

## ANIMAL SCIENCE

**Title:** Moderating body temperature decline in low birth weight piglets in the early post-natal period to improve survival and enhance animal welfare – **NPB #17-166**

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**Scientific Abstract:**

This research was carried out to evaluate the effects of birth weight and intervention strategies (drying, warming, and oxygenation) on post-natal body temperature changes in piglets and on pre-weaning mortality (PWM). Six studies were carried out involving 1,032 sows and 13,208 piglets. In all studies, piglets were weighed and the experimental treatment was applied at birth. Piglet rectal temperature was measured at birth and at a number of times from 10 minutes to 24 hours after birth, depending on the study.

The first study evaluated the effect of drying piglets at birth with 3 treatments: Control (undried) vs. Drying with Desiccant vs. Drying with Paper Towels. Rectal temperatures of piglets dried with either a desiccant or paper towels were similar ( $P > 0.05$ ) at all measurement times but were greater ( $P < 0.05$ ) than that of the undried Control piglets between 20 and 120 minutes after birth. A second study evaluated drying and/or warming piglets at birth using 4 treatments: Control (undried) vs. Dried (with desiccant) vs. Warmed [in warming box (at 36 to 38°C) for 30 minutes] vs. Dried+Warmed. Compared to undried Control piglets, both drying and warming of piglets increased temperatures ( $P < 0.05$ ) between 10 and 120 minutes after birth. However, the combination of drying and warming increased ( $P < 0.05$ ) temperatures relative to the individual treatments. Data from these 2 studies was used to evaluate the effect of birth weight on post-natal rectal temperature changes. Piglets were classified into 3 birth weight groups: Light (<1.0kg); Medium (1.0 to 1.5kg); Heavy (>1.5kg). For all measurement times between 10 and 120 minutes after birth, the impact of drying and/or warming on rectal temperature depended on birth weight [significant ( $P < 0.05$ ) treatment by birth weight group interactions]. For all treatments, the Light birth weight piglets had the lowest rectal temperatures, Heavy piglets had the highest, and Medium piglets were intermediate. Differences between birth weight groups were greater for the Control than for the drying and/or warming treatments. This suggests that drying and/or warming of piglets at birth was more effective at reducing temperature decline after birth in Light than in Medium and Heavy groups.

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Two studies evaluated the effect of oxygenation for 20 minutes after birth. One study compared 3 treatments: Dried (with desiccant) vs. Chamber-Ambient Oxygen (dried; placed in a chamber at ambient oxygen) vs. Chamber-40% Oxygen (dried; placed in a chamber at 40% oxygen). A second study compared 3 treatments: Control (undried); Dried (with desiccant); Chamber+40% Oxygen (dried; placed in chamber at 40% oxygen). Oxygenation (at 40% oxygen) increased blood oxygen saturation but did not positively impact piglet rectal temperature. In fact, piglets on the chamber treatments (at either ambient or 40% oxygen) had 0.3 to 0.4°C lower ( $P < 0.05$ ) rectal temperature on removal from the chamber at 20 minutes after birth by compared to piglets that were dried but remained in the farrowing pen.

Plasma immunoglobulin immunocrit values, an index of colostrum consumption, was measured on blood samples taken at 24 hours after birth from piglets representing the Control and all intervention treatments and birth weight groups. There was no effect ( $P > 0.05$ ) of either intervention treatment or birth weight group for immunocrit values in any of the studies.

The final study evaluated the effect of drying and warming of piglets at birth on PWM using 2 treatments: Control (undried) vs. Drying+Warming (dried with desiccant; placed in warming box for 30 minutes), with 400 litters/treatment. Pre-weaning mortality was similar ( $P > 0.05$ ) for the Drying+Warming and Control treatments (15.7 vs. 16.4%, respectively). In addition, there was no treatment difference ( $P > 0.05$ ) for PWM within the Light (43.7 vs. 45.5%, respectively), Medium (15.3 vs. 16.6%, respectively) and Heavy (8.0 vs. 8.5%, respectively) birth weight groups.

The results of these studies suggest that all drying and/or warming treatments were effective in reducing the magnitude of the post-natal temperature decline, particularly for light birth weight piglets. However, there was no positive effect of oxygenation of piglets at birth on post-natal rectal temperatures. In addition, the combination of drying and warming of piglets at birth did not reduce PWM.