

## **Interview: Errors in Anatomic Pathology**

**Interview:** Dr. Stephen Raab, Professor of Pathology

**Introduction:** Dr. Michael Astion conducted this interview (Errors in anatomic pathology: An interview with Dr. Stephen Raab. 2006. *Laboratory Errors and Patient Safety*. 3(2): 1-7.) with Dr. Stephen Raab about errors in anatomic pathology. At the time of the interview, Dr. Raab was the Director of the Center for Pathology Quality and Healthcare Research at the University of Pittsburgh Medical Center. He is now (2009) the Vice-Chair for Quality and Director of Anatomic Pathology at the University of Colorado, Denver. Dr. Raab leads a group that is one of the most productive and influential group studying pathology errors. His findings are relevant to both anatomic and clinical pathology. A study (1) by Dr. Raab and his colleagues estimated that the average discrepancy frequency between originally reported pathology results and the results of a secondary case review in the case samples they examined is about 6.7%, and 5% of the discrepancies have a modest to significant effect on patient care. Discrepancies rates may be even higher for specific specialty areas of anatomic pathology. For example, in the diagnosis of thyroid diseases by cytology and biopsy, Dr. Raab's group has shown that in the case samples they examined, 25.0% of patients had a false negative diagnosis and 9.9% had a false positive diagnosis (2). The most common root causes of these problems were poor specimen quality, and lack of standardization of diagnostic categories.

**LEPS:** How much time do you spend on research vs. clinical service?

**Dr. Raab:** I spend about 50% of my time in research related to medical errors, and 50% in clinical service.

**LEPS:** How did you become interested in errors in pathology?

**Dr. Raab:** It was a long process. I originally studied health policy at Stanford. My focus was on variability in medical decision-making and how this variability affects diagnosis and patient outcomes. This work sparked an interest in errors. Like many researchers in medical error, the more recent motivator for my interest, was the Institute of Medicine report from 1999, *To Err is Human* (3). This report led me to review the errors literature in anatomic pathology, and there was not much there. What was there focused on errors in the interpretation of microscope images rather than on the entire process including the systems for collecting the specimen, processing the specimen, and reporting the results. Since scientific studies of errors in anatomic pathology were limited, a group of us at the University of Pittsburgh, who were interested in the field, decided to submit a grant application to the NIH to fund work in this field, and we received the funding.

**LEPS:** What did this grant allow you to do?

**Dr. Raab:** In 2002, the NIH Agency for Healthcare Research and Quality funded us to develop a web-based database to collect anatomic pathology errors from four institutions: the University of Pittsburgh, Western Pennsylvania Hospital, University of Iowa Hospitals, and the Henry Ford Hospital System (4). These institutions voluntarily report

their errors in a de-identified fashion. The database is the foundation of most of our research.

**LEPS:** How many errors have been reported to date, and is the number of participating institutions growing?

**Dr. Raab:** There are now more than 25,000 errors in the database, and the number of participating institutions has grown from four to nine.

**LEPS:** What are some current problems in quality improvement in anatomic pathology?

**Dr. Raab:** Historically, there has been a tendency to overly focus on errors caused by pathologist misinterpretation of microscope slides, and to neglect errors in specimen collection, and errors in the cytology or histology laboratory that prepared the slides. Quality improvement is more effective if there are simultaneous efforts to improve quality in specimen collection, laboratory processing, and pathologist interpretation, rather than just focusing on interpretation.

**LEPS:** Why has the specimen collection and laboratory component been neglected?

**Dr. Raab:** One factor is that there has been a false belief that that it is too difficult to improve these aspects of anatomic pathology. Consequently, in many anatomic pathology laboratories, the specimens are processed today no differently than they were 30 or 40 years ago, when these laboratories first came into being.

**LEPS:** Error detection is critical to quality improvement. How are errors usually detected in anatomic pathology?

**Dr. Raab:** The two most common methods of error detection are cytologic-histologic correlation and secondary review of previously reported cases. Cytologic-histologic correlation refers to cases in which the patient has both a cytology specimen and a histology specimen. The cytology specimen is usually collected first, for example by placing a fine needle into a mass and aspirating it. The histology specimen is often prepared from sampling a biopsy or sampling a mass or other lesion that has been surgically removed. Discrepancies between the cytologic and histologic diagnoses often reveal errors.

**LEPS:** What is secondary case review?

**Dr. Raab:** Secondary review is the most traditional method of error detection. Secondary review refers to having a different pathologist review all the data from a previously reported case including the anatomic pathology specimens. The cases can be selected at random, for example if one wanted to determine agreement rates between pathologists, or could be selected because a physician questions the accuracy of a pathology report.

**LEPS:** Are there accreditation requirements regarding how frequently cytologic-histologic correlation or secondary review must be performed?

**Dr. Raab:** CAP has recommendations and requirements but there is no specific legal requirement regarding the minimal frequency or the exact methods employed. In practice, there is significant variability between institutions.

**LEPS:** What kind of errors do these methods detect?

**Dr. Raab:** They detect many different errors including mislabeled specimens, suboptimal specimens -for example a cytology or histology specimen that fails to sample the cancerous area of a mass-, and errors in interpretation by a pathologist. As I mentioned, there is a tendency to put too much emphasis on errors in interpretation.

**LEPS:** What is your general approach to interventions to decrease errors in anatomic pathology?

**Dr. Raab:** In general, I like Lean as an approach to enhance quality. One aspect of lean I particularly focus on is enhanced communication. Specifically, I favor any intervention that involves more frequent communication between pathologists and other physicians.

**LEPS:** Why does frequent communication between pathologists and care providers reduce errors?

**Dr. Raab:** Disconnection between pathologists and direct care providers is a significant latent source of errors in pathology. When pathologists communicate more frequently with care providers, the quality of the pathologist's work improves because both the clinician and pathologist are better informed about the patients.

**LEPS:** What are some examples of enhanced communication between pathologists and care providers?

**Dr. Raab:** Here are three:

- Pathologists calling their diagnosis directly to the physician caring for the patient,
- Increasing the number of conferences at the multiple-headed scope with both pathologists and care providers present,
- Having the pathologist physically present when a different physician collects a fine needle aspirate.

**LEPS:** Can you tell us about your work regarding improving service related to fine needle aspirates (FNAs)?

**Dr. Raab:** We introduced immediate interpretation for FNAs to improve the quality of specimen collection and interpretation. The project was guided by lean principles. Our underlying assumption in the project was that delay in interpreting fine needle aspirates is a wasteful practice that adds no value to the FNA. To improve workflow and communication, we adapted single piece flow for the specimen collection, processing, and interpretation. That means that each specimen moved through the process without becoming part of a batch.

**LEPS:** How does this intervention illustrate enhanced communication?

**Dr Raab:** The specimen collector, who is often a direct care provider or radiologist, receives immediate feedback from the pathologist regarding the adequacy of the specimen. In addition, the pathologist talks to the patient's physician regarding the diagnosis. The overall picture is one of faster, higher quality service, with more communication between providers. The new system promotes teamwork and enhances learning.

**LEPS:** What about some specific interventions you like in the cytology or histology laboratory?

**Dr. Raab:** I would like to see lean used to improve the workflow and physical layout of gross pathology processing areas, cytology laboratories and histology laboratories (5).

**LEPS:** We know you have done a fair amount of work related to Pap smears. Can you tell us a specific lean success story in this area?

**Dr. Raab:** We recently published results from a study where we applied lean principles to decrease errors and turnaround time related to Pap testing (6). Our interventions included:

- Using a checklist in the gynecologist office to maximize the likelihood of an adequate specimen.
- Changing from batch flow to one-piece flow in the cytology laboratory.
- Assigning a unique cytotechnologist and pathologist to the gynecologist and having the technologist and pathologist call abnormal results and inadequate specimens directly to the gynecologists.

Overall, we improved speed, communication, and quality without increasing costs. The new system, with its enhanced interaction between the gynecologist and specific pathology staff, has a higher level of accountability than the previous system.

**LEPS:** There is a morbid joke circulating in the laboratory industry that when staff hear that lean is being implemented, it means that less employees are needed. This has caused some leaders to adopt lean principles without using the term "lean". What is your approach?

**Dr. Raab:** I use the term. Technical people like it, as do CEOs.

**LEPS:** Besides increased communication, what other interventions do you favor regarding decreasing errors in pathologist interpretation?

**Dr. Raab:** The key to decreasing errors in pathologist interpretation of an adequate specimen is standardization. Standardization is basically an agreement that work is going to be done a certain way. It requires that standards be developed at a national or international level, than adhered to by each pathology practice.

**LEPS:** How can each pathology practice adhere to a given diagnostic standard?

**Dr. Raab:** To achieve standardization, the pathologists in the practice must work together as a group and apply methods such as:

- Reviewing a sampling of each other's cases
- Meeting frequently around the multiple-headed scope to decide cases by a consensus-building process.
- Double (redundant) viewing of some specimens before resulting (7)

**LEPS:** If the specimen is double read, and there is a discrepancy, how do you know which pathologist is correct?

**Dr. Raab:** You do not know the correct diagnosis at first. But the discrepancy allows the pathologists to take a deeper look at the case and come to a consensus regarding the

diagnosis. Double viewing of slides is also helpful because pathologists do a better job knowing that a colleague is reviewing some of their cases.

**LEPS:** What is the role of culture in accepting standardization as a strong intervention for decreasing interpretation errors?

**Dr. Raab:** Clearly, the success of these interventions will depend on the culture of the practice. A pathology practice that has a culture of encouraging debate, admitting error, working as a team, and accepting constructive criticism will be able to adapt these interventions and achieve a high level of standardization. Practices dominated by individualists or egotists tend to resist change and have trouble standardizing. Unfortunately, many practicing pathologists strongly resist standardization.

**LEPS:** This leads us to ask about a new term your group introduced recently. What is the "Big Dog" effect (8)?

**Dr. Raab:** At many institutions, there is a dominant senior pathologist, the Big Dog, who becomes the gold standard of anatomic pathology. The other pathologists follow the diagnostic beliefs of the Big Dog, and defer to the Big Dog on difficult cases and in the analysis of the cause of an error.

**LEPS:** What are the problems caused by Big Dogs?

**Dr. Raab:** There is a poor agreement between Big Dogs from different institutions in their interpretation of a particular case. This makes it hard to achieve standardization regarding a diagnosis. In addition, Big Dogs agree poorly regarding their assessment of the causes of an error. This hinders quality improvement, since judgments regarding root causes of an error provide a guide for the choice of interventions.

**LEPS:** If you get the Big Dogs together can they come to a consensus on how to diagnose certain cases?

**Dr. Raab:** You can get them to agree when they get together, and then when they return to their home institutions they revert to their usual beliefs and practices.

**LEPS:** Are Big Dogs the source of latent errors in anatomic pathology?

**Dr. Raab:** They can be. For example, Big Dogs make rules regarding case interpretation that the more junior pathologists follow. When the rules are erroneous, they are systematically embedded in the practice and are the source of systematic interpretation errors.

**LEPS:** Is the Big Dog hypothesis related to the problem of medical narcissism written about by Dr. John Banja (9)?

**Dr. Raab:** Yes. Unfortunately, many Big Dogs do not see the problem of medical narcissism as applying to them. They have trouble accepting that they sometimes block standardization and quality improvement.

**LEPS:** Is there an accomplishment that you are most particularly proud of?

**Dr. Raab:** To date, I think our biggest accomplishment is to get a large number of institutions to participate in the database and share their anatomic pathology errors, all

without any financial reimbursement for participating. This gives me hope that institutions are becoming interested in the quality of anatomic pathology.

**LEPS:** How about an accomplishment regarding interventions?

**Dr. Raab:** There is no particular intervention that I am particularly proud of. Even when we have attempted an intervention and failed, many times it was not that the intervention was bad, but that the culture was unable to accept it.

**LEPS:** Since the discrepancy rate for anatomic pathology diagnoses is fairly high (1) should patients always seek a second opinion regarding interpreting their pathology slides?

**Dr. Raab:** This is a tough question. In the long run, I would like to see pathology practices implement the methods of standardization that I previously discussed. This would result in sufficiently low discrepancy rates such that second opinions would usually be unnecessary. Therefore, I would be hurting my long term goal by suggesting that patients always seek a second viewing of their slides. For now, I think a reasonable compromise is that patients seek a second opinion when their physician lets them know that their results are unexpected. However, if the anatomic pathology results fit together nicely with the rest of the clinical data, there is no need for a second opinion.

**LEPS:** To conclude, what is the view from 40,000 feet regarding the problem of errors in anatomic pathology?

**Dr. Raab:** Well, one way of looking at it, which has been adopted by those who resist major changes, is that is we achieve amazingly good results in anatomic pathology given the lack of standardization, and the lack of stringent government regulations.

**LEPS:** Is that the way you view it?

**Dr. Raab:** No. My view is that serious errors in anatomic pathology are not that common, but they are common enough that we should be highly motivated to decrease them. In addition, there is a large number of smaller errors which do not dramatically effect patient outcomes but which bring high costs to the healthcare system in terms of retesting and other wasted work. Many of our practices in anatomic pathology are archaic. If we want to significantly increase quality, we have to get beyond the mentality that the practice of anatomic pathology is good enough.

**LEPS:** Do you like being the carrier of this message?

**Dr. Raab:** Not particularly. Some pathologists are resistant to it, and a little bit angry, but I believe it is the right message to be carrying forward.

**References:**

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