# Using a Logic Model to Design and Evaluate a Quality Improvement Leadership Course

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## Abstract

Strong leadership is an essential factor in the success of quality improvement (QI) initiatives that generate and sustain improvements in patient outcomes. Notably, there is a rising need for frontline clinicians, who are often charged with leading QI efforts, to receive training in blended QI and leadership methods and skills. The Leading Healthcare Improvement (LHI) course is a longitudinal leadership course embedded within the Department of Veterans Affairs Quality Scholars (VAQS) program, a multisite interprofessional QI fellowship program. The LHI course was developed to provide frontline clinicians who are emerging QI leaders with the skills to lead and advance improvement efforts at their institutions. It consists of eight 60-minute online sessions and was implemented and delivered to a cohort of interprofessional fellows at 9 sites during the 2017–2018 academic year.

This article describes the use of a logic model as a framework to guide the planning, implementation, and evaluation of the LHI course. The authors developed 5 logic model components: inputs, activities, outputs, short-term outcomes, and long-term outcomes. They defined the short-term outcomes using feedback from fellows and an evaluation of the fellows' abstract submissions to the VAQS Summer Institute. Submissions were reviewed to identify how fellows applied the LHI course concepts to QI projects at their respective sites. The authors also collected preliminary impact data from fellows to determine long-term outcomes.

Finally, they used the logic model to inform changes to the LHI course based on the evaluation data they collected and developed plans to measure the impact of the course on learners, patients, and the health care system. The authors conclude with lessons learned to guide others who are implementing similar QI efforts.

**E**ffective clinical leadership is vital to the delivery of high-quality health care. Of the many factors that contribute to the success of quality improvement (QI) initiatives, strong leadership is an essential element of teams that are able to realize improvements in patient care.[1] In comparison, ineffective leadership is linked to low-performing QI teams that do not reach or sustain their improvement goals.[2] Much of the existing research on leadership in QI has been dedicated to studying the effects of organizational leadership—a top-down approach—on QI success, as opposed to leadership by frontline providers within QI teams—a bottom-up approach.[3] Physician leadership, specifically, is often emphasized as an important factor in QI success, though the need to train nurses and other frontline health care professionals in QI and in the leadership of QI teams is increasingly being recognized as an important strategy to address the challenges of the U.S. health care system.[4] Yet, there are few leadership training programs in existence today that also feature QI education, and those that do are rarely interprofessional. Existing training programs are also often short in duration and give students limited opportunities to apply the skills they have learned in real time.[5] In this article, we provide a framework for the design and evaluation of a leadership course embedded within a longitudinal and interprofessional QI training fellowship—the national Department of Veterans Affairs (VA) Quality Scholars (VAQS) program.

### The VAQS Program

The VAQS program, an advanced fellowship program funded through the VA Office of Academic Affiliations, is a postdoctoral QI fellowship with fellows and faculty from diverse training backgrounds, including physicians, nurses, pharmacists, and clinical psychologists. The curriculum is delivered weekly over 2 years via an online platform that allows for synchronous communication among the Coordinating Center in Houston, Texas, 8 VA medical center sites around the United States, and 1 affiliated site in Toronto, Canada. The national curriculum is composed of 4 core courses, which provide foundational knowledge in: (1) QI principles; (2) study design and statistical approaches; (3) career development; and, most recently, (4) leadership for health care improvement.

In addition to the national QI curriculum, fellows engage in mentored projects and tailored didactics at their respective sites and present their findings at an international conference—the VAQS Summer Institute—hosted each summer by the VAQS Coordinating Center. The fellowship has grown over the last 20 years, in part due to our commitment to continuous internal QI, which provides fellows with the requisite

skills to address the challenges of our evolving health care system.[6–10] Notably, the VAQS curriculum did not have a course on leading change management; however, our 2016 alumni survey found that VAQS graduates often enter leadership positions after completing the fellowship. This finding inspired the development of a QI leadership course, Leading Healthcare Improvement (LHI), to ensure fellows have the skills needed to lead and excel in change management and improvement science.

## A Logic Model as a Tool for Educational Planning and Evaluation

To meet the challenges of our increasingly complex health care system, training programs must evolve to equip health care professionals with the necessary skills to deliver high-quality patient care.[11,12] This evolution is guided by data collected through continuous program evaluation. Planning the program evaluation early in the program development process is crucial to ensure that the necessary resources are available, to identify whether program objectives are being met, and to critically analyze why and how objectives are being met. This type of thoughtful evaluation allows for evidence-based program restructuring to better meet the needs of learners and also provides guidance for successful program replication.[13]

As we restructured the VAQS fellowship program to incorporate a core leadership training course, we used a logic model as a framework to guide course design and evaluation. Logic models are useful tools for programs to conceptualize why and how objectives, or outcomes, are achieved. They provide a graphic representation of the relationship between program resources, the activities they support, and the outcomes that are generated.[14–17] Logic models are also effective in the design and evaluation of curricula for educational training programs, allowing program directors to identify the resources they need for curriculum delivery, define learning objectives and desired learner outcomes, and plan for the assessment of learners.[17–20]

The VAQS curriculum development and evaluation team, composed of interprofessional clinicians and educators, identified 5 components for our logic model: inputs, activities, outputs, short-term outcomes, and long-term outcomes (see Figure 1). These components were developed based on a review of the literature describing the use of logic models in health professions education and research[17–24] as well as our prior experiences with developing and evaluating the VAQS program. We used an iterative process to revise the logic model until we reached a consensus on all components, including the desired leadership skills, the necessary resources and activities to cultivate those skills, and outcomes to indicate whether learners were achieving those skills. One member of the team (S.R.) drafted the initial logic model and presented it to the larger group for discussion. The same member then incorporated the group feedback into the next draft for consideration at the following team meeting.

We proceeded in this iterative manner for several months until the entire group reached a consensus. Initial versions of the logic model included descriptions of the knowledge, skills, and attitudes we expected fellows to acquire over the course of the 2-year fellowship based on existing program competencies. For example, organization and system leadership requires appropriate project identification and goal setting. We expect fellows to be able to identify their institution's priorities, tailor projects to those interests, and respect the impact of organizational culture on the success of change efforts. We then identified which skills we could measure, as well as how and when to measure them. Next, we used the knowledge, skills, and attitudes we had identified earlier to develop tools, such as a stakeholder analysis matrix and value proposition template, that the fellows could use to apply the leadership concepts they learned in practice. We also agreed that the VAQS Summer Institute, as the halfway point of the 2-year fellowship, would provide an ideal opportunity to assess how learners had applied the skills of the course, provide corrective feedback if needed, and adjust course content for the following year, as necessary.

In the following sections, we describe the 5 components of our logic model: inputs, activities, outputs, short-term outcomes, and long-term outcomes.

## Inputs

**National coordinating center.** The VAQS Coordinating Center is based in Houston, Texas, and includes a team of individuals responsible for coordinating the development, delivery, and evaluation of the national VAQS curriculum. In addition to managing the weekly curriculum, we hold monthly calls with faculty at all participating sites to receive ongoing feedback and to coordinate the delivery of the national and local curricular activities.

**Institutional support.** At the time we developed the LHI course, there were 8 VA sites (Atlanta, Georgia; Birmingham, Alabama; Cleveland, Ohio; Greater Los Angeles, California; Iowa City, Iowa; Nashville, Tennessee; San Francisco, California; and White River Junction, Vermont) in the United States and 1 affiliated site in Toronto, Canada, participating in the VAQS program. The process to become a VAQS program site is competitive and requires that the site demonstrate its institutional and financial commitment to support its faculty and fellows. In turn, fellows lead QI projects that address their institution's strategic priorities and have potential for both local- and national-level impact.

**Participants.** The site faculty and fellows have the most proximal engagement with the curriculum. Site-based faculty include improvement and implementation experts responsible for delivering the local VAQS curriculum and mentoring fellows. As leaders in their fields, they expand the VAQS network through the recruitment of other nationally renowned QI experts to deliver sessions to the other VAQS faculty and fellows. Fellows often graduate into high-ranking positions at various institutions, both inside and outside the VA, and continue to engage in impactful QI work. As alumni, they often contribute to the VAQS program as senior faculty or expert speakers.

## Activities

**Curriculum development and delivery.** To develop the LHI curriculum, we combined and adapted components of the Practice Change Leaders for Aging and Health strategy,[25] based on John Kotter's framework,[26] with QI methods and skills.[9] The LHI learning objectives were drawn from the VAQS program competencies, which were developed
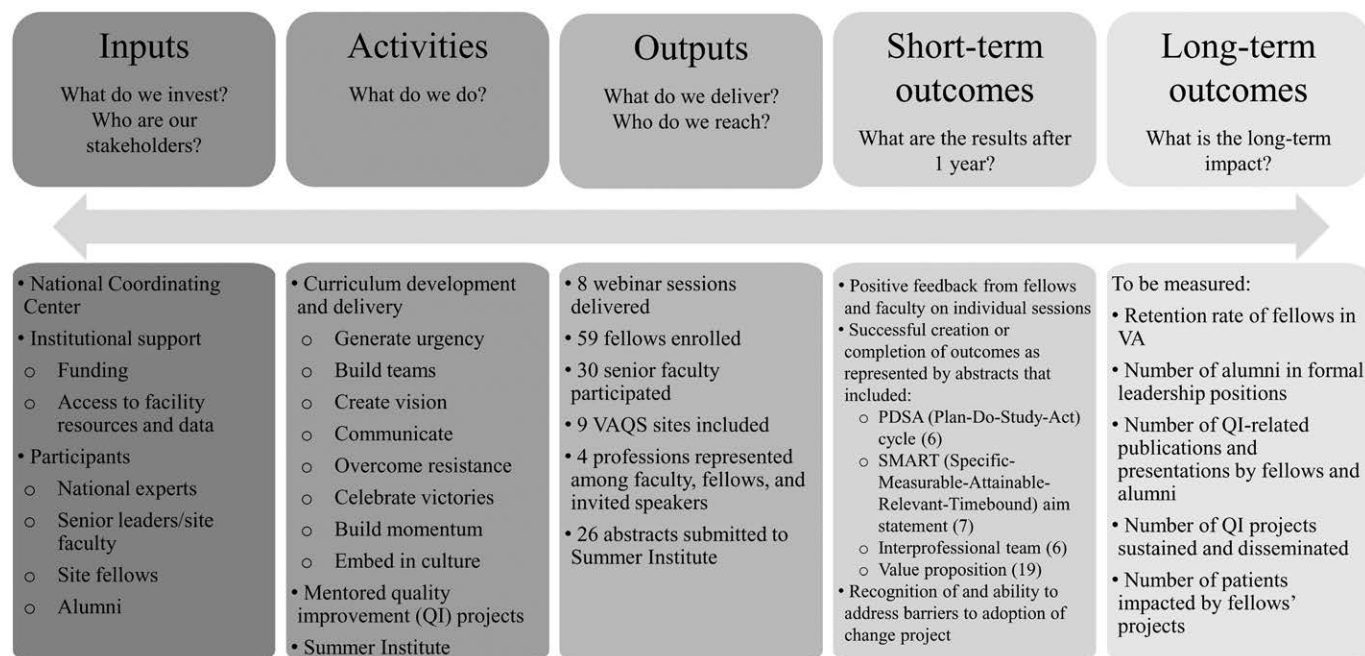
**Figure 1** Logic model used in the planning and evaluation of the Veterans Affairs Quality Scholars (VAQS) Leading Healthcare Improvement course. Numbers in the outputs column are reported for the 2017–2018 academic year. Numbers in parentheses in the short-term outcomes column are the number of abstracts, of the 26 total abstracts submitted to the VAQS Summer Institute, that included the listed outcome.

in 2012 through the consensus of interprofessional VAQS faculty scholars. The program has 5 competency domains: (1) interprofessional collaboration and teamwork; (2) improvement methods and skills; (3) organization and system leadership for quality and safety; (4) research; and (5) teaching and learning. In an effort to fill in gaps in the VAQS curriculum, we designed the LHI course to specifically align with the competency domains of both interprofessional collaboration and teamwork and organization and system leadership for quality and safety.

Within interprofessional collaboration and teamwork, the specific competencies we addressed included: "Use the knowledge of one's own role and those of other professions to improve healthcare systems," and "Apply relationship-building values and the principles of team dynamics to perform effectively in different team roles to improve quality and safety." Within organization and system leadership for quality and safety, the specific competencies we addressed included: "Design, implement, manage, and monitor quality improvement systems," and "Communicate effectively with various constituencies that are consumers of QI information." We designed eight 60-minute sessions to be delivered over the course of 1

academic year: (1) Generate urgency, (2) Build teams, (3) Create vision, (4) Communicate, (5) Overcome resistance, (6) Celebrate victories, (7) Build momentum, and (8) Embed in culture.

**Summer Institute.** The VAQS Summer Institute takes place every August at varying locations around the United States. Fellows and faculty from all 9 sites, as well as national experts in QI, convene to network and share progress on their work. The 3-day conference includes oral presentations and a poster session in which fellows highlight the progress they have made on their projects, attend skill-building workshops led by national QI experts, and take advantage of opportunities for cross-site mentoring and networking.

**Mentored QI projects.** Fellows are expected to work on at least 2 QI projects during their fellowship. Projects should address both institutional and national VA strategic priorities. Examples include hospital-acquired infections, suicide prevention, and decreasing unnecessary opioid prescriptions. Fellows are mentored by VAQS faculty and other QI leaders at their sites.

**Outputs**

The outputs we tracked are the products of the activities and reflect what we

delivered and who we reached through the LHI curriculum. Outputs such as numbers of faculty, fellows, and QI projects varied between sites and are presented here for all fellows and faculty across all sites.

We delivered the LHI course for the first time during the 2017–2018 academic year. The cohort included 59 fellows and 30 senior faculty based at 9 sites across the United States and Canada. The 59 fellows included 26 first-year fellows, 25 second-year fellows, and 8 third-year fellows. Although the fellowship is designed to last for 2 years, some fellows apply for an additional third year during which time they primarily focus on completing their QI projects. Eight fellows resigned early from the fellowship to pursue job opportunities or other commitments; thus, they only partially completed the LHI curriculum. Approximately half of our interprofessional cohort of faculty (17/30; 57%) and fellows (31/59; 53%) represented medicine, with the remainder representing nursing, pharmacy, and clinical psychology. The distribution of professions between faculty and fellows was similar. Outputs for curriculum development included the delivery of 8 LHI online sessions lasting 60 minutes each. Outputs for the mentored QI projects part of the curriculum and for

the Summer Institute included the 26 abstract submissions to the Summer Institute.

### Short-term outcomes

The short-term outcomes reflect the knowledge, skills, and attitudes we expected fellows to acquire after their first year (when they initially receive the LHI curriculum). These outcomes were used to create the learning objectives of the 8 sessions. In addition to assessing whether the objectives were met, we assessed the written abstracts that the fellows submitted to the Summer Institute to determine how they applied the course concepts to their QI projects. All short-term outcomes reported were gathered during the 2017–2018 academic year.

**Satisfaction and learning.** We distributed an online survey to faculty and fellows immediately after each online session to obtain feedback. We asked respondents to rate (1) their overall satisfaction with the sessions and (2) the extent to which they perceived that each prespecified learning objective was achieved. These outcomes were assessed on a 5-point Likert scale (1 = not satisfied/poor, 5 = very satisfied/very well). We averaged respondents' satisfaction scores and the degree to which they perceived objectives were met across all 8 sessions. Faculty and fellows rated the sessions highly. They expressed high overall satisfaction (mean 4.3, standard deviation [SD] 0.34) and agreed that the learning objectives were met (mean 4.3, SD 0.21).

**Application of leadership skills.** After completing all 8 sessions of the LHI course, fellows submitted abstracts to present their QI projects at the Summer Institute. We required that the abstract include specific lessons and leadership skills gained from the course and asked fellows to describe how these skills facilitated the development of their QI project. We analyzed the abstracts for course-related content separately from the reviewers who determined eligibility for presentation at the conference. We used deductive content analysis, with the structured abstract headings serving as domains, to identify the leadership skills described.

We received 26 abstract submissions to the Summer Institute from 23 of the 26 eligible fellows who were attending

the conference. Fellows who resigned from the fellowship and those who graduated before the Summer Institute were not eligible to submit abstracts. Only fellows completing the first year of their fellowship were required to submit abstracts; submissions were optional for second-year fellows who planned to extend the fellowship for an additional year. The professional distribution among fellows who submitted abstracts was similar to the overall distribution in the fellowship, with 13 of the 23 fellows (57%) representing medicine and the remaining 10 fellows (43%) representing nursing, pharmacy, and clinical psychology.

Most abstracts described projects that were still in progress; however, 6 abstracts clearly described the completion of at least 1 PDSA (plan-do-study-act) cycle. These 6 abstracts all reported positive outcomes, with achievement or near achievement of the stated project goals and LHI outcomes. Examples of successful projects included reducing the institutional fecal immunochemical test specimen rejection rate from 29% to 8% to improve colorectal cancer screening rates, decreasing patient wait times for phlebotomy from 44 minutes to 30 minutes, and improving pneumococcal vaccination rates from 3% to 21% in a rheumatology clinic.

Throughout the course of the academic year, fellows also completed specific session deliverables for their QI projects (such as the development of a team charter) to reinforce the learning objectives. They incorporated these deliverables into their Summer Institute abstract submissions to demonstrate their understanding and application of core course concepts. Of the 26 submitted abstracts, 7 included SMART (specific-measurable-attainable-relevant-time bound) aim statements, 6 described strong interprofessional teams inclusive of the project's primary stakeholders, and 19 provided value propositions clearly describing the alignment of the project with institutional and/or national priorities—all skills that were taught in the LHI course.

Fellows were asked to identify the barriers they faced and strategies for overcoming these barriers in their current or future projects. Fellows frequently associated the level of involvement or buy-in from

key stakeholders with the success of their projects. Those who had difficulty identifying or engaging stakeholders found that their projects stalled or were unsuccessful. Two fellows reported:

> While we engaged surgical providers and [operating room] nursing staff, who are the key stakeholders, I think that we failed to secure the buy-in necessary to maintain momentum to execute any meaningful interventions. More to the point, I don't believe that nursing staff, who were the real gatekeepers for getting this done, sensed any urgency or personal stake in the project's outcome.

> While the team was unanimously in support of the interventions, some key players don't see ongoing measurement as a priority.

In addition to identifying key stakeholders earlier in the process, fellows discussed the importance of highlighting small wins and celebrating them early in the process as ways to build momentum for the project. The same fellows quoted above respectively commented:

> The importance of ensuring that the project is meaningful to the key gatekeepers is an important lesson to carry forward.

> We should work to maintain enthusiasm of the ground-level staff and help find other ways to demonstrate that their work is important and helpful.

These strategies reflect the lessons and objectives of the LHI course.

### Long-term outcomes

The long-term outcomes are intended to measure the impact of the LHI course over time, not only on the career trajectories of fellows but also on the institutions where they implement their projects. According to the 2016 alumni survey mentioned above, many fellows take formal leadership roles after completing the fellowship. This information inspired us to develop the LHI course in the first place. We plan to adapt the survey to collect additional outcome measures, including the number of QI-related presentations and publications by alumni, as well as sustained QI project impact on patient-centered outcomes, among others. To this end, we have convened an evaluation subcommittee, composed of interprofessional fellows and faculty across our sites. The subcommittee has strategized about which additional

measures to collect to capture the impact of formal leadership training on future graduates, their institutions, and the larger health care system. However, given that the course is nested within a fellowship program, the long-term outcomes will more accurately reflect the impact of the VAQS fellowship in its entirety rather than the LHI course.

## Other Considerations

Health professionals hoping to improve patient care—especially frontline clinicians who are often charged with leading QI initiatives—must demonstrate strong leadership. Learning how to manage teams to improve individual patient care is a hallmark of many clinical training programs; however, formal education in leadership can better prepare clinicians to build on and leverage those skills for system-level improvements. The LHI course, which is currently 1 of the 4 core courses of the VAQS program, was developed to provide frontline clinicians who are emerging leaders in QI with the skills to lead and advance QI efforts at their institutions.

The LHI logic model we developed allowed for the thoughtful planning and evaluation of this new course. Although we were uniquely positioned to implement the LHI course through our existing VAQS partnerships and curriculum, the logic model can serve as a guide for other QI programs that are considering the resources they may need and the outcomes they should measure during the planning and evaluation of an interprofessional, longitudinal QI leadership course. While many of our inputs and related activities are reflective of existing resources at both the national and local levels of the VAQS program, the short-term outcomes include skills and competencies that QI leaders should be able to demonstrate and apply in the advancement of QI efforts elsewhere. The short-term outcomes of the LHI course, in turn, feed into the long-term outcomes, which contribute to the development of a network of QI leaders with the ability to direct initiatives that improve the quality of patient care on a national level. The largest barrier that future implementers, VA-affiliated and non-VA-affiliated alike, are likely to face is allowing time for clinicians to conduct QI work.

While some cost would be incurred by having a trainer deliver the LHI course to clinicians, the course itself is made up of eight 60-minute online sessions. We believe that this format could be easily adapted for practicing frontline providers in a variety of health care settings, with the added advantage of synergizing course requirements with existing QI efforts at those various sites. In addition to the expenses related to content delivery, another cost is the release time for fellows to complete the training. The importance of having dedicated time to conduct QI projects cannot be understated. Individuals must have time to apply the skills they learned in the course if change in the health care system is to be achieved.

Overall, the LHI course was well received by fellows and faculty, and evaluations demonstrated the acquisition of leadership skills among fellows. Fellows who were farther along in their projects were able to demonstrate how course concepts facilitated their work through the abstracts they submitted to the VAQS Summer Institute. We are encouraged by the fellows' ability to identify barriers to their project's success as well as strategies to address those barriers based on course content.

The number of references to interprofessional teams and SMART aims in the Summer Institute abstracts was lower than expected, indicating that we need to restructure and measure these parts of the curriculum. For example, we asked fellows to discuss their interprofessional teams in their abstracts but did not require them to detail how their teams functioned in an interprofessional manner, limiting our ability to draw conclusions on how they applied this skill. However, the low number of references to interprofessional teams and SMART aims can also be attributed to the fact that fellows engaged in projects of varying complexity, were at different stages of implementing their projects, and experienced a delay between receiving the LHI course content and applying it to their QI efforts.

Most fellows begin implementing their QI projects approximately 3–6 months into the VAQS program because of the time needed to understand a new clinical setting and its needs as well as to engage stakeholders for the project.

Through our experiences with QI project implementation, we have learned that very few QI projects can be completed in less than 6 months. Thus, the 12 months that we currently provide fellows between the start of fellowship and the presentation of their work at the Summer Institute is too short. Given the anticipated timeline needed for projects and the outcomes we have noted, we are revising both the timeline for when we collect short-term outcomes data and the types of data we collect. For example, documenting when fellows choose their projects, establish interprofessional teams, and initiate projects that align with institutional priorities can serve as important milestones to better understand when and how they are applying their leadership skills. Furthermore, we will work with site mentors to help fellows identify QI projects within the first 6 months of the fellowship, which should ideally yield completion of 1 PDSA cycle by the time they present at the Summer Institute.

While the logic model is an extremely useful tool, it can oversimplify the process of program (or course) planning and evaluation by overlooking its iterative nature. Although it appears linear, our logic model underwent several revisions before we reached consensus on its current state, and it will continue to undergo revisions as we restructure the LHI course based on our outcome measures. Fewer fellows than expected achieved the short-term outcomes, which led us to evaluate and revise the course content and data collection, guided by the logic model. We are already using the evaluation data we collected during the initial year of implementation to revise some course elements to better prepare our fellows to take on their future leadership roles. One strategy to improve fellows' leadership skills is working more closely with site-based faculty to reinforce key course concepts throughout the academic year. For example, we have increased the repetition of and emphasis on the need for interprofessional stakeholders and teams as well as the importance of tailoring communication to those varied stakeholders. We are also reassessing our data collection methods and outcome measures through the VAQS internal evaluation processes. The logic model will continue to guide how we capture outcomes, including revisions to the abstract guidelines, to better assess

fellows' real-world application of the knowledge and skills they gained from the LHI course.

Our experience suggests that empowering frontline clinicians to improve the health care system by providing them with practical skills in QI and, importantly, leadership early in their careers is important to their overall success. The LHI logic model can serve as a roadmap for other leadership programs to aid them in identifying resources early, assessing their learners, revising their activities based on evaluation data, and capturing program impacts that reflect the importance of strong leadership on improvements in patient outcomes.

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