Driving vascular access excellence – a compelling case for change

Providing enhanced models of patient care to a growing culturally diverse population, the 627 bed St George Hospital (SGH) in Sydney is a major public hospital with special expertise in oncology, critical care/trauma, cardiothoracic surgery, mental health and women's and children's health care. In 2019 this leading hospital introduced a dedicated state-of-the-art vascular access team (VAT) service to address increasing demand for both treatment and nutritional support access lines, as well as competing priorities within staff roles. Advocating for the VAT, SGH Clinical Nurse Consultant Tanya Flynn leveraged her longstanding experience placing vascular access devices (VADs) and oncology background to collaborate with the Nurse Manager of Cancer Services and the Nurse Manager of Surgery, Perioperative, Anaesthetics and Trauma in making it a reality. Together they created a compelling business case that was subsequently awarded funds to establish the VAT as a standalone mainstream service. Here, Ms Flynn describes the SGH VAT service set up with focus on their journey from conception and strategy through to implementation and key insights.

VAT service scope and structure

Established mid 2019, the SGH VAT service placed a total of 920 peripherally inserted central catheters (PICCs) and midline catheter devices in 2020, of which 525 (57%) were PICCs and 395 midlines (43%). Patients are mainly Sydney based, yet sometimes also come from elsewhere in NSW.

Resourced with 1.5 full time equivalents (FTE), the SGH VAT is a dedicated department servicing all hospital areas except the Intensive Care Unit (ICU), Monday to Friday 8.00am-4.30pm. Outside of these hours any urgent lines are placed by nursing and medical staff who complement the VAT but are not part of the team. The VAT activities include insertions and pre-placement patient education, after which the ward or outpatient clinic provides ongoing care. VADs for inpatients are placed by the VAT at the bedside mainly or in a

procedure room when sterile conditions cannot be maintained bedside, while outpatients are seen in the Cancer Care Centre. Where haematology patients are admitted to the ICU and require vascular access, the VAT also performs these procedures for patient continuity of care in placing lines and VADs. In addition, the SGH VAT acts as a hospital/community resource including (but not limited to) over the phone trouble shooting for other facilities and healthcare providers.

Inpatients and outpatients are referred electronically via the Electronic Medical Record (EMR), for which the VAT has a dedicated referral set-up within this system, and is used for all documentation, medication and administration. Urgent referrals are via the hospital paging system in addition to the electronic referral.

As a full time VAT member, Ms Flynn and her part time VAT colleague report to the Nurse Unit Manager of Surgery, Perioperative, Anaesthetics and Trauma. The medical reporting line is to the Head of Department (HOD) Anaesthetics.

Growing demand and competing priorities drive VAT need

Vascular access procedures were previously performed separately by Oncology and Nutritional Support for their own patients, as well as other areas of the hospital. Each was placing around 60 lines per month as an additional service to their regular clinical duties, yet without a dedicated FTE nor any consistency in processes or product choice. This created confusion among end users and ward staff as to the hospital's different VADs and insertion techniques, and also raised questions among nurses. For example, Oncology used the Sherlock 3CG™ Tip Confirmation System for PICCs performed in a single procedural room, while Nutritional Support conducted bedside insertions using a blind insertion technique and confirmed tip placement with X-ray.

Oncology was also increasingly placing lines, while a decision to place midlines in inpatient chemotherapy patients was a key contributor to the increased demand for vascular access services. This in turn placed increased demands on staff, especially the Haematology Ward, who felt they had competing roles in performing two jobs between their regular duties and the need to perform vascular access insertions.

"We kept getting busier and had more and more referrals. Trying to do both roles well was really difficult" Ms Flynn said. This only intensified the need for a streamlined, more consistent and timely service to meet treatment deadlines. Born as much from role conflict as the increasing demand, the solution recognised was to have a dedicated standalone VAT service.

The inspiring ideas challenge

The SGH VAT was established with few barriers, yet a critical first step was obtaining Executive approval for its set-up and funding support. For this Ms Flynn and the Nurse Managers as champions applied to the hospital's "Inspiring Ideas Challenge" Program and so leveraged an existing mechanism for funding new projects aiming to improve services and patient care. From this, funds were successfully obtained to plan and implement the VAT over an expected 18 month timeframe, yet set-up occurred in only 9 months.

How was this outcome achieved?

Executive and stakeholder buy-in

The VAT concept was generally well supported by hospital key stakeholders including both Oncology and Nutritional Support Nurse Managers/Co-Directors and the Director of Nursing (DON) given the need. Any initial concerns about Oncology looking to "take over" were soon resolved through education and by involving relevant stakeholders in developing the business case. The SGH Executive also considered the VAT to be an essential service, irrespective of the cost implications, as it was "something they needed to do."

Building the case and obtaining approval

A systematic evidence-based approach was used to build a business case for the SGH VAT service and obtain formal approval. For this Ms Flynn was appointed Project Manager in leading a review of four NSW hospitals with established VAT services that would serve as an informative benchmark.

For each hospital Ms Flynn and colleagues looked at their VAT service activity over a 12-month period including clinical practice scope and procedures (e.g., devices used, tip confirmation, staff at each procedure), operational days, structure and governance (e.g., FTE, nurse grading), reporting lines and committees, patient referral processes, succession planning and other staff matters (e.g., recruitment, leave). They also reviewed SGH services provided by Oncology, Nutritional Support and Radiology. For the internal review a multidisciplinary stakeholder working group was established, which enabled various inputs from medical leads in Radiology, the ICU, Emergency, Anaesthetics and Nursing (DON, Nursing Coordinators, Oncology, Nutritional Support, Radiology).

While the original budget for the VAT was based on the existing costs of Oncology and Nutritional Support services, there were few expectations for the VAT service to deliver cost savings or cost neutrality, given the resource costs (e.g., staff, devices) and limited rebates when lines are placed by nursing staff.

Nevertheless, potential cost savings were found when comparing the standardised VAT service with vascular access procedures by different departments. For example, cost savings of around $10,000 per annum were calculated by not performing chest X-rays for tip confirmation, while additional cost savings would be realised by standardising products and having increased purchasing capacity.

Having all information collated and presented in table form was the culmination of an efficient review process, which was completed in only three months. In addition to the internal stakeholder working group, Ms Flynn found that developing good relationships with external hospital VAT teams considerably helped. She presented the business case to the Nursing Executive Committee, and then the DON presented to the Clinical Directors Committee (Heads of Department Medical Leads) who approved the VAT, which was then signed off as an endorsed hospital service.

Implementing the VAT service

There were no special training needs or other requirements to implement the SGH VAT service as Oncology and Nutritional Support staff were already qualified to perform vascular access procedures, while any new staff members 'shadow' experienced staff members to gain experience. Some staff in Oncology and Nutritional Support also continue to place devices to maintain their skills, which enables them to be back-up staff when VAT team members are on leave.

How choice of VAD is made

SGH cancer treatment protocols are mainly based on the online eviQ resources that provide guidance on the type of line to be used (peripheral or central) and number of lumens required. Certain treatment medications are administered via different access lines based on their pH, nature (e.g,. irritant, vesicant) and choice of administration route[1-2].

The SGH VAT has developed a table of frequently used medications and types of access required, which is used to guide decisions regarding the appropriate choice of VAD. For example, vancomycin and flucloxacillin can be painful for patients when administered via a peripherally inserted cannula and so a PICC is recommended.

Ultrasound is used to guide various device placements (e.g., PICCs, midlines). The Sherlock 3CG™ Tip Confirmation System is used for all PICC insertions at SGH, except in patients with atrial fibrillation who are tracked using this system but tip placement confirmed with a chest X-ray.

The VAT continues to use the Sherlock 3CG™ Tip Confirmation System traditionally used by Oncology as their standard practice because of the accuracy of PICC placement. "You can see the tip heading in the correct direction towards the superior vena cava and can confirm tip placement by the change in P-wave. This is reassuring but sometimes when a line doesn't feed properly or the wave is not correct you need to recognise this. There is a learning curve to using the Sherlock technology, and so we've found that good support from the company is very important" Ms Flynn said.

Measuring VAT service outcomes

The initial goals of the VAT service were a reduction in hospital days (i.e. discharging patients with lines in place within a shorter timeframe), a decrease in central line associated blood stream infection (CLABSI) rates and realising potential cost savings with less use of chest X-ray, increased purchasing capacity and recouping available rebates. Yet as the service has only been running for 18 months, the data is not considered mature enough to compare with previous time points for which at least two years of post-VAT service data would enable reliable comparisons. Limited data were also collected for Nutritional Support and Radiology and certain other parameters prior to introducing the VAT service.

Nevertheless, the VAT service has streamlined processes and brought consistency to VAD use, as well as enhanced continuity of patient care. In addition, it has facilitated the inclusion of trialling new vascular access products in the clinical setting. It is also an evolving service and team whereby complex insertions are always an opportunity to learn, as are new ways of troubleshooting or finding an approach that works better for the patients or team.

"Executive support from the outset made a big difference. Also important is identifying interested people in other departments who are willing to help in being a project contact and champion, which may not always be the Head of Department"

Tanya Flynn
Clinical Nurse Consultant
The St George Hospital Sydney NSW

Five key factors for VAT service success

- **Executive Management Support**
- **'Buy-in' from medical staff and the wards**
- **Higher level key stakeholder involvement to champion the VAT and remove roadblocks**
- **Access to external hospital VAT services, leveraging their expertise and resources**
- **Ongoing education, training and support from the VAD supplier**

Key factors for VAT success

From conception to planning and implementation, the key drivers of SGH's success in setting up and running their VAT service were gaining Executive support, buy-in from medical staff and the wards, as well as having higher level key stakeholders involved and committed.

"Having the right people involved is important as it helps to ensure there are no roadblocks once you have an approved plan to action, such as any resistance from people experiencing role changes, although they support the idea of a VAT."

"Also, regardless of the product used, our experience is that having a good relationship with the VAD supplier who gives us ongoing education, training and support is essential to the success of the VAT and in helping to ensure the quality and safe use of their devices" Ms Flynn said.

Another success factor in setting up the VAT was having access to other hospital VAT services: "This was very useful as we could draw on their clinical expertise and existing resources. It gave us valuable insights into knowing what resources are needed" Ms Flynn said. Today the SGH VAT is able to mentor other new VAT teams, and with the growth of this specialised service over time there is now an established network of practitioners across hospitals to provide advice and support. External healthcare practitioners new to the VAT role will often "shadow" SGH VAT members, which has been very helpful to these individuals, while the SGH VAT has "picked up tips" from them too.

Education and feedback as collateral benefits

The VAT service has facilitated the effective education of both ward staff and patients – an unplanned, yet welcome benefit that focuses the VAT on end user needs.

"Educating ward staff is important so they are familiar with the device, its management and how to troubleshoot, while patient needs are a further area of education. For many patients establishing access can be difficult and so part of the VAT's role is to provide a service that gives a positive experience for them. For example, when a patient comes to our service having already had multiple insertions and you then tell them you're going to do it again but differently. Here it's important to listen to their concerns and explain what you are doing, which not only supports improved outcomes, but is also rewarding."

"A good device insertion in particular is a relief for patients as they don't need to go through any more jabs. On the spot feedback our VAT receives from patients is also another measure of the service's impact" Ms Flynn said.

The Future VAT Service

Ms Flynn noted that having used similar VAT services at other facilities, many doctors at SGH are now reliant on the VAT, while VAT services are becoming more and more popular. Given these trends, the SGH VAT is now looking to evolve and expand their service which, when first established, it was decided that midlines and PICC lines would be the focus, and centrally inserted lines a future service.

"We are ready to take our VAT service to the next level, which would allow staff to perform their clinical roles, while also expanding their capacity for other activities such as involvement in research" Ms Flynn said. "The need is definitely there along with the opportunity to further add to the patient and hospital benefits we achieved in having a dedicated standalone coordinated service for VAD care."

1. Sou, V, McManus, C, Mifflin, N, et al. A clinical pathway for the management of difficult venous access. BMC Nurs. 2017; 16(1):64-71

2. Hallam C, Weston V, Denton A, et al. Development of the UK Vessel Health and Preservation (VHP) framework: a multi-organisational collaborative. J Infect Prev. 2016;17(2):65-72

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