Consensus Conference on Second Opinions in Diagnostic Anatomic Pathology: Who, What, and When

John E. Tomaszewski, MD, FASCP (chair),1 Harry D. Bear, MD, PhD, FACS,2 Julia A. Connally,3 Jonathan I. Epstein, MD,4 Michael Feldman, MD, PhD, FASCP,5 Kathryn Foucar, MD, FASCP,6 Lester Layfield, MD,7 Virginia LiVolsi, MD, FASCP,8 Ronald L. Sirota, MD, FASCP,9 Mark H. Stoler, MD, FASCP,10 and Robin E. Stombler11

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As in all disciplines of medicine, the goals of anatomic pathology conform to the ethical principles of beneficence and nonmaleficence. Beneficence, ie, the obligation to help patients, dictates that pathologists provide accurate and timely diagnoses and prognoses. Nonmaleficence, ie, the obligation not to harm patients, dictates that pathologists seek to protect patients from wrong diagnoses and reduce diagnostic variability that can have a major impact on therapy.

Error is an elusive concept when one attempts to define it or to codify its characteristics. The Institute of Medicine (IOM) has adopted Reason's definition of error: the failure of a planned action to be completed as intended (ie, error of execution) or the use of a wrong plan to achieve an aim (ie, error of planning). Another operational definition for error is "you know it when you see it." Both definitions, however, are a little lean on usefulness for those striving to avoid error. Whatever its definition, it is important to realize that the assignation of the term error to an action is more judgmental than factual and often varies from observer to observer. It is colored and distorted by hindsight bias, that is, bias induced by the knowledge of outcome.

In the tort system, error associated with liability must fulfill 2 conditions: (1) the act occurred and violated the standard of care and (2) the act was responsible for injury to the patient. The liability concept is effective in assigning blame, but it does little to reduce future errors. In the concept of "near or free error," a scenario that could have resulted in untoward consequences but that did not result in patient injury is recognized. Free error allows for a learning experience and system correction before disaster strikes.

Several categories of error can be recognized in the practice of anatomic pathology. Operational error refers to functions related to physical processes, such as specimen preparation, slide labeling, and information transfer. In certain operational situations the "best practice" is not defined or remains controversial. Cognitive error refers to error caused by defective or deficient mental processes, such as lack of knowledge, oversight, misinterpretation, violation of established diagnostic rules, and contextual biases. These errors are probably the most troublesome to individual practitioners.

The prevalence of error is related to many factors, including the following:

- The case selection presented to the diagnostician
- The quality of the specimen preparations used for diagnoses
- The availability of special studies used as diagnostic aides
- The adequacy of the classification systems used for diagnostic and prognostic stratification
- The skill of the diagnostician
- The clinical information provided to the pathologist
Error traps

2 are the factors that put upward pressure on the rate of error. Such traps might include poor design of processes and tasks, incomplete training, or poor working conditions. Error in an individual practice is influenced by local and distant circumstances. Any program that seeks to reduce error must take all of these characteristics into account.

The recent IOM report on error in medicine cites 44,000 deaths per year attributable to medical errors with an estimated social cost of $17-29 billion. The portion of these bad outcomes attributable to error in diagnostic pathology is unknown, but the limited literature available suggests a substantial problem in diagnostic variability. In general surgical pathology, the frequency of diagnostic differences on rereview varies widely in the literature. Kronz et al reported a 1.4% frequency of changed diagnoses on mandatory second opinion at Johns Hopkins University Medical Center. Abt et al, at the Penn State Milton S. Hershey Medical Center, found a 5.8% incidence of clinically significant changes in pathologic diagnosis. Malhotra et al identified 28 cancer-related discordances in 275 cases (10.2%) referred to the University of Massachusetts Medical Center. The risk for discordance also changes with the organ system. Epstein et al found 1.3% significant differences on rereview of prostate needle biopsy specimens for evaluation of prostate cancer. Selman et al found significant diagnostic discordance in 4.7% of cases of gynecologic-oncologic histopathologic review. The study by Harris et al suggests that the diagnosis of sarcoma, however, is particularly fraught with difficulty with a rereview discordance rate of 22%. Although these studies provide some information on the incidence of pathology error, it is difficult to compare their data, in large part owing to varying definitions of "significant diagnostic differences." Thus, the landscape of anatomic pathology error seems to be significant but varied.

A "zero error" rate is a laudable goal, but, as with any system in which human beings are involved, the chance of achieving this goal is extremely slim. As in all areas of medicine, the reduction of error in diagnostic surgical pathology and cytopathology is a goal that will require insight, inventiveness, and diligence. Total quality improvement (QI), of which error reduction is a major part, can be accomplished in anatomic pathology through a multifaceted approach. Some suggested components of a quality assurance (QA)/QI program in surgical pathology and cytopathology are given in Table 1.

Many of these QA activities have at their core the application of the concept of redundancy as a mechanism for error reduction. Redundancy, which entails the repetition of the same process or critical mechanism, is a well-known error-reduction strategy in other industries. The redundant events should be, as far as possible, independent of the initial event, and the amount of redundancy should be proportional to the criticality of the task. The use of second opinion in diagnostic surgical pathology and cytopathology as an error-reduction mechanism is an example of safety improvement by redundancy. Many of the QA/QI programs listed in Table 1 have second opinion as a fundamental component.

The American Society of Clinical Pathologists (ASCP) and its Board of Directors have made patient safety in pathology and laboratory medicine one of its highest priorities. On June 23, 2000, the ASCP convened a public consensus conference in Washington, DC, on the use of second opinion in diagnostic anatomic pathology. The goal of the discussions was to develop guidelines for the effective and equitable use of second opinion as 1 component of a total QA program. Invited participants were selected to represent various aspects of the practice of surgical pathology and cytopathology in academic and community medical centers, the surgical viewpoint, and opinion from a patient advocacy group. Participants were asked to outline their thoughts on various aspects of second opinion. Abstracts of these comments follow in order of presentation.

Second Opinion in Diagnostic Surgical Pathology and Cytopathology: An Overview. A recent IOM report focused a community-wide discussion on patient safety in the delivery of health care. Expanding knowledge
about patient safety, raising expectations for improvement of patient safety, enhancing data collection about safety issues, and creating systems within organizations, which improve patient safety, are focus points in the IOM 4-tier approach toward enhancing patient safety. Second opinion in anatomic pathology is 1 mechanism for error reduction by redundancy. Second opinion is an integral part of many aspects of a total QA program in anatomic pathology.

Variance in anatomic pathology can be the result of several factors, including operational errors, lesion heterogeneity, poorly stated criteria, ambiguous qualitative terms, imprecise qualitative terms, cognitive mistakes, or difficult diagnoses. The landscapes on which error occurs are detailed and heterogeneous. A precise definition of error-prone landscapes would allow for logical answers to the questions of which patients and which clinical settings are best served by second opinion activities.

See "Scope of the Problem."

Second opinions in diagnostic anatomic pathology are needed for lesions of certain organs much more so than for those of other organs. Hence, a primary cancer diagnosis in the prostate or breast based on needle core biopsy probably should be reviewed by a second pathologist, who could be a colleague or an extramural expert. On the other hand, certain primary cancer diagnoses are so obvious (eg, colonic adenocarcinoma) that second opinion would rarely, if ever, differ from the initial "read." The latter cases probably do not require another pathologist to confirm the initial diagnosis. Certain biopsy specimens for nonneoplastic diseases—the so-called "medical biopsies" such as liver, renal, or skin biopsies—are so frequently misinterpreted or interpreted in a clinically nonmeaningful manner that expert reevaluations are essential. Hence, the questions of what specimens should have a second opinion can be answered in general terms by the following: any new cancer diagnosis, especially of organs that are notorious because of biopsy size or technique and/or benign mimics of cancer occurring therein (prostate, breast) and any biopsy for a nonneoplastic "medical" condition, such as a liver biopsy. Whether the second pathologist is an intramural colleague or an extramural expert depends on the difficulty and/or unusual nature of the case and the expertise available in one's own institution.

Pathologic Second Opinions: A Surgeon's View. Many hospitals mandate internal review of outside pathology specimens before surgical intervention. Second opinions reportedly find discrepancies with clinically significant impact in approximately 2% of cases. As pathologists are pressured to make diagnoses from smaller amounts of material from minimally invasive techniques, this rate may increase. Because the surgeon is ultimately responsible for surgical outcomes, unnecessary or inappropriate procedures, and medicolegal consequences, the surgeon should be concerned about diagnostic accuracy. The surgeon may not be familiar with the way a pathologist at another institution translates images into words or the level of experience and diagnostic tools being brought to bear and, therefore, may not be comfortable with proceeding to surgery based on an outside pathologist's report. Conversely, a pathologist's report, particularly on cytologic material, may depend on the context, including the expectation of the clinician's response. Thus, surgical intervention generally should not be undertaken based on a new pathologic diagnosis given at an outside institution. The human and financial savings probably outweigh the costs incurred.

Before the topic of second opinions in anatomic pathology can be approached logically, several overriding issues in morphology-based diagnosis warrant discussion. Examples of these issues include the following: (1) What is the goal of the diagnostic process? (2) What is the best mechanism to achieve this goal for the most cases? (3) How is achievement of this goal measured? (4) How should new diagnostic techniques and new treatment modalities be integrated into best pathology practice? (5) What standards should be set for using the ever-growing numbers of specialized diagnostic modalities?
Specialized testing is uniquely relevant to the practice of hematopathology because various techniques for antigen identification on cells are currently the standard of practice for a substantial percentage of neoplastic conditions, and genotypic analysis is part of the definition of several distinct clinicopathologic entities. Because the availability of some of these specialized tests is limited, one common avenue for consultation in hematopathology is the request for specialized testing. A blanket recommendation for increased second opinion at specialty laboratories would substantially reduce much of the diagnostic variation that is currently seen in hematopathology, but mandating widespread second opinion is not without potential costs. For example, second opinion could cover up classification deficiencies if authority is substituted for skepticism, could increase the power for experts to promote suboptimal classification systems, could create a false sense of diagnostic certainty, could make pathology a less attractive specialty by turning many pathologists into triage pathologists, and has the potential for excess use of specialized diagnostic testing. Currently, political forces are driving all medical specialty societies to address issues of error and individual practitioner variation, raising the danger that medicine's response will be political rather than scientific. Hopefully, the solutions that pathologists recommend will strengthen the specialty, while increasing the percentage of cases that are labeled according to current best practice.

Second Opinions in Anatomic Pathology: The Role of Molecular Diagnostics. Molecular diagnostic studies are used increasingly in anatomic pathology practice. Their usefulness stems from the potentially high sensitivity and specificity attainable from molecular analysis. In cases of morphologic uncertainty, adjunctive molecular testing often can provide independent strong evidence in favor of a specific differential diagnosis. Examples are well established for several hematologic, epithelial, and mesenchymal neoplasms. Thus, a second opinion based on molecular studies, because of its relative nonreliance on morphologic interpretation, although requiring morphologically representative samples, may be more useful as a second opinion or arbitrator.

The next level of molecular diagnostics might be to submit the tissue or cytologic sample for primary molecular analysis, perhaps without morphologic examination. Few situations support such a strategy in the medical literature. Furthermore, while the revolution in molecular biology is exciting and holds great promise, these tests are still new to clinical laboratories. As with all laboratory tests, clinical implementation requires scientific documentation of the test's performance characteristics, the technical feasibility of the specific method, and validation studies demonstrating the clinical value of the test. For most molecular tests, these issues are unstudied or more properly still in the realm of clinical research.

Pathologic Second Opinions: The Patient's Perspective. The patient's fear and anxiety about misdiagnosis may be relieved by sympathetic communication with health care providers. The patient wants most to be informed, but not confused or alarmed—a delicate balance requiring good communication skills. The effects of biopsy sample size should be communicated because the patient wants any size sample removed in order to achieve an accurate result. Cost is an issue; informed patients may be willing but unable to pay for second opinions, and choice of services is limited. As more patients do their own research on second opinions, they will request more information from their providers.

Second Opinions in Diagnostic Anatomic Pathology: Perspectives About Error Reduction and the Consultative Process. Redundancy is an error-reduction strategy that is used successfully in a wide variety of domains outside of medicine. It can involve task repetition by the initial method or by a different method. In general, the amount of redundancy should be proportional to the criticality of the result, and the redundant process should be as independent as possible from the initial method. Use of second opinions in diagnostic anatomic pathology is a form of redundancy that can be used to further the 2 main goals of diagnostic anatomic pathology: making a reproducible diagnosis and preventing an erroneous diagnosis. Types of second opinions
include informal consultations and formal consultations, mandatory consultations and optional consultations, and intradepartmental and extradepartmental consultations. Informal second opinions are usually oral, are often poorly documented, and lack accountability, whereas formal second opinions usually are written, are well documented, and provide some level of accountability. Mandatory consultations are second opinions solicited according to a set of codified rules that are prescribed in individual work settings, whereas optional consultations are second opinions that are solicited whenever an individual operator feels a second opinion is necessary or desirable. Well-documented mandatory formal intradepartmental and extradepartmental second opinions performed using a set of agreed-on prescribed parameters can improve diagnostic accuracy and can reduce medical error.

Error-reduction strategies in anatomic pathology frequently involve review of previously diagnosed material. These review processes can be split into 2 broad categories: (1) those that occur via in-house mechanisms and (2) those that involve external review. Regardless of which review process occurs, anatomic pathology computer information systems (AP-IS) need to support these endeavors. Support for second opinion efforts should not be limited to just report generation but must include support for preanalytic processes, such as material tracking at the block and slide level, express mail tracking of material sent outside, case identification, identification of the reviewing and primary pathologists, and automated tracking of cases for follow-up so that second opinions can be correlated with primary diagnoses. Currently, most laboratories require a substantial personnel resource at the support and professional staff levels to accomplish these processes.

Analytic processes must be supported and enhanced by the AP-IS. Report generation should be facilitated through the use of structured reports for major tumor resections. Standardization of information presented in anatomic pathology reports, as well as embracing Web technologies such as XML, would greatly simplify the exchange of information between disparate AP-IS.

By incorporating structure and defining information at a granular field level within information systems, postanalytic QA tools that allow for study of differences between opinions can be greatly enhanced and automated. To date, most studies involving second opinion differences have relied on retrospective paper-based reviews. It will only be through study of larger data sets involving academic and community practices that we as a professional society will come to a better understanding of how errors occur and how we can best target system processes to reduce these potential pitfalls. Finally, the future holds exciting opportunities, including the development of robust virtual slide systems and Web-based data standards (XML) that will allow for remote viewing of case material using familiar Internet protocols, eliminate the collection and transfer of physical materials, and facilitate large multidisciplinary studies that allow us to better define that landscape on which errors are more likely to occur.

Following the presentations there was a spirited discussion on recommendations for the use of second opinion. The consensus recommendations of the conference are given in Table 2. How these recommendations are to be applied may vary with individual practice settings; however, all are believed to be useful ideas for the reduction of diagnostic error in anatomic pathology.

Second opinions come in a variety of flavors. Ideally, a second opinion will verify a given diagnosis with another independent method based on data with independent operating characteristics. Examples of these sorts of second opinions include comparison with a unique clinical course that is pathognomonic for that disease or the use of alternative technologies that independently define a unique diagnostic category. An example of the latter situation might be a unique translocation, which is understood by the combined literature to be a "gold standard" test that defines a particular disease. The t(9;22)(q32;q11) translocation in chronic myelogenous leukemia is an example of such a test in hematopathology. Indeed, a significant portion of the current
nomenclature in diagnostic hematopathology relies on nonmorphologic data. In most areas of state of the art diagnostic activity, however, these non—image-based sources of verification are not available, and morphologic interpretations remain the gold standard. Second opinions in these circumstances are basically a new look at the same data, albeit by different operators. In this redundancy exercise, the submitting pathologist attempts to clarify what is the "standard of care diagnosis" for that particular case.

If opinions are not concordant among reviewers, a difficult search for assignment of "closest proximity to correctness" ensues. This can be handled in a number of ways. One can use a consensus philosophy if enough interpretations are submitted, but it is well recognized that consensus opinions can be incorrect (eg, "the world is flat"). One can default to a probability statement, but such statements are often not well received by clinicians who prefer to function in a binary world. One can default to the most experienced internal expert available in a given group; however, even experts can be wrong. The often used tactic is to release such logjams by sending the case to the best known expert in the field whose opinion often prevails. Inevitable human fallibility can corrupt the process. In essence, none of these solutions is fully satisfying.

Ultimately, it remains the responsibility of the originating pathologist to synthesize the best diagnostic statement from all of the data available at the time and to use the most expedient and practical strategy to achieve a reproducible diagnostic statement. And ultimately, the clinician must decide what action to take based on the diagnosis made, recognizing that disagreements may exist.

A formal policy on the application of second opinion data should be created in each pathology department. The parameters for these policies should be crafted individually for each group; some of the items covered in the recommendations of Table 2 are possible starting points. Each departmental QA program should include guidelines for the use of internal second opinions. Second opinion redundancy is best used in clinically critical cases as defined locally by the stakeholders in the diagnostic process. Pathologists should nominate cases for second opinion that are problem prone as defined by the individual, the group, or the literature. Such cases selected for second opinion might seek to confirm a positive diagnosis or reveal a missed false-negative diagnosis. Clinicians should nominate cases in which the clinical data do not match the pathologic diagnosis or the cases in which the pathologic interpretations are unclear or unresolved. In addition, patients who are seeking a second therapeutic opinion are ideal candidates for a second pathology opinion. Since the treating institution is responsible for the assigned diagnosis used for therapeutic decisions, it seems logical and prudent that all cases in which planned major therapeutic interventions are based on a tissue or cytologic diagnosis should be confirmed by second opinion at the treating institution. A recent survey by Gupta and Layfield indicated that 50% of respondents had a requirement for in-house review of outside materials.

Perhaps the most difficult decision for practicing pathologists is to recognize the cases that are slated to remain at the originating institution for care but that require a second extradepartmental opinion. The challenges in these instances are to distinguish between the cases that are not further resolvable by any means and the cases that might benefit further by a second expert opinion. It is difficult to define more accurately "when" to consult based on the current literature. The landscape on which error occurs is enormously heterogeneous, and much more investigation is required to define the cues that might help trigger effective and productive second reviews.

The effective use of second opinion in diagnostic anatomic pathology is a subject that needs to be better communicated to clinicians and patients. The committee recommends an enhanced effort by pathology societies to educate pathologists, clinicians, and the public on this important patient safety mechanism. Expectations should be matched to accepted standards of care. All parties should recognize that the
Assignment of anatomic pathology diagnoses is a complex human endeavor that is difficult and not entirely infallible.

The committee recognizes the need for further progress in our understanding of second opinion—supported QA. Funding agencies interested in promoting patient safety should focus some of their support on studies that will further refine the appropriate contexts in which the redundancy of second opinion can reduce error. The elucidation of triggers that may identify error-prone scenarios can lead to better systems with more protection for patients. Only detailed and thoughtful research can create this new knowledge.

Many of the QA/QI program components have a substantial informatics component that includes case and specimen tracking, case selection, information retrieval, case comparisons, report generation, and report delivery. Today, many of these steps still are performed manually, which introduces human error. Implementation of automated systems to handle some of the tasks could reduce operational errors. Information technology that supports the collection of discrete field-level data will be necessary for these sorts of analyses. The committee urges information technology vendors to address this need in new versions of their laboratory information systems.

Finally, no progress will come to pass without fair reimbursement for second opinion activities. Insurers are urged to recognize the importance of these activities and allow for adequate payments.

In summary, this consensus conference recognizes second opinion as an important component of a total QA program in diagnostic surgical pathology and cytopathology and as a key aspect in the assurance of patient safety for tissue- and cytology-based diagnoses. The use of second opinion should be approached in a codified manner with standards tailored to the local health care environment. Much work is required to define further the best operating parameters for the use of second opinion as a vehicle for enhancing patient safety.

References


