Endobronchial and transbronchial biopsy experience: A United Kingdom survey
Janet Fallon1 & Andrew R.L. Medford2

1 Respiratory Medicine, North Bristol Lung Centre, Southmead Hospital, Bristol, UK
2 North Bristol Lung Centre, Southmead Hospital, Bristol, UK

Keywords
Bronchoscopy; endobronchial biopsy; survey; training; transbronchial biopsy.

Abstract
Background: Trainees are performing fewer bronchoscopies as a result of the increased use of endobronchial ultrasound-guided transbronchial needle aspiration. Workforce planning and changes in trainee working patterns may also have compounded this situation. We investigated current trends in endobronchial biopsy (EBB) and transbronchial biopsy (TBB) training and competency in respiratory trainees and consultants across the United Kingdom.

Methods: We performed a national survey and received 131 online responses from 58 consultants and 73 registrars across 13 United Kingdom deaneries.

Results: A significant proportion (31%) of consultants, more than half of which were new consultants, had performed <500 bronchoscopies. Bronchoscopic biopsy experience varies widely across trainees and consultants (9.1% of senior trainees and 14.3% of new consultants had performed <100 bronchoscopies). Most trainees and some new consultants reported performing relatively low numbers of EBB (13% <20 and 52% <50 procedures) and TBB (75% of trainees, 36% of new consultants, 12% of established consultants <10 procedures). Significant numbers of trainees do not feel competent in EBB (24%) and TBB (89% of junior trainees, 64% of senior trainees) and some consultants (24% of new and established consultants) wish for support with TBB.

Conclusions: These results have implications for future specialist training, curriculum planning, and service configuration. Training and performance of EBB and TBB may become concentrated in centers with an adequate volume of these procedures. Higher volumes of EBB and TBB may well be more likely to occur paradoxically in centers without endobronchial ultrasound-guided transbronchial needle aspiration; however, this hypothesis requires further study.

Introduction
Endobronchial biopsy (EBB) and transbronchial biopsy (TBB) have been used for the diagnosis of lung disease for over 40 years; however, there is no firm national guidance on the number of procedures trainees require to achieve competency.1 A 2009 survey of bronchoscopy training performed by the British Thoracic Society revealed that all trainees who responded felt confident to perform EBB by the end of training, but not all were confident in TBB.2,3

The increasing use of endobronchial ultrasound (EBUS) has resulted in a decline in the number of bronchoscopies being performed for the diagnosis/staging of lung cancer and sarcoidosis, among other respiratory pathologies. As a result of this decline, there is concern within the profession that trainees are not obtaining adequate experience in bronchoscopic biopsy techniques to feel confident to undertake these procedures independently. This effect is compounded by changes in working patterns and workforce capacity on time for specialty training.4

Keywords
Endobronchial biopsy; transbronchial biopsy; survey; training; bronchoscopy.
Our aim was to investigate current trends in EBB and TBB training and competency in both respiratory trainees and consultants across a wide variety of centers and regions in the United Kingdom (UK).

Methods

We performed a national survey of respiratory specialist trainees and consultants to investigate current trends in bronchoscopy training and competency (Table 1). An online survey was sent to the training program directors of all UK deaneries and was circulated to the trainees and consultants in those areas in July 2016. We collated and received 131 responses over the next three months from 58 consultants and 73 registrars across 13 UK deaneries. The online survey was open to all consultants and registrars in the UK. “Junior trainees” were defined as specialist trainees in years 3–5 of their specialist training (ST3–5) or years 1–3 of registrar training. “Senior trainees” were defined as specialist trainees in years 6–7 of their specialist training (ST6–7) or years 4–5 of registrar training. “New consultants” were defined as being within the first five years of consultancy, “established consultants” as being between years 6 and 10 of consultancy, and “senior consultants” as being beyond 10 years of consultancy.

Results

Table 2 illustrates bronchoscopy numbers according to experience. Interestingly, 31% of respiratory consultants had performed <500 bronchoscopies. Of this group, new consultants (<5 years’ consultancy) comprised only 55.6% and 11.1% had 10 years’ consultancy experience.

Looking at a threshold of >100 bronchoscopies (to allow meaningful analysis of trainee grades in particular), 90.9% of senior trainees (ST6–7) had performed >100 bronchoscopies compared to 37% of junior trainees (ST3–5). Notably, only 85.7% of new consultants (<5 years of consultancy) had performed >100 bronchoscopies compared to 100% of both established (6–10 years of consultancy) and senior (>10 years’ consultancy) consultants.

Endobronchial biopsy experience

Experience in EBB varied significantly among trainees and consultants (Table 3). As expected, significantly fewer junior trainees had performed >50 EBB procedures compared to senior trainees (15.4% vs. 42.4%). A similar variation was noted among consultants (100% senior vs. 78.9% consultants vs. 64.3% new consultants).

However, a significant number of senior trainees and new consultants reported lower numbers (13% combined

| Table 1 Survey distributed to participants |
|------------------------------------------|
| Questions                                 |
| 1. What is your year of training or consultancy? (Select option) |
| ST3                                      |
| ST4                                      |
| ST5                                      |
| ST6                                      |
| ST7                                      |
| Out of program (e.g. research fellow)    |
| Consultant (0–5 years)                   |
| Consultant (6–10 years)                  |
| Consultant (>10 years)                   |
| 2. Which deanery are you currently working in? (Free text) |
| 3. In what type of hospital are you currently working? (Select option) |
| Specialist tertiary referral center providing advanced bronchoscopy services |
| Teaching hospital                        |
| District general hospital                |
| Other (please specify)                   |
| 4. How many bronchoscopy procedures have you performed in the last 12 months? (Select option) |
| 0–20                                     |
| 21–50                                    |
| 51–100                                   |
| >100                                     |
| 5. How many bronchoscopy procedures have you performed in total? (Select option) |
| 0–20                                     |
| 21–50                                    |
| 51–100                                   |
| 101–200                                  |
| 200–500                                  |
| >500                                     |
| 6. How many endobronchial biopsies (EBB) have you performed in total? (Select option) |
| 0                                        |
| 1–5                                      |
| 6–10                                     |
| 11–20                                    |
| 20–50                                    |
| >50                                      |
| 7. How confident do you feel in your ability to perform endobronchial biopsies (EBB)? (Select option) |
| Need more theoretical training before attempting EBB |
| Need to observe more procedures before attempting EBB |
| Need direct supervision to perform EBB |
| Need indirect supervision to perform EBB |
| Happy to perform independently |
| What factors affect your confidence in your ability to perform EBB? (Free text) |
| 8. What training have you had in transbronchial biopsy (TBB)? (Select option) |
| No training |
| Theoretical or online training |
| Clinical skills or simulation training |
| Observed other operator performing procedure |
| Practical supervision from consultant colleagues during training (1–5 occasions) |
Table 1 Continued

| Questions                                                                 | Data of respiratory physicians | Number (%) |
|--------------------------------------------------------------------------|--------------------------------|------------|
| Practical supervision from consultant colleagues during training         |                                |            |
| (5–10 occasions)                                                         |                                |            |
| Practical supervision from consultant colleagues during training         |                                |            |
| (> 10 occasions)                                                         |                                |            |
| Other (Please specify) (Free text)                                       |                                |            |
| 9. How many transbronchial biopsies have you performed in total? (Select option) |                                |            |
| 0                                                                       |                                |            |
| 1–5                                                                     |                                |            |
| 6–10                                                                    |                                |            |
| 11–20                                                                   |                                |            |
| 20–50                                                                   |                                |            |
| >50                                                                     |                                |            |
| 10. How confident do you feel in your ability to perform transbronchial biopsies (TBB)? (Select option) |                                |            |
| Need more theoretical training before attempting TBB                     |                                |            |
| Need to observe more procedures before attempting TBB                     |                                |            |
| Need direct supervision to perform TBB                                    |                                |            |
| Need indirect supervision to perform TBB                                  |                                |            |
| Happy to perform independently                                           |                                |            |
| What factors affect your confidence in your ability to perform TBB? (Free text) |                                |            |

ST, specialist training.

<20 EBB procedures vs. 52% combined <50 EBB procedures) (Fig 1). The majority of those with experience of >20 EBB procedures felt confident to perform this procedure independently (89%); however, 24.2% of senior trainees did not feel confident to perform these procedures independently (Table 3). The majority of consultants (apart from 5.4% of established consultants) expressed confidence with EBB.

Table 2 Bronchoscopies performed according to experience

| Data                                      | Number (%) |
|-------------------------------------------|------------|
| Bronchoscopies performed by respiratory consultants (total) |            |
| >500                                      | 40/58 (69.0) |
| 200–500                                   | 13/58 (22.4) |
| <200                                      | 5/58 (8.6)  |
| Seniority of respiratory consultants who performed <500 bronchoscopies (total) |            |
| <5 years (new consultant)                 | 10/18 (55.6) |
| 6–10 years (established consultant)       | 6/18 (33.3)  |
| >10 years (senior consultant)             | 2/18 (11.1)  |
| Proportion of respiratory physicians who performed >100 bronchoscopies by seniority (total) |            |
| ST3–5 (junior trainee)                    | 10/27 (37.0) |
| ST6–7 (senior trainee)                    | 30/33 (90.9) |
| Consultant <5 years (new consultant)      | 12/14 (85.7) |
| Consultant 6–10 years (established consultant) | 19/19 (100.0) |
| Consultant >10 years (senior consultant)   | 24/24 (100.0) |

ST, specialist training.

Table 3 Endobronchial biopsy experience

| Data                                      | Number (%) |
|-------------------------------------------|------------|
| Proportion who performed > 50 EBB procedures by seniority |            |
| ST3–5 (junior trainee)                    | 4/26 (15.4) |
| ST6–7 (senior trainee)                    | 14/33 (42.4) |
| Consultant <5 years (new consultant)      | 9/13 (69.2)  |
| Consultant 6–10 years (established consultant) | 15/19 (78.9) |
| Consultant >10 years (senior consultant)   | 24/24 (100.0) |
| Independence self-rating of EBB procedure  |            |
| ST3–5 (junior trainee)                    | 6/26 (23.1) |
| ST6–7 (senior trainee)                    | 25/33 (75.8) |
| Consultant <5 years (new consultant)      | 14/14 (100.0) |
| Consultant 6–10 years (established consultant) | 18/19 (94.7) |
| Consultant >10 years (senior consultant)   | 24/24 (100.0) |

EBB, endobronchial biopsy; ST, specialist training.

Transbronchial biopsy experience

Similarly, the results for TBB showed significant variation (Table 4). Almost all trainees (except 3% of senior trainees) reported performing <50 TBB procedures. A significant minority (25%) of senior consultants and most new and established consultants (78.6% and 73.7%, respectively) reported performing <50 TBB procedures. Significant numbers of respondents reported low numbers of TBB. Most trainees (75%), some new consultants (36%), and even some established consultants (12%) had performed <10 TBB procedures (Fig. 1). The majority of those who

Figure 1 Number of trainees performing 0 (blue), 1–5 (red), 6–10 (green), 11–20 (purple), 21–50 (light green), and > 50 (orange) (a) endobronchial biopsy (EBB) or (b) transbronchial biopsy (TBB) procedures.
had performed >10 TBBs felt confident to do so independently (90%). A minority of trainees rated themselves as competent in performing TBB (11.5% of junior trainees, 36.4% of senior trainees). A significant minority (24%) of new and established consultants reported requiring ongoing supervisory support when performing TBB. We asked respondents about the TBB training they had received, with the majority reporting practical experience through observation and supervised procedures. A minority of respondents had received theoretical/online or clinical skills/simulation training (8% and 4%, respectively). We asked respondents to highlight factors affecting their confidence in TBB, which prompted the following themes:

- Lack of experience/number performed
- Concern about non-diagnostic samples
- Risk of pneumothorax/patient selection
- Role of fluoroscopy
- Long duration since performing the last TBB
- Time out of training/recent return from maternity leave
- Dislike of the procedure

### Bronchoscopy services center

We asked participants to advise what type of center they were currently working in: 20% worked in a specialist bronchoscopy center (centers performing interventional and advanced diagnostic bronchoscopy, e.g. EBUS-TBNA, cryobiopsy, endobronchial valve insertion, autofluorescence bronchoscopy), 31% in a teaching hospital, 46% in a district general hospital, and 3% reported working in other centers. We found that consultants working in specialist bronchoscopy centers had performed higher numbers of bronchoscopies (>100) within the last 12 months (40% in specialist centers vs. 16% in district general hospitals vs. 21% in teaching hospitals). The trainees performing the highest numbers (>100) of bronchoscopies within the last 12 months worked in district general hospitals (45% in district general hospitals vs. 15% in teaching hospitals and 24% in bronchoscopy centers). Senior trainees working in district general hospitals also felt more confident in performing EBB and TBB independently (Fig 2).

### Discussion

Bronchoscopic biopsy experience varies widely across respiratory trainees and consultants. Most trainees and some new consultants report having performed relatively low numbers of EBB and TBB. Significant numbers of respiratory trainees do not feel competent in EBB and TBB and some respiratory consultants report the need for support with TBB. Respondents quoted lack of experience and concerns about complications as factors affecting their confidence to perform these procedures. We acknowledge that this survey involved retrospective data recall by participants with self-rated assessment of competency in EBB and TBB. Nevertheless, we feel these data highlight important trends and changes in practice.

We speculate that our findings may partly result from expansion in the use of EBUS-TBNA, causing a reduction in the use of EBB and TBB for cancer and granulomatous disease cases in particular. Guidance on specific training requirements for EBB and TBB may facilitate specialist trainees to obtain adequate competency in these procedures. Should these trends continue in the future, EBB and TBB may evolve to become a subspecialist skill in specialist bronchoscopy centers or centers with a high volume of EBB and TBB.
Disclosure

The authors report no conflict of interest.

References

1. Du Rand IA, Blaikley J, Booton R et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: Accredited by NICE. Thorax 2013; 68 (Suppl. 1): i1–44.

2. Du Rand IA, Lewis RA. BTS bronchoscopy training survey 2009. Thorax 2009; 64: (Suppl.)A159–66.

3. Smyth CM, Stead RJ. Survey of flexible fibreoptic bronchoscopy in the United Kingdom. Eur Respir J 2002; 19: 458–63.

4. Medford AR. Impact of the European working time directive on specialty training. Qual Saf Health Care 2008; 17: 79–80.