

Anesthesiology  
80:1406, 1994  
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## Costs of Inhaled Anesthetics: IV

*To the Editor:*—Although as a proponent of liquid injection-closed circuit anesthesia I admire and appreciate Weiskopf and Eger's insights into the pharmacokinetics and costs of desflurane *versus* isoflurane,<sup>1</sup> I cannot help but worry that their comparison might be misinterpreted and misquoted.

In the Results section of their abstract, Weiskopf and Eger say that "the relative cost of administering . . . desflurane can be less than, greater than, or the same as the cost of administering isoflurane, depending on the background gas inflow rate selected." Anesthesiologists not quantitatively inclined who skim over the text may not realize that desflurane is less expensive only when delivered in fresh gas flows less than or equal to 1 l/min from the moment of induction. Yet many clinicians justifiably will not use such low flows in the absence of an agent analyzer and the presence of a complex, heated vaporizer of revolutionary design. Eger himself<sup>2</sup> has suggested fresh gas flows during desflurane administration in the absence of an agent analyzer of 4–6 l/min for 10–20 min, followed by 2 l/min for the next 1–2 h, after which flows might be reduced. At these flows, Weiskopf and Eger's data<sup>1</sup> show desflurane to be more expensive than isoflurane. Furthermore, upgrading to desflurane agent analysis adds at least \$1,000 in capital and maintenance costs.

In the Discussion section of their report, Weiskopf and Eger contend that "the need for analysis is decreased in the case of poorly soluble anesthetics (e.g., desflurane)."<sup>1</sup> Though agreeing on this point as a theoretical matter, I do not administer desflurane without agent analysis. I cannot help but worry about the long-term reliability of the Tec 6 vaporizer, with its numerous active electrical components. Until this vaporizer has an established track record, I believe my patients deserve real-time measurement to alert me to a malfunction. Desflurane's vaunted insolubility suggests a very rapid progression to cardiovascular collapse in the event that the Tec 6 vaporizer accidentally delivers an overdose.

The prices that Weiskopf and Eger use in their calculations (close to what we in Chicago pay) suggest either that isoflurane is overpriced or that the manufacturer of desflurane is temporarily sacrificing to gain market share for its new proprietary anesthetic. Why should

desflurane cost only \$0.29 per milliliter, when it is synthesized from isoflurane,<sup>2</sup> which sells for \$0.71 per milliliter? Recall that desflurane comes in a more expensive bottle and that its sales must amortize the cost of all the \$9,500 Tec 6 vaporizers that the manufacturer is supplying at no additional charge to encourage anesthesiologists to start using desflurane.

From a broader perspective, I agree with those who hold that because pharmaceutical agents constitute a small percentage of perioperative costs, it may well be worth spending more for a demonstrably superior agent. Had desflurane been *proven* to result in less serious morbidity or mortality; earlier discharge or return to activity; less nausea and vomiting; less postoperative pain; or lower perioperative costs, I would be enthusiastic about the drug, even if it cost more. In reality, though, introduced after so many anesthesiologists had learned to provide safe, rapid-emergence general anesthesia with drugs already available, desflurane's release and acceptance may be far more important to the manufacturer than to our profession and our patients.

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(Accepted for publication March 9, 1994.)

Anesthesiology  
80:1406–1407, 1994  
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## Costs of Inhaled Anesthetics: V

*To the Editor:*—Weiskopf and Eger<sup>1</sup> state that the amount of anesthetic needed to load the patient's lungs and the circuit is "relatively small and will be ignored in the present analysis." I wish to expand on this small point.

Lowe and Ernst have previously termed this amount of anesthetic (equal to MAC times the sum of volume of the anesthetic system plus the patient's functional residual capacity) the "ventilatory prime."<sup>2</sup> With a conservative estimate of 6 l for the functional residual