In this era of multidisciplinary management of the patient with cancer, there is a critical need for accurate information related to the patient, tumor characteristics, and treatment received or planned to facilitate the quality of care delivered. Staging has been a core component of cancer care for decades, and the rapidly evolving pace of oncology calls for measures to improve the quality of cancer staging. The Institute of Medicine report on improving the quality of cancer care noted that “in order to continue to advance the high-quality cancer care delivery system, measurement and assessment of progress in improving the delivery of cancer care, public reporting of information gathered, and development of innovative strategies to facilitate performance improvement will be needed.”

This charge from the Institute of Medicine calls for adherence to existing quality indicators (QIs) or measures (QMs), practice guidelines, and the creation of new QIs or QMs when none exist. The American Joint Committee on Cancer (AJCC) is engaged in several efforts to improve the quality of cancer staging.

QIs are well-defined, quantifiable targets that allow for the assessment of structure, process, and outcome with regard to care. QIs must be measurable, actionable, and based on evidence. In addition, QIs should serve as benchmarks for the comparison of different metrics associated with care across many institutions.

Among several important QIs and QMs for the care of the patient with cancer, accurate and complete documentation of cancer stage has critical implications for the patient, clinician, and public health scientists. Clinicians involved in the care of the patient with cancer, cancer registries, and other users of staging data look to the AJCC to formulate and revise the rules for cancer staging in the United States. Established in 1959, the AJCC has been collaborating with the Union for International Cancer Control since 1982 to provide a unified anatomic staging system for cancer worldwide. Updates to the staging system are performed periodically by convening the best expertise in the field and using the highest available level of evidence. Previous editions of the AJCC staging system have included nonanatomic prognostic factors within the TNM framework for some disease sites. Expansion of staging to include widely accepted pertinent prognostic factors for many other disease sites is also currently under consideration in the ongoing efforts to develop the 8th edition of the AJCC staging system.

Accurate staging allows the clinician to offer patients treatment recommendations based on practice guidelines and to discuss prognosis. Cancer stage also serves as an important inclusion, exclusion, and/or stratification criterion for clinical trials. In addition to other variables, data elements with which to derive disease stage are abstracted into the National Cancer Data Base (NCDB), the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) database, and the Center for Disease Control’s (CDC’s) National Program of Cancer Registries (NPCR). These data elements allow for research into disease outcomes and trends over time based on stage of disease when necessary and are informative in the formulation of guidelines, targeted population cancer control efforts, and allocation of resources. Importantly, staging facilitates national and international collaborative cancer research efforts, and allows clinicians from different cultural and language backgrounds to communicate and share data regarding cancer. This is especially important as the global burden of cancer cases continues to rise, especially in low-income and middle-income countries.

Despite the fundamental role of cancer staging, timely and accurate stage assignment with appropriate documentation can be difficult to achieve in practice. First, ambiguities in portions of the AJCC staging manual leave interpretation of staging rules to the clinician or registrar, either of whom may be incorrect. Critical to improving quality staging data are cancer registrars, who are personnel with specialized training to abstract pertinent information with regard to the history, diagnosis, treatment, and clinical course of the patient.
surveillance for every patient with cancer in the United States. Registrars are employed at hospitals, state cancer control departments, or at the federal level and abstract information from patient medical records into hospital cancer registries, state cancer registries, the NCDB, the SEER database, and the CDC’s NPCR. Given the vital role played by registrars in the collection of cancer data, their understanding and accurate interpretation of staging rules are crucial to improving the quality of staging data. Second, clinicians and registrars may not be familiar with the most recent changes to disease site-specific staging systems because there may be a time lag to the adoption of such revisions between the date when the newly published manual takes effect and consistent use of the new rules. Although the magnitude of the problem associated with the timeliness of uptake of new revisions in the latest editions of the staging manual has not been formally evaluated, our anecdotal experience based on queries in the American College of Surgeons’ cancer staging forum (CAnswer Forum; cancerbulletin.facs.org/forums/help), hosted by the AJCC, points to the existence of such a problem. Barriers to adherence, such as a lack of awareness and lack of familiarity, may increase inaccuracies in staging data. In addition, apathy to the value of staging by some clinicians may facilitate inaccurate staging or promote a lack of documentation.

In preparation for the transition to mandatory direct abstraction of AJCC staging data in 2016, the AJCC engaged the National Cancer Registrars Association to assess registrars’ understanding of AJCC staging by administering knowledge-based tests to 1342 cancer registrars in 2013. We found significant gaps in knowledge and currently are working closely with our partners to improve registrars’ understanding of AJCC staging. The quality of retrospective outcomes studies using databases and clinical trials that use stage as a stratification factor may be hampered if assignment of stage is not accurate.

Multipronged approaches are needed to increase the quality and accuracy of staging data. As part of ongoing activities by the AJCC regarding the 8th edition of the staging system, the AJCC has established the following core groups to oversee various aspects of the quality improvement process: the Content Harmonization Core, Evidence Based Medicine and Statistics Core (EBMS), Precision Medicine Core (PMC), and Data Collection Core. The Content Harmonization Core, comprised of experts in cancer staging (and chaired by coauthor J.E.G.), has begun to critically revisit and revise the “Purposes and Principles of Cancer Staging” chapter of the staging manual, which includes a general discussion of staging along with detailed rules for applying the AJCC staging system. The goal of this effort is to critically appraise the current fundamental rules for staging cancer in terms of relevance and clarity; when appropriate, new concepts that are pertinent to staging cancer such as the role of imaging in cancer staging will be introduced. In addition, ensuring the consistent use of terms and definitions across chapters and a reduction in ambiguities are some of the goals for the next edition of the AJCC staging system. The newly created EBMS core is collaborating with disease site experts to ensure that the highest levels of available evidence are used to inform changes to the staging system. Toward this end, the EBMS is providing recommendations to guide disease site expert panels about the levels of evidence needed to effect new changes to the staging system to ensure that changes made are based on both clinical and statistical validity. As our understanding of cancer biology matures and computational and statistical modeling continue to improve, clinically relevant prognostic models have and will continue to be created to serve as useful clinical decision aids. Realizing the importance of prognostic models as adjuncts to or independent of traditional staging, the PMC, comprised of clinicians, data scientists, statisticians, and modelers, has been established. The PMC is charged with devising guidelines for the evaluation of prognostic models that include anatomic and nonanatomic factors such as biomarkers and pertinent clinical variables for possible endorsement by the AJCC. The work of the PMC is partly informed by a study commissioned by the AJCC to examine the quality of existing cancer prognostic calculators and nomograms (unpublished data). This study highlighted the generally poor quality of existing prognostic tools. The AJCC is also exploring opportunities for collaboration with data scientists and computational modelers outside of the PMC to build prognostic tools when there is a need. The Data Collection Core is collaborating with clinicians and the registry community to identify important data items that need to be collected by hospital registries to inform future revisions to the staging system.

With funding from the CDC’s NPCR, the AJCC offers self-study modules consisting of multiple lessons, Webinars, and discussion forums to educate registrars about staging. Volunteer physicians who are members of the AJCC offer lessons on anatomy and clinical information pertinent to staging to cancer registrars. In addition, the AJCC hosts an online forum, CAnswer Forum (cancerbulletin.facs.org/forums/help), where clinicians and registrars from around the world seek answers to staging-related questions. Given the crucial role of institutional databases, the NCDB, and SEER registries to outcomes studies, clinician engagement and support of registrar education will help to improve the quality of abstracted data. The AJCC anticipates that multimedia approaches to the dissemination of cancer staging systems including delivery by print, Web, and applications (“apps”) will enhance the receipt of such information to myriad users of cancer staging data. Integration of cancer staging rules into electronic health records may
ease information accessibility and improve the quality of staging data. Avenues to help realize these goals for the upcoming 8th edition of the AJCC staging system currently are being explored.

In addition, stakeholders such as hospitals, accreditation bodies, and payers can and should play a critical role in the quest for high-quality staging data. In an effort to streamline the reporting of staging data and to improve data quality, the College of American Pathologists has sponsored a National Quality Forum-endorsed measure that recommends the reporting of pT category (pathologic tumor), pN category (regional lymph node), and histologic grade for all pathology reports from patients with resected breast cancer. The expansion of such a National Quality Forum measure to include other disease sites may improve the quality of staging data reported by pathologists and potentially enhance the quality of cancer care delivered.

Complete and accurate staging data should be a QM promulgated by all stakeholders involved in the care of the patient with cancer. The AJCC and its partner organizations are committed to improving the quality of cancer staging.

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