A Less-palpation Dairy Practice? Rediscovering Theriogenology

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Abstract

West Michigan Veterinary Service began offering clients the in-house BioPRYN laboratory test for pregnancy diagnosis in February 2008. Previous, the WMVS veterinarians utilized the test in individual cases plagued with uterine adhesions, peri-rectal abscesses or other abnormalities which made trans-rectal examination of the uterus too risky or impossible. It became obvious that the test had the potential for a much broader application and WMVS needed to address the following question: How can we utilize the test on a herd program basis? A four-month study was conducted on a 1,200-cow Michigan dairy to discover the best practical application of the test within the context of our reproduction program and its protocols. A comprehensive reproductive program was the result of the study, which led to a dramatic increase in conception rates. The conclusion of the study left one emotion-packed question unanswered: Now, what do **I** do?

Résumé

En février 2008, le service vétérinaire de l'Ouest du Michigan (West Michigan Veterinary Service, WMVS) commençait à offrir à la ferme de ses clients le test de gestation BioPRYN. Auparavant, les vétérinaires du WMVS avaient recours au test dans des fermes aux prises avec des problèmes d'adhérence de l'utérus, d'abcès périrectal ou d'autres anormalités qui rendent l'examen transrectal de l'utérus trop risqué ou impossible. Il est apparu évident que ce test avait un potentiel d'application beaucoup plus étendu, et les vétérinaires du WMVS ont dû répondre à la question suivante: «Comment utiliser ce test dans un programme réel de gestion de troupeau? » Nous avons effectué une étude de quatre mois dans une ferme laitière du Michigan de 1 200 vaches pour rechercher la meilleure application pratique du test, dans le cadre de notre programme reproductif et de ses protocoles. Cela nous a permis d'élaborer un programme reproductif complet, qui permet un taux ou de conception beaucoup plus élevé. À la conclusion de cette étude, il nous reste à répondre à une question chargée d'émotion: «Et maintenant, qu'est-ce que je fais?»

The majority of the dairy veterinarian's day is typically spent completing rectal pregnancy exams. In a traditional dairy practice, veterinary practitioners enjoy the art of pregnancy diagnosis by trans-rectal palpation of the uterus. The introduction of ELISA technology for the early detection of pregnancy in cattle (BioPRYN Biotracking, LLC) finds the bovine practitioner at a crossroad. Will we continue down the palpation trail exclusively or include the blood test in our "black bag" of clinical reproduction practice?

BioPRYN can detect the presence of a protein called pregnancy specific protein B (PSPB) found in a pregnant bovine's blood as early as 30 days after insemination. Evaluation of the test has shown it to have an overall accuracy of 97%. The test is over 99% accurate at detecting pregnant animals, and 95% accurate at detecting open animals. The false-positive results are most likely due to early embryonic death.

The adaptation and implementation of the BioPRYN test to a reproductive management program must be preceded by a positive answer to the following question: Is there merit for the dairy industry to use the technology, and does the test have a positive economic impact on the individual farm? The primary factor in the recommendation of the test's utilization by a veterinarian, however, is often emotion. Adaptation and implementation failure of the BioPRYN test technology to a farm's reproduction program has a least two major reasons. The first is worry over the emotion-charged query "What will I do if I don't palpate cows?" and the second is the inability or unwillingness of a herd veterinarian to add the new technology into his reproductive management toolbox.

The emotional upheaval the bovine practitioner experiences as he considers the addition of the BioPRYN test to his practice is incontrovertible. Most of the turmoil is due to a loss of identity, if that identity is one of being reduced to a mere cow-palpating technician. Another aspect of this emotional turmoil is a concern surrounding financial security. Cow vets love to sleeve cows! Palpation fills our appointment books with joy and income! With open appointment blocks expanding, veterinarians are left with a simple question at the crux of the issue, "Now, what do I do?"

It is interesting to note that the veterinary profession has been less concerned over the use of unlicensed technicians for pregnancy/pathology diagnosis by farms and even veterinary practices than the controversy generated by the development and implementation of the BioPRYN technology. The BioPRYN test has provided opportunity for the dairy farm to increase reproductive efficiency and for the bovine practitioner to reintroduce himself as the most highly trusted and valuable consulting professional on farms demanding progressive advice.

The use of the BioPRYN test, within the context of a comprehensive reproductive management program, has encouraged the WMVS veterinarians to practice applied, clinical theriogenology. The success of our reproductive management protocols has generated service income for our clinic, and that increase is a direct result of the test's use. Available appointment time is now spent in reproductive program monitoring and evaluation as well as other important areas of health management. The WMVS approach to reproductive management programming centers around the need to identify the OPEN cow. The satisfaction in viewing a list of pregnant cows is unmistakable, but it is more important to find one open cow. This provides another opportunity for pregnancy with the least amount of days involved and the greatest probability for conception. To accomplish this, our "toolbox" contains a few tools and an instruction manual to help ensure success.

WMVS divides clinical theriogenology into two general areas. The first is mastering the science of reproduction. The science includes the physiology of achieving pregnancy and/or the pathology causing infertility. It also involves the general health requirements necessary for highly productive animals, including welfare and comfort concerns, proper nutrition, disease prevention, and proper immune function. Knowledge of the bovine estrus cycle and current information on hormonal manipulation of the cycle to achieve pregnancy are imperative if an above-average conception rate is to be achieved.

The science aspect also includes the farm reproductive recipe or protocol. All eligible cows are included in the protocol and will be divided into cohorts based on days fresh. The voluntary waiting period (VWP) is derived by looking at the following two Dairy Herd Improvement Association (DHIA) indices: days-in-milk (DIM) and percent of the herd pregnant (open cows eligible to be bred). As a farm begins to experience reproductive success, the calving interval and average pounds of milk at dry-off are also monitored. The usual starting point for farms experiencing average reproductive results is a VWP of 60 days.

Protocol development is dependent on DIM and number of available open cows. If the farm needs to be concerned about open days and it has a large number of eligible cows, a protocol that minimizes days to a service but has a decreased conception rate may give them enough numbers of pregnancies per cohort. However, if a farm has relatively low days open and a minimal number of cows to be bred, a protocol which maximizes conception rate is preferable. Continuous protocol monitoring is necessary to determine its success. In order to evaluate this success, one must judge it against a set of standards and employ analytical programs like Dr. David Galligan's Visual Analytics and the ABS Economic Impact Calculator which help to determine if a protocol change is economically advisable. The evidence-based standards used by WMVS are those published for the timed artificial insemination (TAI) protocols and corroborated by target goals reached and exceeded by our own clients. The data collected is stored and evaluated weekly. Table 1 shows an example of reproductive stats collected on weekly cohorts at a typical 700-cow dairy in western Michigan.

The stats for the dairy on 5/29/09 are as follows:

- DIM: 184
- % herd pregnant, total herd: 55% or 439 preg/793 cows
- Eligible cows pregnant: 63% or 439 preg/696 cows
- 97 cows are not eligible (prior to 60 DIM)

The reproduction protocol for the dairy was as follows:

- VWP is 60 days.
- G-6-G Ovsynch TAI begins at 54+ days.
- First services are G-6-G Ovsynch.
- Subsequent services are Ovsynch TAI (no pre-pregnancy information GnRH) or visual estrus breeding. (Six-day PGF injection on Ovsynch, not seven-day.)
- Open/pregnant information is obtained by BioPRYN test at 30 (P1) and 60 (P2) days.
- Issues of infertility are examined by trans-rectal and ultrasound examination.
- Problem (infertile) cows are those open after third insemination.

The goal is to maximize the first-service conception rate. Our target for first-service conception rate (CR) is 60%. The random (no pre-synch) Ovsynch target is 40% CR, and the goal for cows bred on estrus detection is 20% CR. If the farm underperforms as per our target goals, the following causes of poor reproductive performance are investigated:

1. Protocol compliance.
2. Dry/transition/fresh cow issues.
3. Individual cow infertility.

Lack of protocol compliance is the greatest contributor to poor reproductive performance when all other health and production parameters are in order.

Table 1. Rolling Acres Dairy Farm, TAI Repro data. Conception Rates
RAC: Herd #:

DATE	TTL COHORT	TTL %	G-6G-6	G-6 %	G-6-G	G-%	OVSYNCH	O-%	ESTRUS	E-%
May ttl	**78 of 167**	**46.7**			**39 of 61**	**63.9**	**20 of 43**	**46.5**	**19 of 63**	**30.2**
5/27/2009	20 of 45	43			9 of 15	60	6 of 13	46	5 of 17	29
5/20/2009	19 of 40	47			9 of 14	64	5 of 11	45	5 of 15	33
5/13/2009	24 of 45	53			12 of 18	66	6 of 11	54	6 of 16	37
5/6/2009	15 of 37	40			9 of 14	60	3 of 8	38	3 of 15	20
Apr ttl	**74 of 173**	**42.8**			**40 of 66 (68)**	**61 (59)**	**21 of 48**	**43.8**	**13 of 57**	**22.8**
4/29/2009	12 of 30	40			7 of 12	59	3 of 8	37	2 of 10	20
4/21/2009	16 of 38	42			8 of 13	61	5 of 12	42	3 of 13	23
4/15/2009	13 of 31	42			8 of 15	53	3 of 7	43	2 of 9	22
4/8/2009	14 of 32	43			6 of 9 (11)	67 (55)	5 of 10	50	3 of 11	27
4/1/2009	19 of 42	45			11 of 17	64	5 of 11	45	3 of 14	22
Mar ttl	**55 of 127**	**43.3**	**4 of 8**	**50**	**27 of 44**	**61.4**	**14 of 34**	**41.2**	**11 of 41**	**26.8**
3/25/2009	10 of 25	40	4 of 8	50	5 of 10	50			1 of 7	15
3/18/2009	13 of 29	44			9 of 14	64	4 of 10	40	1 of 5	20
3/11/2009	16 of 38	42			5 of 8	63	6 of 14	42	5 of 16	31
3/4/2009	16 of 35	45			8 of 12	66	4 of 10	40	4 of 13	30
Feb ttl	**73 of 157**	**46.5**			**25 of 39**	**64.1**	**24 of 47**	**51**	**24 of 71**	**33.8**
2/25/2009	19 of 46	41			8 of 13	61	6 of 12	50	5 of 21	24
2/18/2009	19 of 38	50			7 of 11	64	5 of 10	50	7 of 17	41
2/11/2009	7 of 18	39			3 of 5	60	2 of 5	40	2 of 8	25
2/4/2009	28 of 55	51			7 of 10	70	11 of 20	55	10 of 25	40
Jan ttl	**70 of 151**	**46.3**			**24 of 37**	**64.9**	**21 of 42**	**50**	**25 of 72**	**34.7**
1/27/2009	27 of 52	52			8 of 11	69	4 of 7	57	15 of 34	44
1/21/2009	13/34	38%			5 of 8	62	6 of 14	43	2 of 12	17
1/14/2009	10 of 28	36			4 of 8	50	4 of 9	45	2 of 11	19
1/7/2009	20 of 37	54			7 of 10	70	7 of 12	58	6 of 15	40
Dec ttl	**93 of 215**	**43.3**			**34 of 58**	**58.6**	**29 of 66**	**43.9**	**30 of 95**	**31.6**
12/31/2008	9 of 23	39			4 of 8	50	4 of 8	50	1 of 7	15
12/24/2008	26 of 58	45			12 of 20	60	3 of 10	30	11 of 28	39
12/17/2008	19 of 42	45			9 of 15	60	6 of 14	42	4 of 13	30
12/10/2008	13 of 40	32			4 of 7	57	5 of 12	42	4 of 20	20
12/3/2008	26 of 52	50			5 of 8	62	11 of 22	50	10 of 27	45
Nov ttl	**58 of 151**	**38.4**			**19 of 32**	**59.4**	**24 of 61**	**39.3**	**15 of 58**	**25.9**
11/26/2008	15 of 35	43			5 of 8	62	7 of 17	41	3 of 10	30
11/19/2008	17 of 45	38			5 of 9	55	7 of 17	41	5 of 19	26
11/12/2008	14 of 40	35			5 of 8	62	5 of 15	33	4 of 17	23
11/5/2008	12 of 31	38			4 of 7	55	5 of 12	42	3 of 12	25
Oct ttl	**59 of 158**	**37.3**			**18 of 29**	**62.1**	**21 of 54**	**38.9**	**20 of 75**	**26.7**

The protocol listed for an individual farm is not a suggestion; rather, it is a specific program to be followed to the letter!

Metabolic function is the next area to evaluate closely. The dry cow diet and housing set the stage for later reproductive success. The cow that freshens easily, cleans, and achieves and sustains peak milk production is a cow that will have the best chance for a successful first service. WMVS emphasizes first-service conception rate because it is the best indicator of exceptional cow health and management.

Individual cow infertility is the area of lesser concern statistically. If the target goals are met, services per conception are under control. However, dairymen typically know who these infertile individuals are and the concern over her open status is real! This is an opportunity for the veterinarian with an interest in theriogenology. A complete physical exam, vaginal speculum exam, and reproductive tract ultrasound exam are performed to determine if pathology exists and a plan of action is prescribed. This is traditional veterinary practice and its value should not be discounted.

When the veterinarian promotes a philosophical shift in reproductive thought and action from pregnancy rates to open cow rates, he has an opportunity to positively affect the dairy. The key issue is to find the OPEN cow as soon as possible. The dairyman purchasing reproductive information has three method choices. The standard method is a trans-rectal examination of the uterus for the amniotic vesicle or a membrane slip as early as 30 days performed by a very experienced and careful licensed veterinarian. The second method is the trans-rectal exam with ultrasound. This exam can be done in the 25-day range by a competent ultrasonographer using good equipment. This method has the added advantage of sizing (staging) ovarian structures by the veterinarian who has a complete understanding of the estrus cycle and reproductive physiology. Ovarian, uterine, and cervical pathology can also be diagnosed with a comprehensive ultrasound exam. The final method of open/pregnant cow diagnosis is the BioPRYN laboratory test. This method has the advantage of early detection (30 days), is minimally invasive (2cc blood), less labor- and time-intensive, provides accurate information at a lower cost to the dairy, and provides an added intangible positive psychological advantage over traditional pregnancy detection methods.

An interesting phenomenon occurs on our dairies soon after implementing the reproduction program which includes the use of the BioPRYN test. The conception rate numbers improve, often dramatically. Typically, these farms have been following published ovulation synchrony programs (science of reproduction) with no better than average success. The improvement in conception rates is centered in the psychology of the protocol management. Management of the details is really mastery of the art of reproduction. This art is the second area of clinical theriogenology practice emphasized by WMVS veterinarians.

Reproductive program success is primarily dependent on the art of protocol application. We have found that specific attention to protocol compliance is the critical variable. There is a new sense of excitement and anticipation as the dairymen receive test results. There is a real sense of accomplishment and satisfaction when he sees progress. The feelings of depression over poor reproductive performance are replaced by the positive attitude of investigation and discovery. The art of a successful reproductive practice for a veterinarian then, is managing human behavior!

The BioPRYN test is a tool that provides reproductive status information. This tool provides accurate information in a timely manner. Its use allows the herd veterinarian time to provide consulting investigation and advice in all areas of production medicine and surgery. The veterinarian plays a unique role in that he is the only professional trained to understand the proper use of all the tools in the reproductive toolbox. He enjoys the status as the trusted advisor willing to adapt to new technology and innovative thought. Mark Twain said, "Even if you're on the right track, you'll get run over if you just sit there!" Bovine practitioners must continue to demonstrate innovative leadership in the implementation of new technology to supply farms with value-added services aimed at augmenting the farmer's market-competitive position.

Twain also said, "In order to succeed, you must know what you're doing (science), like what you're doing, and believe in what you're doing (art)." Veterinarians are approaching a decision-making crossroad. In today's economic climate, progressive dairymen depend on a progressive veterinarian! Are you an innovator, an early adaptor, a late adaptor or ... obsolete?

Acknowledgements

The author thanks Merle Coffey from Rolling Acres Dairy Farm in Allegan, Michigan and Wendell VanGunst and Johan Vosloo of Country Dairy in New Era, Michigan. These dairymen are innovative thinkers, and working with them is a delight. He also thanks his partners at West Michigan Veterinary Service for participating wholeheartedly in this adventure. The WMVS veterinarians especially express their gratitude to Hannah Groenink, LVT, the WMVS BioPRYN laboratory manager, and to Jodi Boersema, LVT for their dedication and commitment to this project.

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