



AN INFORMATIONAL RESOURCE FOR PROVIDERS OF AND SUPPLIERS TO EMS

O-Two Medical Technologies Response to the 2005 Guidelines for CPR

The much anticipated *Guidelines for CPR* were published this week with some fairly significant changes that could affect protocols and if you are a manufacturer, product designs.

O-Two Medical has always used the latest *Guidelines* (1992, 2000 and now 2005) as a benchmark in designing resuscitation products for use in EMS.

We have anticipated many of the recommendations put forward and have been delivering a similar message on over ventilation as stated in the new *Guidelines* over the last several months ([see previous newsletters](#)).

In this fairly lengthy newsletter, we have highlighted many of the notes and quotes ([in blue](#)) from the 2005 *Guidelines* on problems with the way ventilations are being performed, on recommendations on how they should be performed and how our products respond ([in red](#)).

O-Two's CAREvent® Products Respond to the 2005 Guidelines:

The CAREvent® products from O-Two Medical Technologies are oxygen powered time/volume cycled automatic ventilators/resuscitators (see [link](#) to further product details). They allow a rescuer to provide a patient with a specific and constant tidal volume, respiratory rate and flow, automatically (and hands free). Studies support that automatic ventilators improve lung inflation with diminished or absent gastric inflation and free rescuers hands to focus on other patient needs.

“Bag-mask ventilation is a challenging skill that requires considerable practice for competency”

“When CPR is performed, even by professionals it is often not done well. Excessive ventilation is provided during CPR for victims with advanced airways, with a resulting decrease in coronary perfusion pressure and worse outcomes.”

- **Studies show poor ventilation skills with a standard BVM even immediately**

following training. CAREvent® ventilators provide consistent ventilations with every breath

Once an advanced airway is in place, the compressor should deliver 100 compressions per minute without pausing for ventilation and the rescuer delivering breaths should deliver 8-10 per minute (at tidal volumes of 6-7 ml/kg)

- Once the correct rate and volume is set, CAREvent®s perform to the Guidelines and allow one rescuer to perform CPR (ventilation is hands free with a protected airway and a time/volume cycled CAREvent®)

“The Healthcare Provider should deliver 8-10 BPM and should be careful to avoid an excessive number of ventilations”

- Once set, CAREvent®s maintain a constant BPM frequency.

“The 2000 Guidelines recommended a variety of tidal volumes, respiratory rates and breath delivery intervals. But it is unrealistic to expect the rescuer to distinguish half-second differences in inspiratory times or to judge tidal volumes delivered by mouth to mouth or bag-masks.”

- CAREvent®s deliver consistent tidal volumes, inspiratory times and breath frequencies.

“Rescuers should not provide hyperventilation (too many breaths or too large a volume). Excessive ventilation is unnecessary and is harmful because it increases intrathoracic pressure, decreases venous return to the heart and diminishes cardiac output and survival”

- CAREvent®s provide consistent respiratory rates and volumes

“Avoid delivering breaths that are too large or too forceful. Such breaths are not needed and may cause gastric inflation and its resultant complications.”

“Risk of gastric inflation is increased by high proximal airway pressure and reduced opening pressure of the Lower Esophageal Sphincter. High pressure can be created by a short inspiratory time, large tidal volume, high peak inspiratory pressure, incomplete airway opening and decreased lung compliance”.

“Bag-mask ventilation can produce gastric inflation with complications, including regurgitation, aspiration and pneumonia. Gastric inflation can elevate the diaphragm, restrict lung movement and decrease respiratory system compliance.”

“A translational research study showed that delivery of >12 BPM during CPR leads to increased intrathoracic pressure, impeding venous return to the heart during chest compressions leading to diminished cardiac output during chest compressions and

decreased coronary and cerebral perfusion”

- CAREvent®s deliver controlled flow rates that provide peak airway pressures, inspiratory times, tidal volumes and frequencies that are constant and controlled thus eliminating the risk of over ventilation and its complications.

“Bag-mask (ventilation) is most effective when provided by 2 trained and experienced rescuers”

- CAREvent®s reduce the number of rescuers required to provide effective and consistent. In advanced airways, CAREvent® deliver the recommended BPM automatically while the rescuer performs compressions. With a mask, one rescuer can both manage the seal and deliver the ventilations.

*“It is critically important that rescuers **MAINTAIN** a ventilation rate of 8-10 BPM during CPR and avoid excessive ventilation”*

- Only an automatic time/cycled ventilator (like CAREvent®s) can guarantee this consistency

Quotes & Notes Supporting CAREvents (oxygen powered, time/volume cycled devices) Over Pressure Cycled Devices:

“ATVs may be useful if tidal volumes are delivered by a flow controlled, time cycled ventilator without PEEP”

- Flow-limited or pressure cycled devices deliver constant PEEP -- the CAREvent® products DO NOT!

“Disadvantages of ATVs – they require oxygen and electrical power”

- CAREvent®s’ advanced micro pneumatic circuitry operates by compressed gas (air or oxygen). No batteries are required.

“Rescuers should avoid using the automatic mode of the oxygen powered, flow-limited resuscitator because it applies continuous PEEP that is likely to impede cardiac output during chest compressions”.

- Pressure cycled or flow-limited devices are not recommended – CAREvent®s are time/volume cycled. See our Sept 05 newsletter for differences.

Mask based CPR performed at 30:2 for all ages except newborns.

- Only CAREvent® automatic ventilators and resuscitators have a delayed cycling feature (new models set at 20 seconds) allowing time for 30

compressions before the delivery of the next automatic breath.

Advanced airway CPR performed with continual compressions at 100 pm and ventilation at 8-10 BPM at tidal volumes of 6-7 ml/kg (500-600 ml)

- The CAREvent®s allow one rescuer to perform CPR in patients with an advanced airway. Ventilation can be delivered automatically at 10 BPM in the appropriate tidal volumes while uninterrupted compressions are delivered.

O-Two's SMART BAG® Responds to the 2005 Guidelines

The SMART BAG® is the only Bag-Valve-Mask (BVM) with a “Smart Valve” to control flow rates. It compensates for rescuers squeezing a “bag” too hard and/or fast. Clinical studies have demonstrated that the SMART BAG® reduces peak airway pressure, lowers the number of breaths per minute (closer to Guidelines) and more significantly, lowers gastric inflation volumes (versus standard BVMs).

“The Healthcare Provider should deliver ventilations at a rate of 8-10 BPM and should be careful to avoid an excessive number of ventilations”

- The SMART BAG® provides a tactile, visual and audible reminder to remind the rescuer to slow down thereby reducing the risk of excessive ventilations

“When CPR is performed, even by professionals, it is often not done well. Excessive ventilation is provided during CPR for victims with advanced airways, with a resulting decrease in coronary perfusion pressure and worse outcomes.”

- The SMART BAG® reminds the rescuer to slow down by reducing the flow rate from the balloon that causes thigh airway pressures which can seriously affect coronary perfusion pressure

“Rescuers should not provide hyperventilation (too many breaths or too large a volume). Excessive ventilation is unnecessary and is harmful because it increases intrathoracic pressure, decreases venous return to the heart and diminishes cardiac output and survival”

- By slowing down the flow from the balloon SMART BAG® reduces the ventilation rate as longer inspiratory time is required to deliver the required tidal volume. The SMART BAG® has been clinically proven to deliver tidal volumes in line with the 2005 Guidelines.

“Avoid delivering breaths that are too large or too forceful. Such breaths are not needed and may cause gastric inflation and its resultant complications (in the un-protected airway).”

- The “SMART TECHNOLOGY” in the SMART BAG® controls the flow reducing the force of the delivered breath and reducing the risk of gastric inflation.

“Risk of gastric inflation is increased by high proximal airway pressure and reduced opening pressure of the Lower Esophageal Sphincter. High pressure can be created by a short inspiratory time, large tidal volume, high peak inspiratory pressure, incomplete airway opening and decreased lung compliance”.

“Bag-mask ventilation can produce gastric inflation with complications, including regurgitation, aspiration and pneumonia. Gastric inflation can elevate the diaphragm, restrict lung movement and decrease respiratory system compliance.”

- By decreasing the delivered flow rate, the SMART BAG® reduces the peak inspiratory pressure that causes gastric inflation. A number of clinical studies have demonstrated the reduced or absent gastric inflation when using the SMART BAG®

“A translational research study showed that delivery of >12 BPM during CPR leads to increased intrathoracic pressure, impeding venous return to the heart during chest compressions leading to diminished cardiac output during chest compressions and decreased coronary and cerebral perfusion”

- Clinical studies in the USA and Europe have demonstrated that the use of the SMART BAG® over a regular BVM significantly decreased inspiratory flow rate and peak airway pressure. More importantly, gastric inflation volumes were absent or significantly reduced.

“Bag-mask ventilation is a challenging skill that requires considerable practice for competency”

- The “Smart Valve” incorporated into the SMART BAG® compensates for rescuers squeezing too hard and fast and provides real time visual, audible and tactile feedback on the quality of ventilation they are providing.

“All breaths (regardless of device) should be given over 1 second”.

- Rescuers who are squeezing a “bag” too fast (and creating excessive peak inspiratory flows and pressures) are slowed down by the SMART BAG®.

Street Sense is published by O-Two Medical Technologies Inc., innovators in resuscitation since 1971 (mouth-to-mouth barriers, BVMs to a full line of automatic ventilators/resuscitators).

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