



Implementation of the *CCAC Revised Guidance on Euthanasia Using Carbon Dioxide*

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CCAC Revised Guidance on Euthanasia Using Carbon Dioxide (CCAC, 2020) has been developed to replace the guidance concerning carbon dioxide in the *CCAC guidelines: euthanasia of animals used in science* (CCAC, 2010), specifically, Guideline 13, “If carbon dioxide use is required for non-anesthetized rodents, a gradual-fill rate of less than 30% and greater than 20% of the chamber volume per minute should be used.”

The revised guidance was developed by the CCAC Secretariat staff and reviewed by the CCAC Standards Committee and CCAC Board of Directors. It was prepared following questions from CCAC program participants concerning the revision to the American Veterinary Medical Association (AVMA) *AVMA guidelines for the euthanasia of animals*.

The most significant change to the AVMA guidelines is the increase in the upper limit of the CO₂ flow rate to 70% of the euthanasia chamber volume per minute. In response to this, and based on the most recent scientific literature and expert opinion, the CCAC has changed its guidance on CO₂ flow rate to 30-40% of the chamber volume per minute, with the ability for animal care committees to approve higher flow rates, if appropriate. The revised guidance is aimed at minimizing the time for animals to become unconscious, without the experience of pain.

The 30-40% range was set because of the many different types of euthanasia set-ups. Variables include: cage size and layout, gas flow, input and exit port locations, and injection port angle and size. Most facilities do not have the means to monitor the actual concentration of CO₂ within the euthanasia chamber and ensure that it does not exceed a concentration at which animals start to experience pain.

The CCAC hopes the revised guidance, combined with each institution’s experience in implementing the *CCAC guidelines on: euthanasia of animals used in science* (CCAC, 2010), will assist institutions to develop species-specific standard operating procedures for the use of carbon dioxide with their particular facility set up. In addition, the use of isoflurane has been revisited in the revised guidance. Rendering an animal fully unconscious with isoflurane, followed by a lethal concentration of carbon dioxide is regarded as an acceptable procedure, provided that there is no likelihood for the animal to regain consciousness.

The CCAC will be revising the *CCAC guidelines on: euthanasia of animals used in science* (CCAC, 2010), within the next few years. In the interim, we invite comments and feedback on this revised guidance.