Timeliness in Breast Cancer Care as an Indicator of Quality

Deirdre Kiely, MS, MPA, RN, ANP

The current study sought to define best practice for timeliness for a breast cancer program at each diagnostic step. The study was a retrospective review of patients newly diagnosed with invasive breast cancer who were enrolled in the breast cancer database from 2009–2011. A convenience sampling methodology was used for patient selection, and descriptive statistics for various time intervals were calculated for identified data points from abnormal imaging to surgery. No evidence-based practice standards exist for access to breast cancer care. Practice guidelines that include benchmarks for quality measures and an established process to measure patient outcomes would promote high-quality care. An understanding of how practice sites function also would help healthcare providers identify and develop resources to improve patient outcomes. In the current study, the advanced practice nurse (APN) in the practice setting was identified as a key point person in facilitating patients’ timely access to healthcare services. The physician and APN practice model was instrumental in influencing the process. The results of the current study provided clinical data to identify benchmarks that a breast oncology practice can use to monitor timeliness as a quality indicator.

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The American Cancer Society (ACS), 2013) estimated that 234,580 women would be diagnosed with breast cancer in 2013. The diagnosis and management of breast cancer has evolved during the past three decades. The advent of the Comprehensive Breast Center as a model of care in the 1980s and all of the advances that have occurred within its multidisciplinary specialties have changed the face of breast cancer care. Those changes include the use of breast magnetic resonance imaging (BMRI) as a diagnostic tool, breast-conserving approaches to surgical management, and targeted therapy in the adjuvant setting. Timely access to care has been used as a measure of efficiency for the multidisciplinary team approach in providing care to the patients with breast cancer in this complex model of care (Landercasper et al., 2010). The National Consortium of Breast Centers defined quality of breast cancer care as “accurate evaluation and appropriate services with compassion in a technically competent and timely manner” (Landercasper et al., 2010, p. 449). Timely access to each of the diagnostic steps from initial consult to surgery is important to ensure that women with breast cancer avoid treatment delays. Multidisciplinary breast cancer services currently do not have established benchmarks to ensure that high-quality structural and process indicators are maintained and enhanced. A need exists for a better understanding of how breast oncology services are provided across different settings to develop a standard to provide access to high-quality care. Timely access to care remains a priority topic on the agendas of the American College of Surgeons’ (2013) Commission on Cancer and the Institute of Medicine (Hewitt & Simone, 1999).

The purpose of the current quality and performance improvement study was to clearly define an urban academic breast cancer program’s best practice for timeliness at each diagnostic step. The multidisciplinary team included physicians, nurses,
Timeliness as a Quality Indicator

Timeliness can be defined in different ways, depending on context. In relation to health care, timeliness can be defined as a quality measure with a relationship to access to healthcare services. According to Mainz (2003), three common measures of assessing breast care quality can be monitored (i.e., outcomes of care, structure of care, and process of care). Kaufman (2007) noted that outcome results are not useful in breast surgery when compared to other surgical specialties because breast cancer survival statistics can take years to define and involve many variables and decisions.

In reviewing the literature, several investigators reported that delays in diagnosis influence treatment and associated clinical outcomes (Angarita, Acuna, Fonseca, Crystal, & Escallon, 2010; Kaufman et al., 2010; Quan et al., 2012; Trufelli et al., 2008). Because so many factors influence clinical and quality outcomes, dedicated breast care centers are limited to structural and process measurements as quality indicators. That may be because of the complexity of services provided and the understanding that delays may be necessary to provide optimum care. The time intervals would represent a standard with which to measure timeliness as a quality indicator, and they must be clearly defined and measureable to be applied in oncology practice.

Landerscasper et al. (2010) reported that the “optimal time intervals between a patient’s abnormal screening mammogram or breast symptom to breast cancer diagnosis and first treatment have not been established either for patient satisfaction or for cancer-specific survival” (p. 452). Those investigators reported that patients’ expectations were met or exceeded 90% of the time when the median time interval from an abnormal screening mammogram to diagnostic evaluation was six days, and when the median time to surgical consultation and to surgery was three and seven days, respectively. In the current study, the median time interval measured was from last intervention to surgery as a more accurate reflection of the complex diagnostic process.

Impact of Imaging on Time Intervals

Many studies suggest that additional diagnostic evaluation, including a preoperative BMRI, could be a variable that delayed the average time from initial consultation to surgery (Bleicher et al., 2009). However, a BMRI done prior to the initial consultation could result in a similar time delay reflected in the interval from diagnosis to initial consultation. The only way to avoid a BMRI-related delay would be not to recommend a BMRI as a preoperative diagnostic study. According to the consensus guidelines of the American College of Radiology ([ACR], 2013), the current indications for recommendation of a diagnostic BMRI is “to evaluate the extent of disease in invasive carcinoma and ductal carcinoma in situ to determine the presence of multifocality and multicentricity” (p. 2). In addition, this diagnostic evaluation has been found to detect occult disease in the breast containing the index malignancy in about 15% of patients, with a range of 12%–27%, which potentially can alter surgical management (ACR, 2013). According to Houssami et al. (2008), the amount of patients affected by BMRI for surgical management ranged from 8%–33%, but no consensus exists that using BMRI to detect additional malignant foci within the affected breast improved patient outcomes.

Instead of not including BMRI in preoperative diagnostic evaluations, institutions should allocate resources to support the availability of BMRI and make scheduling more efficient and flexible. The breast imaging department at the site in the...
TABLE 1. Sample Characteristics (N = 907)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>X</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>59</td>
<td>22–95</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>901</td>
<td>99</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>73</td>
<td>8</td>
</tr>
<tr>
<td>Asian</td>
<td>86</td>
<td>9</td>
</tr>
<tr>
<td>Caucasian</td>
<td>692</td>
<td>76</td>
</tr>
<tr>
<td>Hispanic</td>
<td>55</td>
<td>6</td>
</tr>
<tr>
<td>Native American or Pacific Islander</td>
<td>1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Some high school</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>High school diploma</td>
<td>117</td>
<td>13</td>
</tr>
<tr>
<td>Some college</td>
<td>138</td>
<td>15</td>
</tr>
<tr>
<td>College degree</td>
<td>291</td>
<td>32</td>
</tr>
<tr>
<td>Graduate school</td>
<td>303</td>
<td>33</td>
</tr>
<tr>
<td>Missing data</td>
<td>14</td>
<td>2</td>
</tr>
</tbody>
</table>

*Sample includes all participants enrolled in the breast cancer database at the study site.*

current study implemented an innovative program to ensure prompt and easy access to all services provided by the department, including BMRI. The program included onsite scheduling, expanded service hours, and additional staffing in an effort to improve the productivity and efficiency of the department. The current study aimed to learn if the newly implemented program affected delay measured in days.

The Role of Advanced Practice Nurses

The APN is a member of the multidisciplinary healthcare team who provides each patient with personalized, informative care about the steps in breast cancer diagnosis and treatment. The APN consulted the multidisciplinary team of specialists in oncology, surgery, radiation therapy, radiology, and pathology. That approach allowed the APN to identify, develop, and implement an appropriate care plan that is evidence based and enhances quality care, access to services, and patient outcomes. Patients also are discussed at a weekly breast cancer conference for multidisciplinary consensus on management issues. The New York University Langone Medical Center Cancer Institute’s state-of-the-art facility centralizes the latest innovations in cancer prevention, screening, diagnosis, surgery, and ongoing treatment, all of which are essential components of a comprehensive breast care program (Jamieson-Baker & Marino, 2004). The APN plays a key role in facilitating patient care during treatment.

The model of care that puts the APN in a central role allows patients and families to receive ongoing support regarding the importance and clinical relevance of the diagnostic steps. The APN also encompasses the role of patient educator by assessing patient learning needs, readiness to learn, and potential barriers. The APN in the current model is a strong patient advocate, ensuring that patients move through the process in a timely manner. APNs also support the individual needs of patients and families. In addition to the APN, all of the other team members must function to the full potential of their roles to make the multidisciplinary team effective and efficient (Ezziane et al., 2012).

The Role of the Navigator

Any discussion of timely access to care should consider the work of Harold Freeman, former president of the ACS, and his vision of the role of navigation in addressing healthcare disparities in access to cancer care (Freeman & Rodriguez, 2011). The founding principle of the program of patient navigation is offering individualized assistance to patients, families, and caregivers to help overcome barriers in the healthcare system and facilitate timely access to quality care (C-Change, 2005). That role can be filled by a trained layperson or healthcare professional.

In an article evaluating the cost effectiveness of navigation programs for patients with cancer, Ramsey et al. (2009) found that few prospective, controlled trials have evaluated the efficacy of navigator programs and their impact on cancer-related morbidity and survival. Because of those findings, the cost effectiveness of navigation programs is not known. Survival data are not functional outcome measurements for studying breast cancer. A comprehensive analysis of the healthcare system and the needs of patients should be performed to identify barriers to care. The decision to implement a navigation program should be driven by data and measurable patient outcomes, but those data are not available.

Methods

A descriptive, retrospective review was conducted for a single breast oncology practice in an ambulatory setting of an urban academic medical center. The study was limited to a single provider because of the easy access to the nonelectronic medical records to validate clinical information and abstract data. Descriptive statistics including age, gender, ethnicity, and stage of disease were collected. The time intervals for patients with a new diagnosis of breast cancer were measured in days. Those intervals included the number of business days from abnormal imaging to biopsy, from biopsy to initial consultation, from initial surgical consultation to surgery, and from last intervention to surgery. The time intervals of initial consultation to surgery and last intervention to surgery also were analyzed by critical events (e.g., diagnostic imaging, multifocal findings noted after initial consultation, additional biopsies, additional consultations, etc.).

TABLE 2. Data Collection for Time Intervals (N = 907)

<table>
<thead>
<tr>
<th>Interval (Days)</th>
<th>X</th>
<th>SD</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>From imaging to biopsy</td>
<td>11.33</td>
<td>14.42</td>
<td>9</td>
</tr>
<tr>
<td>From biopsy to initial consultation</td>
<td>5.64</td>
<td>9.08</td>
<td>6</td>
</tr>
<tr>
<td>From initial consultation to surgery</td>
<td>14.67</td>
<td>10.7</td>
<td>12</td>
</tr>
<tr>
<td>From last intervention to surgery</td>
<td>7.38</td>
<td>4.1</td>
<td>7</td>
</tr>
</tbody>
</table>
second opinions). Descriptive statistics were gathered for BMRI scheduled before and after consultation, as well as pre- and postimplementation of an initiative to improve BMRI scheduling and reporting.

**Sample**

Eighty-four patients with newly diagnosed invasive breast cancer were enrolled in the breast cancer database from 2009–2011 and met the inclusion criteria for the study. Patients diagnosed with stage I–III breast cancer who were enrolled in the breast cancer database and had completed a corresponding questionnaire with complete data entry were included in the study. Patients with stage IV disease were excluded from the study because the purpose was to measure time points from abnormal imaging to surgery. The National Comprehensive Cancer Network’s (NCCN, 2012) treatment guidelines specify that surgery only is indicated for stage IV disease in select, localized clinical scenarios.

The breast cancer database is a longitudinal database that includes patients with breast cancer who have had definitive breast cancer surgery at the study site and have voluntarily consented to be enrolled. A convenience sampling methodology was used, and 40 patients were selected from the eligible population of 84 patients. Of that group, nine patients were established to the practice, and 31 were new patients. The database was open to male and female patients, but the study group was all female. Of the initial sample, one participant had neoadjuvant chemotherapy as the initial therapeutic intervention and was excluded from the analysis, leaving a sample size of 39 participants.

Descriptive statistics for the time intervals were calculated for identified data points from the time of abnormal imaging to the date of surgery. Patient participation in the database was completely voluntary, with measures in place to maintain the confidentiality of the individual and medical records. All patients signed consent forms to enroll in the database and have their medical information included in this research study. The database was approved by the institutional review board at the New York University School of Medicine.

**Results**

The median age of participants in the current study was 59 years, and the median age at the time of breast cancer diagnosis is 61 years in the United States (National Cancer Institute, 2013). The majority of participants were Caucasian, well-educated women, which is consistent with the demographics of the medical center at large (see Table 1).

The participants’ pathologic stage at presentation included stage I (n = 26), as well as stages II and III (n = 14). The original data collection and analysis combined stages II and III, and the authors were unable to report those stages separately. Data specific

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Time Intervals Measured</th>
<th>Comparative Data Standards</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quan et al., 1997</td>
<td>25,543 participants who were aged 50–69 years and lived in Ontario, Canada</td>
<td>Time to first assessment; diagnostic interval was from abnormal mammogram to recall with no biopsy required; second diagnostic interval from abnormal mammogram to recall with core biopsy; third diagnostic interval from abnormal mammogram to recall with core or surgical biopsy</td>
<td>Ontario Breast Screening Program’s quality indicators and breast assessment affiliates versus usual care from primary care physician</td>
<td>Time to first assessment was less than or equal to 21 days; time from abnormal mammogram to recall with no biopsy was less than or equal to 35 days; time from abnormal mammogram to recall with core biopsy was less than or equal to 42 days; time from abnormal mammogram to recall with core or surgical biopsy was less than or equal to 49 days</td>
</tr>
<tr>
<td>Richardson et al., 2010</td>
<td>23,701 Native American and Alaska Native participants who were aged 50–64 years and located in territories and metropolitan areas; measured in two time periods (1996–2000, 2001–2005)</td>
<td>Diagnostic interval was from time of abnormal mammogram or clinical breast exam to date of diagnosis; treatment initiation interval was from time of diagnosis to initiation of treatment; total interval was from time of abnormal mammogram or clinical breast exam to treatment initiation</td>
<td>National Breast and Cervical Cancer Early Detection Program: 60-day program benchmark for all time intervals</td>
<td>Diagnostic interval was 80%; treatment initiation interval was 94%; total interval was 90%; median times were lower for minorities; improvement in median time intervals between times 1 and 2 reflect program enhancements</td>
</tr>
<tr>
<td>Trufelli et al., 2008</td>
<td>68 underserved participants who had an average age of 56 years and were patients in public hospitals in Brazil</td>
<td>Median time to schedule first appointment and from first consultation to biopsy</td>
<td>National Cancer Institute in the United States in 1996</td>
<td>Median time to schedule first appointment was three months; median time from first consultation to biopsy was two months; longest time delay occurred between mammogram and biopsy, where the median time was 72 days</td>
</tr>
</tbody>
</table>
to the time interval from BMRI to surgery were analyzed in
the second group of enrolled patients (N = 44) and were used
exclusively for comparative data to measure the impact of an
intervention that allowed timely scheduling in the breast imag-
ing department at the study site.

Table 2 illustrates the time intervals for each of the data points.
The median time of seven days at the study site was below the
median of 11 days from the initial set of NQMBC data and falls
within the 25% for measurement results (Kaufman et al., 2010).
That result remained constant regardless of pathologic stage.

Table 3 shows comparative data from three international
studies with varied study populations receiving care in differ-
ent healthcare systems. The comparative data standards used
as benchmarks and outcomes in the studies demonstrate the
variability in how timeliness is measured as a quality measure
in an underserved population or public hospital setting. That
variability also is demonstrated in comparison to some of the
critical time intervals measured at the study site where fewer
barriers in access to care existed (see Table 4).

The researchers collected data pre- and postimplementation
of the breast imaging initiative, measuring the time interval
from BMRI to surgery. The average time between diagnosis
and initial consultation before the initiative was 5 business days if a
BMRI was performed before the initial consultation (n = 1) and
6.17 if a BMRI was performed after the initial consultation (n = 18).
After the initiative, the average time between diagnosis
and initial consultation was 11.6 business days if a BMRI was
performed before the initial consultation (n = 5) and 11.94 if a
BMRI was performed after the initial consultation (n = 17). The
average time between initial consultation and surgery before the
initiative was 32 business days if a BMRI was performed be-
fore the initial consultation and 12.78 if a BMRI was performed
after the initial consultation. After the initiative, the average
time between initial consultation and surgery was 11.8 business days if a
BMRI was performed before the initial consultation and 13.88
if a BMRI was performed after the initial consultation. The re-
results suggest that the interventions did not make an appreciable
difference on the time interval from BMRI to surgery. The data
analysis, however, did not address whether a more timely BMRI
resulted in additional diagnostic evaluation or a change in the
surgical plan while maintaining a constant time interval from
initial consultation to surgery.

### Discussion

Timeliness is a measurement of patient ability to access
healthcare services once a need has been identified. The mis-
ition of Healthy People 2020, a government initiative, is to
identify nationwide health improvement priorities and health
measures that serve as indicators of progress toward achieving
those goals (U.S. Department of Health and Human Services,
2012). Actual and perceived difficulties or delays in getting
care reflect significant barriers to care. The dilemma has gained
momentum as a healthcare priority because the United States
already is developing of new models of care that are essential
to meet the increasing demand for services.

The participants in the current study largely consisted of
well-educated Caucasian women who actively participated in
their medical care. Future studies could examine timeliness
data points for a public hospital that could provide a more eth-
ically diverse population. A needs assessment of that group
is suggested to determine the need for a designated navigator
role to assist in providing timely access to healthcare services
for underserved populations.

In the current study, a hospital-based practice specializing
in breast cancer care was used to identify key data points from
abnormal breast imaging to surgery. The APN in the multidis-
ciplinary collaborative practice setting was identified as key in
facilitating timely access to healthcare services. The APN col-
laborates with other team members to develop a care plan that
is based on individual needs assessment and evidence-based
practice standards that optimize patient outcomes.

Using the physician and APN practice model at the study
site was instrumental in influencing patient timely access to
services. In that role, the APN can implement the care plan
and provide ongoing education to patients and staff regarding
the need for timeliness as a measure of quality. Identifying potential
barriers to patient access to care, advocating on behalf of the

### Table 4. Comparison of the Average Number
of Business Days to Surgery From Initial
Consultation and Last Intervention (N = 39)

<table>
<thead>
<tr>
<th>Variable</th>
<th>X (Days)</th>
<th>Interval 1</th>
<th>Interval 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional imaging studies performed during the time period</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–1</td>
<td>24</td>
<td>12.08</td>
<td>7.46</td>
</tr>
<tr>
<td>2+</td>
<td>15</td>
<td>18.8</td>
<td>7.27</td>
</tr>
<tr>
<td>Additional foci found on additional imaging after the initial consultation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>28</td>
<td>12.93</td>
<td>7.54</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>17.43</td>
<td>6.71</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>22</td>
<td>7.5</td>
</tr>
<tr>
<td>Additional biopsies performed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>27</td>
<td>12.63</td>
<td>7.56</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>17.13</td>
<td>7.13</td>
</tr>
<tr>
<td>2+</td>
<td>4</td>
<td>23.5</td>
<td>6.75</td>
</tr>
<tr>
<td>Additional consultations prior to surgeryb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>29</td>
<td>14.69</td>
<td>6.93</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>14.6</td>
<td>8.7</td>
</tr>
<tr>
<td>Second opinions sought after initial consultation and prior to surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>35</td>
<td>14.78</td>
<td>7.42</td>
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<tr>
<td>1</td>
<td>4</td>
<td>13.33</td>
<td>7</td>
</tr>
<tr>
<td>Pathologic stage</td>
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<td></td>
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<tr>
<td>I</td>
<td>26</td>
<td>14.77</td>
<td>7.77</td>
</tr>
<tr>
<td>II, IIIa</td>
<td>13</td>
<td>14.46</td>
<td>6.62</td>
</tr>
</tbody>
</table>

*From consultation to surgery
* From last intervention to surgery
*b Consultations included medical and radiation oncology, as well as reconstructive surgery.
*c The original data collection and analysis combined stages II and III, and they were not able to be reported separately.
patient, supporting the patient through the spectrum of breast cancer care from diagnosis to survivorship, and assisting the patient in navigating the healthcare system are all responsibilities that the APN undertakes to provide high-quality care.

It remains unclear whether a navigation program would be cost effective and efficient for a healthcare system to implement. The Commission on Cancer (2013) program standards recommend conducting a community needs assessment prior to implementing a navigation program, which will enable the cancer program to tailor its services to the identified needs of the population it serves and increase access to services, as well as reduce healthcare disparities. The standards also recommend reassessment of the community needs at regular intervals once the program is initiated.

Limitations

A patient satisfaction survey was not included in the current study, so that variable could not be correlated with the results. The inclusion of a satisfaction instrument would provide useful information in future studies. The impact of patient choice in scheduling surgery, measured by comparing the date surgery was offered as opposed to when it was performed, is a critical time variable that can serve as a measure of patient satisfaction. The general patient satisfaction survey in place at the current study site does not address timeliness, so it was not relevant to the current analysis. A patient satisfaction instrument was not used in the current study because of its retrospective design and to avoid recall bias. The patients were identified during two years, and the last patient identification occurred more than six months prior to the data analysis. Therefore, the patient satisfaction variable could not be correlated with study data.

Another limitation of the current study is the generalizability of the results because the study design included qualitative research based on convenience sampling and has limited application to a wider population or context. The lack of an electronic medical record limited access so the study only included a single provider using a nonelectronic medical record.

Future Research

When conducting studies in the future, researchers should continue data analysis for the current study to further define the variables that affect critical time intervals and a relationship with patient care outcomes. Researchers also could expand the data set to include multiple providers at the study site to diversify demographics within the sample and to improve generalizability to a wider population. Researchers could expand the study from a single center to multiple centers, including a public hospital to allow for comparative data analysis of the study sites to determine if a navigation program would be an effective intervention to support a hard-to-reach patient population with access to care in a public hospital. Measuring additional data points that include the date surgery was offered versus performed could help healthcare providers consider patient choice and availability of operating room time. Exploring patient choices and preferences via a prospective patient satisfaction survey could increase satisfaction. Researchers should identify personal barriers that may affect timely access to care, including distress and comorbidities. Developing criteria to measure patient perception of timeliness would be beneficial because few studies address the issue.

Conclusion

Because standard guidelines do not exist, healthcare providers must establish practice guidelines that promote high-quality patient care, with benchmarks to serve as quality measures. An established process must exist to measure outcomes as changes are put in place to decrease critical time intervals, particularly as the process relates to allocation of limited resources. A fuller understanding of how a practice site functions would be beneficial, and building on that understanding to identify and develop all available resources would improve patient outcomes.

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Implications for Practice

- Use timeliness as a quality indicator to measure patient’s ability to access healthcare services once a need has been identified.
- Facilitate patients’ timely access to breast cancer care.
- Establish practice guidelines that promote high-quality breast cancer care with benchmarks to serve as quality measures.


