Usefulness of the Intersocietal Accreditation Commission (IAC) Quality Improvement Self-assessment Tool After 1 Year

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Background and objectives: The Intersocietal Accreditation Commission (IAC) created a voluntary quality improvement (QI) tool that allows imaging facilities to self-assess and document the quality of imaging studies. This study aimed to evaluate users' perceptions of the effectiveness and usefulness of the new QI self-assessment tool. **Methods:** The IAC's QI tool evaluates 4 quality measures: test appropriateness; technical quality/safety; interpretive quality; and report timeliness/completeness. A survey was appended to the tool to assess the perceived value. **Results:** Between May 2016 and July 2017, a total of 829 facilities completed 5312 self-assessments. During that time, 936 respondents completed the survey. There was a high level of agreement that the tool is easy to use (91.8%), encouraged critical thinking (90.3%), and the activity was worthwhile (89.6%). **Conclusion:** The results show that most respondents find value in using the voluntary IAC QI Self-assessment Tool. Respondents believed tool use encouraged critical thinking, and they were satisfied with the QI self-assessment process.

Key words: accreditation, diagnostic imaging, quality improvement, self-assessment

Accreditation is often considered to be a benchmark of quality. The Intersocietal Accreditation Commission (IAC) is a nationally recognized accrediting organization offering voluntary accreditation programs for imaging facilities since 1991.[1] The IAC provides imaging accreditation programs for computed tomography (CT), echocardiography, magnetic resonance imaging (MRI), nuclear medicine and positron emission tomography (PET), and vascular testing facilities. To date, the IAC has more than 14 000 accredited sites throughout the United States.

There are multiple steps in the IAC application process facilities must complete before accreditation is granted (Figure 1). The first step is to review the *IAC Standards*.[2-6] The standards are the foundation of the accreditation program and represent the minimum requirements to which laboratories are held accountable. Next, a facility performs a thorough self-assessment to identify and correct areas of noncompliance with the standards. Frequently, facilities need to revise protocols or institute quality improvement (QI) programs to meet accreditation requirements. Next, the facility completes and submits the online application. The application requires the facility to upload documentation related to staff qualifications, policies and protocols, equipment quality control, case studies including images and final reports, and QI program data. Two independent, trained peer reviewers evaluate submitted materials for each application. Then, the Board of Directors evaluates the peer-review findings and decides to grant or delay accreditation until all areas of noncompliance are corrected. If accreditation is granted, the facility is accredited for 3 years. At some point, midway through the 3-year accreditation period, every facility is audited or site visited to ensure continued compliance with the standards.

QI is fundamental to the IAC's mission of *improving health care through accreditation*®. All facilities must provide a written QI plan to become accredited. The QI plan must assess 4 key areas: test appropriateness; technical quality and safety of imaging; interpretive quality review; and report completeness and timeliness. During the 3-year accreditation period, facilities are required to follow their QI plan and measure each of the key quality areas annually. In addition, facilities must conduct at least 2 QI meetings annually to discuss the results of QI analyses.

On the basis of feedback from mid-accreditation audits, site visits, and reaccreditation findings, the IAC realized many facilities do not understand fundamental QI principles, nor do they carry out their QI plans. The consequence is few facilities actually measure and improve quality. Recognizing this, the IAC developed a voluntary, online QI self-assessment tool to help facilities self-evaluate and document the evaluation of image quality and final report interpretation.[7] The QI tool structure is a combination of 2 of the American Society for Quality's 7 basic quality tools: check sheets and control charts.[8] For various types of imaging examinations,

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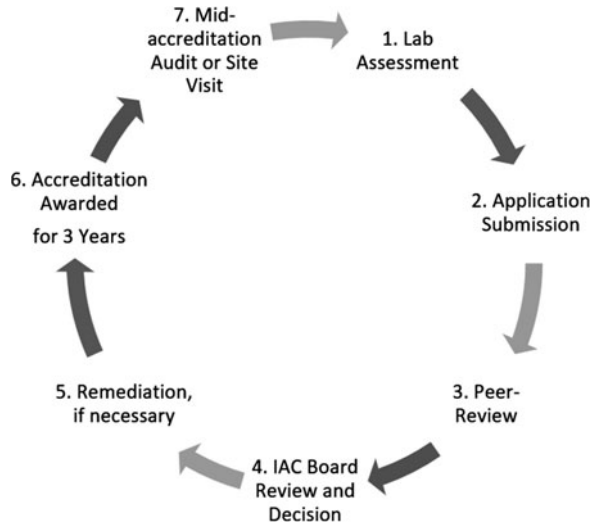

Figure 1. The IAC accreditation process. IAC indicates Intersocietal Accreditation Commission.

the QI tool asks a series of relevant quality questions and then calculates the percent correct. A facility can use the tool repeatedly to measure quality, and the tool displays graphs and improvement over time.

Use of QI tool is free, and any staff member, including physicians and technologists, is encouraged to use the tool, whether the IAC accredits the facility or not. The average time to complete an assessment is difficult to estimate for 2 reasons. First, the facility must first review the quality of the images and the accuracy of the interpretation, which can vary significantly between imaging examination types. For example, a simple nuclear bone scan may take less than 10 minutes to review the images compared with a complex PET/CT scan with hundreds of images, which could take more than an hour. Second, an assessment can comprise a single case or multiple cases. However, there are fewer than 20 questions per case, and we estimate it takes less than 5 minutes to enter responses for each case.

The IAC QI Self-assessment Tool targets the 4 key quality measures to help facilities standardize process of care evaluation metrics, identify areas for improvement, and implement corrective actions to improve the quality of the images and reports to lead to better patient outcomes. The degree to which the QI self-assessment tool achieves these objectives is unknown. Therefore, the IAC designed a survey to ascertain the perceived value of the IAC QI Self-assessment Tool. The aim of the survey was to (1) evaluate the effectiveness and usefulness of an online QI self-assessment tool to assess the quality of imaging, interpretation, and reporting, and (2) determine whether completing the QI self-assessment process encouraged staff to think critically about their work.

METHODS

The IAC QI Self-assessment Tool was launched in May 2016. This study evaluated users' opinions from May 2016 to July 2017. To determine the number of voluntary self-assessments completed, the date of completion, and the respective imaging modality for which the assessment was completed, the IAC QI self-assessment data repository was queried.

QI Self-assessment tool and measures

The QI self-assessment tool concentrates on 4 quality measures: test appropriateness; technical quality/safety; interpretive quality; and report timeliness/completeness (Table). For each of these measures, the assessment asks 3 to 7 questions specific to the area of testing (eg, CT, MRI, echocardiography), with a maximum of 20 questions per assessment.

QI Self-assessment process

During a QI self-assessment, 1 or more imaging studies are reviewed from the various testing areas within a given modality (eg, CT areas include neurological, musculoskeletal). There is no limit to the number of assessments a facility may complete or the number of imaging studies and final reports that may be evaluated within a given session. Imaging study and final report selection are left to the discretion of the facility based on their areas of concern or perceived need for improvement. One or more staff members are assigned to review each imaging study and final report and to answer the quality metric questions.

Table. Four Quality Measures

Measure	Description	Goal(s)
Test appropriateness (appropriate use)	All imaging studies must be ordered for a suitable indication using the published appropriate use guidelines or by comparing the indication with acceptable indications endorsed by professional medical organizations.	Reduce unnecessary testing and redundancy in imaging.
Technical quality review	All imaging studies are of diagnostic quality, and, if applicable, the patient radiation dose is documented and reviewed.	Verify diagnostic quality imaging; reduce unnecessary or repeat examinations; reduce unnecessary radiation exposure, where appropriate.
Interpretive quality review	All reports are reviewed for accuracy of clinical interpretation.	Validate accuracy of interpretation reflected on the final report.
Final report review	All reports are reviewed for completeness and timeliness.	Confirm compliance of report content with requirements of IAC Division Standards; ensure reports are approved and signed by the interpreting physician in 2 working days.

Upon completion of the assessment, a quantitative analysis report is generated. For every case study (images and final report), there is a breakdown of the responses by question and quality measure. For each case study, 2 scores are calculated, one for image quality and the other for the level of agreement among staff members who reviewed the case study. For each assessment, an average overall score and an average score by measure are calculated and displayed graphically (see Supplementary Digital Content Material 1, available at: http://links.lww.com/QMH/A26). Facilities are encouraged to discuss the feedback at their regularly scheduled QI meetings to develop action plans to improve the effectiveness, accuracy, and safety of the care they provide. Following the implementation of corrective measures, the facility can use the QI self-assessment tool to reassess the case study quality, the effectiveness of change, and trend of the results over time.

QI Self-assessment tool survey

A voluntary survey was appended to the online self-assessment to assess the perceived value of the IAC QI Self-assessment Tool. The survey comprised 18 questions related to 4 areas: tool ease-of-use (n = 8); analysis report (n = 3); self-assessment process (n = 4); and facility information (n = 3) (see Supplementary Digital Content Material 2, available at: http://links.lww.com/QMH/A27). The question types included rating, dichotomous, multiple-choice, and open-ended. For the rating questions, respondents were asked to rate their level of agreement with statements using a 4-point Likert scale (4, strongly agree; 3, agree; 2, disagree; and 1, strongly disagree).

The research protocol was deemed a QI activity, with the purpose limited to measuring and reporting provider performance data for clinical, practical, or administrative use. Thus, we did not seek investigational review board approval. The feedback provided to the IAC was voluntary and anonymous. An explanation was provided at the beginning of the survey, and all respondents indicated their willingness to complete the survey.

Statistical analysis

The data were analyzed using SPSS for Windows (version 22.0; Chicago, Illinois). The data were cleaned and examined for outliers and normality. To determine percent agreement, "strongly agree" and "agree" were combined into an "agreed" category and "strongly disagree" and "disagree" were combined into a "disagreed" category. The percentage of respondents who agreed with the statements is reported.

The responses to the 11 agreement statements were averaged to create an overall score (1-4), with a higher score indicating a greater level of agreement. The responses to the open-ended questions were combined into 1 group because of similarities and overlap between questions and responses. A qualitative thematic analysis was used to identify and report patterns from the comments for the open-ended questions. Categorical and ordinal data were expressed as the number and percentage of respondents for each query. Continuous data were reported using descriptive statistics including the median, interquartile range (IQR), and mean (SD).

RESULTS

Self-assessments

Between May 2016 and July 2017, a total of 829 facilities completed 5312 self-assessments (Figure 2). The median number of assessments per facility was 3 (IQR = 1-7; mean = 6.4, SD = 10.8). The majority of the self-assessments were completed by vascular testing facilities (n = 2724; 51.3%), followed by echocardiography facilities (n = 1487; 30.0%) and nuclear medicine/PET (n =766; 14.4%).

QI Self-assessment tool survey

Facility characteristics

Over 15 months, 936 respondents completed the survey that followed the self-assessment (Figure 2). Of survey respondents, the median number of staff (physicians and technologists/sonographers combined) per facility was 9 (IQR = 5-16), with a median of 2 staff members (IQR = 2-4) participating in a self-assessment. Also noted in the survey, technical directors were involved in 80.1% (n = 749) of the assessments, with medical directors involved in 33.7% (n = 315). Both the technical director and the medical director participated in the self-assessment for 30.3% (n = 284) of the surveyed facilities. The technical director alone completed the self-assessment for 20.8% (n = 195) of the respondent facilities. Of the medical and technical staff, 20.2% (n = 189) and 54.4% (n = 509), respectively, participated in the self-assessment.

Tool ease-of-use

The percent agreement with the statements was high for all 3 surveyed areas (Figure 3). For questions related to using the tool, the scores ranged from 89.1% (n = 834), for ease of the process of entering the case study information, to 92.8% (n = 869), for understandability of the case study questions. Of note, 91.8% (859) of

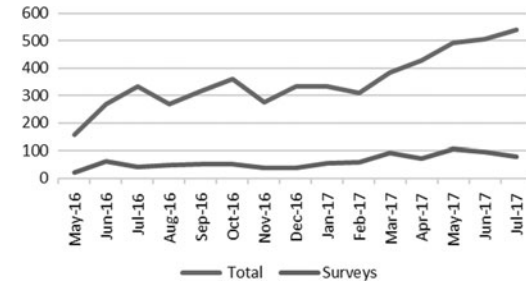

Figure 2. The total number of completed Intersocietal Accreditation Commission quality improvement self-assessments (top line) compared with the number of completed surveys of the 15-month data collection period (bottom line).

Figure 3. Respondent percent agreement with 10 metrics related to the QI self-assessment. The metrics are separated into 3 groups: self-assessment tool; self-assessment report; and self-assessment process. QI indicates quality improvement.

respondents agreed that the QI self-assessment tool was easy to use.

Self-assessment report

The survey results for the self-assessment report were similar, with respondents agreeing that the report was both easy to understand and informative, 91.6% (n = 836) and 91.7% (n = 837), respectively. The free-text comments related to the report were positive, with 214 (24.3%) respondents praising the analysis report and providing suggestions for improvement.

Self-assessment process

Regarding the self-assessment process, 93.4% (n = 839) of respondents agreed that completing the self-assessment was worthwhile and 94.1% (n = 845) felt the process encouraged the staff to think critically about their work. Overall, 91.1% (n = 818) of respondents were satisfied with the IAC QI self-assessment process.

Overall score

The overall average score on the 4-point Likert scale (1, strongly disagree; 4, strongly agree) statements was 3.2, indicating respondents were satisfied with the tool, report, and process, finding it useful.

Qualitative analysis

The QI self-assessment tool included a question on whether participants encountered any technical issues while using this brand-new product, with first use by the imaging community in May 2016. Of the survey respondents, 20.4% (n = 191) stated they had experienced problems. Almost half (n = 88; 46%) of those reporting technical difficulties experienced problems in the first 6 months. The most frequent issues were related to an incompatible Internet browser, e-mail notification issues, "timing out" of the program prematurely, and inaccurate case study date.

Qualitative analysis of the comments to the open-ended questions revealed several prominent themes (Figure 4). The most frequent comments (n = 33; 21.9%) were requests for the calculation of an aggregate score for each assessment and the ability to download the results of the self-assessment. As an example, one respondent stated, "I'd like to be able to download the results in a spreadsheet so that I can further evaluate and graph the results by sonographer and physician."

Almost 17% (n = 26) of the comments were suggestions related to question content. Interestingly, several respondents suggested there should be more questions on the self-assessment and the questions should be more specific. One respondent stated, "I think the technical assessment questions are too basic. We want a more in-depth and detailed assessment of protocol, imaging, etc," or as another respondent stated, "We would like to see more technical quality review questions if we are going to use this in the future in place of our current QI assessments."

Several of the respondents (n = 24; 15.8%) requested the ability to customize the assessment by being able to identify the technologist/sonographer who performed the examination and the physician who performed the initial interpretation. Respondents also requested the ability to add comments to the assessments and results to enhance the educational potential.

DISCUSSION

In May 2016, the IAC introduced a new QI self-assessment tool providing the ability for diagnostic imaging facilities to self-assess and document the quality of imaging studies and final interpretive reports performed at their facility. The IAC's primary goal, when creating the QI self-assessment tool, was to provide a simple method for facilities to document meaningful QI activities and identify opportunities for improvement. Through a mechanism of continuous QI, the quality of a facility's imaging and reporting should improve because of using the tool. The IAC was uncertain whether facilities would accept and utilize the tool for process improvement. Therefore, a survey was appended to the QI self-assessment tool to assess the perception of the ease-of-use and effectiveness of the IAC's QI Self-assessment Tool. Overall, there

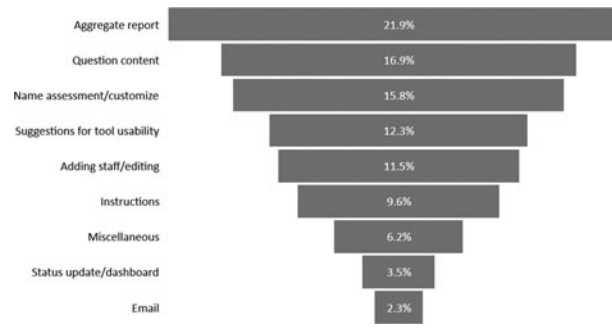

Figure 4. Results of the thematic analysis of the open-ended question comments.

was a high level of agreement by respondents that the tool was easy to use (91.8%), encouraged critical thinking (90.3%), and that completing the process was worthwhile (89.6%).

Historically, routine performance of QI has been challenging for facilities applying for IAC accreditation. A 2015 study by Nagueh et al[9] found that of the organizations applying for echocardiography accreditation, 45.5% had deficiencies related to QI. Similarly, a 2017 study by Farrell et al found that 43.3% of vascular testing facilities performing transcranial Doppler imaging had QI deficiencies.[10] These gaps were attributed to a lack of performance of QI or failure to document efforts. Often, facilities only complete QI activities as a housekeeping chore to obtain accreditation. Going forward, the percentage of facilities with QI deficiencies at the time of the accreditation evaluation will be used as a performance measure of the effectiveness of the IAC QI Self-assessment Tool.

The IAC QI Self-assessment Tool is novel in that it is designed to assess the quality of the entire imaging process, including study appropriateness, the technical quality of the images, and interpretation accuracy, and to report completeness and timeliness. The tool is also unique in that it evaluates the clinical competency of the technologists/sonographers and the physicians. The results of the survey show both the medical director and the technical director worked together to assess the cases in more than 30% of the facilities and the technical director worked alone in only 21% of the cases. The involvement of physicians and the technical staff is a critical success factor for an effective QI program as noted in the literature.[11-13]

There are 2 radiology QI programs currently available that are geared more toward physicians. The American College of Radiology's (ACR's) General Radiology Improvement Database (GRID) can be used to meet the Part IV MOC requirements.[14] GRID is a registry of QI performance indicators including report turnaround time, patient wait time, time from order to examination, reacquisition rate, and several outcome measures such as the rate of nondiagnostic biopsies. The ACR also offers RADPEER, a Web-based program that allows reporting of peer review and scoring of previous studies.[15]

The development and launch of the IAC QI Self-assessment Tool served as a performance improvement project for the IAC as well as the applicant facilities. Pilot testing and analysis of survey feedback allowed early correction of technical difficulties. For instance, a few facilities experienced a problem where the date of the case study changed by 1 day. An investigation into the issue determined that the problem was due to time zone conversion, and the problem was quickly fixed. Early use of the tool by users in differing practice settings illuminated Internet browser issues. Now the QI self-assessment tool checks the user's Web browser on the log-in page. Difficulties with the system "timing out" were readily corrected by increasing the session idle length.

Aside from identifying technical issues, the survey also produced a plethora of suggestions to improve the usability of the QI self-assessment tool. For example, early users noted that the analysis only reported a score for each case separately. On the basis of that feedback, a summary score for the entire assessment and graphs were added to the analysis report. Survey respondents also noticed a mismatch between requirements in the *IAC Standards* and tool functionality. The standards require a minimum of 30 cases per year, but the QI self-assessment tool limited an assessment to 20 cases, requiring a facility to split the results over 2 reports. This issue was also addressed.

Finally, there were some helpful suggestions from survey respondents that will be considered by the IAC in future QI self-assessment tool versions. These include ideas for the ability to download the self-assessment data in spreadsheet form so that pivot tables comparing staff can be created. In another example, survey respondents felt it would be helpful to upload images and reports for each case to make it more convenient for staff to review. Other suggestions for tracking internal progress, analyzing trends, benchmarking performance, and delivering feedback are already in progress by the IAC.

Limitations

The survey was appended to a voluntary self-assessment, which may result in selection bias as individuals with a favorable view of the IAC QI requirements would be more likely to use the QI self-assessment tool and complete the survey. Although the QI self-assessment tool is available for use by accredited and nonaccredited facilities, very few nonaccredited facilities have used the tool thus far. Thus, the results may not be generalizable to nonaccredited populations. All the authors of this article are employees of the IAC, raising the potential for experimenter expectancy bias. This survey focused only on the QI self-assessment tool ease-of-use and the usefulness of the self-assessment process. Therefore, the validity of the tool or accuracy of the self-assessment cannot be assumed. Finally, this survey cannot determine whether the use of the QI self-assessment tool improved facility quality. Further research is necessary to test these hypotheses. The IAC is currently collecting data to validate and test the effectiveness of the QI tool in improving quality.

CONCLUSION

The results of this survey show that most respondents find value in using the IAC QI Self-assessment Tool. As anticipated, respondents found the ability to easily review images and reports using the directed online QI self-assessment tool to be worthwhile. Respondents believed the use of the tool encouraged critical thinking and were satisfied with the IAC QI self-assessment process. Based on the results of this survey, the IAC will continue initiatives to streamline the

management of QI activities and to ensure the tool provides value.

REFERENCES

1. Company mission. Intersocietal Accreditation Commission Web site. http://www.intersocietal.org/iac/about/companymission.htm. Accessed August 14, 2017.
2. IAC standards and guidelines for adult echocardiography accreditation. http://www.intersocietal.org/echo/standards/IACAdultEchocardiographyStandards2017.pdf. Accessed August 14, 2017.
3. The IAC standards and guidelines for CT accreditation. http://www.intersocietal.org/ct/standards/IACCTStandards2017.pdf. Accessed August 14, 2017.
4. The IAC standards and guidelines for MRI accreditation. http://www.intersocietal.org/mri/standards/IACMRIStandards2015.pdf. Accessed August 14, 2017.
5. The IAC standards and guidelines for nuclear/PET accreditation. http://www.intersocietal.org/nuclear/standards/IACNuclearPETStandards2016.pdf. Accessed August 14, 2017.
6. IAC standards and guidelines for vascular testing accreditation. http://www.intersocietal.org/vascular/standards/IACVascularTestingStandards2016.pdf. Accessed August 14, 2017.
7. The new IAC QI tool. Intersocietal Accreditation Commission Web site. http://www.intersocietal.org/QITool. Accessed August 14, 2017.
8. The 7 basic quality tools for process improvement. American Society for Quality (ASQ) Web site. https://doi.org/10.5281/zenodo.400832. Accessed April 8, 2019.
9. Nagueh SF, Farrell MB, Bremer ML, Dunsiger SI, Gorman BL, Tilkemeier PL. Predictors of delayed accreditation of echocardiography laboratories: an analysis of the Intersocietal Accreditation Commission Database. *J Am Soc Echocardiogr*. 2015;28(9):1062.e1067-1069.e1067.
10. Farrell MB, Choi JY, Ziu E, Cockroft KM. Characteristics of accredited transcranial doppler ultrasound laboratories in the United States. *J Neuroimaging*. 2017;27(2):210-216.
11. Barron WM, Krsek C, Weber D, Cerese J. Critical success factors for performance improvement programs. *Jt Comm J Qual Patient Saf*. 2005;31(4):220-226.
12. Weiner BJ, Shortell SM, Alexander J. Promoting clinical involvement in hospital quality improvement efforts: the effects of top management, board, and physician leadership. *Health Serv Res*. 1997;32(4):491-510.
13. Carman JM, Shortell SM, Foster RW, et al. Keys for successful implementation of total quality management in hospitals. *Health Care Manage Rev*. 2010;35(4):283-293.
14. General Radiology Improvement Database. *ABR PQI Project Description*. Reston, VA: The American College of Radiology; 2014.
15. RADPEER(TM). The American College of Radiology Web site. https://www.acr.org/Quality-Safety/RADPEER. Accessed August 15, 2017.