# H.E.R.E. Hyperthermia Endangerment Recognition Equipment: A Study on the Prevention of Vehicular Hyperthermia, Phase Two

Shelts, Kelly

The purpose of this study is to develop a detection mechanism for vehicular hyperthermia. Vehicular hyperthermia occurs when a child or pet is left inside of a vehicle on a hot day and suffers heat strokes, which lead to severe disability or death in extreme cases. In the predecessor to this study, it was found that carbon dioxide sensors can be used to detect child or pet presence within a closed vehicle. This carbon dioxide is created through respiration, when oxygen is inhaled and carbon dioxide exhaled. This project's experimental data serves to correct experimental error and test the effects of open and cracked windows on the CO2 within the vehicle. It was hypothesized that there would be a dramatic increase in CO2 when the windows were completely closed, a less dramatic increase with the windows cracked, and a very small increase with the windows open due to outside gases mixing in the vehicle. Each subject was asked to sit inside of a vehicle with carbon dioxide sensors located on the vehicle's floor. The three subject groups included children, adults, and dogs. Each subject completed three thirty minute tests: one with windows completely open, one with windows cracked one inch, and one with windows completely closed. The data supported the hypothesis, and that this method could be useful if the windows were closed or slightly cracked. These results were used to program a prototype using Arduino and a GSM shield to send a SMS message when the conditions were met.

**Awards Won:**