All software vendors for the clinical laboratory—and their customers—should be preparing for two major changes that are converging within healthcare today.

The first is the arrival of cloud computing in a way that is comparable to that which is already well established in the consumer space. One study has recently suggested that the healthcare cloud computing market, which is currently just 4% of the industry, is expected to grow to nearly $5.4 billion by 2017.1

Another change is the practice of medicine in a growing number of disparate areas. Ultimately, as these two shifts take place, our goal in healthcare must be continual improvement of patient outcomes. With that in mind, what do these changes mean, and how must we be prepared?

Cloud computing is arriving

Taking cloud computing first, we are all familiar with this removal from institutions of physical computers and replacement with servers that reside “in the cloud”—that is, in a data center somewhere, accessible by that institution on an as-needed basis through a variety of service models such as:

- Infrastructure as a Service (IaaS). In this model, an IaaS provider offers computers, either physical or virtual, to be “leased” and managed by the customer. The provider only manages the physical hardware in this most basic cloud computing model.
- Platform as a Service (PaaS). In this model the PaaS provider, such as Windows Azure, offers computing platforms typically consumed by web servers, databases, and development tools.
- Software as a Service (SaaS). This is the most sophisticated model, in which the service provider manages the infrastructure, computing platforms, and applications. Consumers of SaaS are typically only end-users of the hosted application, such as an email or CRM application.

Healthcare institutions are evolving

As for changes within healthcare itself, examples of shifting locations of the medical practice in the next few years are not difficult to find or predict. The boom of point of care testing is now moving beyond the four walls of the hospital as tests become more sophisticated, accurate, and affordable, and therefore more attractive to community physicians and outpatient centers that are keen to grow their practices and better serve their patients with instant results and lower costs. An increase in the practice of digital pathology enables quicker access to pertinent diagnoses from any location, and field tests for remote areas at the point of care are also improving remarkably quickly. We are even witnessing an increasing number of diagnostics aisles within consumer pharmacy chains.

With such inevitable and imminent divergence of medical practice, it is healthcare’s turn to be on the receiving end of the commonly understood benefits of cloud computing, as borne out by market predictions for the coming years through 2017.1 Typically, predictors of future benefits refer to such things as a reduction in overhead costs associated with purchasing expensive equipment and the resources needed to maintain it; paying for only what is needed, when it is needed; and provision of institutions with the ability to scale the service to meet the demands of peak loads as opposed to incurring costs for infrequently used performance capabilities. Then, of course, the need for mobility as required by this divergence is supported by access to that cloud via any Internet-ready device.

Healthcare, the cloud, and standardization

Two vital considerations must be made as healthcare and the cloud combine. The first involves areas with which we are all familiar: performance, security, and regulation.

- High-availability is a requirement for most healthcare applications. Service Level Agreements (SLA) between Independent Software Vendors (ISV), cloud service providers, and end-users will need to be negotiated to help meet uptime, bandwidth, and performance requirements.
- HIPAA and HITECH laws will continue to be relevant issues for those who are choosing a healthcare application. If Protected Health Information (PHI) is to be stored by the cloud service provider and ISV, those services must adhere to certain security and privacy provisions as set forth in those acts. A Business Associate Agreement (BAA) can be negotiated with cloud service providers to help consumers with compliance.

We are already seeing plenty of vendors that have overcome these hurdles with both existing and new applications involving laboratory information systems (LIS). It would be easy to
conclude that given the inevitable upside of the cloud and the predicted growth within healthcare, technology will inevitably evolve toward better patient outcomes.

However, it is the second consideration within the context of this potential upside that cannot be ignored: that is, standardization. It’s great to have data where you need it, when you need it, but the data is of no use if it cannot be communicated across several systems at once, particularly given the growth of electronic health records as a result of the 2010 Affordable Care Act.

The collective standardization of healthcare data across disparate systems is a daunting task, but one that must be pursued if we are to be successful in an electronic world, just as the inverse—inconsistent disparate data sets—can threaten patient safety. One recent example of this is the CommonWell Alliance, driven ultimately by the goal of improving patient care by creating patient-related data that can be shared across systems. The mission of this alliance is to create a certifiable national infrastructure that, broadly, supports patient matching across settings of their health data and patient access to that data.

Therefore, while the best vehicle from a practical perspective for sharing standardized data may be the cloud, the advantages it brings can be realized only if a unified approach is spearheaded by alliances that enforce standardization. If we are successful in that unification, then the opportunity to leverage the power of cloud computing across healthcare will not only maximize output gains, but will realize our overall goal of making a significant contribution to improved patient care.

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Reference