm or extension personnel or herd veterinarians obtained an ear notch specimen from all calves (including those that were born dead) either immediately after birth or at weaning, the dams of all calves that were identified as PI with BVDV, all heifers and cows that did not calve, and any resident bulls. Ear notch specimens were individually placed in labeled freezer bags and stored on ice or in a refrigerator until they were delivered to a regional extension office, where they were then frozen. Each week, the regional extension offices would ship all of the collected specimens to a veterinary diagnostic laboratory.

The ear notch specimens were analyzed in pools (≤ 10 ear notches/pool) by means of an RT-PCR assay with an internal RNA control to monitor inhibition of the reaction to detect BVDV RNA. A validation panel as described was used to amplify both BVDV type 1 and 2 RNA. When positive results were obtained for a pool of ear notches, the ear notch specimens that made up that pool were individually retested by means of a gel-based RT-PCR assay.

For animals that had an ear notch specimen test positive for BVDV RNA with the RT-PCR assay, a blood sample was collected a minimum of 14 days after the ear notch specimen was obtained for virus isolation and subsequent genetic sequencing of the virus as described to confirm that the animal was PI with BVDV. All cattle PI with BVDV were euthanized or slaughtered as soon as possible after identification.

Sentinel serologic testing—A subset of project producers volunteered to have their herds rescreened for cattle PI with BVDV by the use of sentinel serologic testing as described. Briefly blood samples were obtained from 5 randomly selected calves ≥ 6 months old that had not been vaccinated for BVDV (ie, sentinels) from each calf-management group within the herd (ie, a group of calves that were managed separately from other groups of calves within the herd). Serum antibody titers against BVDV types 1 and 2 were determined by means of standard microtitration assay procedures. A herd was classified as having a positive sentinel serologic testing result (ie, likely to have cattle PI with BVDV) when 2 of 5 calves within a management group had serum antibody titers ≥ 128 against either BVDV type 1 or 2. A herd was classified as having a negative sentinel serologic testing result (ie, unlikely to have cattle PI with BVDV) when 4 of 5 calves within each management group evaluated had serum antibody titers ≤ 64 against both BVDV types 1 and 2.

Data collection and analysis—Herds were enrolled in the project between 2008 and 2010. Upon agreeing to participate in the project, producers completed an enrollment form, which was used to obtain data regarding herd size and existing herd management
procedures such as herd vaccination protocol, frequency and source of herd additions, and what biosecurity measures, if any, were routinely practiced. The enrollment forms were collected and maintained by one of the investigators (BBB), and a copy of each form was forwarded to the diagnostic laboratory to facilitate matching diagnostic test results with the correct herd. An epidemiological investigation was conducted for each animal that was confirmed to be PI with BVDV. Information obtained for each PI animal included source (raised or purchased), dam identification (when available), and exposure to other cattle. This information was used to attempt to determine how BVDV may have been introduced into the herd so that strategies to mitigate further BVDV exposure could be implemented.

In February 2011, a survey was mailed to 497 cattle producers in the Upper Peninsula, which included the 294 project participants, to assess the impact of the project. The survey consisted of 4 technically difficult questions about BVDV and multiple questions related to the implementation of management practices to control and prevent BVDV transmission that were intended to assess the producer’s knowledge. The survey was mailed to producers who did not participate in the project in an attempt to identify factors associated with nonparticipation. Survey respondents remained anonymous.

Originally, the project was to be evaluated for the 6-year period of 2008 to 2013; however, the project was terminated in 2012 because of a lack of ongoing BVDV surveillance. Descriptive statistics were used to summarize the proportion of cattle producers who participated in the project, the number of cattle tested, diagnostic test results, and results from the 2011 survey.

Results

Project participation—Four hundred ninety-five of the estimated 735 (67%) cattle producers in the Upper Peninsula of Michigan were identified and directly contacted by study investigators to participate in the project, and 294 of those 495 (59%) producers enrolled in the project between 2008 and 2010 (Table 1). When evaluated by region, producer participation was greatest in the western region (87/117 [74%]) followed by the eastern (62/103 [60%]), south central (96/167 [57%]), and north central (49/108 [45%]) regions. The majority (164/294 [56%]) of producers enrolled in the project during 2008, whereas 26% (77/294) and 18% (53/294) of producers enrolled during 2009 and 2010, respectively. Reasons for not participating in the project were provided by 199 of the remaining 201 producers and varied; however, the most frequent reasons given for not participating in the project were that the producer had no interest in participating in any kind of project and the producer did not foresee any personal benefit from participating in the project.

Of the 294 participating producers, 156 classified their herds as beef, 52 classified their herds as dairy, 6 classified their herds as mixed (ie, contained both dairy and beef animals), and 80 did not provide a herd classification. These herds represented 26,148 (53%) cattle in the Upper Peninsula of Michigan, and 84% (3,814/4,551), 54% (6,564/12,210), 49% (4,363/8,817), and 49% (12,052/24,596) of the cattle in the western, eastern, north central, and south central regions, respectively (Table 1). The project herds consisted of 7,262 beef cattle, 8,469 dairy cattle, and 10,417 other cattle (ie, dual-purpose beef and dairy cattle, show cattle, or cattle raised for purposes other than the production of meat or milk).

Herd screening for BVDV—Of the 294 producers who participated in the project, 232 (79%) submitted ear notch specimens for evaluation for BVDV RNA with the RT-PCR assay. A total of 17,917 ear notch specimens were assayed, of which 6,334, 6,676, 4,363, and 544 specimens were submitted in 2008, 2009, 2010, and 2011, respectively. Twenty-two cattle from 9 (4 beef and 5 dairy) herds had ear notches specimens that tested positive for BVDV RNA with the RT-PCR assay.
and were confirmed as PI with BVDV on the basis of BVDV being isolated from follow-up blood samples that were obtained a minimum of 14 days after the ear notch specimens.

Of the 4 beef herds that had cattle PI with BVDV, 1 had 4 cattle PI with BVDV, 1 had 3 cattle PI with BVDV, and 2 each had 1 animal PI with BVDV. Of the 5 dairy herds that had cattle PI with BVDV, 1 had 6 cattle PI with BVDV, 1 had 4 cattle PI with BVDV, and 3 each had 1 animal PI with BVDV. The original source of cattle PI with BVDV was not definitively identified for any of the 9 herds. All 4 beef herds that had PI cattle had exhibited cattle at a regional fair where 2 subsequently died; these cattle were identified as PI with BVDV on the basis of postmortem diagnostic test results. Two of the beef herds also had a history of purchasing cattle without screening them or the calves they were carrying at the time of purchase for BVDV. The 5 dairy herds with cattle PI with BVDV ranged in size from 20 to >1,000 cows. Four of the dairy herds likely purchased cows that were PI with BVDV or carrying calves that were PI with BVDV. The remaining dairy (approx 50 cows) had not purchased or exhibited cattle for 13 years prior to screening the herd for BVDV; however, bred heifers from that herd had been commingled with a neighbor's herd approximately 6 years earlier, and one of those bred heifers subsequently gave birth to twin heifers, both of which were PI with BVDV.

Sentinel serologic testing—Thirty-six (34 beef, 1 dairy, and 1 mixed) herds volunteered to have their herds screened for BVDV with sentinel serologic testing in addition to RT-PCR assay on ear notch specimens. Serum antibody titers against both type 1 and 2 BVDV were analyzed for 235 cattle in 47 management groups, of which only 1 management group had positive sentinel serologic testing results (ie, at least 2/5 calves had serum antibody titers ≥128 against BVDV type 1 or 2). The herd that had the management group with the positive serologic testing result had 3 calves identified as PI with BVDV. No cattle PI with BVDV were identified in the herds that had management groups with negative serologic testing results. Thus, for determining whether a herd contained cattle PI with BVDV, there was 100% agreement between the sentinel serologic testing strategy and the ear notch screening method used.

2011 survey results—One hundred forty of the 497 (28%) surveys mailed in February 2011 were returned, of which 35 (25%) were from the western region, 22 (16%) were from the eastern region, 26 (19%) were from the north central region, and 57 (41%) were from the south central region. The distribution of respondents by region was similar to the distribution of cattle producers (western, 24%; eastern, 21%; north central, 22%; and south central, 34%) by region.

Survey results indicated that prior to initiation of the project, 45% (63/140) of the respondents knew very little about BVDV; 49% (69/140) vaccinated their cattle against BVDV annually, 30% (42/140) never vaccinated their cattle, and 94% (132/140) had not had a serious disease problem in their herds during the previous 10 years. For 3 of the 4 technically difficult questions about BVDV, the proportion of respondents that provided the correct answer ranged from 78% to 93%; however, the proportion of respondents that correctly answered the remaining technically difficult question was only 54%. Regarding the prevalence of cattle PI with BVDV in the Upper Peninsula, 24% (34/140) of respondents believed it was similar to that in other regions of the United States and 63% (88/140) believed BVDV was a small problem in the region. The articles on BVDV management that were published in monthly extension newsletters and other lay publications were regarded as very or somewhat valuable by 47% (66/140) and 44% (62/140) of respondents, respectively. Respondents also indicated that they knew a lot (49/140 [35%]) or some (71/140 [51%]) more about disease management as a result of the educational portion of the project. When asked how the project would affect future decisions regarding herd management, 61% (85/140) of respondents indicated that they would test all new herd additions for BVDV, 59% (83/140) planned to quarantine all new herd additions for 30 days prior to introducing those cattle into the main herd, 66% (92/140) planned to review and update their herd vaccination protocols, and 58% (81/140) were going to use the fact that their herd did not contain any cattle PI with BVDV as part of their marketing program.

Twenty-two of the 140 (16%) survey respondents did not participate in the project. The possible reasons for not participating in the project included “Project would be too much work,” “Do not believe BVDV is a problem,” “Did not know about the project,” “Did not understand the project,” and “Other,” with space provided to describe or expand on their answers. The most frequent response was “Other,” and there was no subjective trend evident in the written comments.

Discussion

The present report describes results for a BVDV eradication project conducted in the Upper Peninsula of Michigan, in which 59% of the region’s cattle producers who were identified and contacted participated. Unfortunately, producer interest in the eradication project and continued BVDV surveillance waned 3 to 4 years after the project’s initiation, so the project was discontinued and it is now regarded as a BVDV control project. At the onset of the project, the ultimate goal was to screen all cattle in the Upper Peninsula for BVDV so that cattle PI with BVDV could be identified and removed from production (ie, euthanized or slaughtered). Admittedly, that goal was idealistic for a voluntary program; however, postproject analysis identified several aspects of the project where adjustments could have been made that might have resulted in the participation of a larger number of producers.

An unanticipated and major obstacle for recruitment of cattle producers into the project was the unavailability of a complete and accurate list of all cattle producers in the Upper Peninsula. With the exception of licensing records for dairy producers who sold milk commercially, there was no publicly accessible list of cattle producer names and addresses in Michigan. Thus, project awareness was initially made through public communication channels such as newsletters, magazine articles, and re-
animal disease management is as much about working important things we learned from this project was that continued for the duration of the project to maintain project. Also, promotion and communication must be and approved by stakeholders prior to initiation of the project within a realistic period should be written number of people and supplies necessary to complete for a longer period of time. A plan that specifies the implementation of a voluntary disease eradication proj-

ducer interest waned over time. phase of the project were unable to be sustained and pro-

tions in 2008 to economic concerns in 2009 and 2010 that occurred from generally favorable economic condi-

tion an extremely small percentage (ie, < 1%) of cattle PI with BVDV. Another factor that likely contributed to the decline in producer interest in the project was the change that occurred from generally favorable economic condi-

tions in 2008 to economic concerns in 2009 and 2010 that had detrimental effects on cattle producers in general and dairy producers in particular. Regardless of the reasons, the educational and marketing efforts during the initial phase of the project were unable to be sustained and pro-
ducer interest waned over time.

Our recommendation to ensure the successful im-
plementation of a voluntary disease eradication proj-

ect is to recruit sufficient human resources to manage the workload from the onset of the project, rather than trying to spread the workload out over fewer people for a longer period of time. A plan that specifies the number of people and supplies necessary to complete the project within a realistic period should be written and approved by stakeholders prior to initiation of the project. Also, promotion and communication must be continued for the duration of the project to maintain producer interest and enthusiasm. One of the most im-
portant things we learned from this project was that animal disease management is as much about working with cattle producers as it is about the biological inter-

action between the animal and pathogen.

The strategy (ie, RT-PCR assay on ear notch speci-

mens) used to screen herds for the presence of cattle PI with BVDV in the present project is certainly not the only one that can be used. In many European countries, disease eradication programs often rely on the detection of antibodies against a specific pathogen within individual-animal or pooled samples to detect herds that contain infected animals. In the United States, however, widespread use of BVDV vaccines makes the use of antibody detection methods to screen herds for cattle PI with BVDV impractical except in special cir-

stances. In this project, the cost of screening the entire herd for BVDV was minimized by obtaining ear notch specimens only from calves as they were born, the dams of calves that were PI with BVDV, and any other cattle in the herd that did not calve. The BVDV status of a calf can be used to infer the BVDV status of its dam; a calf that is PI with BVDV might have a dam that is PI with BVDV, whereas a calf that is not PI with BVDV will always have a dam that is not PI with BVDV. This strategy is applicable for both beef and dairy herds; however, its use is more convenient in beef herds where calving is typically confined to a short period and all cattle can be tested in a timely manner, compared with dairy herds in which calving generally occurs continuously throughout the year. Also, use of this strategy requires that, in addition to newborn calves, all cattle that did not calve (bulls, weaned heifers, and cows that did not become pregnant) must be tested for BVDV to definitively determine whether a herd contains cattle PI with BVDV.

In the present project, we used a sentinel serologic testing strategy to rescreen a subset of herds that had already been screened for BVDV by means of individual animal ear notch testing. The sentinel serologic testing results suggested that the method was accurate for predicting the presence or absence of cattle PI with BVDV within a herd and thereby supported the results of other studies. Long-term evaluation of the use of sentinel serologic testing as a low-cost surveillance method for the detection of herds with cattle PI with BVDV should be performed for herds with a variety of BVDV management programs in various regions of the country.

Results of the present project indicated that the prevalence of cattle PI with BVDV (0.12%) and herds containing cattle PI with BVDV (3.9%) in the Upper Peninsula was similar to those in other regions of the country despite the fact that the Upper Peninsula is geographically isolated and there is minimal movement of cattle into or out of the region. Moreover, the fact that 94% of respondents to the 2011 survey reported that they had not had a serious disease problem in their herds within the previous 10 years suggested that cattle herds in the Upper Peninsula were generally healthy and disease problems were infrequent.

Responses to the 2011 survey suggested that the educational phase of the project had relevant effects on cattle producers’ knowledge about infectious disease management and control practices. Most importantly, respondents planned to pay more attention to biosecurity practices (ie, screen herd additions for BVDV and
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1. Baker JC. The clinical manifestations of bovine viral diarrhea

d. Provided by Dr. Julia Ridpath, National Animal Disease Center,

a. Ag Connections, Michigan State University Extension, East Lan-
sing, Mich.

b. Lay publications included the following: Cattle Call and Michi-
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Magazine, Michigan Agricultural Experiment Station; Perspec-
tives Magazine, College of Veterinary Medicine, Michigan State
University, East Lansing, Mich; and Hoards Dairyman, Fort At-
kinson, Wis.

c. Diagnostic Center for Population and Animal Health, Michigan
State University, East Lansing, Mich.

d. Provided by Dr. Julia Ridpath, National Animal Disease Center,

To our knowledge, the Michigan Upper Peninsula Bovine Viral Diarrhea Virus Eradication Project was the first large-scale attempt at regional BVDV eradica-
tion in the United States. The project was designed as a
low-input voluntary program with the ultimate goal
of eliminating all cattle PI with BVDV from the Upper
Peninsula. This project could then be used as a model
for BVDV eradication in other regions of the country.
Unfortunately, during the project, many obstacles were
encountered and producer interest waned such that the
project had to be abandoned, and the project is now considered
a BVDV control program. Nevertheless, the important
lessons learned from this project will be valuable con-
siderations in the design and implementation of other
BVDV or disease eradication programs.

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