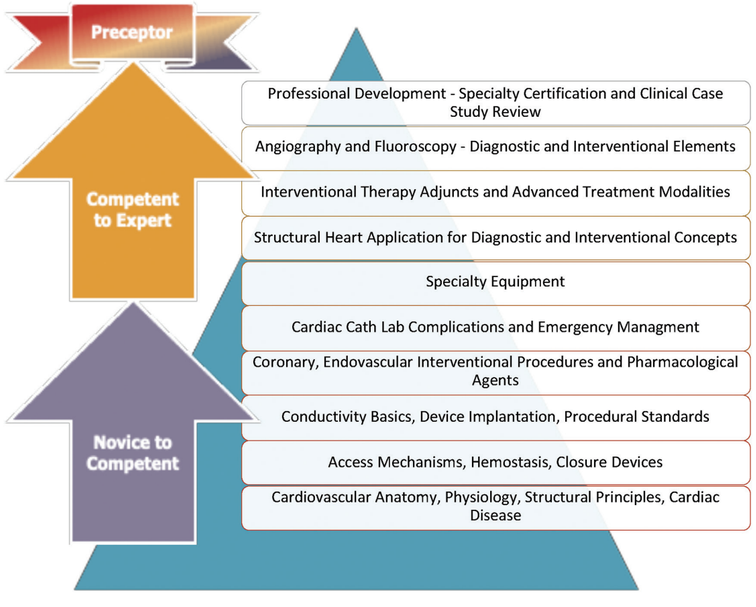
Continuing an Educational Conversation: Functionality and Implementation for Orientation Success in the Cardiac Catheterization Lab (Part II)

Sarah Davis-Arnold, MSN-ED, RN, RCIS, NPD-BC

In Part II of the Educational Conversation in discussing *Frameworks for Orientation Success in the Cardiac Catheterization Lab* (Part I is in *CLD* January 2022), we will discuss the functionality of operationalizing didactics to influence success in the cardiac catheterization lab.

The necessity of developing and designing the *Cardiac Catheterization Platform Core Curriculum for Interprofessional Education Standards and Professional Development* stemmed from a deficit of accessible resources for facilities to optimize the education and continued training for cardiac catheterization in addition to other interventional procedure platform modalities. Operationalizing didactics through orientation curriculum became due course in improving the quality and safety of procedural care. We have spent over half a decade traveling coast to coast in the specialty of cardiac catheterization, electrophysiology, and interventional radiology. These diverse experiences, coupled with many professional hats, including clinical educator, quality data abstraction, accreditation application lead, assistant nurse manager, and staff nurse, have cultivated a deep perspective and understanding of the requirements for a robust and effective professional education and training program.

With changing cath lab landscapes and environments of care, the loss of experienced nurses and technologists can be a deflating hole in experiential knowledge not quickly replicated.



Comprehensive Cardiac Catheterization Core Curriculum and Professional Development Model: Figure 1. Hierarchal Course Structure incorporating Learner and Preceptor Continuum.

Education and Learning Theory (what you need to know for the "why" behind the program)

Briefly, in our continued educational conversation, we will make a quick stop to share some of the theory and learning. Still, the emphasis here will be on arming cardiac cath lab professionals and leaders with a roadmap for successfully implementing core components and systems to foster practical orientation. To meet the education and industry needs, we have developed an extensive framework and are available for consultation on combined operational programs and existing resource assessments to evaluate the implementation of cardiac cath lab education and orientation programming.

The *Cardiac Catheterization Core Curriculum* is a facet of the dimensional process it takes to orientate effectively, train efficiently, and maintain highly skilled cath lab professionals. Utilizing the notion of Benner's skill acquisition model, novice to expert, the Core Curriculum applies andragogy components to the transition of novice professionals to expert[1] professionals with the intent to obtain specialty-related national certification in their field while practicing a mindful application of Duchscher's Stages of Transition Theory.[1] A newly hired registered nurse to the cardiac cath lab would be able to experience the execution of this program to facilitate foundational knowledge-building, transition from novice to a competent care provider, navigate the transition of abstract cognitive processes produced during growth, and achieve the goal of the Cardiovascular Credentialing International (CCI) credential of Registered Cardiovascular Invasive Specialist (RCIS).[2] The *Comprehensive Cardiac Catheterization Core Curriculum Model* is centered on the principles of adult learning, interprofessional collaboration, high-acuity care delivery, effective practice transitions, and cardiac catheterization best practice guidelines. This integration of principles can streamline specialized procedural training, decrease orientation costs, increase staff satisfaction and retention, and set clear expectations designed for team and individualized growth.

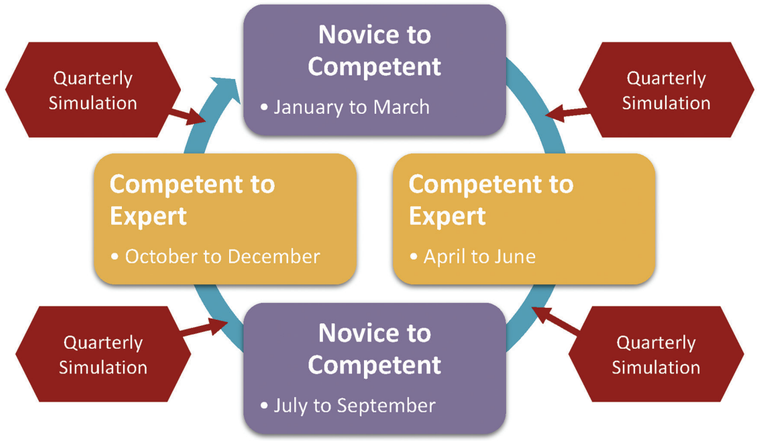
It must be noted that every interventional program is varied and unique. The *Comprehensive Cardiac Catheterization Core Curriculum and Professional Development Model for Interventional Platform Standards* will guide foundational core curriculum necessities and serve as a framework for the intended program to utilize as appropriate and consistently evaluate for effectiveness. The timeframe for orientation of individuals to the cardiac cath lab will depend on and need to be adjusted based on the following:

1. Case volume;
2. Acuity of critical care or emergency care experience of the individual;
3. Complexity of care and number of care modalities (hybrid programs, electrophysiology, interventional radiology, structural heart) delivered within the facility;
4. Individual intrinsic professional motivation.

The model's orientation section is designed to represent a facility with high volume, high acuity cases, standard cardiac catheterization care modalities, and a moderate individual intrinsic professional motivation. It is important to note and evaluate the overlap and incorporation of the mandatory items required by regulatory bodies and the organizations implementing this framework. Core mandatory items might include:

1. 12-lead electrocardiogram (EKG) recognition;
2. Moderate sedation and capnography monitoring;
3. Pharmacological agents and medication safety prerequisites;
4. Radiation safety, fluoroscopy;
5. Basic and advanced hemodynamic monitoring.

The mandatory items list is not comprehensive, and can be adjusted to facility standards and requirements. This program can also be implemented without a cardiac cath lab nurse educator, although this is not recommended by the Society for Cardiovascular Angiography and Interventions (SCAI).[3] It would be feasible for standardized programming of the didactic courses to be offered via an asynchronous e-learning management system platform. Additionally, staff practical orientation and training can be accomplished through the *Core Curriculum* framework and principles, which have been developed in a pre-packaged fashion. In facilities with patient safety concerns and programs in crisis, there is a critical need to first implement a patient safety and care standards course that encompasses basic safety principles and foundational care measures in order to ensure regulatory safety standards are being met. Following that period, a careful learner needs assessment and a gap analysis can be conducted to skillfully address the causative elements and design a remediation program for the facility for compliance.



Core Curriculum Calendar: Figure 2. Calendar of Course Execution and Learner Continuum Segments.

The 'Nuts and Bolts' of a Well-Oiled Cath Lab Orientation Machine

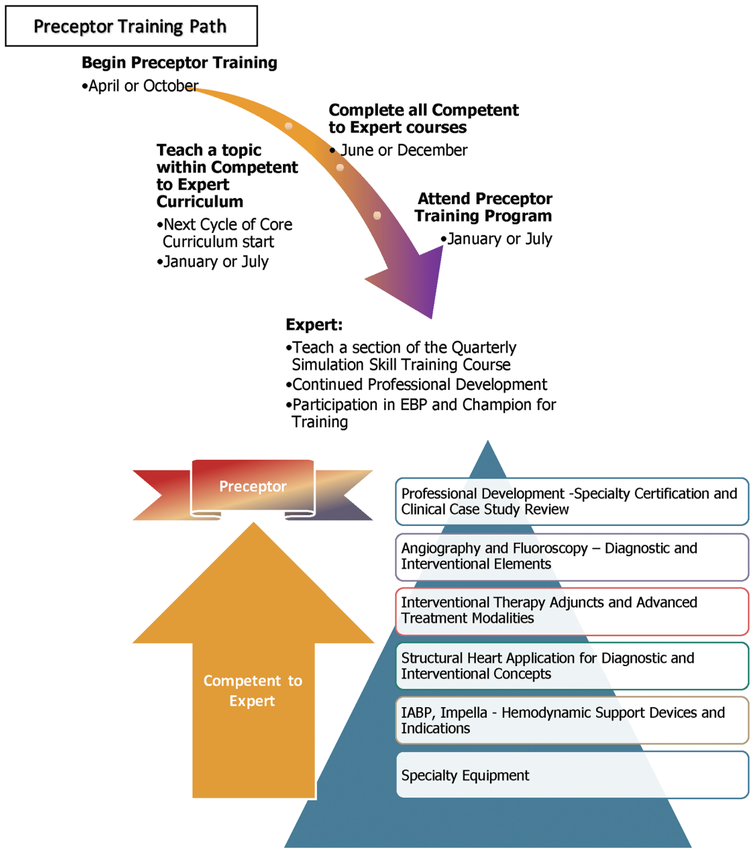
The *Comprehensive Cardiac Catheterization Core Curriculum and Professional Development Model* consists of twelve fundamental courses, layering foundational knowledge from basic cardiovascular anatomy and physiology intertwined with coronary artery disease pathology, up through advanced professional certification concepts (Figure 1). Paired with quarterly high acuity, low volume simulation, recommended out-rotation to operating/surgical shadowing, and an orientation outline for a preceptor that incorporates weekly didactic topics for learner and experiential (bedside) completion recommendations, the orientation design is systematic and layers foundational knowledge to offset preceptor burden or deficits in preceptor knowledge through standardized didactic courses.

Orientation should comprise a minimum of the following:

1. Didactic courses specific to the cardiac cath lab professional;
2. Orientation framework for new hire staff that pairs experiential learning and competency expectations with knowledge topics for personal, professional review;
3. Preceptor role standards and training;
4. Quarterly simulation;

Experiential Learning Guidance: Table 1. Recommendations for Bedside/Preceptor Driven Organization for Foundational Topic Delivery.

Week	Experiential Learning Topics (Bedside/Preceptor Driven)
1	Facility mission/values and Cath Lab standards Orientation to Cath Lab environment, storerooms, and call requirements Cardiac anatomy/physiology and conduction cycle Coronary anatomy and structure Procedures performed in the Cath Lab Hemodynamic principles Coronary artery disease process and treatment in the Cath Lab Aseptic and sterile technique, AORN principles Access: Arterial/Venous anatomy, equipment, antegrade/retrograde definitions) Shadowing/observational practice Introduction to room opening and equipment checks
2	Permanent Pacemaker, Automatic Implantable Cardioverter-Defibrillator, MICRA, BiV device implantation Conduction cycle, device definitions, indications, procedure setup, and charting Patient "hook-up" to monitoring and demonstration of EKG competency Closure devices and manual pressure Introduction to monitoring Supplies/equipment and procedural application Moderate sedation, capnography monitoring, and emergent respiratory rescue



Preceptor Training Path: Figure 3. Steps to Preceptor Training Model Incorporating Core Curriculum and Learner Continuum Segments.

5. Experience pathways for new hires that strategically address the plan for orientation for individuals with existing cath lab experience, those individuals with critical care background with no cath lab experience, and those with no critical care experience and no cath lab experience.

Let's explore functionalizing each, beginning with didactics. The didactic courses are sub-grouped into two sections, novice to competent and competent to expert, and are further divided to enhance the preceptor's knowledge and skillset while orienting, including the last six courses as a refresher or additive for teaching advanced equipment, structural heart principles, interventional adjunctive therapy, and angiography/fluoroscopy interventions in emergent case scenarios. A digestible orientation calendar format includes case scenario-based skills through quarterly simulation-based learning for low volume, high acuity care delivery.[4] Quarterly simulations can be conducted for the whole cardiac cath lab team to improve staff communication, emergency response, and patient outcomes (expanded upon below).

The most ideal course didactics for new hires in the orientation period would be taken in quarterly calendar segments (Figure 2). Courses 1 to 6, *Cardiovascular Anatomy and Physiology through Cardiac Cath Lab Complication and Emergency Management*, would be offered from January to March and July to September. The coinciding courses numbered 6-12 would be offered April to June and October to December.

Through the cyclic calendar execution, consistent cultivation of knowledge building for new hires, existing staff, and preceptors is accomplished. This cyclical execution also provides the opportunity for new hires, at any point in the year, to access the courses in an appropriate and timely manner for orientation. It is an investment of time with large payoffs in supporting experiential (in the lab) learning. The *Core Curriculum* allows nurses and allied professionals to build specialty knowledge that enhances the delivery of safe patient care. Further, for some interventional programs to overcome complexity experience gap challenges, the solution can be found within the application of the *Core Curriculum* as a leveling mechanism for common foundational knowledge required to provide safe and effective care in the lab environment.

It is also vital to discuss the impact of the current pandemic, and these courses have also been executed via digital means with success, still retaining the case scenario and "escape room" application. While requiring additional creativity and innovation, a virtual means of lecture utilizing this technique has been justifiably accepted and it is a viable methodology for interprofessional education[5] in overcoming a socially distanced or dispersed learning population (for example, in a health system with multiple cardiac cath labs instituting the didactic courses).

The extended period following the formal orientation and initial competency period is not assigned during the onboarding and orientation timeframe in order to maximize staff retention and satisfaction. This period is typically when the new hire completes orientation and one year of employment. The transition of professionals to the rigorous environment of the cardiac cath lab must be a facet of preceptor and leadership "checks" from the end of formal orientation to the year marker. This period marks the differentiation of precepting to mentoring in order to facilitate success and retention and initial onboarding coaching.[5]

The *Core Curriculum* planning includes quarterly simulation-based learning for low volume, high acuity care delivery, and high stakes and high acuity events.[4] These recommendations align with the SCAI expert consensus on best practices[3] within the cardiac cath lab. It is critical to include effective briefing and debriefing.[7] The inclusion of briefing and debriefing maximizes experiential learning, and integrates critical clinical reasoning and thinking.[8] Recommendations for the quarterly simulation course themes consist of *STEMI Recognition and Emergent Care in the Cath Lab and Complications* and *Emergencies in the Cath Lab*. These are distinct, already-developed courses in the *Core Curriculum* with intentionally planned case scenarios and simulation competency objectives that provide a comprehensive means to facilitate cardiac cath lab expert consensus recommendations, staff professional development, and periodic competency assessments. To maintain staff development in the cardiac cath lab's educational programming, it is suggested, at a minimum, to host case scenario-based education of these course themes on a quarterly, ongoing basis. Additional core elements to consider having in the cardiac cath lab include as an orientation or staple resource:

1. **Procedure manual**: a list of every procedure, definitions, setup, equipment list, and essential care components (example: intra-aortic balloon pump placement, proper site, sheath, and patient care for transfer to critical care unit);
2. **Drug reference resources**;
3. **Cognitive aids**: (time-out, set up diagrams for complex procedures/hybrid procedures, advanced cardiac life support [ACLS] protocols).

As discussed in the *Core Curriculum* introduction, the orientation and education presented herein are modeled to represent a facility with high volume, high acuity cases, standard cardiac cath care modalities, and a moderate (to high) individual intrinsic professional motivation level. For each interprofessional role and experience level presented, using, for example, the *Experiential Learning Guidance Table* (Table 1), per-week learning topics could be expanded to two-week intervals for a 26-week orientation for lower volume labs or complex, multiple modality labs with robust, high acuity programs that surpass typical diagnostic and interventional labs with on-call requirements.

Education, training, and competency are all different, but are often categorized under the same system. Determination and prioritization of each will be a critical step in facilitating effective management. Competency methodology can take many forms and it is at the facility's discretion to determine strategy, such as the Donna Wright Competency Method.[9] In Wright's approach, competencies are assessed in a periodic state appropriate to the professional period and the ongoing (routine) competencies.[9] Periodic assessment can be illustrated by the evaluative methodology during the *Quarterly Simulation* discussed above. These competencies will depend on the skill domain assessed. Domains include clinical/technical skills, critical thinking skills, and interpersonal skills.[9]

Preceptors, both nursing and allied health professionals, are vital to the foundational education and skill of an interventional platform program. Preceptors are the mechanism of action through which new professionals (experienced or inexperienced) can be successfully transitioned to the cardiac cath lab environment and platform culture. As care delivery systems continue to increase in complexity, there is an increased need for cardiac cath labs to maintain and cultivate a healthy stock of human capital in the form of preceptors. Preceptors are critical for ensuring continuous professional development and facilitation of learning in the perioperative critical care setting.[10] Taking that knowledge and utilizing our prior model of the curriculum courses and learner progression, brings us to the expansion of the competent learner to an expert learner, building the foundation of the preceptor model illustrated in Figure 3.

Investing in preceptor capital can mitigate the lack of succession planning and the experience complexity gap by presenting advanced topics in the competent-to-expert schedule, reinforced through the application of simulation in a quarterly fashion.

By supporting the foundational knowledge of the preceptor through an advanced didactic core curriculum, staff and preceptor can cultivate a positive relationship. Preceptors who lack the foundational information or tools either in knowledge, skills, or ability can have an irreparable negative effect on new staff and the new staff's stay within the department.[11] Investing in preceptor capital can mitigate the lack of succession planning and the experience complexity gap by presenting advanced topics in the competent-to-expert schedule, reinforced through the application of simulation in a quarterly fashion.

Conclusion

We have presented the concepts behind the *Cardiac Catheterization Platform Core Curriculum for Interprofessional Education Standards and Professional Development* with the goal of providing solutions to that well-questioned topic of orientation to the cardiac cath lab. Operationalizing orientation frameworks, adult learning principles, and cardiac cath lab specialty didactics can influence success. It is imperative to sustain safety, efficiency, quality of patient outcomes, operational efficacy, and staffing stability in the cardiac cath lab. With changing cath lab landscapes and environments of care, the loss of experienced nurses and technologists can be a deflating hole in experiential knowledge not quickly replicated. Applying these concepts will generate stimulating conversations around cath lab program planning, with the goals of bolstering poor succession planning, reframing the orientation process, and changing the interventional platform's education and orientation perspective to support cardiac cath lab nursing and interprofessional workforce capital. ■

For more information about consulting and orientation materials, please contact Sarah Davis-Arnold, MSN-ED, RN, RCIS, NPD-BC, at sdavisarnold@gmail.com

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Sarah Davis-Arnold, MSN-ED, RN, RCIS, NPD-BC

Sarah Davis-Arnold has traveled coast to coast as a cath lab RN since 2014. She has an educational background in the procedural platform realm. Sarah is a member of the VA ONS Cardiovascular Field Advisory Committee, working on a National Orientation Program for nurses. She can be contacted at sdavisarnold@gmail.com