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In Reply:—We read the letters to the editor written in response to our review article¹ and the accompanying editorial² with great interest, and we are encouraged by the enthusiasm generated for this very important discussion.

Drs. Skipper and DuPont contest our assertion that “outcomes have not appreciably changed” during the period of time covered by our review (1992–2007), and cite three papers to support their position.^{3–5} Each of these papers report similar positive outcomes for physicians treated and monitored by physician health programs, but they specifically do not indicate any improvement in outcomes in the periods covered (1991–2005). These reports support our assertion that “outcomes have not appreciably changed.” In interpreting these studies, it is important to appreciate that the selection process, which is generally described as individuals who *complete* a multiyear program, tends to systematically eliminate early relapsers from the data set. Nonetheless, these are peer-reviewed reports that could and perhaps should have been cited in our review. We agree that treatment and monitoring by a physician health program is essential if an anesthesiologist wishes to return to clinical practice.

Skipper and DuPont also cite the lack of evidence for patient harm reported in the 2005 study by Domino *et al.*; however, lack of evidence is not the same as lack of harm. We believe it is both self serving for the addicted practitioner as well as somewhat irrational from a neurophysiologic perspective to argue that an individual who is managing an addiction that requires diverting medication from their patients is a competent anesthesia provider. One might argue that given a stable dose of methadone, one could be an attentive and focused anesthesiologist. As pointed out by Dr. Torri, when someone is diverting drugs and charting it on a patient's record, one need not look further for harm. To suggest that harm is only measurable in morbidity and mortality is indeed to minimize the role and value of modern anesthesia practice.

Although we had a serious discussion as to whether to suggest a “one strike, you're out” policy for anesthesia practitioners, we chose to suggest an individualized approach. It should be noted that asking a

trained nurse or physician to find another specialty of medicine in which to practice is hardly draconian, and we find it difficult to assert that individuals have some form of right to return to the scene of the crime. We note that “out” could easily mean out of clinical medicine entirely, but even this scenario allows for alternative careers. However, we are also acutely aware of individuals who were treated for substance abuse who have been successfully practicing anesthesiology for 20 or more years without a relapse. Unfortunately, these cases are rare. The suggestion made by Berge *et al.* is a simple solution without ambiguity, but each case of addiction and recovery has its own narrative that we believe merits consideration. We applaud the assertion made by Dr. Katz that if, as a society, we are going to adopt a “one strike, you're out” policy, it should be based on evidence. However, we add with some resignation that the lack of appropriate evidence does not diminish the imperative to make decisions when confronted with an addicted colleague.

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Looking Beyond Model Fidelity

To the Editor:—We read with interest the article by Chandra *et al.* in which the authors address the cost-effectiveness of simulation-based

teaching of procedural skills.¹ The authors compared an inexpensive low-fidelity simulator to a relatively expensive high-fidelity simulator for learning a complex psychomotor skill: Fiberoptic orotracheal intubation. They found that the high-fidelity simulator had no additional educational benefit.

These findings are consistent with the results of other research that has found low-fidelity models to be as effective as high-fidelity models

The above letter was sent to the authors of the referenced article. The authors did not feel that a response was required. —James C. Eisenach, M.D., Editor-in-Chief.

in early skill acquisition^{2,3} although there is some evidence that high-fidelity models may have an advantage later in the learning curve supporting a graduated approach through models of increasing fidelity.⁴ However, we would like to suggest an alternative factor that affects the analysis of Chandra's findings. In addition to differences in fidelity, the models used can also be differentiated according to the part task training theory.⁵

Part task training is defined as the deconstruction of multicomponent tasks into several single-component tasks. When each skill is learned separately, the single-task format allows a more rapid development of automaticity, reducing processing demands during subsequent integration into the performance of the whole procedure.⁶ Fiberoptic orotracheal intubation is a complex psychomotor task which requires the association of two component skills: The manipulation of the fiberoptic bronchoscope and the appreciation of the endoscopic view of the upper airway anatomy.

The AccuTouch Flexible Bronchoscopy Simulator (Immersion Medical, Gaithersburg, MD) can be considered a full task trainer model, whereas the "choose-the-hole" model can be classified as a single task trainer dedicated to learn specifically the manipulation of the bronchoscope. The other component skill of identifying the endoscopic appearance of the airway anatomy can be achieved through other simulators such as the virtual fiberoptic intubation part task trainer. The virtual fiberoptic intubation software (Institut de Recherche contre les Cancers de l'Appareil Digestif, Strasbourg, France) is a free screen-based simulator that focuses on learning normal and altered endoscopic airway anatomy away from the fiberoptic bronchoscope.⁷ Using only the computer's mouse or keyboard, this virtual progression helps the learner to mentally integrate the schema of the correct airway route. The difference between the groups in Chandra's study is not only one of fidelity, but also the difference between a full-task and a part-task simulation. It is interesting that there was no difference between the groups, and we can only speculate whether there would have been a difference if the part-task group had in addition used another part-task trainer such as the virtual fiberoptic intubation part task trainer to enable deliberate practice of both component skills.

We suspect that each type of simulator has a specific role. Part task trainers may be used for learning each component of a complex task, whereas full task trainers may be used to integrate those skills before working in the clinical setting. Given that Chandra *et al.* found a single part task trainer to be equivalent to a full task trainer, we hypothesize that the use of complementary single task trainers has the potential to be more effective than a full task trainer in early skill acquisition for fiberoptic orotracheal intubation.

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A Near Miss: A Nitrous Oxide-Carbon Dioxide Mix-up Despite Current Safety Standards

To the Editor:—This case summary reports the inadvertent connection of a nitrous oxide hose to a carbon dioxide wall outlet and subsequent administration of high levels of carbon dioxide gas to a patient during anesthesia. The possibility of such a misconnection was unexpected, as it was assumed that the safety-keyed connection system would not allow such a coupling. Therefore, we consider it important to warn others of this occurrence.

Briefly, a healthy 32-year-old male presented for extracorporeal shockwave lithotripsy. The case was scheduled in a "procedure room." Because of the small size of this room there is no boom dedicated to the delivery of anesthesia gas and electricity, as there is in the standard operating rooms. Medical gas hoses from the Draeger Narkomed 2B anesthesia machine (Draeger Medical, Inc., Telford, PA) have to be connected to gas outlets on the wall. This is the only operating room at our institution with such a configuration. The gas outlets (Connect2 Quick-Connect Medical Gas Outlets) and hose connectors (Ohmeda-style male hose adapters) were manufactured by Allied Healthcare Products, Inc., St. Louis, MO.

On the morning of surgery, a CA-1 anesthesia resident performed the daily equipment check but did not check the nitrous oxide line up to

the wall outlet. After premedication the patient was transported to the operating room. He received 100 mg of lidocaine with 30 mg of propofol after preoxygenation. Nitrous oxide and oxygen flows were turned to 4 l each, and an inhalational induction was planned with sevoflurane. The patient continued breathing for 2 to 3 min without any change in consciousness; the induction was taking longer than anticipated. Upon checking the anesthesia machine, it was noticed that there was no nitrous oxide gas flow and the nitrous oxide hose was disconnected from the wall. The lithotripsy machine technician was standing nearby and was asked to attach the nitrous oxide hose to the wall outlet. After connection, the pipeline pressure gauge rose and there was return of flow through the nitrous oxide flow meter. Soon, the patient started to noisily hyperventilate, exchanging very large tidal volumes (> 1,000 ml). The capnograph audibly alarmed, showing an end-tidal carbon dioxide of 105 mmHg. The gas supply source was checked, and it was found that the nitrous oxide gas line was connected to the carbon dioxide gas wall outlet. As this particular room had no nitrous oxide wall outlets, the nitrous oxide hose was disconnected from the carbon dioxide wall outlet to allow use of the E cylinder of nitrous oxide (otherwise, the pressure differential would favor the higher-pressure wall source). The E cylinder was then employed for induction and maintenance of the patient. After the patient was

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