

## Letter to the Editor

# Encouraging Quality Improvement through the Use of a National Perfusion Database

On a daily basis, perfusionists may informally discuss aspects of quality improvement (QI), but the formal practice of QI is more difficult to operationalize. Efforts and expectations for QI may be limited by experience and/or available tools. In addition, high-quality data and sound analytic assessment are needed for the development and integration of evidence-based clinical guidelines. Since 2010, there have been developments within the perfusion community directed at fostering QI including 1) the creation of a national perfusion database endorsed by the American Society of Extracorporeal Technology (AmSECT) called PERForm™, 2) the establishment of a partnership between participating PERForm™ institutions in Michigan and Anthem Blue Shield Blue Cross, and 3) the redeployment of the AmSECT Quality Committee (AQC).

The Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative (MSTCVS-QC) created the PERForm™ Registry in 2010. PERForm™ is a multi-institutional cardiovascular perfusion database focusing on the practice and outcome of cardiopulmonary bypass (CPB). PERForm™ data is linked with existing adult cardiac surgical databases and is used to provide a comprehensive and informed view of cardiovascular operative practices and their relation to clinical outcomes. This linkage allows for the creation and dissemination of quarterly benchmarking reports to facilitate quality assurance and improvement. Benchmarking reports are generated from variables abstracted from The PERForm Registry data entry form (1). Variables from this form are displayed against de-identified participating centers such that each participant can compare against their peers. For example, the proportion of cases where pump suckers were terminated “prior to, or at initiation of, protamine delivery” is displayed on a bar graph with participating centers numbered on the x-axis. Only members of each center are aware of the number assigned to their institution. Data review sessions are also conducted quarterly to promote collaboration

among cardiovascular surgeons, perfusionists, data managers, administrators, and other healthcare professionals. Any perfusionist who participates in PERForm™ is invited to attend these quarterly meetings.

A memorandum of understanding exists between the PERForm™ Registry and AmSECT, which establishes the mutual endorsement between the two entities. PERForm™, the officially endorsed cardiovascular perfusion registry of AmSECT, supports AmSECT activities (particularly those related to quality assurance/QI) and promotes the development of national QI initiatives. The PERForm™ registry and AmSECT work symbiotically to encourage participation in a national perfusion registry, to engage more of the community in AmSECT membership, and to promote QI initiatives.

PERForm and The Society of Thoracic Surgeons (STS) data are combined to create a more comprehensive view of the pre-op, intra-op, and post-op period. There are a series of steps that occur before these two data sets are merged. Data from the perioperative period is manually inputted into the PERForm Registry data entry form by the perfusionist or data manager for that institution. The party responsible for data entry and the frequency at which it is performed varies among institutions. As an example, each perfusionist may opt to enter the data following each case, a lead perfusionist may enter the data on a weekly basis, or the hospital's data manager may complete entries monthly. Similarly, the party responsible for entering the data for the STS may vary but is typically the hospital's data manager as many perfusion contract groups are limited to intra-operative data. The data entry form is housed by ARMUS, a third-party data management system that has the bandwidth to protect data privacy and provide analytics. Each quarter, the database analyst from the MSTCVS-QC submits a request to ARMUS to release the data and analytics generated from entries made into the PERForm data entry form. The MSTCVS-QC also receives data from the STS. There are five common data fields that exist between the STS and PERForm data that are cross matched to validate the data sets for

accuracy. These fields are not disclosed to participating institutions and have varied in the past, promoting unbiased data accuracy vetting. The data analyst at the MSTCVS-QC is responsible for cross matching and merging the PERForm and STS data sets. As an additional validation method, representatives from the MSTCVS-QC reach out to participating institutions to acquire perfusion records, which are then audited to ensure they match the PERForm/STS data. This entire process allows meaningful, validated, and de-identified aggregated data to return to participating institutions. Currently (October 2021), there are 40 sites that submit data into the PERForm registry with 32 of them located in Michigan and eight outside of that state.

One distinguishing element of this quality collaborative is that it formed a partnership with the Blue Cross/Blue Shield of Michigan (BCBSM) to incentivize QI through reimbursement appropriations. This partnership is instrumental in fostering quality-centric perfusion programs across participating institutions by offering financial incentives if they achieve statewide QI goals. In 2019, the MSTCVS-QC worked in conjunction with the Michigan Perfusion Society (MPS) to use PERForm™ data to pursue evidence-based, statewide Quality Improvement Initiatives (QII). The 2019 QII targeted lowering the Net Prime Volume/Body Surface Area (NPV/BSA) ratio to  $<500 \text{ mL/m}^2$  based on a peer-reviewed journal article utilizing PERForm™ data (2). Among sites with a higher NPV/BSA ratio, 80% lowered their NPV/BSA below the target threshold. BCBSM recognized this success and in 2020, they funded a PERForm-based initiative as one of three Value-Based Reimbursement (VBR) projects. This highlights the utility of having a quality collaborative that can motivate program stakeholders to pursue a targeted goal.

The 2020 QII was based on AmSECT's "Standard 12.1: Cardiomy suction shall be discontinued at the onset of protamine administration to avoid clotting within the CPB circuit" (3). Prior to the 2020 QII, the proportion of participating institutions in Michigan that terminated cardiomy suction in coronary artery bypass graft (CABG) cases upon protamine administration was 58%. The statewide target mean for CABG cardiomy suction termination prior to protamine administration was set at 65%. Within 1 year, more than 92% of participating institutions documented compliance with the target measure. This was deemed a success and the QII was expanded from CABG only cases to include all CPB cases as one of BCBSM's 2021 VBR initiatives with a target compliance of 83%.

In May 2020, AmSECT reinstated the AQC, which had been dormant for about a decade. The AQC was tasked with developing educational material for

perfusionists on how to perform QI, create QI tools, expand participation in national perfusion registries, and promote collection of key performance indicators. Key performance indicators are variables with strong established links to morbidity and mortality that should take priority in being tracked. A previous study utilizing the PERForm registry that examined over 18,000 patients who underwent CPB for cardiac surgery found that red blood cell transfusion was associated with an increased predicted risk of mortality irrespective of if the nadir hematocrit was  $<21\%$  or  $\geq 21\%$  (4). Red blood cell transfusion is an example of a candidate for a key performance indicator; however, the Quality Committee has not yet selected or endorsed any key performance indicators at this time (October 2021). Our mission and vision, which help to guide our efforts, are written below:

**Mission:** To develop and disseminate resources for the perfusion community including educational material and standardized quality indicators aimed to improve patient care and outcomes.

**Vision:** A perfusion community that utilizes a structured QI process to optimize patient care.

To date (July 2021), the AQC has sought to engage the perfusion community in QI processes by surveying the community on its perceived needs for a QI program, by introducing educational material through short vignettes, by creating presentations for perfusion programs, and by brainstorming how to extend the partnership between PERForm™ centers and BCBSM to other perfusion practices. Planned future directions for the committee include release of a toolkit to assist in launching/improving QI initiatives and the development of target key performance indicators.

The evolution of healthcare reimbursement demonstrates how collaboration and collective accountability, which are two tenets of the AQC, can improve outcomes. The enactment of the Affordable Care Act in March of 2010 allowed The Centers for Medicare and Medicaid (CMS) to trial alternative reimbursement methods. One example is the "bundled payment," which releases a single sum paid to all providers along a patient's care continuum. If the action(s) of one provider results in a complication or readmission, the patient may suffer, and payment to all care providers could be affected. Public and private insurance groups trialed or transitioned to similar models following the lead of CMS. Overall, healthcare reimbursement has been transitioning to models that support provider collaboration in hopes to reduce complications, readmissions, and treatments deemed excessive. The objective of these changes is to improve patient care while reducing costs associated with unwanted complications. Significant and positive impacts on the patient care course are

predicted as perfusionists embrace and enact QI programs. The complex system of cardiac surgery and CPB reveals how performance affects other provider teams, and this is ultimately measured by hospital expenditures and patient outcomes. The AQC invites the perfusion community to work together to make QI accessible, convenient, and rewarding.

A site interested in participating in PERForm can learn more about the application and membership benefits by visiting the MSTCVS-QC webpage and navigating to the “PERForm Registry” option under the “Quality Collaborative” tab (5). A representative from the Quality Collaborative will be in contact following application submission. An important initial step to secure hospital buy-in for PERForm membership is to take the information discussed with the Quality Collaborative representative to key stakeholders such as your hospital’s data manager/reviewer. If you would like to be more engaged in AmSECT Quality initiatives, please look for educational releases from the Quality Committee on Facebook, Linked In, and AmSECT University. Future releases by the Quality Committee may include key performance indicators, a QI toolkit, and a guide to build a VBR system.

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