



PROFILES IN EXCELLENCE

Putting first things first

Hospital Sant 'Antonio, San Daniele: Our experience with point-of-care testing

By Dr. Maurizio Ruscio, Chief of Laboratory Services, and Dr. Franco Pertoldi, Chief of Emergency Department and Critical Care Services, Hospital Sant 'Antonio Del Friuli, San Daniele, Italy

At Hospital Sant 'Antonio Del Friuli (San Daniele, Italy), we continually monitor and redesign our care processes to ensure that the needs of our patients are first and foremost in everything we do. Our multidisciplinary team was an early adopter of point-of-care (POC) testing and is currently refining their expertise based on advances in instrumentation, assays and connectivity. Our experience, coupled with technological advances, has allowed us to maintain and enhance our primary focus, which is to continually improve the quality of care for the patients we are privileged to serve.



The Profiles in Excellence article series highlights real-life case stories of process improvement in diagnostic testing in the clinical and laboratory setting.



Dr. Maurizio Ruscio, Chief of Laboratory Services (right), and Dr. Franco Pertoldi, Chief of Emergency Department and Critical Care Services (left), developed a collaborative vision for critical care testing at San Daniele.

The unique design of Hospital Sant 'Antonio...makes it possible for staff to remain within a few steps of any of the critical care units, thus supporting a seamless continuum of care between departments.

Background

Sant 'Antonio is a 300-bed primary care facility in northern Italy with a strong reputation as a center of excellence in obstetrics and gynecological care and as a high-quality orthopedics hospital.

Sant 'Antonio's 18-bed emergency department (ED) provides care to 30,000 patients annually. Specific ED beds are dedicated to trauma and medical patients and are supported by ED observation beds dedicated to low-risk acute coronary syndrome (ACS)-type patients, as well as patients with various respiratory disorders.

The unique design of Hospital Sant 'Antonio allows the ED, ICU, observation, surgery and radiology departments to be located on the same floor. This design makes it possible for staff to remain within a few steps of any of the critical care units, thus supporting a seamless continuum of care between departments.

Point-of-care testing: First steps

In 2003, we assembled a multidisciplinary team that included our ED manager, chemistry supervisor and POC coordinator. Together, we established several guiding principles for our POCT improvement initiative that included the following:

- Needs of our patients are first and foremost! Need will be assessed based on the most urgent testing that can impact morbidity and mortality in the ED.
- Quality of results cannot be compromised.

- Changes must be implemented uniformly and supported 24/7.
- Success can only be achieved utilizing a multidisciplinary approach based upon mutual trust, respect and understanding.
- The POC process must produce a measurable impact upon patient care.

A consensus was reached regarding the acute care testing needs of the ED. There was agreement that these tests should include pH, blood gas, electrolytes, oximetry, metabolites, troponin I, CKMB, D-dimer and creatinine.

Measuring success

Key metrics were established that would enable us to measure potential improvements over time. These included:

- ED door-to-EKG
- ED door-to-drug
- ED door-to-balloon

Shared concerns from differing perspectives

Moving the technology closer to the patient would require shifting certain (critical) laboratory tests from the lab to the ED. Healthy skepticism was voiced by both the ED and laboratory staff as to the benefits of this approach. Ironically, many of the concerns expressed by the team shared the same themes, but the rationale differed based upon the viewpoint of the practitioner interacting with the technology. (See table on page 4.)



Many of the concerns expressed by the participants [lab and ED staff] shared the same themes.

No single instrument could satisfy the menu requirements...We settled on a two-instrument approach.

Concern	Laboratory Perspective	ED Perspective
Quality of Result	<ul style="list-style-type: none"> Will it meet well-defined lab-quality criteria for sensitivity, specificity and precision? We refuse to compromise analytical quality for the sake of an expedited result. 	<ul style="list-style-type: none"> Can we trust results at the POC compared to the main lab? Can we confidently initiate patient treatment based upon these results?
Ease of Use	<ul style="list-style-type: none"> Can we eliminate variables (risk) associated with specimen acquisition and sample handling techniques, across many operators at various skill levels? Daily QC requirements must assure system accuracy while not demanding excessive interaction of non-laboratory staff. 	<ul style="list-style-type: none"> The instrument must not require me to take my primary focus away my patients. It should take minimal steps to complete a test, and involve no intricate assembly of components nor any special operator savvy to produce a quality result. Biohazardous (bloodborne pathogen) exposure should be held to minimal levels.
Connectivity	<ul style="list-style-type: none"> The technology must provide for remote monitoring of the system and users. The intended purpose is to detect and correct issues before they impact the patient. The technology must enable compliance with all regulatory oversight requirements The technology must support instrument troubleshooting from remote locations in the hospital. 	<ul style="list-style-type: none"> We need the results to be automatically routed to various areas within the hospital. Results to migrate to HIS/LIS, patient EMR, ED staff handheld devices. Viewable by practitioners in all critical care areas

From the beginning, it was clear that no single instrument could satisfy the menu requirements of our facility. We therefore settled on a two-instrument approach:

- One instrument would be dedicated to meeting the cardiac portion of ED testing requirements.
- Another instrument would be used to satisfy the blood gas, electrolyte and metabolic parameter testing needs.

After meeting approved laboratory testing standards, instrumentation from two different vendors was selected to satisfy our POC testing requirements.

Ongoing challenges in our POC journey

Initially, five ED operators were selected to attend off-site training on the cardiac instrument. These five individuals trained the rest of the ED staff to operate the instrument.

In the ED, normal learning-curve challenges on the POC instruments were encountered with respect to clinical integration, connectivity and end-user training. However, the nursing staff raised a recurrent concern with the cardiac instrument: While it delivered excellent analytical results, the ED staff felt that they were experiencing “excessive” error messages.

(It should be noted that instrument error messages may provide necessary safeguards to prevent erroneous results. However, if these errors cannot be traced to a correctable root cause [as was the case], they become a distraction in the POCT setting that can hamper overall ED staff acceptance of POC testing.)

Additional issues with the cardiac instrument included exposure to hazardous waste and time-consuming assembly of components. These issues, combined with excessive error issues, created a ripple of discontent through the ED staff operating the cardiac instrument. Understandably, the ED team members felt their time was best utilized caring for the patient, not the cardiac instrument.

Addressing and remedying the concerns surrounding ease of use for cardiac testing became the next challenge in our POC testing journey.

Learning from our past; focusing on the future

Based on three years of POC testing experience and feedback from staff, progress had been made toward our patient-centered goals. By 2009, improvements were observed in all of our key metrics. Naturally, opportunities for improvement still existed. The ED staff was content with all POC instrumentation except the cardiac analyzer. The second evolution of our program began with the selection of a different POC cardiac instrument.

In the three years since our cardiac POC instrument choice was made, manufacturers had continued to introduce new systems with enhanced analytical performance, connectivity, and greater ease of use. We were ready to look at new solutions for cardiac testing.



ED operators voiced concerns about the cardiac instrument:

- **Handling of hazardous waste containers and supplies exposed them more risk than they appreciated.**
- **Assembling all the components to perform testing was time consuming.**
- **The ED staff felt the instrument produced “excessive” instrument errors.**



Six months after implementation, all 64 ED POC testing operators are utilizing the instrument on a 24/7 basis. This meets our goals for both ease of use and consistency of care to our patients.

Sant 'Antonio selects a new cardiac testing technology

Next-generation requirements for POC cardiac testing

- Laboratory quality standards for analytical performance
- Mitigation of biohazardous risk exposure
- Ease of use (integration into the clinical practices of our ED staff)
- Connectivity
- Sales, service and support capabilities across a broad range of healthcare disciplines
- Favorable financial impact

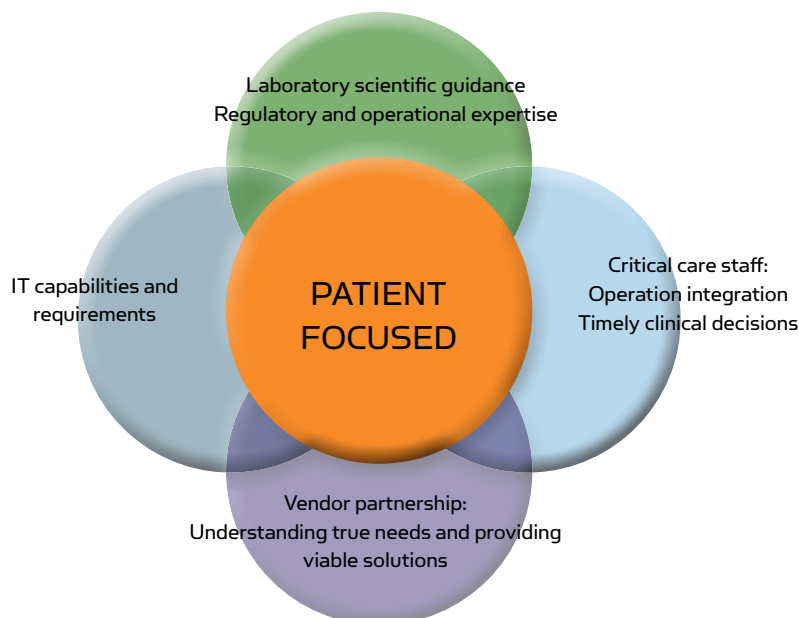
Based on our review and analysis of the current market offerings for POC cardiac testing, we selected the Radiometer AQT90 as our second-generation POC cardiac analyzer. Connectivity was accomplished utilizing RADIANCE software connected to the Hospital Information System (HIS). Results can be viewed by practitioners via terminal and hand-held technologies. Upon satisfying the lab's criteria for analytical quality, education was provided to the nursing staff.

We are happy to report that ED operator acceptance of the new instrument is remarkable. Six months after implementation, all 64 ED POC testing operators are utilizing the instrument on a 24/7 basis. This meets our goals for both ease of use and consistency of care to our patients.

Our advice to others considering POC testing

- **Collaborate.** Decentralized or POC testing done right requires a collaborative, honest approach that puts patients at the center of the initiative. Longstanding perceptions that are barriers to the patient-centered approach need to be addressed.
- **Patient outcomes determine menu.** Determination of the POC test menu must be measured by those test results that have a direct (time critical) impact on patient outcomes. Any test that does not meet this criterion probably does not need to be performed at the POC.
- **Put quality before speed.** Quality of results should not be sacrificed for speed — the two can coexist.
- **Align TAT goals with clinical process design.** A faster turnaround time without clinical process redesign will fail to produce a measurable impact to the key beneficiaries of the system. If you are obtaining quality results quicker, what does that mean for the patient, staff and facility? This is where the return on investment in decentralized testing can be realized by enhancing the quality of care and decreasing the overall cost of care delivery.
- **Carefully define success criteria.** Terms such as “ease of use” and “connectivity” will have variable interpretations based upon the perspective of the person interacting with the technology (i.e., laboratorian, ED staff member, IT professional, MD). Carefully explore and blend the needs from all parties to produce well-defined criteria to successfully evaluate decentralized testing technologies. A system that is truly easy to use should gain rapid acceptance from all intended POC operators.

(Continued on page 8)



Return on investment in decentralized testing is realized in improved quality, cost, and operational efficiency.

POC testing done well requires all parties to ensure it meets the goals of the facility and — more importantly — the patients they serve.

- **Leverage IT to share data.** The key to success of any decentralized system is closely linked to information technology and the ability to share critical data with practitioners in a reliable, timely and secure fashion.
- **Assess all quality variables.** POC technology selected should work for the benefit of the patient and practitioner and easily integrate into the practitioner's care processes. Instrument issues that impede process flow will have a negative impact on overall POC acceptance. Careful consideration should be paid to the variables that can influence the quality of the test result. Pre-analytical sample handling variables should be strictly assessed. Ease of use and exposure to bloodborne pathogens are a few of the criteria you need to consider.
- **Commit to continuous improvement.** Decentralized testing is not a “try it, buy it and forget it” proposition. It requires continuous monitoring to measure impact from a clinical, operational and economic perspective.
- **Carefully define your expectations from your vendor.** Your vendor will play a critical consultative role in providing support across many disciplines. Assess the experience level the vendor has in supporting cross-functioning teams, beyond the traditional sales, service and product support roles. How well does your vendor work with lab, ED and IT issues? Can they provide assistance in the proper intergration of POC technology into patient care and nursing processes in the ED?

POC testing done well requires all parties (including vendors) ensure it meets the goals of the facility and — more importantly — the patients they serve. In our experience, POC testing is a marathon, not a sprint, and it is important that the marathon is a team event.