

SPECIAL ELECTIVE ROTATIONS AS A MEANS OF TEACHING DAIRY PRODUCTION MEDICINE SKILLS TO VETERINARY STUDENTS

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INTRODUCTION

"Livestock production, like all of agriculture, is undergoing marked and pervasive structural changes which will profoundly change animal production practices and the kinds of veterinary services required by livestock industries. These industries desperately need veterinarians who can provide unbiased advice and services in the interconnected domain of production and health with decreasing need for veterinarians equipped only to address disease problems." (1) This statement from *Future Directions for Veterinary Medicine* recognizes the challenge presented to bovine practitioners today.

Bovine practitioners are responding to this challenge. Many dairy veterinarians are committing time, money, and energy to acquire skills for production medicine practice. Practitioner demand for training in non-traditional disciplines is reflected in the programming of this AABP convention. Pre-convention seminars include topics such as dairy records, farm finance, quantitative methods, computer applications, and nutrition management.

Many veterinary practices hope to hire new veterinarians who will bring production medicine skills to the practice. This expectation is understood by many veterinary schools, but satisfying the expectation is not a simple task.

Veterinary educators face two major issues today. *First, students enter veterinary school* with almost none of the animal husbandry background common to students of twenty-five years ago. Urban or suburban rearing is typical, and it is unusual to find a veterinary student who was raised on a working livestock farm. Therein lies a dilemma: the entering student has almost no understanding of animal agriculture, but the emerging veterinarian is expected to be a health and production consultant. The starting post and finish line are now further apart. In education jargon, the learning objectives have expanded. This introduces the second issue: the veterinary curriculum is already overcrowded with an expanding medical base. Committees are working to "reduce the core curriculum" in many schools. No matter how important we may believe our subject to be, proposals to introduce new courses into the required curricula are unlikely to succeed.

In 1989, a new Food Animal Production Medicine section was formed in the School of Veterinary Medicine at the University of Wisconsin-Madison. This section was given the task of developing and implementing a series of production medicine clinical rotations for fourth year veterinary students.

BEHAVIORAL OBJECTIVES

While the demand is for veterinarians prepared to offer "unbiased advice and services in the interconnected domain of production and health", our educational goals in the DVM program necessarily cannot be this open-ended. We have four primary teaching objectives. First, we want our students to be familiar with a commercial dairy farm environment, dairy

operators, and their animals. Second, we want them to understand that health and production problems can be addressed at a herd management level rather than at the individual cow level. Third, they should have mastered "entry level" production medicine skills. And fourth, we want them to have glimpsed a vision of a dairy veterinary service that includes herd management assistance programs.

CURRICULUM

With these objectives in mind, we evaluated opportunities for implementation. The fourth or senior year of the Wisconsin curriculum is composed entirely of one or two-week clinical rotations. Of 52 potential weeks, there are 26 weeks of required rotations. Among the required rotations are four weeks of large animal medicine, two weeks of large animal surgery, two weeks of theriogenology, and two weeks in large animal ambulatory practice. The ambulatory rotation is conducted entirely through 19 private practices located in southern Wisconsin (2).

The remainder of the senior year allows for elective clinical rotations. We defined what we believe to be "entry level" production medicine skills and organized them into three elective clinical rotations. The two-week courses are titled PM1: Dairy Herd Problem Identification, PM2: Mastitis Problem Solving, and PM3: Applied Dairy Nutrition. All of the courses are centered upon dairy farm visits and investigations of herd problems.

PM1: Dairy Herd Problem Identification

The stated objective of this course is to teach students to rank production limiting problems on an individual dairy farm. The course introduces students to concepts of production medicine and to the terminology of machines, structures, and management practices. It is a prerequisite to the other rotations. The content of the course includes Dairy Herd Improvement (DHI) record analysis, economic assessments of herd summary indicators, computerized health and production records, dairy genetics, ventilation and stall design. The main vehicle of the course is a "Form to Develop Goals for Production Medicine Programs" (3).

A different dairy farm is visited each day during the afternoon of the first week. Stations are organized and assignments are given to explore dairy facilities and milking systems, replacement management, feeding systems, and on-farm records. Mornings are spent in workshops in the School of Veterinary Medicine, Wisconsin DHI Center, and Agricultural Engineering labs on campus. Didactic sessions are not usually found in clinical rotations, but are necessary because students do not receive preparatory dairy herd management training in the preclinical curriculum.

The second week begins with computer labs and an introduction to computerized dairy herd record keeping (4). Study herds are assigned from the previous weeks farms. Students assigned a particular herd analyze records from the farm and revisit the dairy. The remaining days are spent in analysis, report writing and presentation.

This course is managed so that student confidence is enhanced. For students in the strange environment of a dairy farm, it is important that the instructors are supportive of the students' ability to observe, interpret and learn. There are no reprimands for growing up in a suburb. Reprimands are given only for low curiosity levels and sloppy thinking. In this course, the students win and their self-esteem goes up!

PM2: Mastitis Problem Solving

The mastitis problem solving course is based upon a similar combination of workshops and farm investigations. The course emphasizes the clinical reasoning process of identifying the problems, formulating hypotheses, and testing the hypotheses through data collection and analysis. The initial problem definition workshop begins with somatic cell information, bulk tank milk cultures, and rates of clinical cases from two study herds. Data are reviewed and an investigative strategy is planned. Farm visits are made to collect milk samples from individual cows and the bulk tank. These samples are frozen until the second week. During the last two days of the first week, training in milking system analysis and milking management is conducted at the Boumatic Training Center of Dairy Equipment Company and on an area farm.

Working in groups during the second week, the students set up and read the culture plates. They revisit the problem herds to evaluate the milking system, observe milking practices, and assess the dairy environment. In the last two days, students analyze the data, evaluate hypotheses, write and present an investigative report. Any recommendations made to correct the problem will have been evaluated using partial budget techniques.

PM3: Applied Dairy Nutrition

The applied dairy nutrition course (5) focuses upon "feedbunk management". As the old saying goes, every dairy ration assumes at least three forms: the ration formulated, the ration fed, and the ration eaten. This course emphasizes what is fed and what is eaten. The course does not teach ration formulation.

Four farms are visited in the two week period. Students gather information about health and production problems, feeding management history, and feeding data. This will include feedstuff weights, feeding schedules, bunk length, feed inventories, feed tags and recipes. Feedstuffs are collected and evaluated for physical characteristics and dry matter. Nutrient analysis will have been requested ahead of the visit.

This course is structured differently than the other rotations. It is taught in what is called a "problem-based learning" format. Following each study farm visit, students meet with the instructors for "tutor" sessions. During these sessions, three lists are developed: a problem list, a hypotheses list, and a listing of learning issues. These lists essentially plan the analysis and reading that will be done by students before the next "tutor" session. During these sessions, the instructors assume a relatively quiet or passive role. A library of reference books and materials are made available in the classroom. The classroom is also equipped with computers and a dairy ration evaluation program (6). Students assimilate the information collected, analyze the rations, research their learning issues, and try to prove or disprove their hypotheses.

The "problem-based learning" format puts the burden of learning onto the student. We believe that students have emerged from the new format with a better understanding of concepts and greater problem-solving skills.

Independent Study Electives

On a very limited basis, we have offered independent study clinical rotations in two areas: computerized dairy records and dairy farm financial analysis. The computerized dairy records project involves securing permission to receive electronic records from a dairy,

installation of the herd data into DairyComp 305®, insuring the integrity of the data, updating production and veterinary information on a monthly basis, and preparation of periodic reports. The financial analysis project is an exercise to study computerized financial records from an area dairy farm and construct a partial budget projecting the impact of a hypothetical investment in facilities.

OPERATIONS

These clinical rotations are unusual in that they are curriculum-driven, not case-driven. Most clinical rotations taught in veterinary schools are case-driven, i.e., the students are exposed to teaching materials based almost solely on the cases presented to that particular clinical service during that particular time period. Case driven rotations work well only if the student has had a strong preclinical education in that discipline. However, students have very little instruction on production medicine in the preclinical curriculum. Thus, the clinical rotations must necessarily be curriculum-driven.

To a large extent, case material for production medicine clinics can be scheduled. Any dairy herd at any time is appropriate material for herd problem identification. While we prefer herds with mastitis and nutrition problems for the other respective courses, all dairies have some problems in these areas and can make acceptable teaching resources.

Some of the farm investigations come from a "core-herd" program, where we provide production medicine services in an on-going basis with a limited number of herds. Others come from referrals of herd problems by the herd veterinarian. At other times, we make requests of practicing veterinarians to help secure an appropriate herd problem.

STUDENT RESPONSE

Student response to the teaching program developed at the University of Wisconsin has been enthusiastic. The series of rotations has been offered in three academic years. In the current fourth year class of 75 students, 43% attended one of the three offerings of PM1, 23% attended one of three PM2 courses, and 33% attended one of four offerings of PM3. In addition, three students from other veterinary colleges have travelled to Wisconsin to take one or more of the rotations. While comments of veterinarians who have hired and employed the students have been positive, no long term assessment of the teaching program has been done.

REFERENCES

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SUMMARY

A series of curriculum-driven clinical rotations in dairy production medicine has been developed at the University of Wisconsin for fourth year veterinary students. The courses emphasize dairy herd problem identification, mastitis problem solving, and applied dairy nutrition. Investigations of real dairy herds and problems provide case materials, and all courses make significant use of computers to analyze data. While participation in the rotations is elective, student enrollment has been substantial.