



Developing America's Healthcare IT Expertise

Modern medicine—with its emphasis on computerized diagnostic tools, close collaboration among caregivers, precisely calibrated treatment, and extensive recordkeeping—could not exist without information technology (IT) and communications. But when it comes to bringing the U.S. healthcare system into the digital age, much remains to be done. To help meet the challenge, the American Recovery and Reinvestment Act (ARRA) has set aside approximately \$20 billion for the purpose of automating medical records and building communication infrastructures that more efficiently link healthcare providers, organizations, resources, and patients.

According to the U.S. government's [Health Information Technology](#) website, broader use of healthcare IT will improve the quality of care, reduce costs, increase efficiency, and make treatment more affordable. Implementing the new technology will also enable dissimilar information applications and systems to interoperate with each other. The recent swine flu threat dramatized the need for a unified records system that would allow the nation's public health workers to quickly identify new cases, ascertain the effectiveness of treatments, and track the disease's spread so as to contain a possible epidemic.

The growing importance of healthcare IT is driving the requirement for a large workforce skilled in network administration, voice/data/video/image converged technology, database management, and “data assurance”—ensuring the confidentiality, integrity, and availability of digital resources. And because so many medical devices and technologies are now linked to networks, even technicians who specialize in technologies such as medical imaging or biomedical laboratory equipment find that networking skills are part of the job description and will eventually be required for promotion to positions with broader responsibilities. Hospital administrators, health organization managers, physicians with their own practices, and pharmacists can also benefit from a foundational understanding of IT and digital communications.

Addressing the sixth annual SAS Healthcare and Life Sciences Executive Conference, keynote speaker Dr. John Halamka, M.D., chief information officer at Harvard Medical School and an expert on healthcare IT, said that the move to a comprehensive electronic medical record system in the U.S. can potentially create as many as 50,000 new jobs. In an [NPR interview](#), Dr. Halamka noted that healthcare IT “requires a lot of hands-on—you need training and education more than hardware and software.”

IT-oriented healthcare jobs, as well as lab technicians, nurses, and physical therapists, will provide “a large source” of projected future growth in the U.S. economy, according to a [report](#) by the President's Council of Economic Advisors released in July 2009.

Where the Healthcare IT Jobs Are

There are several areas in the healthcare IT field where well-trained workers will be able to apply their networking skills. These areas include:

Electronic Medical Records

Medical data about a single patient can be scattered in disparate record systems located in various locations, making it difficult and costly for healthcare professionals to access and share vital information. A digital continuity-of-care record creates an online repository for all patient data, including treatment history, lab results, prescriptions, and radiography such as X-rays and magnetic resonance images, or MRIs. President Obama has called the transition to comprehensive electronic medical records, or EMRs (also known as electronic health records, or EHRs) the “low-hanging fruit” of healthcare reform, and his administration’s stimulus package contains incentives for providers to implement EMRs in a timely manner.

To deal with the transition to universal EMRs, healthcare organizations will need workers trained in disciplines such as network architecting and administration, convergence, data virtualization, and the DICOM standard for manipulating and transmitting medical images. Networks everywhere are moving to a converged architecture that can accommodate voice, data, video, and imaging on one infrastructure, and healthcare networks are no exception. Many healthcare organizations will need to boost the bandwidth capabilities of their networks to handle the additional load that EMRs will put on these systems. Radiological files, in particular, can be hundreds of megabytes in size. By virtualizing these images in a medical archive, an organization can reduce the overhead involved in storing the files in separate applications, while also dramatically improving access and diagnosis time for clinicians.

Privacy and Security

Patients are justifiably concerned about protecting the privacy of their online health records. Healthcare organizations in the United States are required to comply with regulations such as the Health Insurance Portability and Accountability Act (HIPAA), which sets a national standard regarding secure electronic transfer of health data. ARRA extends the scope of HIPAA regulations to include non-healthcare entities that may have access to medical records, including law firms, accountancies, and medical suppliers. With the move to EMRs and technologies like server virtualization that can make data centers more vulnerable to attack, organizations will need IT professionals who can deal with security issues ranging from authentication and encryption all the way up to unified, enterprise-wide threat management.

“As technology continues to improve and become more complex, demand for efficient computer networks and mobile technologies will result in healthy growth of information technology workers. Also, the need to protect and secure networks and electronic data will provide excellent opportunities for jobs related to computer security.”

—Roger Moncarz, branch chief of the Employment Projections Program, U.S. Bureau of Labor Statistics, 6/09

Knowledge of security technologies is now a requirement for many healthcare IT jobs, while larger organizations often have dedicated network security specialists on staff. To meet the need for this expertise, Cisco® Networking Academy® offers CCNA® Security, a new course that provides an additional skill set for students who want to enhance their basic networking expertise to qualify for entry-level networking jobs, or for students who want to go on to specialize in the security area. The course combines hands-on experience, instructor-led lectures, and web-based curriculum.

Telemedicine and Collaboration

Telemedicine is the deployment of communications systems for medical collaboration and information exchange. According to the [American Telemedicine Association](#), telemedicine services may include specialist referrals and consultations, patient consultations, remote patient monitoring, medical education delivery, and consumer medical and health information and support. Telemedicine communications can be as simple as a phone call, but more sophisticated telemedicine uses broadband connections to link hospitals and clinics with outlying clinics and community health centers in rural or suburban areas. Internet links may also reach out to patients' homes for monitoring and other services.

Today, sophisticated collaboration technologies such as Cisco TelePresence™ help healthcare organizations cost-effectively strengthen clinical collaboration activities, scale medical resources, reduce travel costs, and expand patient access to care. Cisco TelePresence technology uses high-definition video, spatial audio, and a high-speed network connection to link people across town or around the world, allowing them to work together as if they were in the same room.

Cisco Networking Academy courses provide students with fundamental knowledge of collaboration technologies and data/voice/video convergence networks. Cisco certifications enhance job applicants' resumes and assure prospective employers that they have the right skills.

Putting the Patient in Charge

Patients are no longer passive recipients of healthcare. The wealth of information available over the Internet allows patients to take control of their own care and well-being, reducing doctor and hospital visits and improving public health. According to a June 2009 [report on U.S. healthcare](#) by the Council of Economic Advisors, "Engaging patients in medical decision making can lead both to better alignment of treatment strategies with patient preferences and to lower costs. Well-informed patients are more likely to be comfortable with less invasive, extensive, and expensive treatment options."

Many healthcare organizations make health records available to their patients online, and applications such as Google Health enable users to collect, store, and manage personal health records themselves. Network specialists are needed to set up patient-facing systems that offer both easy access and the requisite security and data integrity.

Case Study: Florida Community College, Jacksonville

With an enrollment of approximately 80,000 students, [Florida Community College at Jacksonville](#) (soon to be renamed Florida State College at Jacksonville) maintains 11 campuses and education centers across Florida's Duval and Nassau counties. The college has integrated Cisco Networking Academy CCNA, CCNP®, voice, and security courses into three of its degree programs: Associate in Science in IT Security, Bachelor of Applied Science in Computer Systems Networking and Telecommunications, and Associate in Science in Biomedical Engineering Technology. The biomedical technology program trains students to install, inspect, and repair a wide range of equipment used to examine and treat patients in a variety of healthcare settings.

Approximately 1800 students a year are enrolled in the network programs, and 15 students a year are engaged in the biomedical engineering course of study. Each year, about 80 graduates obtain jobs in organizations such as the Mayo Clinic, GE Healthcare, the county health department, and local hospitals.

“Eleven years ago, when the biomedical technology program started, the students only took electronics and biomedical equipment courses,” says Ernest Friend, director of academic systems at the college. “But now, almost all the equipment is connected to a network, and the students need to do things like set it up with an IP address during installation. In fact, I think it won’t be too much longer before hospital IT departments and biomedical departments merge into one organization. If you think of networking as core technology, healthcare and other industries are moving closer to the core skill sets that Networking Academy courses provide. No matter where they work in healthcare, academy students can make a real difference.”

“I estimate that 95% of our former students are employed in the industry,” says Fred Wainwright, an instructor in the program and senior technician at GE Healthcare, a global biomedical equipment and services provider. “GE Healthcare alone has hired more than 20 graduates. In biomedical technology, everything talks to everything else over the network, so all the technicians need a basic understanding of routers, hubs, and switches. They can come back to college and take the advanced courses later if they require more networking depth.”

As this Florida Community College, Jacksonville, example shows, Networking Academy curricula are flexible enough to accommodate multiple degree and certificate programs — those that are IT-specific and also those that are oriented toward particular industries. Networking Academy instructional designers work continuously to make sure the curricula align closely with industry standards and employer expectations.

What’s Next?

Find out more about how Cisco Networking Academy can put your students on the fast track to healthcare IT jobs and other emerging employment opportunities: www.cisco.com/go/netacad/us

For information on Cisco Networking Academy and economic stimulus, visit: www.cisco.com/go/netacad/us/econ

Links

- U.S. Health Information Technology, <http://healthit.hhs.gov/portal/server.pt>
 - Dr. Halamka, Harvard Medical School CIO, NPR Interview, www.npr.org/templates/story/story.php?storyId=99916019
 - Council of Economic Advisors, 7/09, www.whitehouse.gov/assets/documents/Jobs_of_the_Future.pdf
 - American Telemedicine Association, www.americantelemed.org/i4a/pages/index.cfm?pageid=1
 - Whitehouse Council of Economic Advisors, www.whitehouse.gov/assets/documents/CEA_Health_Care_Report.pdf
 - Florida Community College at Jacksonville, <http://www.fccj.cc.fl.us/>
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About Cisco Networking Academy

Cisco Networking Academy is a global public-private education partnership that prepares students for jobs in the green economy, as well as a host of other employment opportunities that require IT and networking skills. In the U.S., more than 128,000 students attend classes in 2200 academies each year. There are academies in over 50% of community colleges nationwide. Networking Academy courses meet the “shovel-ready” test: they can be established quickly and economically in any school, college, or nontraditional setting.



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