



# CARBON DIOXIDE EUTHANASIA: MICE AND RATS SHOW DIFFERENT BEHAVIOURAL RESPONSES



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## Introduction

Carbon dioxide (CO<sub>2</sub>) is used to euthanize or stun a number of different farm and laboratory species, including pigs, poultry and rodents. The objective of this study was to determine whether rats and mice exhibit behaviours indicative of distress during the American Veterinary Medical Association's recommended method of CO<sub>2</sub> euthanasia.

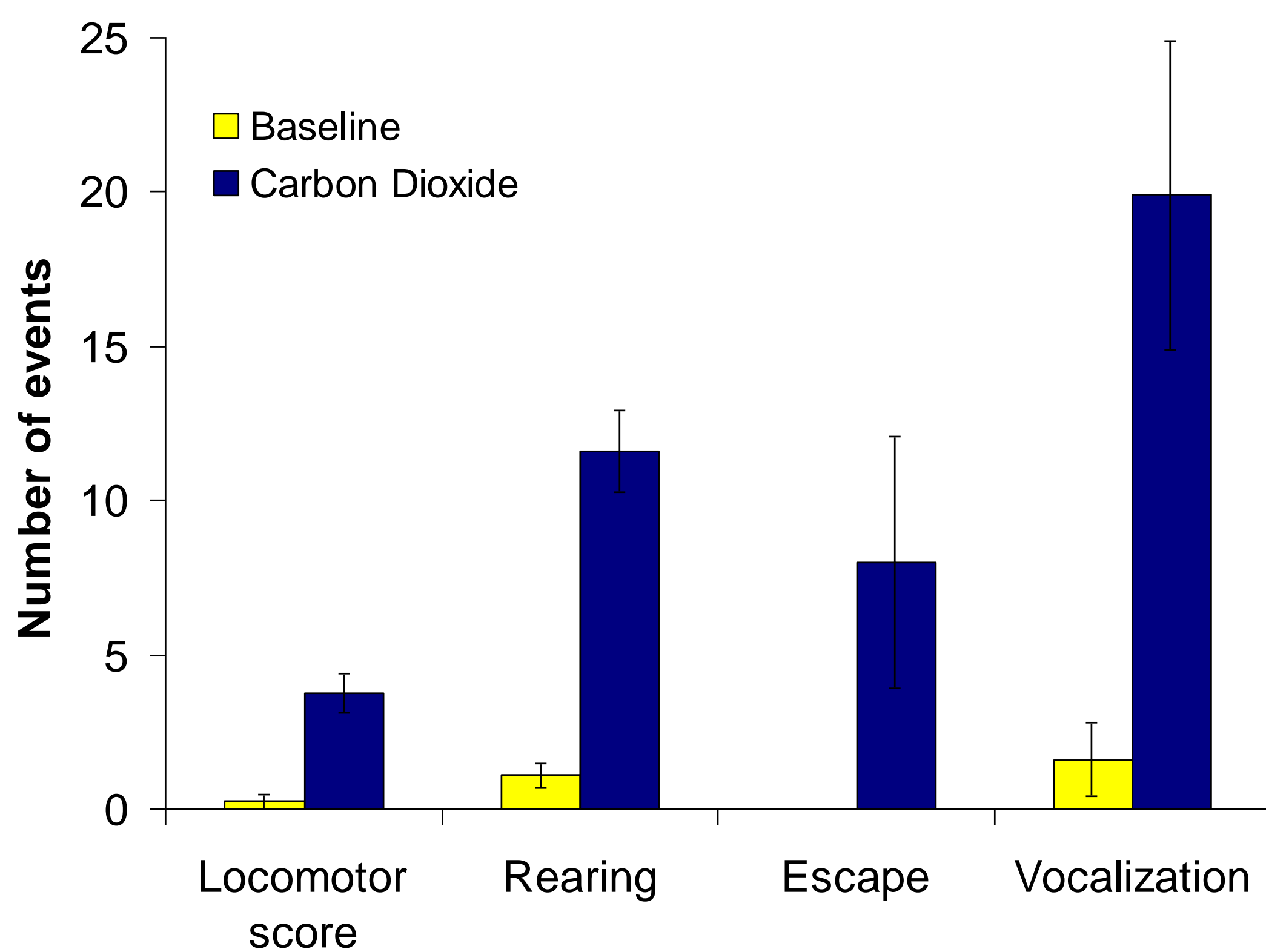
## Materials and Methods

Male Sprague Dawley rats (N=8) and Balb/c mice (N=7) were placed individually into a novel chamber and allowed to acclimatize. CO<sub>2</sub> was then added at a rate of 20% of the chamber volume per minute. Animals were scored continuously for locomotor activity, rearing and wall climbing, escape behaviours (rats: scratching and pushing at the chamber lid; mice: jumping) and ultrasonic vocalizations during the 105 sec periods before and after the start of gas flow. Rats were also scored for the time that they spent with their nose contacting the chamber lid. Within animal comparisons were made using the Wilcoxon Signed Rank test, and data are presented as mean ± SEM.

## Results



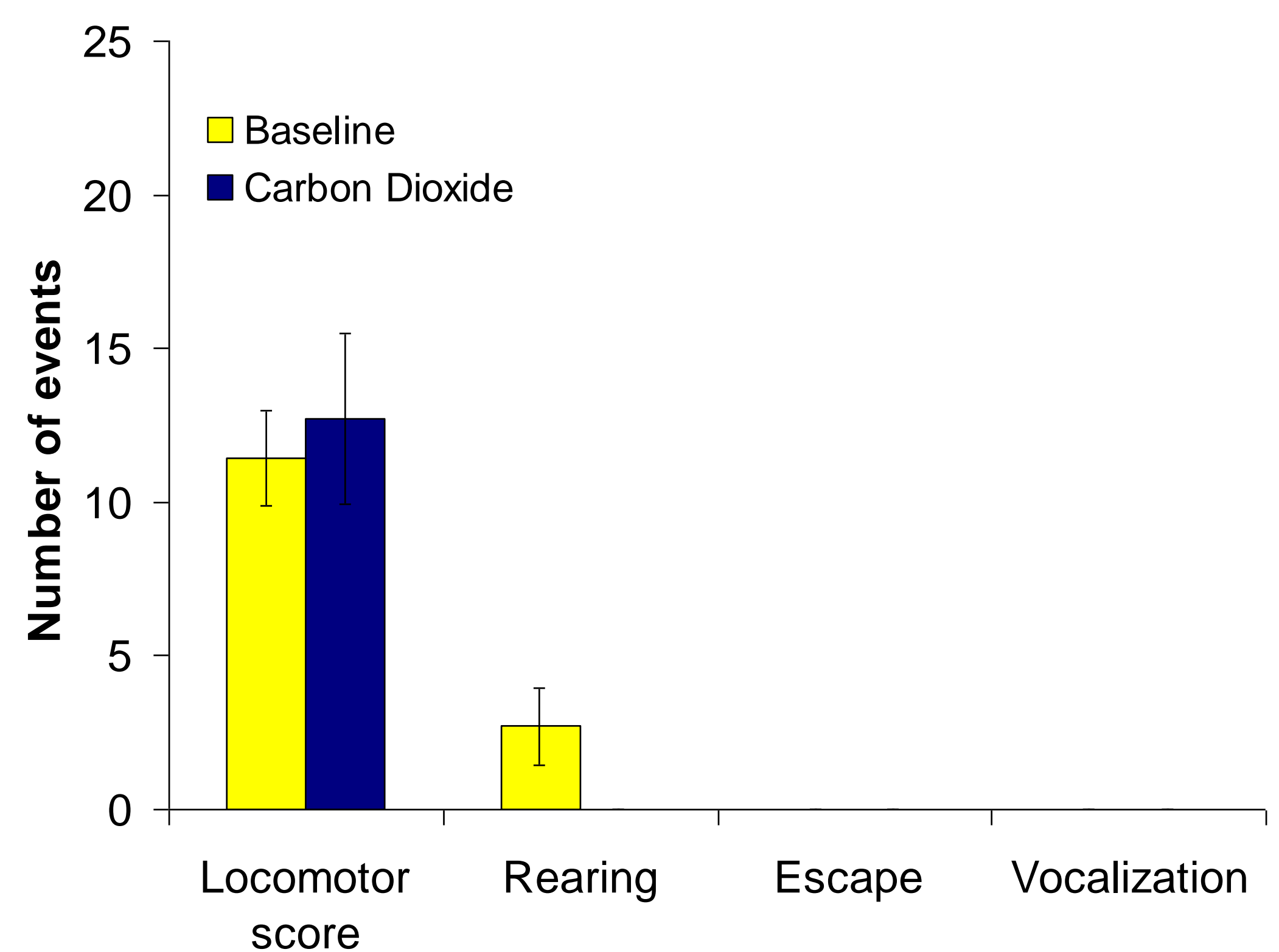
Rats



During CO<sub>2</sub> exposure rats increased locomotor activity (S=18, p<0.005), rearing and wall climbing (S=18, p<0.005), escape behaviours (S=10.5, p<0.05), ultrasonic vocalizations (S=14, p<0.01), and time spent with the nose contacting the chamber lid (28.6 ± 5.4 versus 8.6 ± 6.9 secs; S=14, p<0.01).



Mice



In contrast to rats, during CO<sub>2</sub> exposure mice decreased rearing and wall climbing (S=7.5, p<0.05), and did not show a significant change in any other behaviours, including activity. Mice produced no detectable escape behaviours or vocalizations during baseline or gas exposure.

## Conclusions

While rats show behaviours indicative of distress during CO<sub>2</sub> euthanasia, mice do not suggesting that they may find CO<sub>2</sub> less aversive. Although many variables need to be examined further (differences in genetic lines, coping strategies, and other procedural variables), the results to date suggest a strong species difference in response to CO<sub>2</sub> euthanasia.