

Working Group Invitation: Image Quality in Whole Slide Imaging And Pathologist Performance

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The problem

- Whole slide imaging (WSI) systems produce an image of the glass slide, but they capture a limited amount of information, possibly affecting image quality.
- The quantitative assessment of image quality (resolution, contrast, dynamic range) throughout the WSI imaging chain (scanner, image processing, and display) is an under-examined area of research.
- It is not clear how image quality affects pathologist performance.
 - Not all pathology tasks are the same. Some tasks may depend on specific image properties such as high resolution, contrast, dynamic range, and color fidelity. Others tasks may not.
 - Research evaluating the effect of image quality on pathologist performance with WSI compared to the microscope is limited, especially regarding details of the imaging chain after the optical elements (image capture, compression, pyramid, processing, display specifications and calibration).

Impact

- Understanding issues related to image quality for specific tasks will help define the role of digital pathology in clinical practice and will assist/inform regulatory processes and healthcare reimbursement.
 - Enable access to underserved populations.
 - Avoid incorrect diagnoses.
 - Support effective and reproducible automated image analysis.
 - Support the development of interventions, therapies, and diagnostics (WSI used as the reference).

We invite you to join us.

- [Contact Brandon.Gallas@fda.hhs.gov](mailto:Brandon.Gallas@fda.hhs.gov)
- We aim to form a working group of stakeholders (industry, hospitals, academia, and government) that are interested in investigating WSI image quality as related to pathologist performance. At the start, we will identify an agenda/mission and gather information on the current state of the science and identify gaps in knowledge and unmet needs.
- The goals of the working group will be to
 - Develop and standardize WSI image quality evaluations.
 - Design and execute experiments that investigate pathologist performance as a function of image quality. We will need to recruit many pathologists and conduct studies from multiple sites.
 - Create and disseminate methods, tools, examples, and recommendations for evaluating image quality and pathologist performance (phantoms, shared sets of slides, WSI images, protocols, study designs, analysis methods and source code).