Companion diagnostics, theranostics, genomic sequencing, personalized medicine, electronic health records, and telepathology: This is a small sampling of the terminology being used to describe the tremendous changes taking place in health care. And now we can add “fused diagnostics” to the list. Many people, even pathologists and laboratory professionals, are unfamiliar with fused diagnostics. A small but growing number, however, believe these new techniques will become powerful diagnostic tools that will greatly improve our ability to give patients quality personalized health care.

Fused Diagnostics in a Nutshell

An elementary form of fused diagnostics has actually been in use for years. Consider the case of a patient with a suspected heart attack who is given a physical exam...
and blood tests to check for cardiac markers. Then an electrocardiogram and chest X-rays are done. The information collected is independently evaluated; but diagnostic, prognostic, and therapeutic decisions are made based on the information as a whole using a multidisciplinary approach.

New, more powerful methods of fused diagnostics are being developed that will go well beyond this. They involve applying sophisticated algorithms to integrate, or fuse, molecular and other laboratory data with information collected using various imaging techniques and technologies. The fused data will give us new and more useful insights into a patient’s medical condition that will permit more personalized approaches to diagnosis and treatment.

Fused diagnostics will, of necessity, cross the boundaries that separate diagnostic specialties like pathology and radiology, and subspecialties such as molecular diagnostics. This, along with personalized medicine and patient-centric care, could lead to significant changes in how we organize and provide healthcare services.

**Changing Healthcare Landscape**

Tired of runaway costs and serious medical errors, many Americans believe meaningful change to our healthcare system is overdue. In 2009, the Institute of Medicine gave the medical community five years to improve the quality and safety of patient care or face government intervention. Meanwhile, we are also expected to drastically reduce healthcare costs.

It is easy to give ultimatums but not so easy to find concrete solutions to a very complex problem. If it is a systemic problem, the only way to fix it is to change the system. Fused diagnostics, patient-centric care, and healthcare reform are all attempts to do that.

We are already starting to see some changes. Traditionally, health services have been centralized in hospitals or large medical centers. New patient-centric health services, however, are more decentralized, with services being provided in smaller community-based clinics, surgical centers, and specialized physician practices. On the downside, members of a patient’s clinical team may no longer bump into each other in the hospital hallway. Instead, they may be practicing miles...
away from one another, perhaps even in a different town or state. While this may benefit patients, it makes communication among clinical team members more difficult just when personalized medicine and more complex test results make good communication more critical.

At the other end of the spectrum is the shift toward a multidisciplinary approach to diagnosis. Some people are even advocating the development of integrated molecular diagnostic centers where specialists from different disciplines, such as pathology, radiology, and nuclear medicine, are combined into one department. Diagnosing patients becomes a team effort from day one.

**Good Communication Essential**

What role will the entire laboratory team play in our changing healthcare environment? It could be significant, because we actually have an extremely valuable contribution to make: knowledge desperately needed by clinicians. By "we" I mean pathologists, medical laboratory scientists, and other laboratory professionals. We are in a unique position to distill and interpret complex data and communicate it to other members of the clinical team, especially clinicians and patients.

The test results we give clinicians are usually numbers. We assume they understand what those numbers mean. But most do not. There is simply too much to know. Our body of medical knowledge grows every day. Michael Laposata, MD, PhD, FASCP, made a strong case for this in his keynote address at the ASCP Leadership Exchange in March 2009.1 He gave numerous examples of patients significantly harmed by a doctor’s failure to understand their test results. We need to stop making assumptions and be patient advocates by making sure clinicians thoroughly understand the information we give them and how it affects clinical decisions.

How do we do this? A written report is important, but it is not enough. And, frankly, there is no substitute for face-to-face communication. Clinicians can ask questions and get immediate answers, and diagnosticians can make sure clinicians truly understand test results and their ramifications. The immediacy and the give-and-take of face-to-face communication also help overcome information overload. This occurs when you are inundated with more information than you can readily process and use to make sensible decisions. When face-to-face communication is not possible, we have to find good alternatives. Fortunately, new information technology that may well solve this problem is proliferating, with great strides being made in web conferencing and digital teleconferencing.

If fused diagnostics proves to be as diagnostically useful as some think, it will have the potential to greatly benefit patients, but only if we can adequately communicate with clinicians and make sure they know what the results mean and how to use those results to help patients. I welcome any comments, questions or suggestions you may have. Please email them to me at President@ascp.org.

**References**


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