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A Platform Designed to Empower Quality Improvement for Patients with Atrial Fibrillation

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Abstract

There are significant gaps in care for patients with atrial fibrillation (AF) and is a need to focus on improving guideline-concordant care. Recognizing challenges encountered in pursuing sustainable quality improvement (QI) in AF care, the Heart Rhythm Society spearheaded a multifaceted collaboration grounded in the principles of Improvement Science to develop a robust platform aimed specifically at demystifying QI for clinicians and health care systems interested in closing care gaps for patients with AF. Solution development included an innovative discovery process, a design phase, piloting, and refinement, and finished with transformation into a comprehensive digital platform. End-users were engaged throughout the 4-phase process to help ensure the final platform would meet the needs of clinicians and health care systems. The result was the launch of www.CardiQ.org featuring the Atrial Fibrillation QI Framework and an extensive, curated Resource Library that has been accessed by more than 10 000 users spanning over 100 countries.

Keywords:

atrial fibrillation, innovation, digital, transformation, CardiQ

Introduction

Health care faces many challenges with implementing quality improvement (QI) initiatives to close care gaps including time constraints, lack of resources, organizational culture, and resistance to change, and the additional challenge that QI strategies applied from other industries may not automatically fit into health care settings.[1]

While regulatory and accreditation bodies, guidelines, and incentive programs have established criteria that help health care systems focus on which QI efforts to pursue, atrial fibrillation (AF) is not often prioritized for treatment or quality measure reporting in the same manner as other conditions.[2]

Available evidence demonstrates why health care systems should prioritize AF for QI initiatives. AF is the most encountered cardiac arrhythmia, and with the aging population, some studies estimate a doubling of AF prevalence in the United States by

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2030.[3] AF is associated with an approximate 2-fold increased risk of death and up to 5-fold increased risk of stroke, reduced quality of life, and higher medical costs, representing substantial burdens on affected individuals and health care systems.[4–11]

Despite AF's high prevalence,[3] its association with stroke risk,[4] the existence of AF care performance measures,[12] and treatment guidelines that recommend oral anticoagulation (OAC) as the preferred therapy for reducing the risk of stroke,[13,14] evidence shows that OAC undertreatment of AF is common.[15–21] Studies have shown over 50% of patients with AF who met guideline criteria for anticoagulation were not prescribed an OAC and that approximately 50%–84% experiencing a stroke had not received guideline-recommended therapeutic anticoagulation preceding the stroke.[15,16] Moreover, recent studies have emphasized the need for QI initiatives to increase appropriate OAC use and improve outcomes.[20,21]

Impetus for Collaboration

At an annual Patient Advocacy Summit, the Heart Rhythm Society (HRS), Pfizer, and Bristol Myers Squibb realized that each entity was separately supporting and engaging in QI initiatives to improve outcomes for patients with AF. The Bristol Myers Squibb/Pfizer Alliance (the Alliance) shared its commitment to closing the well-known gap in AF care of patients at risk for stroke who were not anticoagulated according to guidelines. This commitment aligned with the HRS QI Committee's prioritization of closing this care gap. Additionally, HRS published the AF Centers of Excellence position paper[22] that proposed a conceptual model (Figure 1) acknowledging that, given the complexity of AF care, a meaningful impact for patients and their caregivers requires a collaborative approach incorporating the unique contributions of key stakeholders, including medical societies, clinicians, payers, industry, regulators, health care systems, and patients. Recognition of synergy of focus and efforts to close gaps in AF care provided the impetus for a collaboration between HRS and the Alliance to pursue the common goal of creating a transformational, sustainable, and meaningful impact in the care of untreated and suboptimally treated patients with AF.

Methods

The development of a strategy to close gaps in AF care was grounded in the principles of QI and Improvement Science. As shown in Figure 2, the approach included: (1) a discovery phase using an iterative, innovative process to address the specific challenge reflective of the care gap; (2) a design phase to develop a prototype framework based on ideas generated during the discovery phase; (3) a refinement phase of the prototype that included pilot site testing and proactive insights

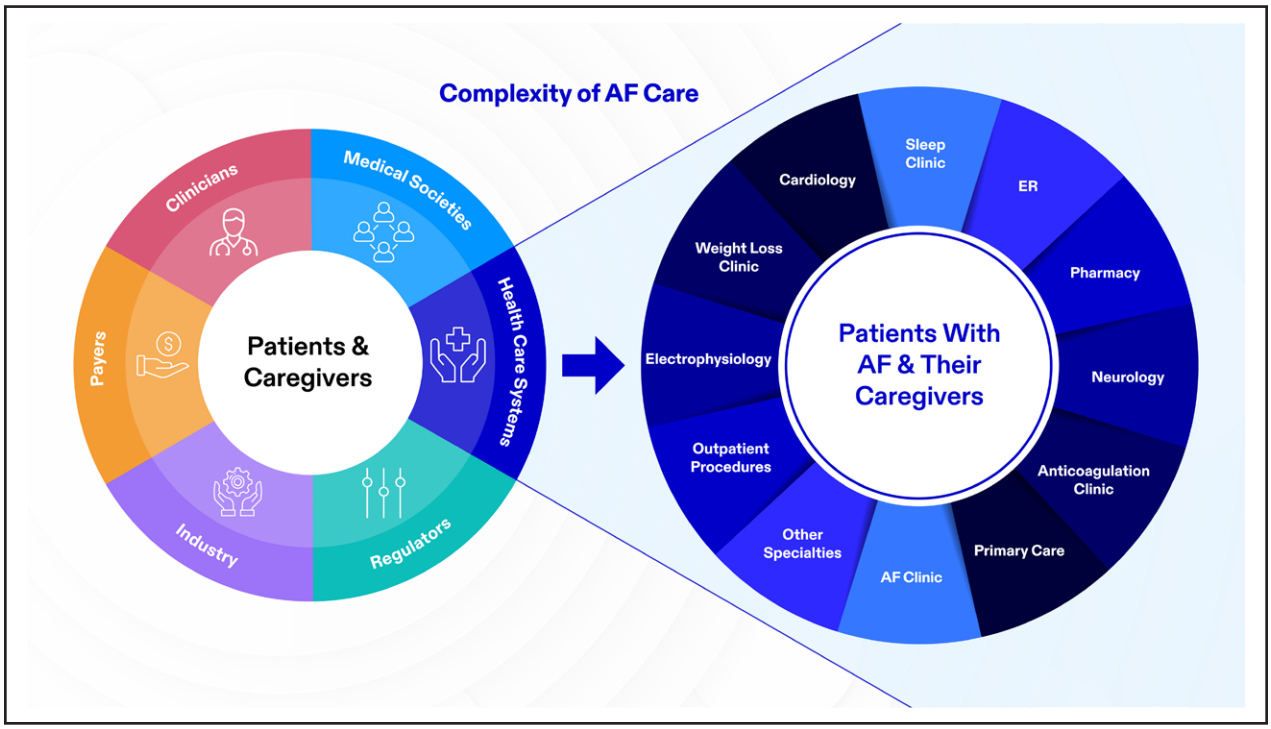

Figure 1. Complexity of atrial fibrillation (AF) care. Adapted from Piccini et al.[22]

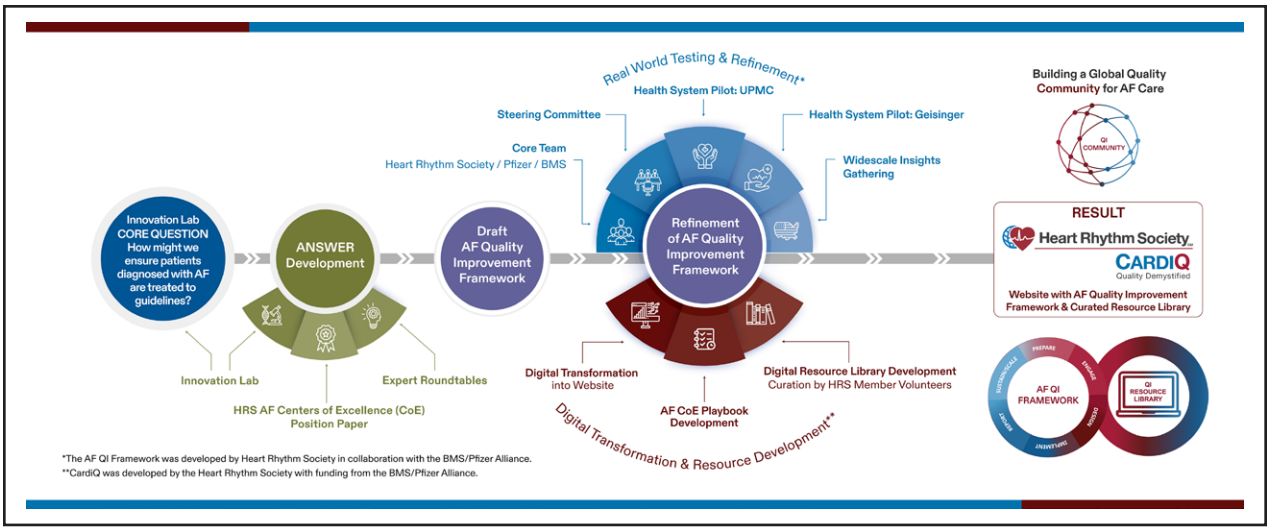

Figure 2. Graphical summary of atrial fibrillation (AF) Quality Improvement Framework and CardiQ discovery and design process and outcomes.

gathered through wide-scale outreach and expert feedback in health care systems; and (4) a transformation phase to integrate the QI Framework into a digital, web-based, publicly available resource.

To provide oversight during the refinement and transformation phases, HRS established an independent steering committee comprised of clinician experts, patient advocates, champions, and representatives from the pilot sites, HRS, and the Alliance.

Discovery Phase

HRS and the Alliance embarked on an innovative approach for solving complex issues, such as suboptimally treated patients with AF and stroke prevention. Known as Innovation Labs,[23] this process (Figure 3) has been successfully applied in leading industries to tackle significant and complex issues and ensure that the invested solutions would be viable, with a high probability of success and return on investment. The process began with targeted scoping sessions to identify the right challenge question and possible solutions to test. The final challenge question was determined to be, "how might we ensure all diagnosed patients with AF are treated to guidelines?" This question was explored further in the Innovation Lab process of discovery that included gathering user insights, creating concepts, and iteratively testing solutions-based concepts using a combination of 1:1 interviews and group sessions. Innovation Lab participants were nominated by HRS and Pfizer and screened by the Innovation Lab Lead to select a group of individuals comprised of clinicians and nonclinical leaders with diverse backgrounds and opposing opinions to guide and pressure test the viability of solutions to the challenge question.

Figure 3. Innovation lab process.

The strongest, potential solutions from the Innovation Lab underwent a series of expert roundtables organized to simulate health care system members (eg, clinicians, QI champions, IT professionals, and patient advocates) who have been involved in addressing the gaps in anticoagulation care. The challenges related to treating patients to guidelines were explored in detail and precisely defined. Case study quality interventions, both successful and unsuccessful, were reviewed and discussed. The discovery phase of the Innovation Lab and roundtables converged on the main requirements for transformational change in AF care and concluded that the best approach involved the establishment of a standardized, yet flexible, QI framework with core characteristics that would be applicable to a wide range of health care systems.

Design Phase

During the design phase, concepts and requirements identified in the discovery phase were put through a series of development cycles to refine and build upon potential solutions. The design phase resulted in the development of an AF Quality Improvement Framework (AFQIF) prototype. This prototype provided supportive details specific to AF care by outlining both "the what" and "the how" to address steps along the QI continuum. In addition, the vision from the outset was to transform the AFQIF into a digitally-enabled tool with a supportive AF Resource Library featuring a range of resources from best practices, business plans, checklists, and care pathways to the recently launched "AF Center of Excellence: An Operational Playbook," available in the public domain.[24]

Refinement Phase

To optimize its utility and scalability in real-world settings for closing gaps in AF care, the prototype resource entered a refinement phase that included: (1) pressure testing and insights gathering in real-world environment pilot programs at 2 different health care systems, (2) systematic, proactive insights gathering from a wide-scale outreach initiative, and (3) Steering Committee and HRS/Alliance Core Team review of consolidated feedback to guide prototype refinements.

Pilot Programs

Geisinger and UPMC were engaged to pilot the prototype AFQIF and to join monthly collaborative "working sessions" to gather feedback in the live environment for refining the resource. Engaging health care systems that were different in terms of QI implementation stages and setting was considered requisite for evaluating and demonstrating adaptability of the Framework, as the prototype AFQIF was envisioned to be flexible and hold value across a range of settings and situations.

Through a vetting process, Geisinger was selected because it had a well-defined AF care gap identified by their neurology leadership and had an interest in developing an inpatient-focused initiative to close that gap. UPMC was selected because it had long-established processes in place to address quality AF care; however, it wanted to re-examine and improve upon existing outpatient, primary care practices. Each system had 12 months to develop, implement, and assess the results of the pilot program using the Framework. During this same timeframe, the multidisciplinary teams from each site participated in virtual, semistructured interviews to systematically examine the prototype and gather feedback regarding its strengths, weaknesses, barriers, facilitators, likes/dislikes, best practices, and suggestions. Each call lasted 60 minutes with 3–4 / who captured feedback on site approaches and utilization of the AFQIF for their prospective QI initiatives. The consolidated insights were evaluated and discussed with the HRS/Alliance Core Team and the Steering Committee. Upon consensus, the AFQIF prototype was adjusted accordingly, and sites were re-engaged to confirm the refinements.

Upon conclusion of the 12-month pilot phase, each site delivered a final report summarizing their initiatives, results, and experiences utilizing the prototype AFQIF at a Collaborative Summit comprising the Steering Committee, HRS/Alliance Core Team, and pilot site representatives.

Wide-Scale Insights Gathering

In parallel with the pilot phase, there was an effort to gather wide-scale stakeholder feedback regarding the prototype AFQIF. Utilizing a structured insights-gathering tool developed by the HRS and Alliance team, 1:1 interviews were conducted with clinicians, administrative leaders, QI directors, and informaticists across a wide range of health systems to elicit perspectives concerning (1) the draft AFQIF's approach, (2) format/usability, (3) perceived utility, (4) potential resources for the Resource Library, and (5) other suggestions for consideration. Responses were compiled and grouped by themes for review by the HRS/Alliance Core Team and Steering Committee.

Results

Geisinger and UPMC completed the QI initiatives to close gaps in AF care. While the initiatives differed in focus and in how the prototype AFQIF was utilized, the insights, feedback, and suggestions from the multidisciplinary teams played a critical role in refining the prototype Framework. Both sites received institutional review board exemptions for their QI initiatives before project initiation.

The Geisinger team utilized the prototype AFQIF as a step-by-step guide in developing, designing, and implementing their quality initiative. The data driving the QI at Geisinger were identified by neurology in a retrospective analysis that examined patients admitted for stroke and identified that approximately half of the patients with a prestroke diagnosis of AF and a CHA2DS2-VASc (Congestive heart failure; Hypertension; Age 75 or older [doubled]; Diabetes mellitus; Stroke, transient ischemic attack, or thromboembolism [doubled]; Vascular disease; Age 65–74; Sex category [female]) score ≥2 were untreated or undertreated with anticoagulation.[16] Pharmacy subsequently designed and implemented a workflow change that identified patients with AF during inpatient admission and who were not on OAC. Before discharge, inpatient pharmacists determined whether flagged patients qualified for anticoagulation; if the patient was a candidate, pharmacists worked with the health care team to start OAC medication. If the medication was not initiated before discharge, the patient's Medication Therapy Management clinic pharmacists were notified to re-evaluate for starting anticoagulation as an outpatient. The initiative was driven by pharmacy and neurology but required the engagement of a network of stakeholders from clinical care teams, informatics, and administrative support in both inpatient and outpatient settings. The intervention was launched in the last 3 months of the pilot, over which time 366 patients were flagged as having AF and no OAC. Of these, 235 patients (64%) met CHA2DS2-VASc criteria for an OAC, of whom 22% (51/235) were started on OAC before discharge, 41% (96/235) were referred to Medication Therapy Management for outpatient follow-up, 33% (78/235) had a contraindication to anticoagulation, and 4% (10/235) declined treatment. The Geisinger team used the AFQIF throughout the entire journey. The Framework functionally served as a guide, project management tool, and communication device to make a meaningful impact. In addition, the AFQIF approach resulted in rapid identification and modification of their initial intervention and also extended their network of champions to activate Cardiology who was previously unaware of the AF care gap. The intervention was incorporated as a standard within the workflow and scaled across the Geisinger system.

The UPMC project team used the AFQIF to target specific areas for re-examination and improvement of a long-standing, primary care initiative focused on guideline-concordant anticoagulation therapy for AF patients. This initiative comprised a 4-part approach including (1) targeted clinician education; (2) provision of unblinded clinician-specific performance data; (3) tracking and reporting of improvements; and (4) an incentivized goal specific to anticoagulation in AF. As a result, primary care had baseline anticoagulation rates >80% for eligible AF patients. Despite these high rates, the UPMC team wanted to improve care for the other 20% of eligible AF patients. In review of the AFQIF, the UPMC project team recognized the need to expand the involved stakeholders to include champions from both electrophysiology and primary care as well as the inclusion of a network of champions from pharmacy, nursing, quality, and informatics. In alignment with the AFQIF, the expanded UPMC team engaged in re-examination of available data, current system challenges, and areas for potential improvement. Identified challenges included variability of care provided by community-based practices and low awareness of, and referral to, the UPMC AF Center of Excellence. The initiative involved re-engagement of select community-based practices with large patient populations and the lowest OAC prescribing metrics for reinforcement of education regarding recent AF anticoagulation guidelines and the referral process to the UPMC AF Center of Excellence. Practices were also provided with lists of patients with AF identified through the electronic health record (EHR) as eligible for OAC evaluation. Manual evaluation of the EHR-generated lists revealed that 19% of cases were on OAC despite the EHR report indicating otherwise, and 15% had a contraindication. About 25% had the potential for reconsideration for OAC treatment. Metrics also demonstrated an approximate 20% increase in referrals to the UPMC AF Center of Excellence by target practices. Using the AFQIF as a guide, the UPMC team expanded their network of champions, revamped their educational outreach program, uncovered errors in EHR-generated reports used for performance evaluations, and connected primary care to an underutilized AF Center of Excellence.

Consolidated Pearls

Learnings and pearls were collected throughout the monthly working group sessions and from the pilot site final reports that were delivered at a Collaborative Summit at the conclusion of the 12 months. Consolidated highlights were extracted,

evaluated, and discussed with the HRS/Alliance Core Team and the Steering Committee. The 2 pilot sites were re-engaged to confirm the learnings from their participation in piloting the prototype AFQIF.

Study site feedback gathered in the working sessions and final reports was positive and supportive of the prototype AFQIF. Both sites provided examples of how the prototype facilitated their pilot QI initiatives, and site leads emphasized that the AFQIF provided an easy-to-follow roadmap. The AFQIF's checklist approach helped identify where to begin, what gaps or challenges existed, and the steps that needed to be taken to accomplish goals. The Framework served as an easy tracking tool that enabled the assessment of accomplishments. The AFQIF was also found to be beneficial as a tool that enhanced communication within the project team and with leadership. The prototype AFQIF emphasized the need for multiple stakeholder participation and collaboration, which also expanded the network of champions for both initiatives.

Wide-Scale Insights Gathering

More than 150 insights were collected in 30 semi-structured interviews designed to ensure that a diverse pool of perspectives was captured from potential end-users beyond those of the pilot sites.

Interviewees included representation from cardiology, primary care, quality, pharmacy, informatics, and leadership. Interviewee health care systems varied by geographic location, size, setting (urban, suburban, rural), and self-professed expertise with conducting AF QI (minimal to robust). All participants, regardless of their baseline level of expertise, provided positive feedback affirming the AFQIF prototype would be a valuable QI asset for AF with its flexibility, efficiency, and perceived utility being some of its most cited strengths. Many provided additional suggestions for content and implementation that were reviewed by the HRS/Alliance Core Team and Steering Committee and incorporated as appropriate.

AFQIF Digital Transformation

Following 3 years of development, the resulting AFQIF (Figure 4) was published online at an HRS website, CardiQ.org,[25] and in the spirit of continuous QI, the AFQIF remains open to future refinement. The AFQIF consists of 6 core "pillars":

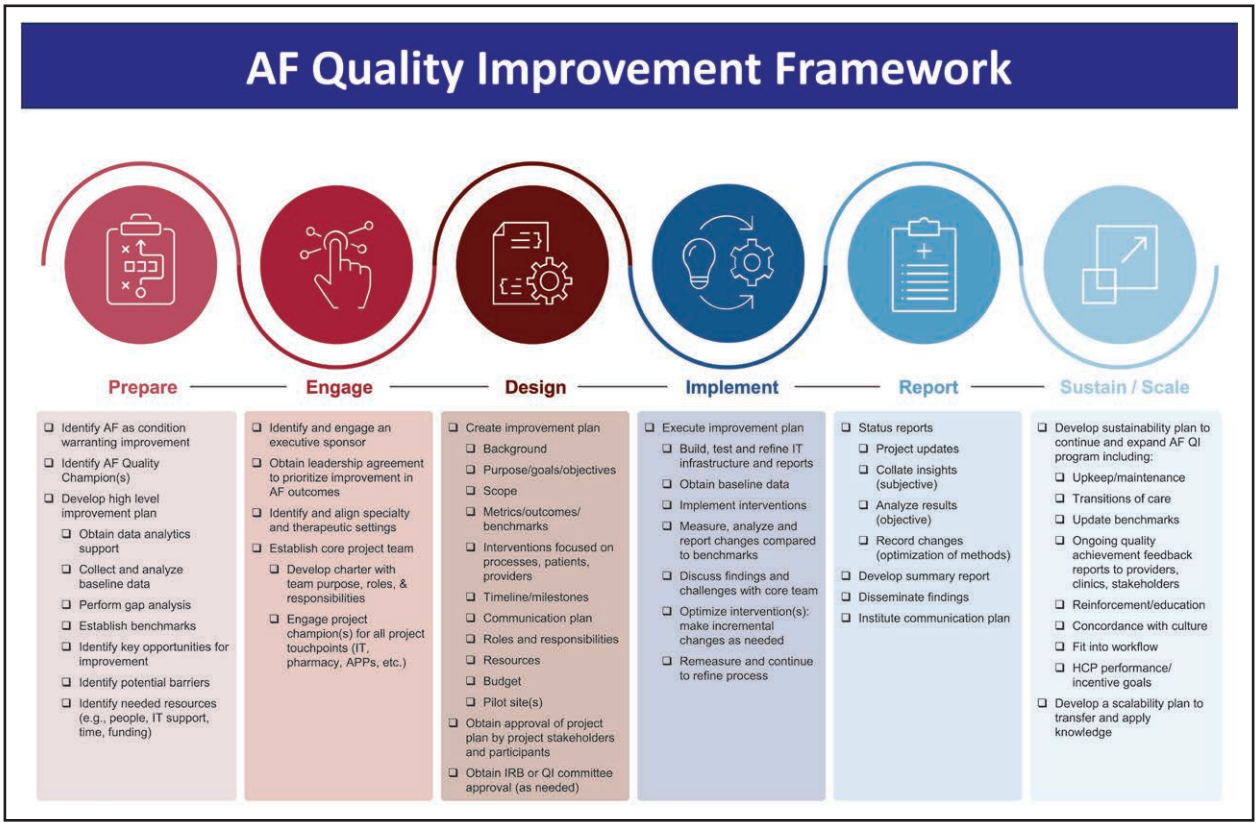

Figure 4. Atrial fibrillation (AF) Quality Improvement Framework.

1. Prepare: The prepare pillar comprises steps and considerations necessary to begin a QI initiative in AF care. Important factors in preparation include prioritization of AF; availability of data/analytics; identification of improvement opportunities, barriers, and needed resources; and assessment of operational readiness.

2. Engage: The focus of the engage pillar is to form, motivate, and activate the broad-based project team that will design and implement the QI initiative, as well as the expanded network of key leaders, clinical and system champions, and stakeholders who will support and advocate for the initiative.

3. Design: The design pillar defines the scope and variables recommended for implementing the QI initiative.

4. Implement: The QI initiative is launched with the implementation pillar. In this stage, the plan is tested and refined as barriers and issues are encountered, with ongoing reporting to the project team and stakeholders.

5. Report: Reporting on progress plays an essential role in the QI process. Many options exist depending on the health care system, the audience, and the purpose of the report. Reporting may provide a foundation for future modifications.

6. Sustain/scale: A plan to regularly review AF data using feedback mechanisms after the achievement of a QI initiative is key to sustain potential benefits. If the initiative has resulted in the intended improved outcomes, health care system leaders may scale the initiative to other sites or to other systems.

As shown in Figure 4, each pillar contains additional supporting details. To simplify the "paper" version of the AFQIF, descriptors in the pillars were kept to a minimum. However, the website is more extensive and includes details on analytics, project teams, EHR and health information technology, patient education and engagement, clinician education, and more.

To have a meaningful resource to support QI in AF, the AFQIF was envisioned from the start as a digital health solution. Once the descriptors were established, its transformation into the digital environment began. Having the AFQIF as a web-based resource allows the user to start off simple and dive in to explore more robust detail based on the health systems' gaps and needs. The website includes a checkbox version of the AFQIF so users can check off areas that were completed or identify areas of focus. The AFQIF is easy to navigate and is intrinsically linked to an HRS member-curated Resource Library housed on an HRS website, CardiQ.org. The Resource Library will continue to evolve as new materials (eg, best practices and templates) are added.

Discussion

The goal for CardiQ was to create, support, and grow a dynamic, iterative resource supporting systematic AF QI that evolves continuously to enhance the quality and outcomes of care for patients with AF and meets the changing needs of the heart rhythm community. The tagline for CardiQ.org is "Quality Demystified," and the AFQIF delivers by supporting the user through the provision of a structured approach to QI. The AFQIF and CardiQ were developed using the principles of Improvement Science and engaged potential end-users up front to help ensure the digital resource would meet the needs of clinicians and health care systems in implementing changes to close care gaps in AF management.

Other well-established QI methods such as plan–do–study–act, six sigma, lean, total quality management, and rapid cycle improvement are not specific to health care or AF and do not prompt the user through a "menu" as outlined in the AFQIF.[26] The battery of suggested substeps within the 6 core pillars of the AFQIF helps users approach the QI process specifically from a disease management perspective within the health care industry. Having it available as a web-based resource facilitates its navigation, allowing the user to start off simple and then explore the supportive elements in greater detail.

An individual health care site's approach to using the AFQIF is meant to be flexible and customizable for the site and situation. The steps are not mandatory but instead are designed to serve as directional considerations for implementing a QI initiative. For example, in the case of the Geisinger pilot, a site might be developing an initiative from scratch and require help in framing the starting point. Another site may have an initiative already in place, as was the case with UPMC where the AFQIF was utilized to target areas to improve an established program. The plan–do–study–act cycle is inherent within the AFQIF's pillars without the need of linearly progressing through the AFQIF; its fluidity enables movement forward and backward across the 6 pillars. It is noteworthy to acknowledge that even with the robust development of the Framework focused on AF quality care, the authors are aware that the AFQIF approach and its overall structure provide a format

that can be adapted and used as a QI initiative guide for other disease states. What makes this unique for AF rests in the detailed support within CardiQ that is specific to health care and patient-centered AF care? While the library of resources grows, CardiQ continues to be evaluated, and features enhanced to support the growing community of 10,000+ users in over 100 countries (October 30, 2023—January 10, 2025).

Conclusion

CardiQ, comprising the AFQIF and Resource Library, was developed to offer a supportive approach that can be tailored to specific health care settings in the interest of addressing gaps in AF care. The authors encourage health care systems to embark on QI efforts to enhance or transform AF care by operationalizing the AFQIF and Resource Library housed on CardiQ.org. HRS also invites the health care community to contribute resources and best practices to the growing Resource Library to help others along their QI journeys.

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Conflicts of Interest

Thomas F. Deering: Paid consultant or received honorarium from CVRx Inc., Pacemate, Sanofi, Boston Scientific, Abbott. John A. Gillespie: Former employee of Pfizer Inc. Julie Simonson: Employee and shareholder of Pfizer Inc. Julie Gouveia-Pisano: Employee and shareholder of Pfizer Inc. Heather Somand: Former employee of Pfizer Inc. Charles J Medico: Employee and shareholder of Pfizer Inc. Karl H. Schuleri: Employee and shareholder of Bristol Myers Squibb. Ramin Zand: Research (Contracted Grants for PIs and Named Investigators only), Heart Rhythm Society; NIH Grant. Sandeep K. Jain: Research (Contracted Grants for PIs and Named Investigators only), Medtronic and Boston Scientific. James C. Coons: Paid consultant or received honorarium from Pfizer and Bristol Myers Squibb. John N. Catanzaro: Honoraria/Speaking/Consulting Fee, Aziyo Biologics. All the other authors have no conflicts of interest to disclose.

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Author Contribution

Thomas F. Deering: supervision, writing – review and editing. Anne Marie Smith: conceptualization, methodology, investigation, supervision, visualization, writing – original draft. John A. Gillespie: conceptualization, methodology, investigation, resources, supervision, visualization, writing – original draft. Julie Simonson: methodology, investigation, resources, visualization, data curation, writing – original draft, project administration. Julie Gouveia-Pisano: methodology, investigation, resources, visualization, data curation, writing – original draft, project administration. Marcia Jackson: methodology, investigation, visualization, resources, data curation, project administration, writing – original draft. Tracy Blithe: methodology, investigation, resources, visualization, data curation, writing – review and editing, project administration. Heather Somand: methodology, investigation, resources, visualization, writing – original draft. Charles J. Medico: conceptualization, methodology, investigation, resources, writing – original draft. Karl H. Schuleri: investigation, writing – review and editing. Michelle L. Budzyn: methodology, formal analysis, investigation, writing – review and editing. Ramin Zand: methodology, investigation, writing – review and editing. Durgesh Chaudhary: formal analysis, investigation, writing – review and editing. Sandeep K. Jain: methodology, investigation, writing – review and editing. James C. Coons: methodology, formal analysis, investigation, writing – review and editing. Erica M. Byers: methodology, formal analysis, investigation, writing – review and editing. Eric Dueweke: investigation, writing – review and editing. Francis Solano: investigation, writing – review and editing. John N. Catanzaro: conceptualization, supervision, writing – review and editing.

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