

LEPTOSPIRA 7

Production and economic effects

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Leptospirosis is one of the infectious disease causes of reduced sow productivity ('infertility' or 'reproductive failure').

After a herd becomes infected, leptospirosis continues to spread within the herd. Infected sows never eliminate the infection – they become carriers – but they develop antibodies to the leptospires and thus provide maternal immunity to newborn piglets through colostrum. The piglets' passive immunity lasts for a few weeks after weaning but by 12 weeks of age, finishing pigs start to become infected with leptospires from the environment and by the time they reach market weight almost all finishing pigs have become infected and are positive for leptospirosis. This means that replacement gilts coming from these infected finishing groups will be seropositive, infected with leptospirosis, and experience reproductive failure unless they are vaccinated prior to breeding. If replacement gilts have not been vaccinated, they are likely to experience reproductive failure after breeding.

Production and economic effects of chronic leptospirosis

When it first enters a susceptible (naïve) sow herd, it causes an abortion storm along with an increase in stillbirths and weak pigs at birth with subsequent increase in pre-weaning mortality. But it is the uncontrolled, endemic (chronic, sub-clinical) leptospirosis infection in sow herds that causes the highest economic losses because of its on-going, hidden effects on sow productivity. Chronic leptospirosis causes losses in total pigs born, pigs born alive, and pigs weaned. It increases stillbirths and increases pre-weaning mortality because it increases the number of live but weak, low viability pigs. It reduces the farrowing rate, reduces the average birth weight, and may increase the wean-to-first service interval. Based on clinical disease investigations, research reports and vaccine trials, Table 1 shows the expected reduction in modern sow herd productivity associated with uncontrolled chronic leptospirosis. Table 2 presents an economic analysis that shows the difference in sow herd productivity and resulting cost of production per weaned pig between sow farms with controlled vs. uncontrolled chronic leptospirosis infection. The analysis is based on current economic and market conditions in the United States. Assumptions: 5,000-sow system; feed cost is the same for both systems; other non-feed variable costs are similar between systems: for example, both systems spend \$1.00 per weaned pig for vaccinating each weaned pig, both spend the same amount for each replacement gilt, and each

Table 1. Sow herd productivity effects of uncontrolled chronic leptospirosis.

	Direction of effect	Controlled leptospirosis	Uncontrolled chronic leptospirosis	Difference (%)
Total pigs born	↓	14.0	13.0	-6.8
Stillborn	↑	0.7	1.0	30.0
Pigs born live	↓	13.0	10.9	-16.0
Pigs weaned	↓	12.0	9.8	-18.0
Abortion %	↑	1.0	2.0	100.0
Farrowing rate %	↓	89.0	75.0	12.0

Sow herd productivity	Controlled leptospirosis	Uncontrolled chronic leptospirosis
Number of sows	5,000	5,000
Pigs weaned/sow/year	28.4	21.9
Pigs weaned/space/year	212	163
Litters/sow/year	2.40	2.25
Non-productive days/sow/year	44	64
Pigs born live	13.0	10.9
Pre-wean mortality (%)	8.0	10.0
Wean age (days)	21	21
Pigs weaned/sow	12.0	9.8
Total pigs weaned/year	142,000	112,000
Cost analysis (\$)		
Corn cost/bushel	3.55	3.55
SBM cost/ton	280	280
Gestation diet cost/ton	180	180
Lactation diet cost/ton	206	206
Total annual cost	4,133,260	4,089,400
Cost/weaned pig	29.07	37.35

Table 2. Economic analysis of uncontrolled chronic leptospirosis.

spends the same for semen cost per dose; fixed costs such as depreciation, interest on loans for the buildings, the animals, and the land are the same between systems. Because of the negative reproductive impact associated with chronic uncontrolled leptospirosis, a 5,000-sow system will produce 30,000 fewer weaned pigs each year. The entire point of the economic analysis is based on the fact that the total annual costs of running the same 5,000-sow system are approximately the same. The chronic leptospirosis system will have some lower costs; for example, they will spend less for vaccines because they have fewer weaned pigs. But they will spend more on total semen costs and total replacement gilt costs because they have to breed more sows (lower farrowing rate) and bring in more replacement gilts (higher culling rate). In the end, any savings are mostly offset by higher costs so the two systems spend about the same amount each year even though the controlled system is producing 30,000 more weaned pigs each year. The bottom line is that the system in control of leptospirosis produces weaned pigs at a cost of \$29.07 per pig, while in the uncontrolled system it costs \$37.35 per pig. In this analysis, uncontrolled chronic leptospirosis increased the cost to produce a weaned pig by over \$8.00 per pig.