OBJECTIVE
To compare CO measured by use of lithium dilution (LiDCO) and ultrasound velocity dilution (UDCO) in an acute hemorrhage canine model.

STUDY
• Twelve anesthetized dogs (15-34 kg) were anesthetized and instrumented to measure direct blood pressure, heart rate and arterial blood gases. CO was measured by use of LiDCO and UDCO techniques.
• Measurements were obtained from each animal at baseline and during a low CO (hemorrhagic) state.
• Ultrasound Flow/Dilution Measurements: A 20 mL bolus of 0.9% sodium chloride was administered and CO was calculated from the transient dilution of blood proteins created by the injection bolus.
• Hypovolemia was induced by withdrawing 40% of the blood volume until the mean arterial blood pressure (MAP) was stable at 40 mmHg for 10 minutes.
• Measurements were converted to cardiac index (CI = CO/BSA) values for statistical analysis.
• Agreement was determined using Bland & Altman analysis and concordance correlation coefficients.

RESULTS
• Twenty-four comparisons were made between the two methodologies. Lithium determinations of CI ranged between 7.5 and 1.3 L/minute(-1)/m(-2). The mean difference between the two methods was 0.40 L/min(-1)/m(-2). The mean relative bias was -17 ± 21% (limits of agreements: -59% to 25%).
• There was no significant effect of state of CI on bias or relative bias (p = 0.24 and p = 0.10, respectively). The concordance correlation coefficient between LiDCO and UDCO was 0.88 (p < 0.0001).

STUDY’S CONCLUSIONS
• When compared to lithium dilution (LiDCO) method, the ultrasound velocity dilution (UDCO) technique is a viable method for measuring cardiac output in a model of normovolemia and hypovolemia in dogs.

TRANSONIC COSTATUS® OBSERVATIONS
• A major advantage of the ultrasound dilution method is that it is a non-toxic indicator.
• Indicator is not lost during passage through the heart and lungs.
• COstatus® flow/dilution sensors are reusable.

REFERENCES