Cardiac Catheterization Laboratory Management and Practice: The Basic Fundamentals

By Amy Newell

You may be wondering – ‘Why begin with a focus on the most basic definition of Management’?  As fundamental as it sounds, some form of management is key to every aspect of our lives, be it work, family, or even leisure. How we manage our everyday lives is just as important as how any manager conducts day-to-day operations within a department, clinical unit, or business setting. We challenge you to rethink this concept and gain a broader idea of what it means to YOU. Understanding this basic definition allows for a broader understanding of the topics to be covered in this article.

As defined by Webster:

Management (Man`age´ment) n.
The act or art of managing; the manner of treating, directing, carrying on, or using, for a purpose; conduct; administration; guidance; control; as: the management of a family or of a farm; the management of a business enterprise; the management of state affairs.

As radiation professionals, many of you may or may not be familiar with the cardiac catheterization laboratory and how managing this department differs from any other hospital unit or ancillary department. In fact, some of you may even have oversight for the cardiac cath lab as part of Imaging Services. The cardiac cath lab (CCL) can be considered one of the most unique and dynamic environments in a hospital. Corazon believes that, when managed effectively, running like a well-oiled machine, a CCL can achieve clinical efficiencies, better patient results, and many other positive outcomes. However, when managed poorly, a domino effect occurs that negatively impacts program performance, which oftentimes takes a significant amount of resources and equity (sweat and/or fiscal) to overcome.

Of course, cath lab management involves fiduciary responsibility as related to FTEs and department budgets, and most often includes a set of “hospital wide” performance and financial goals. In addition to the more “routine” or “standard” management expectations of the cath lab, managing it and managing it well requires superior leadership skills, flexibility, accountability, patience, and a bit of tenacity. The ability to delegate and empower employees is essential to not only the success of the individual, but to the overall success of the cardiac program as well.

As the industry rapidly evolves with clinical and technology advancements, regulatory changes, and healthcare reform, a strong leader no doubt needs to adapt and embrace change...and with that, have the basic knowhow to empower those they lead! Significant daily challenges face a cath lab manager: physician and staff demands, along with patients, who in many cases require higher-acuity care. Add to that the strategic program-driven responsibilities, and suddenly, the management role is a complex web of operational issues driven by day-to-day demands and broad strategic issues that should not be placed on the “back burner”.

At Corazon, we are often called upon to provide our clients with expertise, support, and direction for their cath labs. Whether through a review of operations, for an expansion initiative, or in the context of quality improvement, our goal is to provide an outside “expert” perspective as how to conduct business, from managing the customer’s expectations (patients, physicians, and clinicians), to fiscal accountability, patient and staff safety and satisfaction, to supply management and equipment advice. Most importantly, quality of care is always at the forefront.

The following are critical elements that we see as the major impacts on not only cath lab management, but the overall success of a cardiac and vascular program today, tomorrow, and the future.

Program Quality

In any cardiac program, quality is the most critical component of cath lab management. In today’s transparent environment, many consumers “shop” for healthcare services even before they see their physician. Cath lab managers are faced with questions and pressures from senior leadership relative to program quality and performance. High quality has become the expectation, not the exception.

In Corazon’s experience, patients with internet access are looking for cardiac programs that possess stellar outcomes, as well as favorable patient satisfaction scores. Data in any given scenario means power, and just as important as how the data compares, is how it is shared, reviewed, deliberated, and reported. Accuracy is key! Many physicians—cardiologists in particular—often do not trust the data. Also, shared data should become the basis of an actionable performance improvement process. Regardless of how a CCL measures up against external benchmarks, there is typically room for improvement.

A strong cath lab leader is capable of recognizing talent within, and we often suggest delegating a clinician from the cath lab to assist in the data collection. Cath labs across the country use data, be it a national benchmark comparator such as The American College of Cardiology – National Cardiovascular Data Registry (ACC-NCDR®), or internal dashboards with assigned clinical and fiscal metrics – both have clear benefits. Beyond the clinical indicators, sample operational indicators most often measured are associated with procedural delays, product utilization, costs and reimbursement, or in some circumstances, physician compliance with operational standards (i.e., on-time case starts). All of these can drive a performance improvement plan facilitated through a quality improvement committee or council. Considering the above – Do you know how your quality ratings look to your customers? How does your operation measure up? Is your program fiscally sound?
Diagram #1 - A snapshot / sample of a CCL dashboard with associated indicators.

**Emergency Department STEMI Presentation**

**STEMI Arrival in ED**

12 Lead ECG done within 3 to 5 min

ED Nurse obtains general consent

Bedside (Quick Registration) per patient access

ED MD Activates CCL with 10 min of arrival

ED MD call interventional Cardiologist

**ED Physician**

- ED Clinical Supervisor Instructs unit clerk to Page CCL / House Coordinator at XXXXXX
- The CCL / House Coordinator return phone number – XXX-XXX-XXXX
- The UCS/Tech will document all returned phone calls and give to Clinical Supervisor.
- CCL Team will return page within 5 min. If CCL does not call within 5 min then calls will be made to Cell phones.

**ED Clinical Supervisor**

- ED Supervisor Notifies Patient Registration For STEMI Alert

**House Coordinator**

House Coordinator Call:

- ICU – Secures ICU Bed Immediately
- Lab – XXXX
- Respiratory – XXXX

**ED RN**

ED RN Completes STEMI Checklist

Initiates PCI Education

**ED / CCL RN**

CCL to ED when ready

ED RN discharges patient from ED

Destination CCL

Family Escort to CCL Waiting Area

Patient Transferred to CCL by 1 CCL RN and 1 ED RN (ED to Provide Transport Monitor)

Nurse to Nurse Report while transport to CCL

**CCL RN / TECH**

CCL Staff notifies ICU of Transport to ICU

Patient Transferred to Unit with Defib. / Monitor and Emergency Meds

H.C. notifies Case Management of Inpatient admission

**ICU**

ICU Admission

Sheath Pull per MD Orders

Discharge Criteria Met in ICU

Transfer to PCU from ICU

Discharge Criteria Met in PCU

Patient and Family provided Discharge Instruction and Released to Home

**RN**

Hand Off Communication and Groin Check completed / Documented upon arrival to unit

Process Owner: Cardiac QI Committee
**Patient Safety**

Patient safety should be considered by far the most important focus for any cath lab manager, as it is often associated with the *quality* of a program. Cath lab managers are faced with many challenges to be discussed below, but few are as critical as the patient’s safety. Cath lab managers DO have a great resource - The National Patient Safety Foundation (NPSF), the national organization with their sole focus as Patient Safety. The NPSF provides all hospitals with guidelines and patient safety goals that for many are taken for granted. The cath lab manager must remain vigilant and not only educate, but enforce safe practices within the cath lab. Given the evolving and dynamic nature of the cath lab setting, mistakes and oversights can and do occur, though not intentionally. Even the basic principal of an employee introduction to the patient, or the required “time out” practice, cannot be over stated. Every day, patients place their lives and their trust in the hands of the clinicians and physicians of the cath lab...they have chosen your cath lab for their care. They expect compassion, superior skills from all professional involved in their care, and they expect to be safe. The cath lab manager is responsible for making certain that the patients ARE safe in a variety of ways, and that they will be cared for in a manner that displays best practice and utmost concern for their health. The cath lab carries inherent risks that patient is most likely unaware of, whether it is a miscalculated medication resulting in error, increased contrast utilization, or even prolonged radiation exposure. It is the ultimate accountability of the cath lab manager to assure that safe practices are being employed each and every day in the cath lab environment. Corazon recommends even beyond the hospital-wide NPS goals that the cath lab manager empower a team of clinicians to monitor and remain diligent in keeping the patient safe, free from risk and/or injury.

**Operational Efficiency**

Other critical elements for any cath lab manager are efficiency, along with the ability to embrace change in practice. Efficiency or inefficiency no doubt impacts day-to-day operations, both clinical and financial, which will ultimately impact customers: the patient, physician and cath lab clinicians, and may very well impact post patient care, other departments, or ancillary services. Consider even a “minor” delay and what potential ramifications the program may face operationally, clinically, or even fiscally...especially if they occur often.

For example, consider cath labs offering therapeutic cardiac services such as percutaneous coronary intervention (PCI), specifically the ability to treat the acute myocardial infarction (AMI) patient population. These programs are held to a national standard to successfully treat the AMI patient in a timely manner by opening the blocked coronary artery in less than 90 minutes from the time the patient arrives at the hospital. It should be the goal of EVERY program providing this service to achieve and even exceed this national benchmark. In order to assure an efficient patient care practice, Corazon recommends cath lab management, in collaboration with the other departments involved in patient care continuum, to create a diagram/flow chart that addresses each critical timing element for AMI patients. The sample diagram below depicts a very clear, measurable, and efficient flow that was carefully planned as part of a multi-disciplinary approach to assure operational efficiency for this scenario.

---

**Diagram #2 - Sample AMI operational flow chart**

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Profitability per diagnostic case</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Profitability per PCI case</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>% of Medicare patients</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>% of Charity patients</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Avg supply cost for Diagnostic caths</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Avg supply cost for PCI procedures</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Average Overall Coronary Stent use per case</td>
<td>1.4</td>
<td>Corazon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Average Number of EMS per case</td>
<td>Internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Average Number of DES per case</td>
<td>Internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Avg cost of stents per case (EMS) using stent/case</td>
<td>NA</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Avg cost of stents per case (DES only) using stents/case</td>
<td>NA</td>
<td>Corporate Finance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Avg first case of the day delay time (mins)*</td>
<td>Internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Case Start &lt; 15 min</td>
<td>&lt; 15 min</td>
<td>Internal</td>
<td>X</td>
<td>Data Collection</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Case Start &gt; 15 min</td>
<td>&gt; 15 min</td>
<td>Internal</td>
<td>X</td>
<td>Data Collection</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Avg. Room Turn-Around-Time between CCL cases (mins)*</td>
<td>&lt; 20 min</td>
<td>Corazon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Wait time (team prepared and waiting for physician)*</td>
<td>TBD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Avg Procedural Length of a Lt. Heart Cath (mins)</td>
<td>35</td>
<td>Corazon</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Avg Procedural Length of a PCI procedure (mins)</td>
<td>90</td>
<td>Corazon</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---
Supply / Inventory Efficiency

Considering all of the “high ticket” items found in the cath lab, this is an area to focus on because as costs increase, so do the opportunities for cost savings. This is a fundamental principal for any cath lab manager, as the ability to manage the costs of expensive items such as coronary stents (either bare metal or drug eluting) or peripheral stents, for instance, will no doubt serve to propel or hinder success. Furthermore, tight management of the multiple closure devices on the market is worthy of attention from the cath lab manager and physician leadership in order to achieve a measurable clinical benefit that justifies the high price tag. Clearly, though, vendors are always competing for your business, so sound negotiating skills are a must, along with savvy inventory management.

There are many models for cath lab managers to consider for supply management. The cath lab manager’s ultimate accountability relative to supplies or inventory is to drive standardization, maintain a optimal par level, and eliminate waste, which equals cost savings. Every cath lab is different, as some may have three physicians providing care, while others may have 30. It can be a daunting task to keep ALL of them happy, as many physicians prefer a certain product or vendor for various reasons. It is important to evaluate a best practice, fiscally-responsible inventory model that can be easily managed, and then deploy a successful standards committee to be certain of physician buy-in and support. In Corazon’s experience, the following models should be considered and presented to the executive leadership and engaged physician stakeholders, as well as to the Purchasing and/or Materials Management Department.

The Consignment Model: Should be considered if the cath lab performs a high volume of procedures, thus allowing for better pricing through the “bulk” buy. Further, many vendors will offer deeper discounts during an “end of year” purchase. This option can be risky because be it a next generation balloon or stent, technology updates can quickly render a particular item obsolete. In this case, the cath lab has already paid for the “bulk” product on the shelf, while the physicians request the next generation version.

The Bulk Purchase Model: Should be considered if the cath lab needs special items or chooses to plan procedures with specific stents, balloons, wires, etc. Not only does this keep shelf stock from expiring, but it has a cost savings advantage. The risk associated with “just in time” is delivery— the time the item is ordered will impact the ability to have the item “just in time” for the planned procedure.

The “Just in Time” Model: Should be considered if the cath lab needs special items or chooses to plan procedures with specific stents, balloons, wires, etc. Not only does this keep shelf stock from expiring, but it has a cost savings advantage. The risk associated with “just in time” is delivery— the time the item is ordered will impact the ability to have the item “just in time” for the planned procedure.

The Shelf Pricing Model: In this model, the lab sets the price it is willing to pay for an item on the shelf, and then vendors are able to supply the product if they can match the set shelf price. Shelf price thresholds should be evaluated regularly. Corazon believes every six months is optimal.

Beyond the model(s) considered, the cath lab manager must sustain some level of inventory management, and this can be accomplished in many ways. Manual inventory management, although becoming obsolete, still remains in practice for low-volume cath labs. Bar coding provides an update to inventory at point-of-care; however, the cath lab and/or materials management must work on the front end to assure all of the barcodes are entered into the hospital’s inventory management system, and this can be labor intensive initially and on an ongoing basis.

Radio Frequency Identification (RFID) is another option that works quite well in larger, tertiary centers. RFID also requires the “upload” of coded information on the front end, but provides the cath lab manager the ability to better manage expired stock and “just in time” ordering. Due to the computerized tags on EVERY item, RFID gives greater control and recording of the number of items picked from a cabinet, which can lead to valuable information related to inventory use/expiry. Oftentimes, RFID will generate a report with the associated cost savings for the hospital based on fluctuating inventory use.

Corazon recommends that before ANY investment, the cath lab manager clearly understands ALL options and evaluates which model and inventory management system is best suited for their organization.

Customer Service – Satisfaction

“A customer is the most important visitor on our premises. He is not dependent on us – we are dependent on him.”

Author-Unknown

In the world of the cath lab manager, there are many customers: the patient and families, of course, but also employees, physicians, and even senior leadership should be considered as well. “The customer is always right”…. Does this statement hold true in healthcare? What about for the cath lab specifically?

The answer is – yes! Without a doubt, the customer IS always right, which is itself something of a key component of management., especially in the CCL where each “customer” may have a different opinion or perspective. Many cath lab managers are challenged by physicians and employees who, as part of human nature, and perhaps personality, will rarely concede, even if they admit to themselves that they were wrong. It is in these situations that an astute cath lab manager may redirect the point in question, providing a solution that all parties can begin to discuss and understand, then come to a mutually-agreeable solution. This does not require a “dictator” approach, but rather, offers a more reasonable and practical way to deal with conflicts. There is no doubt that the manager must often make difficult decisions that may not please all involved. The important part is that all decisions must be effectively communicated to ALL stakeholders.

Many, especially the employee and physician, see the cath lab manager as somewhat removed from the day-to-day procedural or direct patient care aspect, and this is ok. The cath lab manager must be able to focus on the administrative tasks at hand, department budgets, vendor or contract negotiations, and even employee performance evaluations and any other managerial duties. It is important, however, that the
cath lab manager be available to the “customer” should a problem arise requiring immediate resolution.

Patients and families often do not have direct interaction with the cath lab manager unless there is a life altering event that occurs during their time within the cath lab. Many cath lab managers are held accountable for their department’s patient/family satisfaction surveys, which have been highly scrutinized in recent years. In fact, regulatory changes are now impacting programs through fiduciary rewards or penalties of Value Based Purchasing, and patient satisfaction accounts for 30% of the total score. As a result, cath lab managers must consistently review these satisfaction scores. In the event that scores are below optimal, the manager should quickly engage the CCL team and perhaps even delegate an employee to perform a root cause analysis and provide a corrective action plan in order to increase scores.

One of the most valued assets of a cath lab manager is the ability to empower employees for the betterment of the department or program. Indeed, the “customer” has a choice—if a patient does not have an “optimal” experience (or in some cases, has just the opposite), “poor” rating will be reported, and more importantly, the word of mouth reputation of the hospital will suffer. Keeping tabs on the patient experience and having a clearly outlined service recovery plan is essential to closing the loop on the patient experience from entry into the hospital, through the care delivery, and post-discharge.

**In Conclusion**

There are many challenges that face the cath lab manager, but the fundamental definition of management must always be considered. A strong cath lab manager / leader will possess not only the qualities mentioned above, but they will bring their own unique style and poise that should promote a positive spirit among their employees, physicians, patients, and executive leadership team. As Corazon provides organizations with the knowledge, expertise, and tools to achieve and maintain cath lab excellence, we cannot overstate how critically important it is to have a well-qualified cath lab manager who acts as a leader by example, a mentor and motivator of the team, and an expert in the organization’s processes and procedures. Such qualities will result in a streamlined cath lab with outstanding results.

Managers, like the coach of a team, must be devoted to a solid game plan (department goals and objectives), developing talent (ongoing training and education for the team), and post-game review (data-driven performance improvement assessments). It is only with these elements that a winning cath lab “team” can be created, sustained, and positioned for the future.

Amy is a Vice President at Corazon, Inc., a national leader in strategic program development for the heart, vascular, neuro, and orthopedic specialties. Corazon offers a full continuum of consulting, recruitment, interim management, and physician practice and alignment services for hospitals and health systems across the country and in Canada. To learn more, visit [www.corazoninc.com](http://www.corazoninc.com) or call 412-364-8200. To reach the author, email anewell@corazoninc.com.