Co-Create Solutions: Innovate or Evaporate: the Value Driven PMO

Fulfilling the Promise of Information Technology in Healthcare

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Innovate or Evaporate: the Value Driven PMO

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Introduction

Project Management Offices (PMOs) are commonplace in today's technology-driven healthcare organizations. This case study is about a Middle Eastern PMO that was instrumental in opening a greenfield hospital and optimizing the services provided by the technology department. The Hospital opened in 2015 by delivering simple clinical services (e.g., ophthalmology exams). However, to provide just this single service, a comprehensive suite of integrated applications needed to be in place (e.g. ERP, Nurse Scheduling, Electronic Patient Record, RIS/PACS, Laboratory systems, Learning Management Systems, firewall security systems, call centre systems, etc.) in addition to Eye Institute specific applications like Zeiss FORUM. This first service offered the opportunity to stabilize, learn and optimize systems, processes and the tasks caregivers complete to deliver exceptional care. More complex services followed such as additional ambulatory clinics (e.g., allergy and immunology), opening acute care, intensive care, and emergency services. The team planned and managed the purposeful stabilization, optimization, and learning for each progressive systems and service deployment. The purpose of this paper is to explain the maturity of the Hospital's IT PMO where principles of Agile and innovation are becoming core competencies. However, it is the innovation elements that distinguishes the Hospital PMO.

Collaborative PMO

The Hospital's IT PMO incorporated best practices (tools, processes, and training) and developed a project planning and delivery method. This Project Management Method (PMM) version 2.0 has matured through multiple versions and outlines critical documents and processes for technical projects. The rationale is that if the project team follows simple procedures and creates these project documents with stakeholders, then it is more likely that the "right projects are done right." The standard suite of PMM 2.0 documents include:

1) Project Requirements
2) Schedule
3) Solution Design (application, infrastructure and integration specifications)
4) Test Plan, Test Cases, and Test Results
5) Training Plan (IT teams, POCT team, and end users)
6) Deployment and Backout Plan
7) Service Operations Manual
8) Project Close Out

The required PMM documentation is mapped to project phases (Figure 1). The project team proceeds to the next phase when they complete the required PMM documentation. These stage gates help to ensure projects are methodically planned and executed resulting in an improved probability of project success. Those familiar with modern project management will see that this PMM approach is typical; however, the underlying philosophy has Agile and innovation elements such as co-create solutions with the customer. We believe this hybrid approach contributed to the on-time completion of the entire IT portfolio and supported the Hospital opening according to plan.

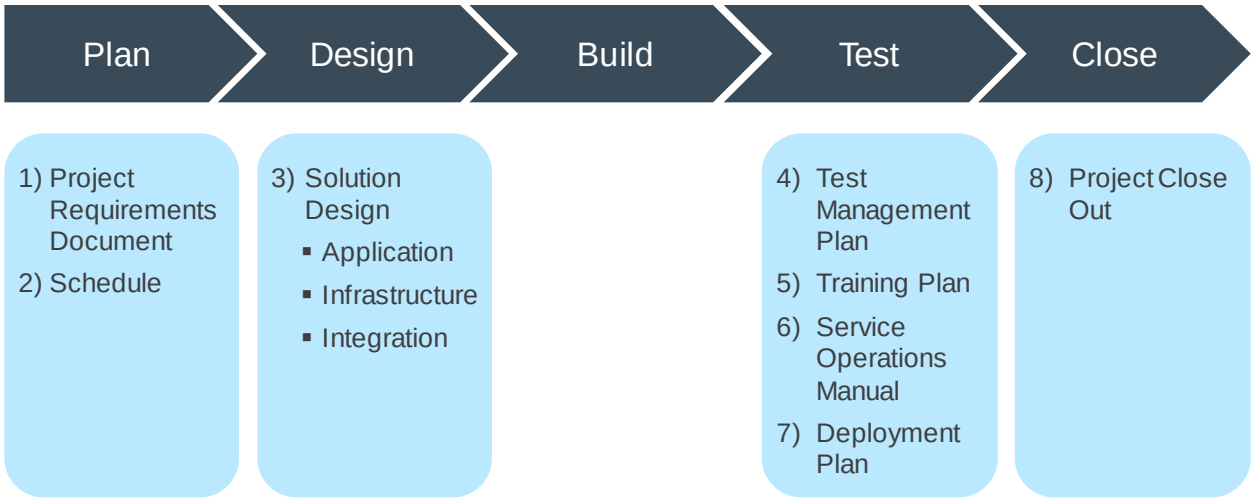


Figure 1 PMM Phases and Documents

The Hospital opened on time. The systems worked as designed; while there were some stabilization efforts, the systems, processes, and people were able to support the on-time opening of more complex services for more diverse patients. During the stabilization phase, caregivers also looked forward and planned optimization initiatives such as Lab optimization involving physicians, nurses, vendors and others in the value chain to improve patient. The Lab Point of Care Testing project exemplifies co-created innovation. It is this case study that follows that illustrates innovation at the Hospital; but first, a look at traditional clinical testing.

Traditional Clinical Testing

Clinicians often base decision making on laboratory test results. Traditionally, testing occurred within the laboratory with specimens collected by trained caregivers for sample analysis and result interpretation. Testing results turnaround time is longer when testing takes place away from the patient bedside or point of care. Standard laboratory testing turnaround-times can range from an hour to multiple days while clinicians wait for results. Long turnaround times delay patient care decision making.

Point of Care Testing (POCT) arose to address some of the shortcomings of traditional testing resulting in multiple benefits[i]:

1) POCT results are immediate, so the caregiver does not have to re-familiarize themselves with the case.
2) The results turnaround time is reduced leading to earlier decision making. Patient care can improve leading to a reduced length of stay and improved patient outcomes.
3) Testing and result interpretation can be completed by non-laboratory personnel thereby reducing staffing bottlenecks and decreased results turnaround time.
4) There is improved specimen stability since analysis occurs at the point of care rather than later in the laboratory.

Laboratory leadership at CCAD developed a POCT strategy that leveraged these benefits.

Point of Care Testing

The Hospital POCT Strategy is a subset of the overall Laboratory strategy that is caregiver and patient-focused to continuously improve and add value to the services offered by the Lab. The POCT team developed the POCT Strategy in the clinical planning phase before hospital go-live. The POCT Strategy addresses people, processes, and

technology; planning and managing all three pillars are necessary for an effective and safe POCT service. Embedded in this strategy are principles of Agile, Lean and innovation, and are evident when collaborating with others such as the PMO. A fundamental aspect of the Lab culture is that continuous improvement is an ongoing journey within each of these three pillars: innovate or evaporate.

People

Central to the Lab are people: patients, clinicians, collaborators, and vendors. The differentiating factor that enables innovation is how Lab caregivers work with others. Lab leadership strives to create long-term teams; that is, they provide a work environment where caregivers want to stay and be part of the Lab team. This permanence allows them to focus on common goals to delight their customers. The POCT team is self-organizing with the right amount of managerial governance. They prefer to meet face to face with their supply chain and other partners (e.g., PMO) and value transparency.

The POCT Laboratory team manages POCT activities ranging from training caregivers to collect specimens, to device calibration, to managing POCT documentation. All POCT caregivers require attaining, demonstrating and maintaining competence in POCT and related activities (e.g., infection control, hand hygiene, sharp object disposal, etc.). Competence is managed and documented in the organization's Learning Management and Human Resources systems.

Technology

Lab caregivers see technology as a value enabler. At hospital opening, the Lab went live with basic functionality; that is, the PMO and Lab together implemented necessary systems while supporting safe and effective patient care. Once stabilized, the Lab caregivers planned for improvement initiatives by turning on additional features to add value or to add other systems and integration to the Lab ecosystem. Thus, continuous technology improvement occurs within the Lab technological space.

Processes

The POCT team lives by the adage: "If you follow a good process, you are more likely to get a good result." (However, they are willing to break and improve processes in their continuous efforts to deliver valued services.) Therefore, a coherent and comprehensive suite of processes and policies guide point of care testing at the Hospital.

POCT Process

There are two major POCT processes: i) use POCT devices without electronic medical record integration, and ii) use POCT devices with electronic medical record integration. The Hospital opened with both integrated and non-integrated POCT devices. The Roche suite of devices was easily integrated with the electronic medical record using the Cobas application for hospital opening. These integrated POCT devices and workflows are successful and well-liked by clinicians; the POCT team learned from this experience.

The Lab team did not integrate non-Roche POCT devices with the electronic medical record due to device complexity; they left this integration for the optimization phase. The high-level workflow for non-integrated devices is straightforward:

1) The physician places a point of care test order using the electronic medical record.
2) The responsible caregiver receives the new order.
3) The caregiver performs the test at the point of care (e.g., ICU).
4) The caregiver manually enters the POCT results into the electronic medical record.
5) The ordering physician receives an alert within the electronic record that the POCT results are available.

After hospital opening, improvement opportunities became clearer. The POCT team undertook a Lean Six Sigma study to understand improvement areas and how to provide additional value.

POCT Optimization

Lab optimization planning began before hospital opening. The Hospital opened, and the Lab caregivers with their various partners stabilized processes and systems. With these successes and learning, the POCT team and other Lab teams prioritized optimization projects. The POCT team completed a comprehensive analysis of the blood gases POCT service using Lean Six Sigma techniques including satisfaction surveys and process time measurements (e.g., results turnaround time). The POCT team identified opportunities for process simplification and results turnaround time reduction.

The POCT strategy envisioned further device integration with the electronic medical record to i) eliminate manual results entry, ii) eliminate the potential for test results manual entry error, and iii) improve patient safety with additional positive patient ID checks. The integrated process follows:

1) The physician places an order for a point of care test using the electronic medical record.
2) The responsible caregiver receives the new order and prints the patient demographic label.
3) The caregiver attaches and scans the patient label on the specimen container.
4) The caregiver scans the patient's wristband for positive patient ID.
5) The caregiver performs the POCT.
6) The POCT device automatically analyses the specimen and sends the test results to the electronic medical record.
7) The ordering physician receives an alert within the electronic record that the POCT results are available.

The Lean Six Sigma study helped POCT caregivers understand the problems and how to improve the process. Fundamental to process improvement was device integration. The POCT leadership proposed and prioritized device integration to the PMO.

<u>Conworx POCT Integration Solution</u>

The technical teams integrated POCT devices with the electronic medical record with the Conworx application system. Conworx is a middleware application that integrates different vendor POCT devices and the electronic patient record. Conworx receives patient data (ADT message) and orders (ORM message) from the electronic patient record. Depending upon the type of POCT device, the demographic and orders messages flow directly to the POCT device. Integration improves positive patient ID so that the right test is performed on the right patient. Results (ORU message) then flow immediately to the electronic record for the ordering physician's attention.

<u>Project Management Method with Agile Enhancements</u>

The project team followed the Hospital's Project Management Method (PMM) to implement the Conworx integration solution. The PMM is a set of tools and processes used by project managers to deliver projects like the Conworx Integration Project. Traditional project documentation like a schedule, test strategy, and go-live strategy support the teams. The delivery method included Agile and the innovation principles resulting in an Agile project management delivery method.

Once the project was approved to proceed, the PMO and POCT teams continued their collaboration to plan the project and co-create the solution. They brought in other teams as required (e.g., they worked with procurement specialists early to procure devices and the Conworx software). However, it is during the transition to production and the go-live period that the PMO and POCT teams demonstrated their Agility. They acted in unison to carefully plan and manage the risks of bringing this new system into Production that would significantly change the POCT workflows.

Staged Approach: Working together with the PMO and POCT teams planned a staged approach to bring this new system into the Production environment. First, the Conworx application placed into Production with a backout plan if the team needed to remove the changes. Once in Production, the team completed comprehensive regression testing to make sure Conworx did not disrupt the other applications in the Production environment. After a day of Production co-existence, the team concluded that Conworx was stable. Next came connecting the POCT devices to Conworx and the electronic medical record. The strategy was to connect the least complicated devices first, then stabilize, learn, adapt and implement more complex devices:

1) DCA Vantage Analyzer (2 devices): measuring HbA1c which aids in efficient glycemic control. These are the least complicated devices that went live without any issues. After two days, the next set of devices were scheduled to go live.
2) Hemochron Signature Elite (9 devices): coagulation testing system using k arterial or venous blood. Again, these devices went live without any issues. After a day of monitoring (rather than the planned two days), the POCT team decided to go live with the next set of devices earlier than planned.
3) RapidPoint (RP) 500 Blood Gases Analyzer (6 devices): used to test blood gas, electrolytes, glucose, lactate, and full CO-oximetry. These complicated devices were high-value devices for the clinicians, and all six also went live without any issues.

Learning: The PMO and the POCT developed a training plan for the different groups of caregivers using the system: IT Support (Level 1), Conworx Support (Level 2), POCT team, physicians, and nurses. While these formal learning opportunities were necessary, it was the informal but purposeful learning that occurred throughout the project. For example, after each piece of the POCT solution was put into Production, the team reviewed the go-live experience to see if additional training, communication or support were required. The team took their lessons learned and applied them to the next POCT devices to go-live.

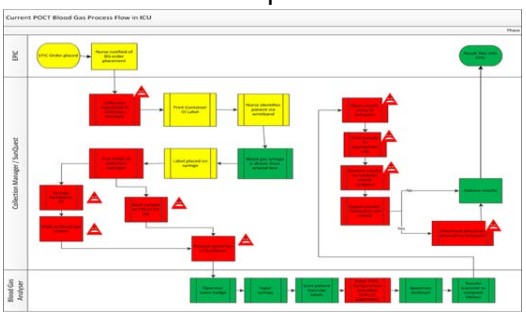
Agile Teams: The POCT, PMO, physicians, nurses, vendors, and device manufacturers together committed to this quality improvement initiative. The team encouraged Agility principles throughout the value chain. For example, the core team met each day, face-to-face to align their work. The team met with physicians and nurses before go-live to answer questions and to validate the rollout strategy. When the devices were being rolled out, the POCT and Conworx Support teams visited the clinicians to provide support, so new processes were easily followed allowing clinicians to focus on patient care.

The deployment of the three types of devices was stable with only minor configuration problems that the team quickly fixed. Given device stability and caregiver satisfaction, the PMO and POCT project leadership closed out the Conworx project early. Due to the success of POCT device integration with the electronic medical record, the POCT leadership plan further POCT device integration.

POCT Optimization Results

Now, the manual steps to enter test results into the electronic record are eliminated thereby decreasing the turnaround time and reducing the potential for human error. In Figure 2, one can see that the red “pain points” representing inefficiency and were reduced after integration. (Note: the graphic was sized to illustrate process improvement results indicated by the reduced number of steps and red pain points; the intention is not for the reader to read the details of the before and after processes. Nothing wrong with your eyes!) They achieved process simplification.

Before Process Improvement



After Process Improvement

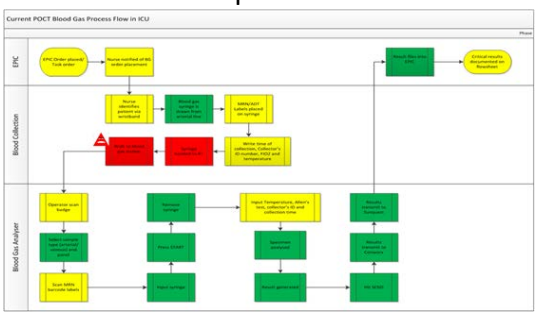


Figure 2: Process Improvement

We would like to share two key results: POCT program success and ISO Accreditation results.

<u>1) Point of Care Testing Success</u>

Integrating POCT devices with the electronic patient record has yielded many measurable improvements; however, for brevity, only the blood gases results are highlighted and are indicative of the successes of the other integrated POCT devices. A critical improvement in the average turnaround time for blood gases results dropped from 25 minutes to less than 5 minutes.

Modality	**Turnaround Time (Minutes)**
Blood gases sent to the Lab for analysis	>25
Blood gases POCT - without Conworx integration	15
Blood gases POCT - with Conworx integration	<5

Table 1 POCT Turnaround Time

POCT satisfaction increased for physicians, nurses, and other clinicians using the newly integrated POCT devices and process. Below are the physician results that are similar to nurses and other clinicians using POCT integrated with the electronic patient record.

Physician Satisfaction with POCT Process	**Before Integration**	**After Integration**
Strongly Agree	11%	33%
Agree	56%	0%
Neutral	11%	67%
Disagree	0%	0%
Strongly Disagree	22%	0%

Table 2 Physician Satisfaction

Besides improvements in turnaround time reduction, integrating POCT devices provided other benefits. A significant feature of Conworx is that POCT devices can be remotely monitored and configured by the POCT Laboratory team. Remote device management saves time for the POCT Laboratory team since they do not have to go to the device should there be a technical or calibration problem; they can use the Conworx administration module in the Lab to investigate device problems. Remote device management reduces unplanned device downtime and increases caregiver satisfaction.

<u>2) ISO 15189/22870 Accreditation</u>

Achieving ISO 15189/22870 POCT Accreditation was an essential POCT strategic goal. The POCT team submitted an ISO application detailing readiness and then hosted the ISO accreditors in August 2017. The accreditors reviewed the POCT program and awarded ISO accreditation in October 2017 for eight device types including POCT

Thromboelastography (TEG) devices. Accrediting the TEG POCT device is noteworthy since there are very few other hospitals in the world that are ISO 15189/22870 accredited for TEG POCT devices. The Hospital became the first lab in the Middle East to be ISO 15189/22870 accredited.

Conclusion

The POCT service at the Hospital has achieved its short-term goals: provide integrated POCT services to the caregivers' satisfaction, and to achieve ISO 15189/22780 accreditation. The work has only begun! Given the success of the POCT program, integrating additional POCT devices (e.g., I-STAT for creatinine testing) is being planned. They are adding additional Conworx functionality such as the competence management module. Here, a POCT device user will be automatically locked out of the device if their training is out of date. The competence management module will improve regulatory compliance and enhance patient safety. The caregivers expect more great things to come from the POCT program. Looking back at the project, we can identify critical success factors that begin with Agile teams.

<u>Critical Success Factors</u>

1) Agile Teams – Extend Agile principles across the value chain teams including vendors, device manufacturers, end users, PMO, and the POCT team. Together, they co-created solutions to add value for POCT users. The POCT and Conworx Support teams were stable in that there was the intention of "permanence" so that the momentum of success continues. These teams met face to face whenever possible, and it was mandatory during the critical go-live period. Indeed, during go live, there were 8 am and 1 pm team meetings to align, communicate, learn and plan.
2) Continuous Improvement – The PMO and POCT teams understand that continuous improvement is critical: innovate or evaporate! To improve they used Lean Six Sigma tools to understand problems and opportunities. Measure to improve problem understanding and results objectivity.
3) Purpose – The POCT and PMO teams had a clear sense of purpose where outcomes were measurable and objective; they formulated value-laden outcomes in the eyes of their customers.
4) Project Success – Define success regarding your customer in addition to other metrics such as delivering on time. The point is to provide products and services that delight your customer over the life of the product or service[ii]; this is a bit contrary to the temporary nature of projects. However, when customer care and ongoing performance are primary indicators of value, then a constant backlog of delivering initiatives will be favored over traditional project delivery approaches.
5) Adaptable Project Management – The PMO developed the PMM 2.0 that guides project participants. It is flexible in that it can be adapted to suit the uniqueness of a project so that the focus becomes adding value (outcomes) rather than finishing on time (outputs) and perhaps not delivering a solution that delights the customer. Given the need for ongoing performance and customer, providing value through lengthy "waterfall projects" is not always appropriate; Agile and other approaches (e.g., #noprojects) offer other delivery methods. A continuous stream of smaller Agile initiatives run parallel to large projects to deliver a continuous flow of value initiatives. This approach leads to more frequent feedback, more improvements, and increased value for caregivers and patients.
6) Innovation– Customers today increasingly demand continuous improvement and change. Meeting these expectations can be helped along through innovation. Innovation principles supported the POCT integration project. For example, a deep understanding of what the customer valued drove effective innovation. Implementing innovative solutions should be incremental and iterative.
7) Information Technology is a 'Strategic Partner' – Gone are the days where IT is just a back-office function. At the Hospital, the IT Department is a strategic partner to clinical and business functions, solving both operation challenges and developing and delivering the strategy. This forward-thinking approach ensures that IT focuses on achieving outcomes and not just implementations and support.

The POCT strategy focusing on people, process, and technology, has been visionary, comprehensive and systematic. The POCT strategy included attaining the prestigious ISO 15189/22780 accreditation. While achieving

the ISO accreditation is outstanding, more is being planned to provide the very best patient care by a team of dedicated caregivers. The journey continues.

Endnotes

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[i] St. John, Andrew, "The Evidence to Support Point-of-Care Testing," The Clinical Biochemist Reviews, 2010 Aug; 31(3): 111–119, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2924123/. And Crocker, J. Benjamin et al, "Implementation of Point-of-Care Testing in an Ambulatory Practice of an Academic Medical Center," American Journal of Clinical Pathology, Volume 142, Issue 5, 1 November 2014, Pages 640–646, https://academic.oup.com/ajcp/article/142/5/640/1761000/Implementation-of-Point-of-Care-Testing-in-an.

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