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Reproductive failure has been described as the most important yet least appreciated disease affecting swine herds. Porcine parvovirus (PPV) infection is the most common and significant infectious cause of reproductive failure in swine. Its wide prevalence and ability to cause fetal death in susceptible pregnant swine make it a significant source of economic loss. To date, no quantitative estimates of the economic loss following PPV infection or the cost-effectiveness of vaccination have been made. The objectives of the study were threefold: first, to summarize what has happened on farms infected with PPV; second, to calculate the opportunity cost of PPV infection; and third, to determine the economic benefit of vaccination.

It appears that three distinct clinical outcomes occur on farms infected with PPV. When a herd previously free of PPV becomes infected an acute outbreak of reproductive failure occurs. It lasts for a relatively short time but two-thirds of the pigs farrowed during that time may be mummified (Donaldson-Wood, et al., 1977). Although herds free of PPV exist, (Johnson, et al., 1976; Donaldson-Wood, et al., 1977), exposure is common and infection is endemic in many herds (Mengeling, 1981). Early work suggested that within infected herds almost all animals over 12 months of age are actively immune (Johnson, et al., 1976) and thus are protected from infection and reproductive failure. More recent work indicated that even in herds where PPV is endemic a significant population of older animals remains uninfected and at-risk of reproductive failure (Gillick, 1977; Cutler, 1981). Acute outbreaks of fetal mummification occur in these herds (Gillick, 1977; Cutler, 1981); although longer than those which occur in uninfected herds, the amount of fetal death is not as great. In addition to these acute outbreaks replacement gilts have experienced chronic fetal death loss. Gilts infected with PPV during gestation farrowed about one live pig less than gilts immune to PPV prior to breeding (Sorensen, 1980; Cutler, 1981).

The absolute amount of opportunity loss associated with PPV infection depends on the market price for finished pigs and the size of the herd infected with PPV. Because market price varies, three were included in the economic analysis. This provided a range of estimates for opportunity loss over a range of realistic market prices, from \$48.00 per cwt. to \$56.00 per cwt. The opportunity losses were calculated for a herd of 100 breeding females farrowing four litters per week.

For acute outbreaks the three most significant variables describing the clinical outcome were how many sows were affected during the outbreak (sow morbidity), how long the outbreak lasted, and how many fetuses were found to be mummified at farrowing. Sow morbidity (the percent of sows farrowing during an outbreak with litters containing one or more mummified fetuses) ranged from <10% to 100% (n=39 farms). The average sow morbidity was 10% in 15% of the cases, 46% in 72% of the cases and 90% in 13% of the cases. Acute outbreaks (n=20 farms) lasted an average of 4 weeks in 75% of the cases and 11 weeks in 25% of the cases. The number of fetuses found mummified at farrowing ranged from 3.1 to 3.3 (n=14 farms) with an average of 3.2 mummified fetuses per affected litter. The average opportunity loss following an acute outbreak of fetal mummification was \$359.00 when the market price was \$40.00, \$864.00 when the market price was \$48.00, and \$1,368.00 when the market price was \$56.00. A 100% effective vaccine appeared to be cost-effective,

i.e. returns from vaccination exceeded the cost of vaccinating, at all market prices examined. However, when the market price was \$40.00 in some instances vaccination was not cost-effective.

For chronic fetal death loss in gilts losses were reported to be continuous, thus time was not as significant as for acute outbreaks. The most significant variables describing the clinical outcome were how many gilts were susceptible to infection, the seroconversion ratio as an estimate of the incidence rate of new infections and the average reduction in the pigs born live for gilts infected with PPV. The average number of gilts seronegative at breeding was 21% in 3 of 6 farm studies and 50% in 3 of 6 farm studies. The range was from 0% to 63%. Estimates of the seroconversion ratio in newly-bred gilts were 50% and 100%. The reduction in live pigs born for gilts infected with PPV after breeding ranged from 1.0 to 1.3 (n=3 studies). An average of 1.1 fewer pigs were born live. The average opportunity loss associated with chronic fetal death loss in gilts was \$372.00 when the market price was \$40.00, \$894.00 when the market price was \$48.00, and \$1,417.00 when the market price was \$56.00. A 100% effective vaccine appeared to be cost-effective at all market prices examined, although in some instances when the price was \$40.00 it was not cost-effective.

Selected References: Cutler, R., Ph.D. Thesis, 1981. Donaldson-Wood et al., *Vet. Rec.* 100:237-239, 1977. Gillick. *Aust. Vet. J.* 53:105-106, 1977. Johnson, R.H. *Aust. Vet. J.* 52:80-84, 1976. Mengeling, W.L. "In Diseases of Swine" ed. H.W. Dunne, A.D. Leman, 5th Ed., 1980. Sorensen, K.J. *IPVS*, p.63, 1980.