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Australia and New Zealand Horizon Scanning Network

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National Horizon Scanning Unit
Horizon scanning prioritising summary

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Brahms PCT Assays: For the diagnosis and control treatment of systemic bacterial infection in emergency and intensive care patients.

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AHTA

Adelaide Health Technology Assessment

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Enquiries about the content of this summary should be directed to:

HealthPACT Secretariat
Department of Health and Ageing
MDP 106
GPO Box 9848
Canberra ACT 2606
AUSTRALIA

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This *Horizon scanning prioritising summary* was prepared by Adriana Parrella and Tracy Merlin from the National Horizon Scanning Unit, Adelaide Health Technology Assessment, Department of Public Health, Mail Drop 511, University of Adelaide, South Australia, 5005.

PRIORITISING SUMMARY

REGISTER ID: **0000069**

NAME OF TECHNOLOGY: **BRAHMS PCT ASSAYS**

PURPOSE AND TARGET GROUP: **DIAGNOSING AND CONTROLLING TREATMENT OF SYSTEMIC BACTERIAL INFECTION IN EMERGENCY AND INTENSIVE CARE PATIENTS**

STAGE OF DEVELOPMENT (IN AUSTRALIA):

☐	Experimental	☐	Established
☐	Investigational	☐	Established *but* changed indication or modification of technique
☒	Nearly established	☐	Should be taken out of use

AUSTRALIAN THERAPEUTIC GOODS ADMINISTRATION APPROVAL

☐	Yes	ARTG number	
☐	No	☒	Not applicable

INTERNATIONAL UTILISATION:

COUNTRY	LEVEL OF USE		
	Trials Underway or Completed	Limited Use	Widely Diffused
Switzerland	✓		
Australia		✓	

IMPACT SUMMARY:

Brahms have introduced a new *in vitro* assay for the quantitative determination of procalcitonin (PCT) in blood serum and plasma. PCT is a 116 amino acid protein with a sequence identical to that of the prohormone calcitonin. Under normal metabolic conditions, hormonally active calcitonin is produced and secreted in the C-cells of the thyroid gland after specific intracellular proteolytic procession of the prohormone PCT. Intact PCT is found in the blood of patients with severe bacterial infections and sepsis (Brahms, 2004).

Indications for using the assay include differential diagnosis of bacterial vs viral infection, early diagnosis of systemic bacterial and fungal infections, and monitoring for sepsis and infectious disease in high-risk patients.

The PCT assay is available in 4 formats;
1) **BRAHMS PCT-Q -** a rapid format for quick semi-quantitative results (available in the U.S. for investigational or research use only)
2) **BRAHMS PCT LIA -** a luminometer based, semi-manual, full quantitative method
3) **BRAHMS PCT KRYPTOR** – an automated method run on the BRAHMS Kryptor instrument (there are 7 installed in Maternal Genetic Screening Units in Australia). The KRYPTOR PCT was launched in Europe in 2002.
4) **LIAISON BRAHMS PCT** – an automated method run on the Diasorin Liaison instrument (not in use in Australia).

The increase in PCT in response to severe *systemic* bacterial infections may provide high diagnostic specificity. Meisner (2002) reports results from previous studies indicating that the PCT assay is 100% sensitive at 1.5 ng/ml at correctly identifying septic shock, with a specificity of 72%. The PCT assay does not react to locally limited bacterial infections, viral infections, chronic inflammatory disorders or autoimmune processes, thus enabling diagnostic differentiation between these clinical symptoms. Importantly, an increase in PCT may be detectable early in the course of severe sepsis and septic shock. The analytical sensitivity of Brahms quantitative test methods ranges between 0.06 ng/ml for Kryptor PCT and 0.1 ng/ml for PCT LIA (Meisner 2002).

A cluster randomised controlled trial (level II evidence) conducted in Switzerland assessed the effect of PCT guided diagnosis on the treatment of 234 patients admitted to hospital with suspected lower respiratory tract infections. Patients assessed with the assistance of KRYPTOR PCT assays received significantly fewer antibiotics (49% reduction, $p < 0.0001$) than patients receiving standard care (Christ-Crain et al 2004).

In Australia Brahms supplies the PCT-Q and PCT LIA formats. The Brahms PCT LIA luminometer system is currently available commercially and is the most commonly used method in Australia. It is currently not required to be listed on the Australian Register of Therapeutic Goods as the product does not diagnose a communicable disease, is not a home-use device and is not made from material of human origin. The regulations governing the listing of goods on the TGA will, however, change as of next year and the assay will be listed. The PCT LIA assay is being used in public hospitals in New South Wales, Victoria and Western Australia in emergency care and intensive care units. The quantitative tests cost approx $12.00 – 15.00 and the semi-quantitative device cost approximately $22.00.

In 2001-2 in Australia there were 12,688 public hospital and 2,261 private hospital separations for principal diagnosis codes A20-A49. Septicaemia is included in this range of diagnoses. This is an under-estimate of those who would actually receive the test as those found to have viral or local bacterial infections are not included. The total mortality from septicaemia in 1996 was 280 deaths in males and 315 in females (3.1 and 3.4 per 100,000).

CONCLUSION:

There is limited information currently available on the Brahms quantitative tests, however there is a small proportion of people likely to benefit from this application through earlier or more appropriate treatment.

HEALTHPACT ACTION:

It is therefore recommended that this technology be monitored.

SOURCES OF FURTHER INFORMATION:

Brahms. PCT-Molecule and Kinetics. Brahms PCT [Internet] Brahms Aktiengesellchaft, Hennigsdorf, Germany. Available from: http:www.procalcitonin.com [Accessed 11th March 2004].

Christ-Crain, M., Jaccard-Stolz, D. et al (2004). 'Effect of procalcitonin-guided treatment on antibiotic use and outcome in lower respiratory tract infections: cluster-randomised, single-blinded intervention trial', *Lancet*, 363 (9409), 600-607.

Meisner, M. (2002). 'Pathobiochemistry and clinical use of procalcitonin', *Clin Chim Acta*, 323 (1-2), 17-29.

SEARCH CRITERIA TO BE USED:

Amino Acid Sequence
Calcitonin/analysis/ biosynthesis/genetics/ metabolism
Inflammation/physiopathology
Molecular Sequence Data
Protein Precursors/analysis/ biosynthesis/genetics/ metabolism
Protein Processing, Post-Translational
Sepsis/physiopathology
Sequence Homology, Amino Acid