

COPD and GOLD Stage I

To the Editor:

An abnormally low FEV₁/FVC ratio is universally accepted as indicative of obstructive lung disease. Clearly, the choice of cutoff to define abnormality is important. The GOLD (Global Initiative for Chronic Obstructive Lung Disease) group set the lower limit of normal (LLN) at 0.7 irrespective of age, defining GOLD COPD stage I as FEV₁/FVC below 0.7 and FEV₁ above 80% predicted.¹ In a recent issue of *CHEST* (January 2012), Mannino and Diaz-Guzman² argue that patients in GOLD stage I are at increased risk of premature death from respiratory causes.

As shown in many publications, the 0.7 cutoff is too simplistic. After age 45, the LLN based on the fifth centile of the FEV₁/FVC ratio falls progressively below 0.7, meaning that the 0.7 cutoff identifies many older patients above the LLN as false positives. Several studies have tried to validate GOLD stage I for identifying obstructive lung disease:

- In asymptomatic subjects, it was neither associated with premature death^{3,4} nor with an abnormal decline in FEV₁, respiratory care use, or quality of life compared with a reference group.⁵
- It was not associated with premature death or respiratory symptoms.⁶
- The adjusted hazard ratio for premature death was not significant.⁷
- Now, Mannino and Diaz-Guzman² state that subjects in GOLD stage I who are above the LLN are at increased risk of premature death from respiratory causes. They fail to present adjusted hazard ratios for respiratory death. Hence, their conclusion lacks evidence; it also contradicts a previous study where the same analysis was done on the same data.⁶

Thus, there is no evidence to support the use of GOLD stage I. Conversely, there is considerable evidence in favor of the LLN:

- Only GOLD stage I with FEV₁/FVC below the LLN was associated with increased risk of death.^{6,7}
- The use of the LLN for both FEV₁/FVC and FEV₁, rather than a fixed ratio and 80% predicted, identified persons with an increased risk of death and prevalence of respiratory symptoms.⁸
- "After correction for potential confounders, only severe COPD as defined by the BTS [British Thoracic Society] criteria was still associated with mortality."⁹

We conclude that GOLD stage I is not associated with respiratory disease or death from respiratory causes unless FEV₁/FVC is below the LLN. Incorrectly labeling subjects as having COPD by the GOLD criteria has detrimental consequences for the individual and family: It incurs high costs for society, and it hampers research into the causes of COPD and its treatment. The mystery is why the GOLD group continues to encourage its use.

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Contemporary Aminophylline Use for Status Asthmaticus in Pediatric ICUs

To the Editor:

Methylxanthines, including aminophylline and theophylline, have long played a significant role in the treatment of pediatric acute asthma exacerbations.¹ Current expert guidelines recommend against aminophylline use for acute exacerbations because of the availability of selective β_2 -agonists such as albuterol, in addition to the narrow therapeutic index and the limited evidence for efficacy of this drug.¹⁻³ We sought to examine whether aminophylline continues to be used for status asthmaticus in pediatric ICUs (PICUs) by surveying PICU fellowship training programs.

We administered an e-mail-based questionnaire to 58 pediatric critical care fellowship directors in the United States representing a geographic sampling of small to large training programs. The survey consisted of 15 questions pertaining to the use of

aminophylline for status asthmaticus in the PICU (e-Appendix 1). The survey was distributed three times at 3-week intervals, and responses were anonymous. The study protocol and questionnaire were approved by the Vanderbilt University institutional review board (protocol No. 101136).

Responses were received from 39 of the surveyed program directors (67%). Twenty-three of those responses (59%) indicated that their PICUs currently use aminophylline for status asthmaticus. All positive respondents (100%) indicated that aminophylline use was based on clinical judgment rather than institutional protocol. Twenty of those using aminophylline (87%) stated that the medication was used only when other treatments had failed. Fourteen of the respondents (61%) whose institution used aminophylline identified a therapeutic range for serum aminophylline levels. Six of these respondents (43%) identified a therapeutic serum level of 10 to 20 $\mu\text{g}/\text{mL}$ for aminophylline, the generally accepted therapeutic range.⁴ There was variation in the reporting of both the minimal effective serum level (mean, 10 $\mu\text{g}/\text{mL}$; range, 5-15 $\mu\text{g}/\text{mL}$) and the toxic serum level (mean, 17.9 $\mu\text{g}/\text{mL}$; range, 10-25 $\mu\text{g}/\text{mL}$).

Aminophylline continues to be used to treat status asthmaticus in PICUs, as determined by surveying fellowship training programs, despite limited evidence for efficacy and expert guidelines recommending against its use for this purpose. If pediatric critical care physicians are to continue to use this drug, further studies are recommended and warranted to assess its efficacy and safety.

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What Is the Pulmonary Rehabilitation Adapted Index of Self-Efficacy Tool Actually Measuring?

To the Editor:

We read with great interest the study by Vincent et al¹ recently published in *CHEST* (December 2011). We commend the authors for expanding the field of self-efficacy research for patients with COPD.

The Pulmonary Rehabilitation Adapted Index of Self-Efficacy (PRAISE) tool contains 15 items, 10 assessing "general" self-efficacy and five assessing self-efficacy specific to pulmonary rehabilitation (PR). The PRAISE tool showed a significant response following PR; however, given the task-specific nature of the self-efficacy construct,^{2,3} we wonder if the increase in self-efficacy was predominantly related to an improvement in the PR-specific items rather than in general self-efficacy. We believe the article would have benefitted from an analysis of individual item performance. If the improvement had been related to PR items only, it may have allowed for abbreviation of the tool. On the other hand, improvement of the general self-efficacy items would suggest that PR benefited areas other than mastery of exercise, such as problem-solving and coping skills (critical aspects of behavioral change for self-management), even though changes in behavior following PR were not measured in this study.

Our interest in exploring the task-specific nature of the self-efficacy construct emerges from our own research. We recently completed the validation of two physical activity questionnaires in patients with COPD compared with objectively measured physical activity, and we included self-efficacy as a possible covariate. We found that general self-efficacy (Stanford Self-Efficacy for Managing Chronic Disease 6-Item Scale) was not significantly associated with physical activity. If the proposed analysis confirms that the PR-related items were responsible for the measured improvement, then our results are congruent and collectively highlight the importance of creating task-specific self-efficacy tools.

We agree with the authors that self-efficacy for activities prescribed in PR may contribute to a critical behavior: adherence to the PR program. Regrettably, the pre-PR PRAISE score showed no association with completion of the program. There were, however, correlations between the change in the Chronic Respiratory Questionnaire emotion and mastery domains (which may represent improved behaviors) and the change in the PRAISE score following PR. We believe a mediation analysis, as described previously,^{4,5} is the most appropriate way to determine if the change in self-efficacy is responsible for the improvements in these domains rather than the direct effect of the PR itself.

We believe the proposed analyses will help determine what the PRAISE tool is actually measuring. We are convinced that additional research aimed at understanding the behavioral aspects of PR is critically needed.