Your observation that "advanced directives need to be developed before transferring patients from ICU to other areas offering lower levels of intensive care" is appropriate. Our article, however, focused on the need to develop criteria that can be applied to presenting patients to evaluate whether or not they would benefit from ICU, or if, in fact they would progress equally well or better in an alternative setting with less intensive levels of care.

As was evidenced by our review of the literature, low risk patients are admitted to ICU primarily for observation purposes, and, statistically, they do not require the high levels of care offered by their ICU experience. In this case, they probably would do equally well if admitted to an observation unit that offers the required monitoring of their condition without the high costs associated with an ICU stay.

As for your comment regarding "100 percent guarantee of good outcome before changing a lesser value of care," I don't believe that this is possible or practical in such a situation. What is possible is planning step-down levels of care that offer appropriate backup in the event additional support is required. This approach would offer the patient appropriate levels of security without incurring the high economic costs or elevated risk of iatrogenic illness possibly associated with ICU care.

I agree with your observation that the decision to offer maximum levels of care to patients with high risk of death or persistent vegetation state is a decision that the families and society must ultimately make for physicians to feel free to select care based on their best judgements. Until this occurs, physicians will continue to respond to high risk patients with little chance of survival or improved quality of life by giving them the highest level of care available to protect themselves against possible legal retaliation.

This may change, however, as the economics of healthcare will ultimately force caregivers to make decisions as to which patients will best respond to a shrinking pool of available healthcare resources.

Hopefully, more studies will produce tools that will enable physicians to make more informed decisions about the patients who will benefit the most from intensive care.

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Wet Nebulizers vs Metered Dose Inhalers

To the Editor:

We read with interest the article by Colacene et al1 that appeared in the September 1993 issue of Chest in which the effects of Albuterol administered by metered dose inhaler (MDI) with a holding chamber or wet nebulizer were compared in patients suffering of acute asthma. The authors support the hypothesis that a dose ratio of six in favor of MDI is needed to obtain equivalent bronchodilatation. We believe that several issues need to be addressed before a final conclusion can be drawn regarding the place of wet nebulizers for treatment of acute asthma.

First, the definition of acute asthma lacks the precision needed for a therapeutic study and can lead to controversial interpretations. As suggested in the guidelines for the diagnosis and management of asthma,2 asthma can be precisely classified in three groups by severity of disease: mild, moderate, and severe. The FEV1 and blood gas analysis failed to estimate severity of patients disease. The fact that all patients but one could be discharged supports the hypothesis that they belonged to acute and moderate asthma. The only patient requiring hospital admission had to be treated by wet nebulization. Indeed, wet nebulizers are in our opinion valuable for treatment of acute and severe asthma. Often in such a situation, patients cannot participate in MDI treatment and require passive beta adrenergic therapy at a high dosage.

It was shown by Barnes et al3 that beta-adrenoreceptors are located in the small bronchi. The preference of a nebulizer, the name of which is unfortunately in the study by Colacene et al, producing a 3.6 μm mass median aerodynamic diameter aerosol is therefore controversial. Use of a facial mask is also controversial as inhalation through a mouthpiece is known to limit nasopharyngeal impaction. These two points are particularly important considering that the effects of a wet nebulizer were compared with those induced by an MDI and a holding chamber producing a 1.3 μm mass median aerodynamic diameter aerosol inhaled through a mouthpiece. Moreover, the inhaled fraction, which is one of the most important criteria to assess effectiveness of a wet nebulizer,4 was not considered at all. The remaining volume of solution in the nebulizer at the end of the inhalation is high with some poor nebulizers, requiring a correction to estimate the actual amount of drug inhaled. Finally, the effects of a smaller dose of albuterol administered with the nebulizer was not assessed and the question of a smaller ratio to obtain an equivalent bronchodilatation in these conditions remains unsolved.

We believe that all studies comparing effects of nebulizers and MDIs have to be carefully analyzed to avoid misinterpretations. Therefore, we think that too much relevant data is lacking to recommend extensive use of MDI rather than wet nebulizers to treat acute and severe asthma in emergency rooms.

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1 Colacene A, Affalmo M, Wolkove N, Kreisman H. A comparison of albuterol administered by metered dose inhaler (and holding chamber) or wet nebulizer in acute asthma. Chest 1993; 104:835-41

Occupational Exposure and Pulmonary Function in Health Care Workers in an Aerosol Pentamidine Clinic

To The Editor:

In the August, 1983, issue of Chest, McDermid et al reported adverse effects in healthcare workers (HCWs) administering aerosol pentamidine (AP) in an inpatient unit were engineering controls were not yet available.

We have reported similar studies from our ambulatory central AP clinic in Toronto, Canada, which has provided over 38,000 individual treatments (60 mg pentamidine via Fisonede).5,6 Al-

980 Communications to the Editor

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