



**Australian Government**  
**Department of Health and Ageing**



Australia and New Zealand Horizon Scanning Network

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# **National Horizon Scanning Unit**

## **Horizon scanning prioritising summary**

**Volume 2, Number 4:**

**Virtual bronchoscopy: Non-invasive CT  
scanning technique for screening patients  
with possible tracheobronchial disease or  
obstruction.**

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# PRIORITISING SUMMARY

**REGISTER ID:** 0000041

**NAME OF TECHNOLOGY:** VIRTUAL BRONCHOSCOPY

**PURPOSE AND TARGET GROUP:** NON-INVASIVE CT SCANNING TECHNIQUE FOR SCREENING PATIENTS WITH POSSIBLE TRACHEOBRONCHIAL DISEASE OR OBSTRUCTION

**STAGE OF DEVELOPMENT (IN AUSTRALIA):**

- |   |   |
|---|---|
| <input type="checkbox"/> Experimental               | <input type="checkbox"/> Established  |
| <input checked="" type="checkbox"/> Investigational | <input type="checkbox"/> Established <i>but</i> changed indication or modification of technique |
| <input type="checkbox"/> Nearly established         | <input type="checkbox"/> Should be taken out of use   |

**AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL**

- |                              |  |
|------------------------------|--|
| <input type="checkbox"/> Yes | ARTG number  |
| <input type="checkbox"/> No  | <input checked="" type="checkbox"/> Not applicable |

**INTERNATIONAL UTILISATION:**

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
Comparative study, oesophageal carcinoma, Germany	✓		
Comparative study, foreign body aspiration, Turkey	✓		
Comparative study, tracheobronchial malignancies, USA	✓		
Comparative study, bronchial and pulmonary disease, China	✓		
Comparative study, thoracic malignancies, USA	✓		
Comparative study, Wegener's granulomatosis, USA	✓		

**IMPACT SUMMARY:**

Virtual bronchoscopy or bronchography (VB) utilises computer tomography (CT) scanning to provide 3-dimensional diagnostic images for the investigation of stenoses (narrowing or stricture), abnormal masses or obstruction of the trachea and major bronchi, without the need for an invasive bronchoscopy which requires anaesthesia. VB employs 3-dimensional images of the thoracic region that have been reconstructed by software from high resolution, 2-dimensional helical CT images. The procedure is rapid with 20 to 100 images capable of being obtained with a single held breath (between 20-30 seconds duration). Transfer of these

initial 2-D images to the work station and the reconstruction of the 3-D images takes approximately 15-20 minutes. VB may be useful for patients in whom fiberoptic bronchoscopy is not suitable or is refused (e.g. children). VB, however, cannot detect subtle mucosal lesions, which may be precursors of malignant lesions. The technology is available internationally through private and public hospitals equipped with advanced imaging software.

Fiberoptic bronchoscopy (FB) is the gold standard for the evaluation of endoluminal and mucosal lesions of the respiratory tract and, if necessary a biopsy can be performed. However, FB provides minimal information in respect to the extent of disease.

The number of claims processed by the Health Insurance Commission for the MBS item numbers 41889, 41892, 41898, 41904 (bronchoscopy) for the period July 2002-June 2003 was 7,017, which may give an indication of the number of patients likely to require VB in the private system.

Finkelstein et al (2002) assessed the accuracy of virtual bronchoscopy (VB) by cross-classifying 33 consecutive patients with thoracic malignant disease on FB and VB. The sensitivity for VB was 100% for the detection of obstructed lesions, 83% for endoluminal lesions, 0% for mucosal lesions and 82% for all abnormalities. The specificity was reported as 100%. Similar results were reported by Summers et al (2002) for the diagnosis of Wegener's granulomatosis.

Costing of the software package (Advantage Windows Workstation, GE Medical Systems) and hardware is approximately A\$95,000. Conventional CT scanners currently installed in Australian hospitals are able to download images in the Dicom format, which is suitable for use with this software.

#### **CONCLUSION:**

Based on patient preferences for a less invasive mode of thoracic investigation, the comparable specificity and sensitivity of the procedure, and the availability of CT technology in Australia it is likely that virtual bronchoscopy will diffuse rapidly into the Australian health system. The evidence-base is currently limited.

#### **HEALTHPACT ADVICE:**

Therefore it is recommended that a Horizon Scanning report be conducted.

#### **SOURCES OF FURTHER INFORMATION:**

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- Xiong, M., Zhang, W. et al (2000). 'CT virtual bronchoscopy: imaging method and clinical application', *Chin Med J (Engl)*, 113 (11), 1022-1025.

**SEARCH CRITERIA TO BE USED:**

Bronchoscopy/\*methods  
 Image Processing, Computer-Assisted  
 Imaging, Three-Dimensional  
 \*Tomography, Spiral Computed  
 Tracheal Diseases/\*diagnosis/radiography  
 Respiratory Tract Diseases/\*diagnosis  
 Tracheal Neoplasms/\*diagnosis/radiography  
 Bronchial Neoplasms/\*diagnosis/radiography  
 \*Bronchoscopy/methods  
 Carcinoma, Bronchogenic/diagnosis/radiography  
 Image Processing, Computer-Assisted/instrumentation  
 \*Imaging, Three-Dimensional/instrumentation/methods