the excess weight dragging on the patient's mask or endotracheal tube. I use a flow rate of 5 L·min^{-1} for preoxygenation and on termination of the anaesthetic. To diminish the diluting effect of the added flow of oxygen to the inspired concentration of halothane, I reduce the oxygen flow to 1 L·min^{-1} during maintenance of anaesthesia. This conserves our supply of halothane, also a costly item in this part of the world.

The Haloxair® has an oxygen flowmeter calibrated from 1–3 L·min^{-1} to which a cylinder of compressed gas can be connected. I keep a cylinder attached, in case of power failure.

The types of cases done at our hospital using this simple circuit include an oesophagectomy, laparotomy for ruptured ectopic pregnancy, Caesarean section, and repair of an oomphalocele in a newborn. It has also been a means of using oxygen in the resuscitation of newborns, children, and adults. There have been no clinical signs of hypoxia.

I feel that in remote areas where use of the Haloxair® is appropriate and cylinders of oxygen are not readily obtainable but electricity is available, the use of an oxygen concentrator in conjunction with the Haloxair® adds an immeasurable margin of safety and offers a very satisfactory method of giving general anaesthesia.

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Oxygen concentrators

To the Editor:

In the article on anaesthesia training in Nepal[1] the use of an oxygen concentrator to supplement air in drawover systems was mentioned. Our unreliable and inadequate supply of oxygen cylinders relates to the fact that Nepal has not developed its own medical gas industry, and all oxygen must be imported from India. This constitutes an unacceptable expense of time and money. Recently the price of oxygen has doubled. This will result in deficits in the care of particularly ill patients. Under the circumstances, as a physician, one is obliged to consider alternatives and it is my firm belief that oxygen concentrators of good design are the answer.

We have recently assessed the features of a Kinox-2 concentrator at the Military Hospital in Kathmandu.[2] The maximum oxygen concentration at different flows was studied using a Critikon Polarographic Oxygen Analyser and BOC Oxygen Flow Meters. The concentration readings were similar to the values predicted up to the recommended maximum flow. At higher flows there was an adverse linear relationship between oxygen concentration and flow rate. At a flow rate of 3 L·min^{-1}, for up to 8 h continuous use, the oxygen concentration was never less than 67 per cent, at 6 L·min^{-1} it was 50 per cent, and at 9 L·min^{-1} approximately 35 per cent. The maximum flow was 9 L·min^{-1}, measured by a Loosko oxygen flowmeter and respirometer calibrated for continuous flow.

The output pressure was 45–50 kpa using an aneroid manometer. This is not adequate for operating modern continuous flow anaesthetic machines equipped with regulators set to reduce cylinder pressure to 60 lb·in^{-2} unless the reducing valves are bypassed and the gas source connected directly to the inlet port of the oxygen flow meter. We have used compressed air in this way when we cannot obtain nitrous oxide cylinders. For drawover systems an oxygen concentrator is an extremely useful component.

The low output pressure limits the usefulness of oxygen concentrators with ventilators requiring high-pressure gas sources. However, minute volume dividers like the Mini-vent and Auto-vent which are cheap and portable and operate by the elastic recoil of the reservoir bag are satisfactory. Similarly, electrically powered ventilators like the East Radcliffe are satisfactory and can be used with low flows of higher oxygen concentration.

We have calculated that the cost of moderate flows of oxygen in a Boyle type anaesthetic apparatus over the course of one year would be equivalent to the cost of one oxygen concentrator. It is expected that oxygen concentrators will form an important component in the operating room, recovery ward, and the intensive care units of Nepal hospitals. However, hospitals will require a stable electricity supply, which at present cannot be guaranteed, or the ability to generate it on an emergency basis. Smaller concentrators which need minimum electricity consumption can be operated by portable generators. These are not very expensive and are becoming more common in our hospitals.

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Revised Guidelines to the Practice of Anaesthesia

To the Editor:

Having read the revised Guidelines[1,2] and noted the new standards and techniques for patient-monitoring during anaesthesia, I must express my concern for the failure of the Guidelines to address an area of practice which in my opinion must sooner or later be regulated.

The Guidelines totally ignore the issue of fatigue and stress suffered by the anaesthetist who may continue to provide service after a prolonged period of "on-call duty." All industries today specify exactly what constitutes appropriate working hours. Union bosses would be horrified to learn of the hours worked by many of our colleagues and would call for independent enquiries into the issue of public safety and anaesthesia.

Unless the profession itself undertakes an innovative approach to the most efficient utilization of its skilled manpower, administrators and bureaucrats may further dictate our future practice.

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REPLY

The Standards of Practice Committee of the Canadian Anaesthetists' Society is well aware of the influence of stress and fatigue on physician performance. Unfortunately, it is not an easy area in which to make noncontentious statements. For example, not all stresses are work related, and limited workloads would by nature be generalities, ignoring nonprofessional factors. Desirable workloads are also extremely variable both between physicians and between different points in the career of the same individual. Finally, no reliable information exists as to whether case numbers, case profiles, or hours worked should best express optimal working conditions for anaesthetists. The Guidelines were therefore limited to suggesting those elements necessary for safe practice; any debility (including fatigue) interfering with the attainment of these principles would clearly be unacceptable.

One has to wonder why any such statement should be necessary. Surely as independent professionals, anaesthetists are capable of regulating their own life styles when patient safety is the issue. No surgeon has the right to place his patient at risk by "forcing" an anaesthetist impaired by fatigue to provide elective service post-call. No anaesthetic department should be allowed to limit its membership for economic reasons if quality of care is constrained. It is time we, individually and collectively, learned to say "no" to those who would have us violate our professional ethics in this manner. We would thereby remove the need for third parties to limit our practice in the arbitrary fashion suggested by Dr. Sheffman, and elevate the image of anaesthesia by responsible action.

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Nitrous oxide is contraindicated in endoscopic surgery

To the Editor:

In their report on trans-tracheal ventilation for laser endoscopic surgery, Ravussin *et al.*[1] use 50 per cent nitrous oxide and 50 per cent oxygen during laser resection of laryngeal lesions.

The use of nitrous oxide during laser endoscopic surgery exposes patients to an unnecessary risk of fire or explosion since nitrous oxide supports combustion.[2] Mixtures of nitrous oxide and oxygen support the combustion of endotracheal tubes set on fire by a CO_2 laser just as readily as 100 per cent oxygen.[3]

It has been recommended that the minimum concentration of oxygen which is clinically appropriate should be administered along with helium or nitrogen during laser endoscopic surgery.[4]

Endotracheal explosion was the most common serious complication of CO_2 laser surgery in a recent survey.[5] The elimination of nitrous oxide from anaesthetic gases should lessen the occurrence of these disasters.

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