

# The Secret to High-Volume PET/CT: Expanding Clinical Utilization in Sydney

In November 2010, Royal Prince Alfred Hospital in Sydney, Australia, reached a significant milestone: the facility scanned its 50,000<sup>th</sup> patient with Siemens Biograph™ PET and PET•CT technology since PET imaging began there in 1992. Along the way, PET and PET/CT have helped physicians at the hospital provide highly personalized treatment as well as enabling them to make key changes to patient management strategies when needed.

By Manjula Puthenedam, PhD

## Defining a Partnership

Royal Prince Alfred (RPA) Hospital's collaboration with Siemens began in 1992 with the installation of a Siemens ECAT 951R whole-body (PET-only) scanner—one of the only two PET scanners in Australia at the time then. In 2003, RPA retired the 951R from clinical scanning when it installed the Siemens Biograph Duo (2-slice) PET•CT scanner. "When we

decommissioned the ECAT 951R in 2003, it had carried out 13,212 patient studies," reports Michael Fulham, MD, Director, PET and Nuclear Medicine, Royal Prince Alfred Hospital, and Professor, University of Sydney, Sydney, Australia.

"The installation of the Biograph Duo, with lutetium oxyorthosilicate (LSO) detector technology, in mid-2003 and the commissioning of our own cyclotron

allowed us to markedly increase our patient throughput," says Fulham. RPA retired the Biograph Duo in late 2009 after it had performed 23,788 patient studies, replacing it with a 128-slice Biograph mCT with time of flight (TOF) technology. Now all patient studies are carried out with this technology. "At each stage of the change in technology, the improvement in image quality



Royal Prince Alfred Hospital in Sydney, Australia.

was obvious; with each iteration, my confidence in identifying sites of disease and response/lack of response to therapy improved,” Fulham says.

## Pushing High Volume

The number of PET/CT devices in the Sydney region expanded from a single site (RPA) in 2003 to eight other sites in 2011. Yet, RPA’s patient volume has continued to increase each year. “We currently scan an average of 26 patients a day,” shares Fulham. How do they do it? There are many components to the answer, among them are teamwork, a can-do attitude, a high speed scanner that offers minimal radiation dose to the patient, excellent efficiency and providing high-quality, personalized care for the patients who come from near and far.

## It Starts with Teamwork

“We were not able to go from 9 patients a day to 26 patients overnight. It was a gradual process as we refined the workflow and distributed the work across the administration, technologist, nursing, scientific and medical staff. Our administration staff contacts the patients prior to the scan to ensure that they understand the scan preparation, confirms the appointment time and gives the patients directions. Nurses explain the procedure to the patients on arrival and insert the

venous lines; technologists inject the isotope, position the patients on the bed and run the scanners. Junior medical staff take a short patient history and the senior staff report the scan. The scientific staff operate the cyclotron which allows us to inject the first patient at 07:30 hours,” says Fulham.

## Minimum Dose, Maximum Speed

Biograph mCT allows Fulham to use a minimum dose of 10mCi at a scanning speed of about 10 minutes. “We have a very good relationship with Siemens and in our opinion the equipment is the best in the market and meets our needs as a clinical and research site. The Siemens approach to development and innovation in their instrumentation, the software to reduce the dose, the reconstruction algorithms and the outstanding image quality exemplifies the ‘can do’ approach,” says Fulham.

## Driving Efficiency

RPA’s data indicate that for patients who had a scan request marked “urgent,” 97.5 percent of patients were scanned within 3 days, according to Fulham. RPA uses voice recognition technology for reporting. The median turn-around-time (TAT) from the completion of the study to the delivery of the report to the referring doctor’s office by fax and email is 72 minutes based on data from 2010, shares Fulham. This means that, generally, the referring doctor has the scan report and images before the patient has returned home!

But more importantly, RPA has allowed referring doctors to refine their own workflow. “For example, clinicians at RPA see patients from throughout the state of New South Wales and so we will scan patients who travel to Sydney from the country in the morning before they see their specialist surgeon or physician later in the morning. This enables the patient to spend the minimum amount of time away from home and allows the clinicians to better plan the patient’s management because they have the results from arguably the most impor-

tant investigation before they see the patient. This is more efficient than the patient being assessed and then having to wait for a scan and then revisit the clinician to discuss the results and the next steps,” says Fulham.

## Personalized Treatment

Siemens Biograph PET•CT also helps in tailoring the treatment to suit the specific needs of the patient. You can design and personalize therapy for the patient only if you can provide the most accurate information about the stage of the disease, says Fulham. Currently, 64.1 percent of RPA’s referrals come from physicians, 27.4 percent from surgeons, 7.5 percent from radiation oncologists and 1.1 percent come from other referrers.

In 2010, RPA scanned 6,327 patients (see table) and the bulk of the work related to cancer followed by neurological disease. Staging lung cancer used to be our biggest group, but now it is lymphomas—because the doctors use the unique capability of PET/CT to accurately stage and restage and assess response to therapy, says Fulham. The profile reflects, in part, the role of PET/CT in clinical medicine as well as the funding status in Australia where fewer indications are reimbursed by the Federal Government when compared to the U.S., he adds. However, “in spite of the limited number of funded indications, the direct impact of scanning such patient numbers is that revenue from our PET/CT program has been re-invested to allow us to self-fund all our major equipment purchases including the scanners, the cyclotron and the associated laboratories,” Fulham says.

RPA has shown the world that with Siemens Biograph PET•CT you can have it all—increased productivity as well as meeting the needs of each patient with quicker, high-quality scans and reduced radiation dose. Highly detailed, speedy reports for referring physicians also help keep referrals high.

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## 2010 PET/CT Exam Mix: Royal Prince Alfred Hospital

Study	Scans	%
Cardiac	27	0.4%
Neuro	412	6.5%
Whole Body	5,888	93.1%
<b>Total Patients:</b>	<b>6,327</b>	

Source: Royal Prince Alfred Hospital