

## 2004 ACOG Annual Clinical Meeting Poster Presentation

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### Measurement Deviations in Mechanical Gauges on Pistol-Type Pumps for Vacuum Assisted Delivery

**Objective:** The accuracy of mechanical gauges on pistol-type handheld vacuum pumps was evaluated to define factors contributing to fetal injury during vacuum assisted delivery (VAD).

**Method:** 25 reusable pistol-type vacuum pumps used at community hospitals were measured against a certified reference gauge calibrated to 0.25%. The pumps were used to create vacuum in increments of 10 cmHg as indicated by the reference gauge, and the corresponding pump gauge value was recorded over the range of 0 to 60 cmHg. The process was repeated four times for each device. The measurements were averaged and standard deviations (SD) were calculated.

**Results:** 44% of all tested pumps were inaccurate by 2 cmHg or more. The SD from the reference for all gauges was 4.4 cmHg. From 40 - 60 cmHg, the "green range" of vacuum gauges, 20% of the tested gauges were more than one SD higher than the reference gauge.

**Conclusion:** Injuries to the fetal scalp associated with prolonged vacuum and multiple involuntary releases (pop-offs) have previously been attributed to incorrect cup choice and placement. This study suggests that an additional mechanism may be partially responsible for pop-offs. Injuries such as subgaleal hemorrhage associated with VAD may be due in part to inaccurate mechanical gauges where the displayed vacuum value is higher than actual vacuum applied to the fetal head, thus increasing the likelihood of pop-offs when traction is applied. These data suggest that further investigation in this area is warranted in order to accurately determine risks associated with VAD.

Vacuum Pump Gauge Study

