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With EHR adoption soaring in healthcare organizations nationwide, providers are turning to informatics to optimize all the new data with the ultimate goal of improving care. But those organizations require a competent workforce with expertise in information science, computer science and healthcare to reap that better care.

Educational institutions are tasked with training tomorrow's leaders in healthcare informatics, a large field with many subspecialties—clinical informatics, population and public health informatics, nursing informatics, medical informatics as well as bioinformatics, which includes translational informatics. Programs are attracting students with diverse disciplines as they attempt to meet the demand for informaticists that appears to have no end in sight.

Rising Enrollment

Interest in the fields of informatics and bioinformatics is surging among newly minted college graduates as well as those seeking a career change.

Interest spans from students of different fields and different stages in their careers, says Jennie Q. Lou, MD, MSc, professor and program director of the biomedical informatics program at Nova Southeastern University (NSU) in Fort Lauderdale, Fla. She has witnessed a growing interest since the inception of the school's biomedical informatics program a few years ago.

"Many of our students are mid-career from the fields of IT, business management and education/teaching, in addition to healthcare professions such as physicians, nurses, pharmacists, occupational therapists, physical therapists and medical technicians," she says. Some students are just starting out, recognizing informatics as an attractive career choice.

Seizing on a rising interest among mid-career professionals for informatics education, the American Medical Informatics Association (AMIA) launched its 10x10 virtual program in 2007. Its goal: train 10,000 professionals in biomedical and health informatics in 10 years through a certification program with masters-level online courses.

AMIA partners with 10 member institutions—including NSU, Oregon Health & Science University, University of Kansas, Ohio State University (OSU), Stanford University and University of Utah—to instruct on both the science and discovery and the training side of informatics.

“A lot of people found their informatics career almost accidentally, then became passionate about it and realized they needed more education,” says Jeffrey J. Williamson, MEd, AMIA vice president of education and academic affairs, on what prompts professionals to enroll. For example, “CMIOs, CNIOs and other health professionals realize now more than ever they need to be concerned about quality and safety, not to mention the social science that goes into the deployment of health information systems, and having an understanding of informatics methods and techniques provides a framework for success.”

OSU College of Medicine is taking on the charge to recruit and teach the next generation of biomedical informatics professionals. Its department of biomedical informatics recently was among 14 sites nationally that received a five-year, National Institutes of Health-National Library of Medicine award for this purpose.

OSU's is the only program among the sites focusing on the underserved areas of clinical and translational research informatics, according to Philip R. O. Payne, PhD, associate professor and chair of the department of biomedical informatics.

Students in the program include PhD graduates seeking to do basic and applied research. The program also recruits postdoctoral trainees, including people with clinical doctorates or doctorates in engineering disciplines that want to cross-train in the informatics field. They often pursue master's degrees concurrently, Payne says.

Curriculum Trends & Student Interests

Informatics is hardly a static field, especially with interest in hot topics such as big data and clinical and translational informatics growing rapidly.

At NSU, course offerings have evolved significantly to meet the needs of the healthcare industry, says Lou. For example, the school has created courses such as Lean Six Sigma in healthcare, NextGen certification, geographic information systems in healthcare and ICD-10 to prepare graduates for the changing expectations of informaticists. Also, many existing courses are being modified to be skill- and competency-based, she says.

At OSU, curriculum changes include a new course—which is very popular—focusing on big data management in biomedicine, says Payne.

When asked which healthcare informatics subtopic garners the most interest among NSU students, Lou went right to the point: clinical informatics.

Payne recently asked students in his introductory survey course about the most interesting topics of the class (see sidebar). “We had covered everything from basic information science principles to public health informatics.”

Payne says he was surprised about the interest in public and population health informatics. “Public health informatics is not necessarily a new field, but it's experiencing a resurgence.”

At AMIA, physicians enroll in the 10x10 virtual program to focus more intensively on specific

areas in informatics. Also, “the board certification is a game changer for informatics,” Williamson says, adding that AMIA courses are receiving tremendous interest with physicians preparing for the board examination.

Other specific areas of interest include translational bioinformatics—applying computational biological and genomic techniques for discovery so clinicians have data to predict outcomes during clinical decision-making. “That’s an area that has emerged into the mainstream within the organization over the past three to five years,” he says.

Also, like students at OSU, population health informatics is of rising interest to students. Students with backgrounds in public health often end up furthering their education to pursue informatics, he says.

The Question of Demand

While these organizations work to develop new informaticists, they also work in a broader environment where the demand for these professionals strongly surpasses the available workforce.

“There is a huge workforce shortage in the field of informatics. There is so much more we need to do to train the next generation of informaticians who can truly bridge the fields of healthcare and informatics,” says Lou.

Payne agrees. “It’s a huge problem. It’s multifactorial. Despite increasing attention and funding on the federal levels and other foundations, the amount of funding that is flowing into training programs for informatics has actually declined,” he said. “We have fewer funded positions now than we did five years ago. Ironically, we’re spending a lot of money funding the science, but we’re not spending money funding the workforce development needs that go with that.”

Lou and Payne both say distance education programs for mid-career professionals can help close that gap. NSU and OSU are among the collaborating institutions for AMIA’s distance learning program.

“We have a lot of physicians who’d like to get training in informatics,” he says. “While standard training in the field is very important, we also have to train people at other levels and build up a workforce multifaceted across all areas.”

More and more schools are launching informatics programs, adds Williamson. Instead of becoming an accidental career, young students are pursuing informatics studies as undergraduates or even at community colleges. “It’s a dynamic space,” he says.

The navigational pathway among the different levels of education still is emerging. Sometimes programs have a different focus and are “quite different from how some of our longtime members think of informatics,” which can cause confusion, he says. The changing nature of informatics education could provide a new pipeline of students, particularly for programs that focus on masters-level training, Williamson adds.

AMIA is working on another advanced interprofessional informatics certification program that would certify clinicians such as nurses, pharmacists and even physicians who were not eligible for the subspecialty in the application of informatics—in another bid to legitimize the field and underscore the required skillsets to be effective at it.

It's about the People

“Biomedical informatics isn't about software. It's about the people using the software,” says Lou. As well-designed as the systems are, they are only as good as the people who use them.

“The challenges we face are far beyond installing some hardware and software. It is truly cultural change. We are actually dealing with different cultures in different settings. It is the people who will be using the technologies that we need to understand, and try our best to make the technologies useful in improving the workflow in different healthcare settings,” she says.

To that end, informaticists need not only be savvy at technology, but have organizational and leadership skills to truly realize the promise of informatics to improve healthcare.

The top three interests that emerged from an introductory informatics classroom survey:

1. Clinical research informatics, especially how the industry can do a better job getting evidence out of the lab and into trials and, eventually, into clinical practice. “Despite our best efforts, it's still a multi-decade process,” Payne says.
2. Public and population health informatics, including how to design, instrument and understand interventions at a population level—everything from promotion to prevention to monitoring of disease trends in the broader population. “There is an increasing understanding among trainees that a lot of things happen outside the walls of our clinics.”
3. Big data, high-performance computing. “As we get more data from biomolecular instrumentation and EHRs, we are running into fundamental data-related problems. Students want to know if traditional statistics and computations don't work, how you evaluate a hypothesis.”

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