



## Viewpoint

## Why Registries are Important: The Example of the Michigan Arthroplasty Registry Collaborative Quality Initiative (MARCQI)

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## ARTICLE INFO

## Article history:

Received 23 June 2020

Received in revised form

23 July 2020

Accepted 24 July 2020

Available online xxx

## Keywords:

Arthroplasty

Registries

Implant

Quality

Clinical registries can take many forms, from rare disease registries designed to study a specific condition to large national implant registries performing device surveillance. Programs that function on an interactive, quality improvement cycle have been termed collaborative quality initiatives (CQIs). In Michigan, Blue Cross Blue Shield of Michigan/Blue Care Network has funded the creation and operation of 17 CQIs. The CQI model uses the shared experiences of a region or state to facilitate face-to-face interaction of surgeons and other members of the health-care team. The Michigan Arthroplasty Registry Collaborative Quality Initiative (MARCQI) follows the CQI model with statewide quality improvement projects based on a high-quality patient registry of hip and knee replacement [1–3]. This viewpoint explains how the MARCQI meets 3 needs for the state of Michigan: (1) facilitate quality improvement through data-driven collaboration and engagement of hospitals and surgeons, (2) provide a “safety net” to identify harms that arise from changes in practice, and (3) perform medical device after market surveillance.

Collaboration is key to accomplishing meaningful change and quality improvement. A CQI operating in a mid-sized state such as

Michigan is suitably sized to allow for face-to-face interaction of surgeons, hospital administrators, and data abstractors at regular collaborative meetings while having enough data to answer complex questions about care protocols. The MARCQI holds 3 collaborative-wide meetings a year with an attendance of approximately 200 people. During the day-long event, there are committee meetings in the morning (device, quality, data abstraction) followed by a collaborative-wide session. These sessions review the data in the registry, focusing on the quality improvement initiatives that have been decided on previously. Risk-standardized hospital-level outcomes data are presented in an unblinded fashion, providing an opportunity for open discussion and sharing of best practices. We have found that the main driver of quality improvement has been through the sharing of risk-standardized data and the resulting discussion and sharing of best practices.

Clinical practice changes over time, and having a registry in place with an infrastructure to routinely analyze and report changes in outcomes can serve as a surveillance “safety net” for these changes. The MARCQI is continuously monitoring for unintended consequences of quality improvement changes. An example in Michigan was the increasing off-label use of tranexamic acid (TXA) for reducing blood loss in hip and knee arthroplasties. Over the last decade, there was a nation-wide increase in orthopaedic interest in TXA, largely driven by a series of small randomized controlled trials demonstrating its efficacy. In 2013, the MARCQI started an initiative to reduce unnecessary transfusions that included the use of TXA, among other strategies. TXA use increased dramatically. The MARCQI conducted an analysis of the safety of TXA in hip and knee replacements, showing it did not increase the risk of readmission, length of stay, cardiovascular events, or venous thromboembolism [4]. This result was shared with the collaborative once the analysis was complete. Transfusions in the MARCQI were dramatically reduced [5,6]. Similar projects have used the same strategy to assure that Michigan-wide quality improvement efforts do not have unintended consequences. These initiatives include opioid prescribing, discharge to extended care facilities, and the use of aspirin for venous thromboembolism prophylaxis [7].

Although the MARCQI is regional rather than national, it has shown that it accrues sufficient numbers of cases to generate implant-specific revision risks [1,8]. In the 2019 MARCQI annual

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report, 5-year cumulative percent revision data were reported for 30 cup and stem total hip arthroplasty implant combinations, 26 total knee arthroplasty knee systems, and 4 unicompartmental knee arthroplasty knee systems. Total hip arthroplasty cumulative percent revision estimates at 5 years ranged from 1.41% to 5.08%, and 5-year total knee arthroplasty cumulative percent revision estimates ranged from 1.50% to 13.11% [8]. These data are provided back to surgeons at collaborative meetings and to the public at large at the MARCQI website (the full annual report and a two-page summary). Presentation of these data at collaborative meetings is performed in an interactive manner with discussion of the clinical meaning of the results. Panel discussions and lively interactive exchanges occur to illuminate how to translate these data into clinical practice.

One of the authors (E.C.) is a community orthopaedist in Alpena, MI, which is in a relatively remote portion of upper Michigan. From this perspective, the MARCQI and joint registries in general have 3 major advantages: (1) ties to a larger group of colleagues; (2) comparisons of local surgeons and hospitals to other institutions, giving a quality benchmark to the community, health systems, and Centers for Medicare & Medicaid Services; and (3) legitimacy with the local community. By being part of a bigger group, smaller sites get the general advantages of contributing a more heterogeneous and rural population to data from larger centers. The aggregate data ultimately give enough statistical significance for meaningful insight into issues such as aspirin for deep vein thrombosis prophylaxis, benefits of TXA, and the appropriate use of narcotics.

Within an accepting and nonjudgmental culture focused on quality improvement, local surgeons and hospitals can be compared with other institutions. This gives a valuable feedback loop that promotes quality and avoids variation based on proven best practices. Ultimately, this elevates the peripheral centers, giving validation to our community health systems when reporting to payors and regulatory bodies. This allows for improvements across the entire state and can demonstrate the excellent performance of lower volume sites. This can counter the argument to concentrate total joint arthroplasty in large centers of excellence and maintain patient access closer to home where they wish to receive care.

At the community, regional, and statewide levels, the MARCQI framework helps break down barriers to communication such as local competition. Surgeons and sites recognized and adopted consistent, standardized best practice, which they participated in developing. This focus on the quality for the patient builds legitimacy in the community as it promotes collaboration at the local level. This also promotes small regional planning to manage local issues and relationships. The registry has given credibility to patients for issues such as preoperative optimization because guidelines are more consistently adopted across the community. Over

time, the lines start to blur between the larger academic centers and the smaller community-rural hospitals because of the learned best practice, consistency, and standardization.

### Conflict of interests

B.R. Hallstrom and R.E. Hughes receive partial salary support from Blue Cross Blue Shield of Michigan as the Co-Directors of the MARCQI, and E. Cornish declares no potential conflicts of interest.

### Disclaimer

Although Blue Cross Blue Shield of Michigan and the Michigan Arthroplasty Registry Collaborative Quality Initiative work collaboratively, the opinions, beliefs, and viewpoints expressed by the author do not necessarily reflect the opinions, beliefs, and viewpoints of Blue Cross Blue Shield of Michigan or any of its employees.

### Acknowledgments

Support for the Michigan Arthroplasty Registry Collaborative Quality Initiative is provided by Blue Cross and Blue Shield of Michigan and Blue Care Network as part of the BCBSM Value Partnerships program.

### References

- [1] Hughes RE, Zheng H, Igrisan RM, Cowen ME, Markel DC, Hallstrom BR. The Michigan arthroplasty registry collaborative quality initiative experience: improving the quality of care in Michigan. *J Bone Joint Surg Am* 2018;100:e143.
- [2] Hughes RE, Hallstrom BR, Cowen ME, Igrisan RM, Singal BM, Share DA. Michigan arthroplasty registry collaborative quality initiative (MARCQI) as a model for regional registries in the United States. *Orthop Res Rev* 2015;7:47.
- [3] Hughes RE, Hallstrom BR, Zheng T, Kabara J, Igrisan R, Cowen M. Michigan arthroplasty registry collaborative quality initiative (MARCQI) report: 2012-2016. Ann Arbor: Michigan Arthroplasty Registry Collaborative Quality Initiative; 2017.
- [4] Hallstrom B, Singal B, Cowen ME, Roberts KC, Hughes RE. The Michigan experience with safety and effectiveness of tranexamic acid use in hip and knee arthroplasty. *J Bone Joint Surg Am* 2016;98:1646.
- [5] Markel DC, Allen MW, Hughes RE, Singal BM, Hallstrom BR. Quality initiative programs can decrease total joint arthroplasty transfusion rates-A multicenter study using the MARCQI total joint registry database. *J Arthroplasty* 2017;32:3292.
- [6] Markel DC, Allen MW, Zappa NM. Can an arthroplasty registry help decrease transfusions in primary total joint replacement? A quality initiative. *Clin Orthop Relat Res* 2016;474:126.
- [7] Hood BR, Cowen ME, Zheng HT, Hughes RE, Singal B, Hallstrom BR. Association of aspirin with prevention of venous thromboembolism in patients after total knee arthroplasty compared with other anticoagulants: a noninferiority analysis. *JAMA Surg* 2018;154:65.
- [8] Hughes RE, Zheng H, Hallstrom BR. 2019 Michigan arthroplasty registry collaborative quality initiative (MARCQI) annual report (updated February 2020). Ann Arbor: Michigan Arthroplasty Registry Collaborative Quality Initiative; 2019.