

2. **Echevarria C**, Anwar GA, Parker S, *et al.* Risk disclosure prior to bronchoscopy. *Thorax* 2010;**65**:277–8.
3. **General Medical Council.** *Consent: patients and doctors making decisions together.* General Medical Council UK, 2008.

## Author’s response: ‘risk disclosure prior to bronchoscopy’—Bianchi *et al*

We are grateful to Dr Bianchi and colleagues for their interest in our study.<sup>1</sup> They argue that ‘knowledge of local and even personal bronchoscopic practice and performance’ is necessary to determine the level of risk to the patient from the procedure and hence the degree of information that must be provided.<sup>2</sup> This is certainly true if there is reason to believe that the risks in an institution or for an individual differ significantly from the norm—in either direction.

A database, such as that used in the Sheffield Teaching Hospitals, for recording complications following bronchoscopy is a valuable resource for auditing outcomes and quality assurance. However, one must be cautious when interpreting the absence of a serious complication in any given series. Hanley and Lippman-Hand, in a now-classic paper, described the ‘rule of three’ for such series: if none of *n* patients showed the event of interest, we can be 95% confident that the chance of this event is at most 3/*n*.<sup>3</sup> For example, the Sheffield data showing no death with 1261 fiberoptic bronchoscopies translate into a 95% confidence limit ranging from zero to an upper limit of 1 death in 420 procedures (Clinicians may find the other implication of using CI—that occurrence of an uncommon complication is not of itself an evidence of poor performance—more comforting). The absence of an uncommon complication in a personal or an institutional series will not of itself help the clinician strike the difficult balance between providing too much and too little risk information.

**Shaun T O’Keeffe, Mateen Uzbeck, Colin Quinn**

Galway University Hospitals, Ireland

**Correspondence to** Shaun T O’Keeffe, Galway University Hospitals, Unit 4, Galway, Ireland; sokanc@iolfree.ie

**Competing interests** None.

**Provenance and peer review** Not commissioned; not externally peer reviewed.

Accepted 24 September 2010  
Published Online First 30 October 2010

*Thorax* 2011;**66**:358. doi:10.1136/thx.2010.151761

## REFERENCES

1. **Uzbeck M**, Quinn C, Saleem I, *et al.* Randomised controlled trial of the effect of standard and detailed risk disclosure prior to bronchoscopy on peri-procedure anxiety and satisfaction. *Thorax* 2009;**64**:224–7.
2. **Bianchi SM**, Saha S, Anderson P. Risk disclosure prior to bronchoscopy. *Thorax* 2010. Published online first: doi:10.1136/thx.2010.150391.

3. **Hanley JA**, Lippman-Hand A. If nothing goes wrong, is everything all right? Interpreting zero numerators. *JAMA* 1983;**249**:1743–5.

## Factors that predict failure in home management of an acute exacerbation of COPD

There is increasing interest in managing patients with non-severe acute exacerbation of chronic obstructive pulmonary disease (AECOPD) in the community. Hospital at Home and COPD Outreach programmes facilitate discharge of patients that would otherwise require hospital admission and have been shown to reduce hospital stay,<sup>1</sup> readmission<sup>2</sup> and healthcare costs without compromising patient care and satisfaction.<sup>3</sup> Despite the human and health-related benefits associated with home services, ~30% of patients relapse within 8 weeks, requiring hospital readmission.<sup>2</sup>

In an effort to better understand the factors that predict relapse in these patients, we prospectively studied consecutive admissions with AECOPD discharged to a COPD Outreach programme. Patients with an AECOPD who met specific criteria<sup>4</sup> were enrolled within 24 h of presentation to hospital. At presentation demographics, number of hospitalisations in the previous year, oxygen use, vaccination status (pneumococcal and influenza) and smoking history were assessed. Breathlessness and quality of life scores were recorded and oxygen saturations and spirometry were measured. Rehospitalisation data were collected at day 14, 6 weeks and 3 months following discharge. Readmission for AECOPD was defined as hospitalisation for >24 h and was assessed using hospital records.

Patient variables were analysed for their association with readmission by day 14, 6 weeks and 3 months using  $\chi^2$  or the Fischer exact test. Multivariate analyses to

evaluate for independent risk factors were performed using logistic regression with readmission as the categorical dependent variable. Admissions for reasons other than COPD were not included in the analyses.

In total, 349 admissions with AECOPD were enrolled in the study. There were 46 readmissions (13%) for AECOPD to hospital by day 14, 81 (23%) by 6 weeks and 106 (30%) by 3 months. The study had approximately equal numbers of males (49%) and females (51%), with a mean age of 69.2 years. Median FEV<sub>1</sub> (forced expiratory volume in 1 s) % predicted was 46.43%.

Univariate analysis is shown in table 1. We found no association between readmission and age, gender, spirometry, quality of life score or length of index admission.

Multivariate analysis identified that hospitalisation in the previous year (p=0.03, OR 2.26, CI 1.1 to 4.8) and a Borg score  $\geq 3$  (p=0.04, OR 2.15, CI 1.0 to 4.6) predicted readmission by day 14 in 75% of cases. Long-term oxygen therapy (p=0.001, OR 3.28, CI 1.6 to 6.5), pack-year history  $\geq 50$  (p=0.008, OR 3.13, CI 1.4 to 7.3) and Borg score  $\geq 3$  (p=0.001, OR 3.31, CI 1.6 to 6.8) predicted 6 week admission in 68.9%.

Our study identifies independent risk factors that are easy to assess, reproducible and can be carried out as early as arrival to hospital, allowing these patients to be identified early in their admission. A significant factor associated with early readmission was the level of dyspnoea reported by patients at the time of enrolment. This reflects the importance of the subjective symptom of breathlessness as a factor that drives patients to seek medical attention.

This is the first study to identify specifically the factors that are associated with rehospitalisation in exacerbations managed out of hospital. This management strategy will become increasingly important in reducing the costs associated with AECOPD

**Table 1** Univariate analyses of association between independent variables and readmission

Variable	Day 14	Week 6	Month 3
Admissions in previous year	p=0.02 (OR 2.3, CI 1.1 to 4.7)	p=0.014 (OR 2.0, CI 1.2 to 3.5)	p=0.027 (OR 1.8, CI 1.0 to 3.0)
Long-term oxygen therapy	p<0.05 (OR 1.95, CI 0.9 to 3.8)	p<0.001 (OR 3.84, CI 2.2 to 6.7)	p<0.001 (OR 3.5, CI 1.9 to 6.3)
Portable oxygen	p=0.51 (OR 1.33, CI 0.6 to 2.9)	p=0.02 (OR 2.76, CI 1.5 to 5.1)	p<0.001 (OR 3.28, CI 1.7 to 6.3)
Home nebuliser	p=0.43 (OR 1.38, CI 0.6 to 3.1)	p=0.36 (OR 1.3, CI 0.71 to 2.5)	p=0.24 (OR 1.4, CI 0.8 to 2.7)
Oxygen saturation <92% on room air	p=0.28 (OR 1.51, CI 0.7 to 3.3)	p=0.005 (OR 2.17, CI 1.4 to 3.3)	p=0.02 (OR 1.7, CI 1.2 to 2.4)
Pack-year history $\geq 50$	p=0.78 (OR 1.07, CI 0.35 to 3.3)	p=0.03 (OR 3.25, CI 1.5 to 6.9)	p=0.01 (OR 2.86, CI 1.3 to 6.2)
Borg scale $\geq 3$	p=0.026 (OR 2.47, CI 1.2 to 5.1)	p<0.001 (OR 3.23, CI 1.7 to 6.0)	p<0.001 (OR 3.23, CI 1.7 to 6.1)
MMRC scale $\geq 3$	p=0.02 (OR 2.56, CI 1.1 to 5.7)	p=0.01 (OR 2.0, CI 1.1 to 3.6)	p=0.01 (OR 2.0, CI 1.1 to 3.4)
Vaccination status (pneumococcal and influenza)	p=0.65 (OR 1.2, CI 0.58 to 2.4)	p=0.8 (OR 1.1, CI 0.61 to 1.9)	p=0.83 (OR 0.94, CI 0.55 to 1.6)

Pack-year history, number of packets of cigarettes smoked per day  $\times$  total number of years smoking; Borg scale refers to level of dyspnoea at enrolment; MMRC (modified Medical Research Council) scale  $\geq 3$  refers to level of dyspnoea at enrolment.