from the sleep apnoea syndrome shortly after they refused a recommended tracheostomy.^{3,4}

Surgery has until now been the only effective treatment, but recently an intraoral tongue retaining device (TRD) was introduced.⁵ At least for patients with a low or moderate apnoea index, this device seems to be useful. It requires considerable instruction and training, however, and many patients find it so uncomfortable that they abandon its use.

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Siemens PCO₂ Gas Analyser

To the Editor:

We recently had the opportunity to assess the Siemens Sirecust 300 System PCO₂ Gas Analyser, when used for the monitoring of end-tidal CO₂ levels during anaesthesia. This instrument was reliable for this purpose, provided that a non-rebreathing anaesthetic or ventilator circuit was used. However, when it was attached to a partial rebreathing circuit, we found that the indicated

levels of CO₂ underestimated the true levels. Communication with the manufacturer provided the explanation which follows:

"The model 300 PCO₂ gas analyser does not contain a dedicated zero reference cell. The zero is reset during each inspiratory phase, assuming this sample contains no carbon dioxide. Therefore, self-calibration is performed during each inspiratory cycle with the implicit assumption that the end-inspiratory PCO₂ level is zero."

When using a partial rebreathing circuit, without CO₂ absorption, the inspired gas may contain CO₂ and the peak level readings will therefore be reduced. We therefore conclude that this particular CO₂ analyser may be unreliable when used in anaesthetic or ventilator circuits in which partial rebreathing may occur. We wish to draw this potential hazard in the use of the Siemens Sirecust 300 System PCO₂ Gas Analyser to the attention of your readers.

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REPLY

Thank you for inviting us to respond to the issue raised by Dr. Dunn and his colleagues.

We find their description of the analyser's function to be accurate and would like to add to it a few comments as to why Siemens chose to go the design route of "automatic zeroing." The Siemens PCO₂ module, through the technique of automatic re-zeroing with each inspiration, offers at moderate cost, a reliable continuous method of long-term measurement of CO₂ with inherent compensation against

- erroneous readings due to transducer drift with temperature change and
- erroneous readings due to "clouding-up" of the measurement chamber from residues left from vapours and patient excretions passing through the system.

When used in either an open or closed respiratory circuit, accurate measurements totally depend upon the inspired breath containing no CO₂. In the case of the latter circuit, it is recognized by Siemens that special caution has to be observed in this regard.

Accordingly, in the Operating Instruction attention is drawn to the prerequisite's of (a) CO₂-free inspired air and (b) fresh soda lime for proper CO₂ absorption. Furthermore, it is stressed that attention has to be paid to other vital signs in "case of a non-physiological fall-off of

the end expiratory PCO₂" (e.g., when fresh gas flow is decreased when using the Bain circuit). We believe our obligations to the user are fully met with this disclaimer in the operating manual.

We at Siemens are certainly concerned with our reputation and the directly related aspects of patient/user safety when our equipment is utilized. There is no doubt that the potential for the occurrence of a hazardous situation in the use of our PCO₂ module in a closed respiratory system has been vividly reinforced to us in the results of the equipment trial reported by McMaster University.

In keeping with our concern, we have prepared an Operating Manual "Warning Insert" which is presently being sent to each identified 300 PCO₂ module user in Canada. These "inserts" have also been sent to all Siemens Electromedical Equipment sales representatives in Canada, directing them to make certain that each prospective buyer/user of our PCO₂ modules is made fully aware of the necessity to precisely follow the operating instructions.

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