Public Health Informatics: An Invitation to the Field
by Mary White

EDITOR’S SUMMARY
As we strive to manage health challenges on a population level, the demand for specialists in public health informatics is growing. The specialty differs from medical and nursing informatics by its focus on broad public health goals, policy and prevention rather than individual patient treatment. The information science component highlights topics such as information exchange, disease registries and privacy and plays a key role in healthcare reform efforts. The range of opportunities is wide, from epidemiology with an information science bent to developing web portals and smartphone apps. For information specialists interested in applying public health issues in their work or pursuing public health informatics, a variety of educational opportunities are available, ranging from webinars and single courses through post-doctoral fellowships, sponsored by the Public Health Informatics Institute, the National Library of Medicine, the Centers for Disease Control and Prevention and others.

KEYWORDS
informatics
health information
demographics
public policy
information professionals
career development

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From the advent of Web 2.0 to recent policy recommendations in the Affordable Care Act, change is creating a rapidly growing demand for public health informatics specialists as well as public health professionals with proficiency in informatics. Information science professionals may find in public health a new and exciting arena to apply their analytical and systems skills. Public health professionals may find increased informatics knowledge and skills helpful in their work. This article gives an overview of public health informatics (PHI) and describes a variety of resources to help those interested in finding out more.

Brief Introduction to the Field
While many are familiar with the more clinically driven specialties such as medical or nursing informatics, PHI is a relatively new field. But what exactly is PHI, and how does it distinguish itself in the health informatics world?

Broadly stated, PHI can be defined as “the systematic application of information and computer science and technology to public health practice, research and learning.” [1, p. 68] Regardless of the health domain, all informatics subspecialties apply the informatics pyramid, the relationship and transformation of data, information and knowledge, to making decisions and solving problems [2]. In contrast to a health IT professional working specifically on troubleshooting technology or infrastructure issues, a PHI specialist leverages information and computer science to support public health goals and decision-making and defines the “how and why” science behind the technological tool or approach [3].

As a profession and a discipline, in general, public health focuses on “population and society’s role in monitoring and achieving good health and
quality of life.” [4] That is, in contrast to the more clinically oriented health (and informatics) disciplines, public health focuses on the health of populations versus that of individuals and on prevention in lieu of treatment. It addresses vulnerable points in the causal chain of health problems and considers governmental/policy contexts [1].

As a field, public health is inherently interdisciplinary and collaborative. PHI is no different, applying a range of disciplines, including information science, engineering, law and the social sciences, to public health issues and processes [3]. Therefore, public health issues and responses draw a diverse group of skill sets to the table, and information scientists are especially well suited to this call.

Information scientists and data analysts may find this branch of informatics especially appealing because it naturally deals with gathering, managing and analyzing large datasets. Practitioners in this field also have much in common with information scientists who are interested in the relationships among information, communication and behavior change. Public health professionals may find a way to enhance their work through cutting-edge applications as well as traditional systems methodology.

While initially focused on disease surveillance and epidemiology, opportunities for applying informatics skills to public health have expanded with the development of information and communication technologies, changes in policy and creative approaches to information and communication needs as well as public health interventions. Examples of the variety of these opportunities and roles were evident in the recent American Medical Informatics Association (AMIA) fall 2012 conference pre-symposium event entitled “Current Issues in Population Health Informatics for Healthcare and Public Health.” Late-breaking topics ranged from information exchange (among clinical care, public health and health departments), disease registries, Web 2.0 technologies and public health, privacy and ethical implications and the impact of government policy on public health and informatics. Presenters were from various educational backgrounds and institutional affiliations and were drawn from the federal government, private healthcare industry, local and state health departments, non-profits and academic institutions.

The various health informatics subspecialty areas are distinguished from one another by the content and principles of their domains (that is, whether “medical” or “bio” or “public health”), as well as through the “differing natures and challenges of their informatics applications”. [1, p. 69] These points are useful in framing differences between PHI and other informatics discipline approaches. The recent policy implications of the HITECH/Affordable Care Act (ACA) offer one example. It motivates the adoption of the electronic health record (EHR) through incentives that are based on attesting to the meaningful use of data collected by the EHRs, including for public health purposes, such as immunization or disease registries or surveillance of data to detect disease outbreaks [5]. This program offers opportunities and challenges for both the clinical and PHI approach. Whereas clinical informatics specialties may focus on in-hospital EHR adoption and necessary specifications important to patient care, public health entities may consider how to access and meaningfully analyze and apply such data to population-level health questions and problems. But both involve an application of health informatics principles – including to such issues as system design, system selection and the ability of the systems to connect and share data through standards and interoperability.

The HITECH/ACA is but one specific, timely example of the potential of PHI. The true range of opportunities offered through PHI is as varied as the topics studied and addressed by the field of public health and as varied as the methods and approaches offered by the field of informatics. Regardless of career role or industry type and location, there are many opportunities to put PHI principles to work: an epidemiologist at the state or local level can learn how to connect to disease outbreak information via a health information exchange (HIE); a health communication specialist at the federal level can design smartphone apps to address chronic disease; an IT administrator at a private health institution may consider the privacy implications of putting health data in the cloud; an academic librarian can develop a web portal to deliver timely information to disaster responders. In short, whether you might wish to focus solely on a career as a PHI specialist, apply PHI principles to your work or apply your skills to public health problems, there is a place for you.
Training and Opportunities

A variety of educational experiences and opportunities in PHI are available for professionals and students, with a range of time and monetary commitment, from professional associations, webinars/virtual events or short courses to traditional academic programs and training fellowships. Several organizations provide formal and informal training and opportunities to learn more about PHI, including the American Medical Informatics Association (AMIA), the Centers for Disease Control and Prevention (CDC), the National Association of County and City Health Officials (NACCHO), the National Institutes of Health (NIH)/National Library of Medicine (NLM), the Public Health Informatics Institute (PHII) and the Association of Schools of Public Health (ASPH). The following list is not meant to be exhaustive, but selected and timely opportunities are described below.

Online Resources/Webinars/Virtual Events. Many governmental and nongovernmental organizations and professional associations provide webinars and online resources for those who want to “get their feet wet” in PHI without the time or financial constraints of physically attending courses or conferences. They offer an opportunity to learn about the variety of intersections between applications of public health and information science and informatics approaches. AMIA, NACCHO [7] and the CDC are just a few offering PHI webinars as well as archived access to some of those events.

During the spring of 2013, the CDC National Prevention Information Network (NPIN) hosted a series of free, live webinars under the theme “In the Know: Social Media for Public Health.” The webinars covered topics including the technology, applications and evaluation of a variety of social media channels, ranging from Twitter to YouTube. Archived versions of these webinars and slides are available at the CDC NPIN website (www.cdcnpin.org/scripts/features/feature_itk.asp).

One exciting, upcoming opportunity, which requires no geographic or financial commitment from the participant, is a national PHI web conference. The CDC, the National Association of County & City Health Officials (NACCHO) and Association of State Health Officials (ASTHO) are sponsoring the free Public Health Informatics Virtual Event, July 16-18, 2013. This year’s theme is “Strengthening Public Health – Health Care Collaboration” and topics will include policy and practice, research and innovation and evidence-based practice. Conference information is available at www.cdc.gov/virtual/PHIVirtualEvent2013.html.

Short Courses. The Public Health Informatics Institute (PHII), a program of the Task Force for Global Health, offers training and an Informatics Academy to advance their mission of improving “health outcomes worldwide by transforming health practitioners’ ability to apply information effectively.” During the summer of 2013, the PHII Informatics Academy is offering an online, 8-week short course in conjunction with the University of North Carolina at Chapel Hill. The course, “Designing and Managing Public Health Information Systems: 8 Steps to Success,” will cover the information technology (IT) lifecycle. Find out more about the short course or other opportunities from PHII at www.phii.org/.

AMIA also offers a variety of informatics virtual courses through the 10x10 program, whose goal is to train 10,000 health professionals in 10 years. These courses are conducted in collaboration with partner academic institutions across the country and are offered with a variety of start dates across the calendar year. While the courses are offered online, participants have the opportunity for intensive in-person sessions, typically aligned with AMIA or other professional meetings. Interested participants may sign up for individual courses, typically lasting three to four months. Course dates and topics may vary throughout the calendar year. Find out more at www.amia.org/education/10x10-courses.

Although not public health specific, through the Woods Hole Medical Informatics course, the National Library of Medicine (NLM) fully sponsors health or information professionals in a week-long intensive survey course on the application of computer technologies and information science in the health sciences. The National Library of Medicine also offers grant opportunities for a variety of informatics training, with a range of possibilities including conference grants, early career development,
research-specific trainingsupport and small business grants. Find out more about the Woods Hole course and these additional informatics funding opportunities at www.nlm.nih.gov/grants.html.

**Professional Associations.** Professional associations provide an opportunity for professional networking and continuing education through association meetings, and their websites are often good places to start to get to know more about current hot topics. The American Public Health Association (APHA) and the American Medical Informatics Association (AMIA) are at the forefront of the public health and informatics fields. Both associations have specialty groups bringing together those with a shared interest in public health, information technology and informatics. After exploring these larger organizations, you may find additional conference or networking opportunities as you gravitate toward specific concentrations or topics, for example at an mHealth summit (www.mhealthsummit.org/).

The American Public Health Association (APHA) offers members access to the “oldest, largest and most diverse organization of public health professionals in the world.” Through the Health Informatics Information Technology (HIIT) section, the vision is to “promote, enhance public awareness and formulate policies on best application and/or methods of information technology and informatics for use in public health” (www.apha.org/membergroups/sections/aphasections/hiit/).

The American Medical Informatics Association (AMIA) is composed of professionals from a variety of informatics subspecialties and provides a forum for those interested in informatics to develop working relationships with each other. By joining AMIA’s 500-member Public Health Informatics Working Group (PHI-WG) (www.amia.org/programs/working-groups/public-health-informatics), you have access to listserv discussions, as well as a network of colleagues at the forefront of this field. The AMIA PHI-WG also hosts educational opportunities, such as webinars on a variety of PHI topics, as well as the “Current Issues” pre-symposium event mentioned above. Those interested in PHI, as well as presentations from the pre-symposium, are encouraged to review the proceedings available through the PHI-WG website.

**Traditional Academic Programs and Training Fellowships.** Finally, traditional academic programs and training fellowships offer formal ways for those interested to gain in-depth training, skills and experience in PHI. Academic institutions offer a variety of levels of training and focus areas in health informatics, including individual courses, graduate certificates, masters and doctoral training, both online and face-to-face. Post-graduation, several fellowships are available to augment the training and experience of informatics and public health professionals.

Some academic informatics programs may take a general approach to health informatics or specialize in specific subspecialties such as biomedical/clinical, bioinformatics, translational and PHI. While there is currently no accreditation process, selected institutions offer a public health informatics-specific focus. Conduct an Internet search or visit the AMIA website for a list of many health informatics and PHI training programs (www.amia.org/education/programs-and-courses).

The National Library of Medicine (NLM) supports pre-doctoral, post-doctoral and short-term (three months) funded informatics research training at selected academic institutions across the country. Fourteen “University-based Biomedical Informatics Research Training Programs” cover up to four areas of emphasis: health care, translational, clinical research and PHI. To find out more about the program, and the institutions focusing on PHI, visit www.nlm.nih.gov/ep/GrantTrainInstitute.html.

Through the Applied Public Health Informatics Fellowship (APHIF), the CDC, in collaboration with the Council of State and Territorial Epidemiologists (CSTE), the Association of State Health Officials (ASTHO), the Public Health Informatics Institute (PHII) and the Association of Schools of Public Health (ASPH), offers fellows on-the-ground experience at the state or local level. This one-year fellowship is an accelerated training program for recent graduates of informatics (or related) masters or doctoral programs, with an interest in the practice of public health. More information is available at www.aphif.org/.

In the two-year CDC Public Health Informatics Fellowship Program (PHIFP), fellows experience an intensive orientation to the CDC, public health and PHI. This orientation is followed by short-term assignments at the CDC...
and with public health partners (domestically or internationally) geared towards solving PHI problems. Graduates will be prepared to assume leadership roles in creating and evaluating PHI projects. Interested applicants should have masters or doctoral level training, informatics, public health and research experience. More information is available at www.cdc.gov/PHIFP.

**Conclusion**

PHI holds opportunities for those who wish to become informatics specialists or those who would like to more fully apply informatics skills in their own public health work. Many public health organizations, including the Association of Schools of Public Health (ASPH), the Public Health Foundation (PHF) and the Association of State Health Officials (ASTHO) [4] [7] [8], among others, have begun defining and highlighting the importance of informatics competencies for public health professionals. Opportunities exist at many levels for interested students and professionals to gain more exposure to and proficiency in PHI. I welcome your interest, involvement and leadership in this exciting and growing field and invite your suggestions on other training and professional opportunities in PHI.

**Acknowledgements**

I would like to give special thanks to Rachel Graber for her support with this manuscript.