In addition, we propose the use of additional diagnostic tools other than biopsy for the detection of malignancies. In a retrospective study, 142 patients were included who had undergone surgery for suspicion of malignancy over the past 5 years at our institute. The mean diameter of the tumors was 3.5 cm (range, 1 to 10 cm). Using standard guidance for CT scanning, malignancy was proven before resection in 107 cases (75%). Peripheral lesions were observed in 73 patients. In 58 of these patients, malignancy was proven by peripheral biopsy findings, but in 15 patients only by brushing findings and not by biopsy findings. This underscores the need for additional diagnostic tools, particularly to detect tumors adjacent to the bronchi.

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The authors have reported to the ACCP that no significant conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.

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Need for Additional Information and Diagnostic Tools in Navigation of the Lung?

To the Editor:

With great interest we read the article “Image-Guided Bronchoscopy for Peripheral Lung Lesions: A Phantom Study” by Merritt et al.1 In the article, the authors put forward the following three reasons to explain poor results in bronchoscopic route planning: (1) the loss of information resulting from the fact that only two-dimensional images are generated from three-dimensional (3D) CT scan images; (2) the fact that skills vary between bronchoscopists; and (3) the occurrence of lesions hidden below the airway mucosa. With their guidance system, Merritt et al1 synchronized virtual bronchoscopy images with real bronchoscopy images and obtained an excellent fusion of CT scan data and bronchoscopy images.

We agree with the three proposed reasons for the variation in CT scan guidance, but we would like to propose a fourth reason, which is easily overlooked. Differences in breathing patterns at the functional residual capacity level and the CT scan data obtained during maximal inspiration may bias the determination of accurate positioning. This may be overcome by performing CT scans at the functional residual capacity level, but differences in central and peripheral movements may influence the results. We have previously shown2 that the mean movement of the carina during quiet respiration averages 6.5 mm in the cranio-caudal direction, and that the 3D displacement vector of the carina was 7.8 mm. Although we do not know the differences between central and peripheral movements in 3D displacement, this may be of even more importance. So, we wonder whether the system is capable of adapting itself to the breathing pattern of the patient or whether further improvement could be achieved by using four-dimensional CT scan data?

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Response

To the Editor:

We thank Vincenten et al for commenting on our article in CHEST (November 2008).1 We agree that accurate lesion localization is crucial to efficient diagnosis. Tsuiboi et al2 have pointed out the varied relationships of primary lesions to the airways: a few are endoluminal, but others are peribronchial. Guidance systems need to provide strategies for the full range of lesions found in the clinical setting.

We agree that dimensional changes in the lung arising from the ventilatory cycle are a potential source of site-localization error. In our experience, our system minimizes this sort of error because of the synchronization that takes place at each bifurcation. This in fact enables incremental adjustment to any error related to respiratory phase. This error is greatest in the lung periphery and in the lower respiratory tract (where the largest proportional ventilation occurs). The use of the four-dimensional system may be an improvement that would be more crucial to an electromagnetic bronchoscopy navigation system that relies on external reference points and does not have the capacity to synchronize at individual bifurcations.3

We wholeheartedly support the need for advances in diagnostic methods to sample tumors adjacent to bronchi. High on our wish list would be longer needles that could be threaded through a flexible thin bronchoscope and then stiffened for biopsy. Also, as

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Need for Additional Information and Diagnostic Tools in Navigation of the Lung?

To the Editor:

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