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<p>Advances in computing speed and power have made a pure digital work flow for pathology. New technologies such as whole slide imaging (WSI), multispectral image analysis, and algorithmic image searching seem poised to fundamentally change the way in which pathology is practiced. This article provides the practicing pathologist with a primer on digital imaging. Building on this primer, the current state of the art concerning digital imaging in pathology is described. Emphasis is placed on WSI and its ramifications, showing how it is useful in both anatomic (histology, cytopathology) and clinical (hematopathology) pathology. Future trends are also extrapolated.</p>	
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<p>Recent advances in next-generation sequencing (NGS) methods and technology have substantially reduced costs and operational complexity leading to production of benchtop sequencers and commercial software solutions for implementation in small research and clinical laboratories. This article addresses requirements and limitations to successful implementation of these systems, including (1) calibration and validation of the instrumentation, experimental paradigm, and primary readout, (2) secure data transfer, storage, and secondary processing, (3) implementation of software tools for targeted analysis, and (4) training of research and clinical personnel to evaluate data fidelity and interpret the molecular significance of the genomic output.</p>	
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<p>New technologies, analytic techniques, and computer-assisted diagnosis algorithms will change the way pathologists and clinicians interact with and use clinical data. Simultaneously, the artisanal nature of the culture and clinical practice of medicine have made them resistant to change. An understanding of workflow science will help pathologists prepare for the changes that lie ahead in anatomic and clinical pathology, better care for patients, and make better and more respectful use of existing human and other resources. This article provides a primer on workflow science, including historical perspective, review of current literature, and extrapolation of future trends.</p>	

Educational, Practice and Business Needs**Pathology Resident and Fellow Education in a Time of Disruptive Technologies 623**

James M. Ziai and Brian R. Smith

The development of disruptive technologies is changing the practice of pathology. Their implementation challenges traditional educational paradigms. Training programs must adapt to these heuristic needs. The dual explosion of new medical knowledge and innovative methodologies adds new practice aspects to the pathologist's areas of expertise. This transformation potentially challenges the traditional core model of training. It raises questions as to how pathology should incorporate future expanding subspecialty needs into educational and practice models. This article examines the impact of these disruptive technologies on resident and fellow education and explores alternative educational and practice models that may better accommodate pathology's future.

Twenty-First Century Pathology Sign-Out 639

Scott Tomlins, Daniel Robinson, Robert J. Penny, and Jay L. Hess

It is difficult to imagine a field that is changing as rapidly as pathology. A convergence of factors including not only scientific and technological advances but also changes in business models is transforming the field, particularly in the area of cancer diagnostics. The authors examine 8 themes, or "forces of change," in pathology and speculate on how these will affect pathology sign-out and the future role of pathologists in patient care.

Changing Trends in Laboratory Testing in the United States: A Personal, Historical Perspective 651

Charles M. Strom

This article reflects on my nearly 40 years providing clinical and laboratory genetic services. It reviews the evolution of laboratory and genetic testing from their grant-supported academic research to current complexities. Changes in the economic and academic landscape parallel technological innovations in laboratory testing. My career trajectory parallels the newer trend of genetic testing. I began in academics, working as a student and postdoctoral fellow in academic laboratories that also provided clinical testing services. Next came time in a small molecular laboratory performing diagnosis and testing services. My current position is with a national commercial laboratory company.

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