1 Effect of microclimate during winter transport on chicken meat quality. S. Dadgar*, E. S. Lee, T. L. V. Leer, N. A. Burlinguette, H. L. Classen, T. G. Crowe, and P. J. Shand, *University of Saskatchewan*, *Saskatoon, SK, Canada*.

A variety of stressors are present during transportation of broiler chickens from the farm to the slaughter plant that could affect animal welfare and subsequent meat quality. Some research is available on the effect of transportation stress on meat quality, however, the effect of environmental conditions, especially transport below freezing temperatures, has not been well studied. The objective of this study was to assess the effect of cold stress and location within a transport vehicle during winter transportation on chicken meat quality.

Ninety broilers, 39 days old with an average live weight of 2.3 kg, were wing banded at the farm and placed in a grid system within 6 drawers (15 birds/drawer) of a module-based handling system (Anglia Autoflow Ltd.). Temperature logging Thermocron iButtons (Dallas Semiconductor) were inserted into the proventriculus of test birds to monitor internal body temperature. Hygrocon iButtons (137), which record temperature and humidity, were strategically placed throughout the trailer. The modules were transported, using an actively ventilated transport vehicle with 2 tarped sides and an insulated floor and ceiling (total load of 2854 birds). Ambient air temperature during the 3.5 hours of transport (-27±3°C) was recorded with a logger on the outside of the truck. Chickens were slaughtered at a commercial poultry processor, with core samples removed from the right breast of each bird at 30 min postmortem and quickly frozen in liquid nitrogen. Chilled carcasses were then returned to the University meat lab for quality determinations.

Drawer locations were selected to provide a range of microclimates within the load. As expected, temperatures and RH were significantly ($P<0.05$) different throughout the trailer, with average temperatures of our targeted drawers ranging from -11°C to 5°C and average RH ranging from 72 to 89%. Environmental temperature within this range had minor effects on breast meat properties. While raw breast meat color from chickens in the coldest drawer was significantly ($P<0.05$) darker and more red (lower Minolta L* and higher a*), there was no significant difference in average core body temperature, water pick up, drip loss, b*, pH, thaw loss, cook loss and Warner Bratzler shear force for breast meat due to drawer temperature. However, breast meat from birds located in the coldest drawer tended to have the highest initial and ultimate pH ($P=0.08$ and 0.11, respectively). For most meat quality characteristics, thigh meat from chickens transported in the coldest drawer (-11°C) was significantly different from samples from birds held at more moderate temperatures (3.5°C or above) during transportation. Thigh meat from birds in the coldest drawer had the lowest Minolta L* and b* values, highest a* and ultimate pH values and lowest thaw loss and cook loss values.

In conclusion, this study shows that different microclimates inside poultry trailers could result in different meat quality within the same load. Furthermore, during cold transport, thigh meat quality (especially color) was more greatly affected by temperature during transportation than breast meat quality. Further trials are underway to establish guidelines for temperature-humidity combinations that induce the least physiological stress on the birds during cold transport and to document effects on meat quality.