Effects of long distance transport on early-weaned pigs

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While transporting weaner pigs is a common practice in swine production, there is very little published research on how this process impacts piglet health and welfare. Transport of piglets to nursery or grower facilities benefits health by reducing disease transmission across age groups, however other aspects of transport (mixing, handling, temperature extremes, time off feed and water) can cause acute stress. The proximity of transport to another stressful event, weaning, is also likely to influence the overall impact of transport, but to date no studies have examined the timing of weaning relative to transport. Currently in Canada, federal transport regulations limit the maximum transport duration for all ages of swine to 28 hours. These regulations are based on studies conducted on market hogs and the published research on transport of weaner pigs is limited (Lewis, 2008; Rioja-Lang et al., 2019; Sutherland et al., 2014). However, the differences between market hogs and weaned piglets (e.g. body size, ideal temperature conditions, proximity to weaning) mean that weaned piglets are likely to have different responses to transport conditions.

To address this gap, Dr. Jennifer Brown and colleagues at the University of Guelph and University of Saskatchewan are conducting research on transport of weaner pigs under Canadian commercial conditions. Two commercial farms were selected based on transport distance between the sow and nursery barns. Nursery pigs were transported for short (SD: <3 h) and long (LD: >30 h) durations in summer 2019, with four trips studied for each duration. The LD piglets were transported in a 4-deck potbelly trailer in one of three compartments: the upper-back (C-UB), bottom-front (C-BF), or bottom-middle (belly) (C-B), which represent a range of different environmental conditions. SD piglets were transported on the main deck of a flat deck trailer, which was comparable in size and stocking density to the C-BF of the LD trailer.

Monitoring equipment on the interior and exterior of the LD and SD trailers recorded temperature (T, °C) and relative humidity (RH, %) at five-minute intervals throughout transport. Piglet data were collected at three time points: the morning before transport (T0), immediately after transport (T1) and approximately 3 days after arrival to the nursery barns (T2). Blood samples were collected at T0 and T1 to compare physiological measures of dehydration, stress and fatigue across treatments and time points. When piglets arrived at nursery barns, their behaviour was video recorded for 5 hours on arrival and three days later to identify differences feeding, drinking, and postures following transport.

The trailer conditions for SD groups were on average, slightly warmer and more humid than for LD groups. Average temperature during LD transport was 22.8°C while the average temperature in SD transport was 24.3°C. Temperatures were below the thermoneutral zone for this age group (24°C, National Farm Animal Care Council, 2014) for 47% of the time for LD transports, while the SD group experienced temperatures below 24°C for 36.0% of the time. The most extreme trailer temperatures (both cold and hot) were recorded in the upper back compartment of LD transports.

Piglets undergoing LD transport weighed significantly less than those in SD transport at T1 (immediately after transport) but no difference was found at T2, 72 h following arrival ((Table 1).

Table 1. LS Means comparing Long and Short Transport piglets on arrival and at 72 hours following transport (n = 440).

	Long transport (LD)		Short transport (SD)			
	Arrival (T1)	72 hrs (T2)	Arrival (T1)	72 hrs (T2)	SEM	P value
Body weight (kg)	5.7a	6.4 c	6.1 b	6.5 c	0.05	<0.001

Relative to their weights at T0, SD piglets gained 0.1% of their body weight between T0 and T1, while LD piglets lost 6.2%.

Of the total number of pigs loaded, no piglets died in SD transports (0/2,034) and 7 piglets died during LD transports (7/11,434 = 0.06%); due to the low frequency of mortality no significant difference was found between transport durations. In both transports, the ear location had the greatest increase in lesion severity, followed by skin lesions. Lesions on ears and skin appeared to be related to mixing aggression at weaning rather than due to transport alone. The incidence of lameness was low (1.84% of piglets scored) with all lameness cases identified as mild in severity.

Physiological parameters measured in blood were within normal reference ranges for piglets of this age group. Statistical analysis found significant differences between transport treatments, both before and after transport. Differences before transport were likely due to differences in the weaning timeline of piglets, as the LD piglets were weaned up to 6 days before transport while SD piglets were weaned immediately before. On arrival at nursery barns, indicators of physiological stress including cortisol and neutrophil: lymphocyte ratios were higher in SD piglets compared to LD piglets, reflecting acute stress. The SD piglets also showed greater levels of muscle injury compared to LD piglets (elevated aspartate aminotransferase and creatine kinase levels), while LD piglets had higher hematocrit levels indicating greater water loss.

Behaviour observations from video recording of piglets following arrival showed that all pigs spent most of their time lying after transport (77% of observations), followed by feeding (11%), drinking and sitting (both 9%). In the 5 hours following arrival, piglets from LD transports were observed to spend more time feeding, drinking and sitting than those from SD transports, suggesting greater hunger and thirst. However, differences in weaning timeline between treatments also likely influenced the behaviour results.

In conclusion, this study represents the first research in Canada on the effects of transport on weaner pig health and welfare. Differences between LD and SD transport were found, but neither treatment was identified as being better than the other. Based on physiological measures the SD piglets appeared to have a greater stress response compared to LD, likely related to SD piglets' exposure to multiple stressors (weaning, loading and transport) with limited time to recover. The LD piglets showed greater weight change and dehydration post-transport. The LD piglets were weaned days prior to transport and had more time to habituate to conditions during transport. This could not be controlled for due to the study being based on existing commercial practices, and as such, these results raise additional questions regarding the timing of weaning and transport. Is it better to complete weaning before pigs are transported? The answer may vary depending on the age of pigs, length of transport and trailer conditions. The study was completed in summer with minimal challenges to piglets thermal comfort. Information is needed on the effects of long duration transport of weaner pigs during winter, where thermal conditions are likely to pose a greater thermoregulatory challenge.

ACKOWLEDGEMENTS
Funding for this project is provided by Swine Innovation Porc through the Canadian Agricultural Partnership. The authors would also like to thank the participating producers and truckers, and acknowledge strategic program funding from Sask Pork, Alberta Pork, Ontario Pork, the Manitoba Pork Council and the Saskatchewan Agriculture Development Fund.