Diagnostic Ultrasound

The fuzzy black and white photograph of their unborn child is a proud possession of many expecting parents. These noninvasive but clinically valuable images are made possible by diagnostic ultrasound, the standard method for monitoring pregnancy in women and determining the sex of human fetuses after 140 days of gestation. Diagnostic ultrasonography has also revolutionized reproductive management of the mare. Ovarian structures, such as follicles and corpora lutea, and uterine contents, such as an embryo or endometrial cyst, are now easily seen rather than palpated blindly. As a result, ultrasound machines are standard equipment for equine practitioners enabling them to more precisely monitor the time of ovulation, and thus optimize the time of breeding, as well as detect pregnancy as early as 12 days post ovulation.

In the cattle industry, this technology is not as commonly used because of the cost of the machine and the perception that rectal palpation is sufficiently reliable. The machines are expensive ($10,000 to $30,000). But a competent rectal palpator can simply not be as accurate as a competent ultrasonographer. An experienced palpator can detect and stage pregnancies with greater than 85% accuracy at 30 to 32 days of gestation; the accuracy increases to essentially 100% after days 35 to 38. However, manual pregnancy exams performed prior to day 40-42 of gestation have been shown to increase the incidence of embryonic mortality and fetal abnormalities slightly so they are unlikely to be performed. A well-trained ultrasonographer can detect pregnancy with 95% accuracy by day 25 and 98-100% accuracy by day 28 of gestation with no adverse effects on the developing embryo.

In the dairy industry ultrasonography can have huge impacts on reproductive management and overall profitability if used properly. Since efficiency of heat detection is often less than 75%, at least 25% of cows expected to be pregnant by lack of estrous are actually open 21 days post-breeding. These females will not be diagnosed as non-pregnant until observed in estrus an additional 21 days later (or 42 days post-breeding), or until they are scheduled for pregnancy examination. By using ultrasonography, every female not seen in heat could be pregnancy tested 28 days post-breeding. If not pregnant, PGF2‡ could be administered to short-cycle the female if a corpus luteum is visible. This corpus luteum, which resulted from the missed heat and subsequent ovulation, should be at the correct stage for regression by the PGF2‡ injection. This procedure allows for insemination 31 to 33 days post-breeding, since the second heat was missed, rather than waiting for a naturally occurring estrus at approximately 42 days post-breeding. This should also increase heat detection efficiency since these females should be in estrus 2 to 3 days after the PGF2‡ injection and could be observed more closely for impending signs of heat.

With this system average days open could be dramatically reduced, even in well

managed operations.This requires a more labor intensive individual female program since cows are evaluated daily. Such a program will not be cost effective in every management system, yet many dairies could very profitably incorporate this tool into their daily

routines. Pregnancy examinations after 40 days post-breeding by the veterinarian are still necessary because up to 7% will naturally abort prior to day 45 and an additional 1-2% of pregnancies will be lost prior to day 60 of gestation.

With a daily ultrasound program in place, monitoring the problem breeders becomes more feasible.Ovarian follicles, both normal and abnormal, and corpora lutea are easily seen with ultrasound.Cows that have not been seen in estrus since freshening or repeat breeders can quickly be examined and an appropriate therapy administered. An additional use of ultrasound is fetal sexing which is performed between day 58 and approximately day 95 of gestation. While this is often nothing more than a curiosity, niche markets can be developed for females pregnant with either heifer or bull fetuses.

Will adoption of this technology improve cash flow? Ultrasound will not work on every dairy. However, if a conservative estimate predicts $4/day/cow is gained for every one day reduction in days open and a 300-cow dairy reduces days open by 20 days, a net increase of $24,000 will be realized in cash flow annually. This makes a $15,000 ultrasound machine look like a fairly wise investment. Mike Holland, PhD, CSU.