

**CASE STUDY
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Pacific Edge Limited.

www.pacificedgedx.com

Ground breaking non-invasive tests for bladder cancer

Pacific Edge grows international market for two novel molecular tests for detection and monitoring of urothelial cancer

Two ground breaking, non-invasive diagnostic tests for bladder cancer are the first of four new bladder cancer detection tests to be successfully launched by Pacific Edge Limited, a company which specialises in the discovery and commercialisation of diagnostic technology for early detection and monitoring of cancer.

Founded in New Zealand in 2001, Pacific Edge identifies unique gene and protein signatures for development of its new class of cancer management tools. It utilises state of the art molecular biology, gene expression analysis and signature development, validation with world-class tissue banks and clinical data, and proprietary analytical software.

Cxbladder Triage, which accurately identifies patients with a low probability of bladder cancer, and Cxbladder Detect, which identifies bladder and other urinary tract cancers from a small volume of patient urine, are achieving rapid sales growth in the USA, Australia and New Zealand. The tests will shortly be launched in Spain and are being trialled in South East Asia, as Pacific Edge positions itself as a global leader in cancer molecular diagnostics and a 'one stop shop' for urologists.

"There have been no new therapies in bladder cancer for 30 years and no new diagnostic tests for 15 years," said David Darling, CEO of Pacific Edge. "Our tests are cost effective, extremely accurate and precise. They provide urologists with a valuable new perspective and lead to better patient compliance because they are non-invasive."

Cxbladder Triage (www.cxbladder.com) combines the power of genomic biomarkers with extra phenotypic and clinical risk factors to accurately identify patients with haematuria who have a low probability of bladder cancer. It can reduce the number of patients needing costly, invasive work-ups for urothelial cancer.

Cxbladder Detect measures the gene expression levels of five biomarker genes which represent a bladder cancer signature. It is a quick, cost effective and accurate adjunct to cystoscopy, can replace other urine-based tests or in some instances remove the need for CT/IVP.

Both products have been tested and validated in international multi-centre clinical studies¹. In the latest study published in May 2015, the scientific journal Biomed Central Medical Research

Holyoake et al (2008). Development of a Multiplex RNA Urine Test for the Detection and Stratification of Transitional Cell Carcinoma of the Bladder. Clinical Cancer Research, 14(3), 742-749.

Methodology ranked four non-invasive bladder cancer diagnostic tests based on a study of 939 patients, including nine with urinary carcinoma, across five data sets. Data compared the tests on three measures of accuracy: sensitivity, signal-to-noise and cross-validation error rates. Overall, Cxbladder Detect outperformed the three other tests:

Sensitivity/specificity urinary cancer diagnostic tests

	Sensitivity % (95% CI)	Specificity % (95% CI)
Cxbladder Detect	73.6 (65.1-81.7)	81.7 (78.7-84.4)
Cytology	46.0 (36.3-55.8)	95.3 (93.7-96.6)
NMP22	45.9 (35.9-56.3)	88.0 (85.5-90.2)
FISH	47.7 (31.5-63.3)	87.7 (84.7-90.3)

Source: Breen et al. BMC Medical Research Methodology 2015

Research on Cxbladder Triage published in BMC Urology in April 2015 revealed that 80% of patients with micro haematuria who did not have urothelial cancer were correctly triaged out, and could bypass a full urological work-up.

Pacific Edge will launch two further products in its Cxbladder suite in 2015/16: Cxbladder Monitor and Cxbladder Predict.

Worldwide, bladder cancer is the sixth most prevalent form of cancer (8% of male cancers and 2% of female cancers) with a high recurrence rate. It carries the highest medical cost per patient of all cancers (US\$240,000 from diagnosis to death).

In the USA, where Pacific Edge analyses urine samples at its CLIA-certified and CAP-accredited laboratory in Pennsylvania, the market potential is around 2 million tests each year. Pacific Edge has agreements with three National Provider Networks (FedMed, ACPN, Stratos and Multichoice) and is advancing commercial relationships with private insurance companies, integrated healthcare providers, the Veterans' Administration, and the Centre for Medicare and Medicaid Services.

User programs, where urologists can trial Cxbladder in their own practices, have proven the most effective sales strategy. Further programs are being rolled out internationally, including one of the USA's largest not for profit health insurers and providers, Kaiser Permanente, and the first South East Asian program with one of Singapore's biggest hospitals, Tan Tock Seng. Taiwan and Thailand will also be targeted.

"South East Asia has considerable potential for us, particularly because of the increasing numbers of medical tourists," Mr Darling said.

Franchise partnerships have been signed with Oryzon in Spain and Healthscope in Australia. In New Zealand, where Pacific Edge has a CLIA-certified laboratory, the company has launched a successful ecommerce site for online ordering of Cxbladder tests by NZ residents and healthcare professionals. It will be replicated in other markets where possible.

O'Sullivan et al (2012). A multigene urine test for the detection and stratification of bladder cancer in patients presenting with hematuria. *Journal of Urology*, 188, 741-747.

Kavalieris et al (2015) A segregation index combining phenotypic (clinical characteristics) and genotypic (gen expression) biomarkers from a urine sample to triage out patients presenting with hematuria who have a low probability of urothelial carcinoma.

Breen et al (2015) A holistic comparative analysis of diagnostic tests for urothelial carcinoma: A study of Cxbladder Detect, Urovysion® FISH, NMP22® and cytology based on imputation of multiple datasets.