Implementation of ONC's Workforce Development Program

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Evaluation of the IT Professionals in Health Care ("Workforce") Program

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Overview and Introduction

To help address the increasing and evolving demands of the current health-care and policy environments, the Office of the National Coordinator for Health Information Technology (ONC) developed the Information Technology (IT) Professionals in Health Care Program (referred to as the "Workforce Program"). The Workforce Program's primary goal is to train a new workforce of health IT professionals who will be ready to help providers implement and maintain electronic health records (EHRs) to improve health-care quality, safety, and cost-efficiency. To this end, ONC designed the program to train high-caliber health IT professionals interested in supporting the growing and evolving health IT industry. More information about the Workforce Program and this evaluation is available in *Overview of ONC's Workforce Development Program.*[1]

The Workforce Program is comprised of four constituent programs: the Community College Consortia to Educate Information Technology Professionals in Health Care (CCC), the Program of Assistance for University-Based Training (UBT), the Curriculum Development Centers (the Centers), and the Competency Examination for Individuals Completing Non-Degree Training program (Competency Exam program, also known as the HIT Pro exam). In order to provide training in the appropriate areas needed in the growing health IT workforce, ONC also defined 12 professional roles that the various training programs target.

- *Community College Consortia (CCC) to Educate Information Technology Professionals in Health Care.*[1] This program provides $68 million to five consortia, which currently support approximately 82 community colleges covering all 50 states, to establish or improve non-degree health IT training programs that can be completed within six months. ONC charged the funded community colleges with training more than 10,500 new health IT professionals by 2012. The training programs are designed for professionals with an IT or health-care background and focus on training students for the following professional roles: practice workflow and information management redesign specialists; clinician/practitioner consultants; implementation support specialists; implementation managers; technical/software support; and trainers. Two additional grant programs support the CCCs' efforts to develop or improve their health IT training programs, the Curriculum Development Centers and Competency Exam programs, described below.

- *Program of Assistance for University-Based Training (UBT).*[ii] This program provides grant funds totaling $32 million to nine colleges and universities to create or expand health IT training programs focused on health IT roles that require a higher level of training. Over the course of the grants, these programs will award nearly 1,700 people certificates of advanced study or master's degrees in health IT. Students can complete the certificate programs in one year or less, and the master's degree programs in two years or less. The UBTs are also offering distance-learning options for students. The training programs focus on the following six professional roles: clinician or public health leader; health information management and exchange specialist; health information privacy and

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[1] This 2011 report is available online at: http://www.healthit.gov/sites/default/files/pdf/onc-work-force-development-program-annual-report-2011.pdf.

security specialist; research and development scientist; programmers and software engineer; and health IT sub-specialist.

- *Curriculum Development Centers (the Centers).*[iii] ONC awarded a total of $10 million in cooperative agreements to five universities to develop health IT educational materials for the CCC program. ONC tasked the five recipients of these grants with creating materials for members of the CCCs to use in training students in the six professional roles listed above. The materials are available to other schools outside the Workforce Program for wider use across the country. Furthermore, ONC awarded one grantee additional funds to serve as the National Training and Dissemination Center (NTDC). The NTDC has established a secure electronic site from which all materials may be downloaded through the end of 2012.

- *Competency Examination for Individuals Completing Non-Degree Training (HIT Pro Exam).*[iv] ONC awarded one two-year, $6 million cooperative agreement to Northern Virginia Community College (NoVA) to fund the design and initial administration of competency exams in health IT for the six professional roles that are the focus of the CCC program. NoVA subcontracted with Pearson VUE and the American Health Information Management Association (AHIMA) to develop and administer the competency exams. NoVA made vouchers available to cover the cost of the exam for individuals who complete one of the CCC programs. Other health IT professionals may sit for the examination.

In support of the Workforce Program, ONC funded NORC at the University of Chicago (NORC) to perform an independent evaluation of the Workforce Program and all four of the constituent programs. This research brief focuses on describing the Workforce Program's grantees' implementation efforts, based on surveys, focus groups, and interviews with populations and key stakeholders involved with each of the workforce programs. This brief describes the schools' approaches to integrating evolving and newly developed curricula, recruiting and training faculty and prospective students, and coordinating among the four grant programs, as well as with other prospective employers of students trained through the Program. The Workforce Program evaluation has been exploring these challenges through both formative and summative evaluation approaches, providing critical formative feedback to the grantee institutions on their activities, and offering perspectives on the Program's contributions in helping to build a skilled workforce equipped to meet employers' needs.

Methods

This report characterizes the processes that the colleges and universities participating in the ONC-funded Workforce Program have undertaken over the past two years to implement their health IT training programs. The report draws on qualitative data gained through a series of site visits and conversations with the grantees in order to discuss how they have structured their programs, worked to connect students with potential employers, and coordinated with other ONC health IT grantees. Specifically, the report references what the evaluation team learned during discussions with students, program administrators and staff, faculty members, and employers about each of these specific topics. Where appropriate, the report supplements the qualitative site visit findings with relevant data collected through the surveys of students and faculty. Appendix A provides additional details about the site visits and surveys.

Overview of Student Population

To provide context for the rest of the report, the administrative data presented in Table 1 below provide a snapshot of the number of students who have enrolled and completed the CCC program, as well as the demographic characteristics of those students.[2]

Table 1: Community College Student Population (as of March 31, 2012)[v]

		Region A	Region B	Region C	Region D	Region E	Total
Number of Students Successfully Completing the Program		3,828	1,568	2,315	2,162	2,209	12,082
Number of Actively Enrolled Students		69	1,124	1,692	2,758	928	6,571
Mean Student Age		42.2	46.1	46.2	46.1	47.0	45.1
Prior Experience	**Health IT**	41%	17%	18%	16%	15%	24%
	HC (Not IT)	37%	42%	31%	50%	32%	38%
	IT (Not HC)	6%	31%	30%	27%	25%	21%
% Rural		30.6%	10.1%	6.4%	12.5%	4.9%	15.3%
% Minority		14.9%	42.1%	30.2%	38.4%	27.2%	27.8%

The Role of the Curriculum Development Centers

As discussed, ONC awarded five grantees funds to develop health IT curricula and educational materials for the CCC programs.

The Development Process. Each Curriculum Development Center developed four "components." One component translates roughly to one course and is comprised of a number of "units," which are in turn comprised of "elements." The elements created by the Centers include PowerPoint slides with voice-over narration and recordings; class activities and homework assignments; self-assessment questions; and links to supplemental readings and other resources. Although the curriculum was designed as a buffet from which colleges could select materials, ONC and the Centers provided the community colleges with a "set table" that outlines which components should be taught within each role to help guide the colleges in selecting from the buffet. The Centers created "blueprints" for each component that outline the planned component objectives, unit topics, unit objectives, and unit elements. Despite the separate assignments, the five Centers worked together and with ONC to design a cohesive set of components, using a consensus-based decision-making process.

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[2] Updated enrollment data are also available at: http://dashboard.healthit.gov/college/.

In their grant applications, the grantees identified which components they felt they could best develop, and ONC subsequently used this information to assign components to the Centers.

All the Centers used a "team" approach within their own programs as well to design their components. In some cases, one team developed all of the Center's components; in other cases, different teams developed each component. The teams consisted of staff including project/team leads, curriculum/instructional designers, technical writers, and content experts. Although some Centers already had the necessary staff to fill these positions, others hired staff or consultants to serve in various roles such as instructional designers and technical writers. Each Center's team(s) met regularly (in-person and virtually) to design their assigned component(s). Additionally, the Centers sought input on the materials from various departments within their respective universities.

Partnerships. The Centers all worked with community colleges, some of which were CCC grantees. Some Centers also partnered with other local colleges and universities. In some cases, these partners were on the teams developing the materials; in others, the partners reviewed the draft components after they were developed, providing higher-level feedback prior to their release. Furthermore, one Center had 30 students from a local community college test the first round of materials by reviewing the PowerPoint slides and exams and providing feedback on them.

All the Centers had advisory boards or committees composed of stakeholders, including vendors, staff from community colleges, clinicians, consultants, and other local employers. Some advisory boards reviewed the components as they were developed; others provided higher-level guidance at the outset of the project and then periodically throughout development. Additionally, some advisory boards served as conduits to local employers, who in turn provided feedback on the materials. The Centers also solicited feedback from local employers prior to creating the components to ensure the materials aligned with local workforce needs.

In sum, although each Center took a slightly different approach to developing the components, they all sought input from ONC, other Centers, partners, university departments, advisory boards, and local employers.

The Revision Process. In addition to working with partners to develop materials, the Centers used the feedback gleaned through these partnerships to inform subsequent versions of the materials. The National Training and Dissemination Center (NTDC) has released three versions of the materials. The first half of Version 1.0 was released in August of 2010, with the second half following in fall of 2010. Version 2.0 was subsequently released in spring of 2011, and Version 3.0 was released in March 2012. The revisions to Version 2.0 were mostly technical in nature (correcting typos, improving quality of voice overs and slides, etc.), while the revisions to Version 3.0 focused on substantive issues (filling gaps by adding content, and minimizing overlap in the components). In order to help determine the particular substantive issues to emphasize in Version 3.0, the NTDC contracted with the American Medical Informatics Association (AMIA) to do a "gaps and overlaps" analysis of the existing materials. The Centers then met to review this analysis and determine the best ways to revise and improve Version 3.0. When multiple components covered the same content, the Centers discussed how to ensure the

information was consistent and determined whether the repetition was valuable from a pedagogical standpoint, or merely redundant. They also strategized on how to fill gaps in the materials. Version 3.0 incorporated these various sources of feedback.

Furthermore, as part of its dissemination responsibilities, the NTDC collected feedback on the materials from the CCCs. The NTDC did this in two ways: 1) through a feedback mechanism on the NTDC website; and 2) by conducting a survey of the CCC faculty in the summer of 2011. The Centers used the information collected through these mechanisms to revise all versions of the materials.

The Design and Implementation of the Training Programs

ONC afforded the CCC and UBT grantees flexibility in developing their training programs. Below we discuss some of the approaches used by the grantees.

THE COMMUNITY COLLEGE CONSORTIA PROGRAM

Formation of the Consortia. The five consortia formed in different ways and chose different models for running their respective training programs. In some regions, several schools were already working together on issues both related and unrelated to health IT, so it was a natural progression for the schools to apply for the ONC funding opportunity as a consortium. In other regions, the consortium formed for the purposes of the grant. In many instances, member colleges approached the lead about applying for funds; however, some lead institutions also leveraged already-existing relationships with community colleges in the region to recruit members. Accordingly, lead institutions chose to apply for the role of consortium lead for a variety of reasons, including possession of a robust infrastructure capable of supporting the endeavor, extensive experience leading large federal grants, and having previous experience with health IT programs.

Schools' Backgrounds. Many of the member schools had existing health IT programs, including associate's degree and certificate programs. Similarly, schools that had related health information management (HIM) programs, but lacked health IT programs, viewed the grant program as an opportunity to expand to their curricula. Although such schools were at an advantage due to a familiarity with the subject matter, they still created essentially new programs, rather than adjusting existing programs, in order to meet the objectives of the HITECH grant.

Workforce Roles. Colleges used different processes for determining and selecting which ONC-developed workforce roles to offer. Some colleges selected roles that built on the existing course offerings, while others offered roles according to faculty subject matter expertise and staff capabilities. Schools also convened advisory committees consisting of local employers that offered input concerning local workforce needs. In such instances, schools also used this information to determine the roles offered to ensure that graduates would have the ideal skill set needed for employment in their local area. Many schools allowed students to enroll in more than one role (sometimes in parallel and other times sequentially) and felt that students who are trained for more than one role would be more desirable candidates to employers. Some schools using this approach made certain roles a prerequisite for additional training in other roles.

Furthermore, in several instances schools opted to merge roles in order to streamline and consolidate curriculum materials and to address the perceived overlap in the components taught for each role. For example, one consortium lead developed a two-track model, which all member schools in that consortium employed. This approach enrolled students with an IT background in an engineering track (which merges the technical/software support staff and implementation support specialist roles) and enrolled students with a health care background in a consulting track (which merges the remaining four roles). While students in both tracks took some courses focusing on the same curriculum components, the courses' content differed (e.g., more technical content for the engineering track).

Recruitment, Application, and Acceptance Processes. The community colleges used a variety of strategies to recruit students to their training programs, including word-of-mouth and various forms of advertisements. Many schools had great success with word-of-mouth strategies (via colleagues, friends, and acquaintances) and used minimal program marketing. Schools engaging in marketing campaigns utilized a number of platforms for recruitment, including ads and articles in local newspapers and college newsletters; radio and/or classified ads; pop-up ads on the home page of their school's website; communication with various networking groups; and presentations/booths at job fairs and relevant professional conferences.

Similarly, schools took different approaches to their application and acceptance processes, as well as to offering student orientations. Some consortia set and agreed on baseline admissions criteria for all member colleges, while others left it to the discretion of each individual school. Numerous schools took a proactive role to placing students in a particular workforce role by reviewing students' resumes and personal statements, and weighing their prior experience (e.g., experience in either health care or IT). Concerning orientation, schools adopted different approaches to introduce the program to students; some schools hosted a mandatory orientation session while others held optional sessions. The depth of orientation also varied with some schools offering a more traditional orientation while others organized more-involved sessions that sought to introduce students to concepts that the program would cover and impart a sense of the program's intensity. In most cases, the rationale for holding orientation sessions was to provide potential students with an understanding of program expectations, and to identify individuals who might not be well-suited for the program.

Faculty. Schools took a variety of approaches to identify and hire faculty members. Several community colleges used their advisory board members to identify potential instructors. Some advisory board members became instructors and in other instances, the members helped schools recruit staff from within their respective organizations. Other schools took the approach of recruiting instructors who were currently teaching health care or IT courses at the college. The majority of faculty members teaching in the programs are adjunct instructors who also work in the field. As a result, most faculty members possess an industry background as opposed to an academic background, although many have prior teaching experience. In a few instances, prospective instructors approached program leadership to express an interest in teaching after learning of the program through the marketing to recruit students.

Learning Platforms. Schools implemented a spectrum of learning platforms ranging from fully online to fully in-person training programs. Colleges that used a hybrid approach to training (some online learning and some in-person learning) implemented their programs in a number of ways. For example, at one school, students spent six hours on the weekends in in-person classes, with the remaining courses delivered online. Other schools offered students more flexibility in deciding the proportion of online and in-person classes. Another school allowed students enrolled in online courses seeking additional academic support the flexibility to attend in-person classes. At yet another school, all courses were online, but the students participated in regular "face to face" networking sessions in which they heard from local employers, experts in the field, and faculty members. Some schools changed their learning platforms as the grant progressed, in part as a reaction to student feedback. One school had considered offering more online and hybrid classes; however, results from student surveys indicated a preference for in-person classes. Another school had initially considered implementing the program entirely online, but feedback from the first cohort of students suggested that students appreciated the in-person interaction.

Use of Curriculum Materials. Schools took varying approaches to revising and using the materials provided by the Centers. Some schools left it up to the individual instructors to revise, update, and supplement the materials. In some instances, instructors used the materials unedited, and in other instances, they revised as they saw fit. At other schools, the program leadership revised the materials prior to giving them to the instructors. Additionally, to address the large volume of materials created by the Centers, some schools assigned a particular instructor, or hired an instructional designer, to review all of the materials and select the topics they felt were most salient. These topics included materials schools felt were most likely to appear on the HIT Pro exams and/or to be useful in a job setting.

In one region, the process of systematically reviewing and revising the materials occurred at the consortium lead level. When the lead of this region first received the component blueprints, staff at that institution created a framework of competencies for each role and fitted the components and units into that framework. As the lead institution completed the re-packaging of materials, they distributed them to their member colleges.

Projects, Activities, and Hands-On Learning. In an effort to enhance the courses' practical application, many programs and individual instructors integrated group projects and hands-on learning activities into the coursework. Some schools added activities to provide students with hands-on experience in tasks relevant to EHR implementation. For example, one school created an exercise related to the vendor request for proposals process. While all schools received access to VistA to conduct EHR lab work, some schools used additional open-source EHR software products to expose students to a variety of platforms.

Schools also used group projects to capitalize on the students' varying backgrounds. Instructors took care to place students with diverse backgrounds in groups to foster collaborative learning and a sharing of each other's experiences. Several instructors also incorporated case study examples from their professional experience into the courses to demonstrate real-world applications. Others identified online videos to highlight stories from the field and developed problem-solving scenarios for students to test and apply their knowledge.

Furthermore, some community colleges included an internship or practicum in their programs. At the majority of schools, this was not a requirement; however, many students took advantage of the opportunity to have additional hands-on learning. While some schools assisted students in finding these opportunities and had formal programs in place, at others, it was up to the students to find internships on their own.

THE UNIVERSITY-BASED TRAINING PROGRAM

Creation of the Training Programs. All UBT grantees had graduate programs in health IT prior to receiving grant funding. Further, many were planning to or had started to create new health IT training programs prior to the grant. Accordingly, all UBT grantees felt the funding was a natural fit for them based on their respective backgrounds in health IT and planned activities. Grantees selected the roles that they would offer based on their existing capabilities and programs.

Grantees used the ONC funds to enhance their health IT programs in a variety of ways. All but one of the universities created additional certificate and master's degree programs. Many used the funds to expand upon existing programs by adding additional requirements such as completion of an internship or practicum. Some UBTs updated the format of their existing programs (e.g., by converting their courses into online programs), while others opted to revise the content of existing course materials. UBT grantees also used funds to create new courses for their existing programs.

Recruitment, Application, and Acceptance Processes. The universities recruited students for their programs in a variety of ways, including advertisements in the schools' newsletter(s) and website(s); on Facebook and LinkedIn; at professional and trade conferences; through email notifications; and via word-of-mouth. All grantees used funds for recruitment efforts and to provide scholarships and tuition assistance to students. The overall application process across the UBT programs was consistent and similar to the process for the universities' other graduate programs. Applicants were required to submit an application form, essay, transcripts, and letters of recommendation.

Faculty. Although some of the UBTs hired new faculty members to teach courses, the majority of UBTs drew instructors from a broad array of departments and schools within the university. These instructors had already been teaching in fields related to health care, health IT, or IT. In instances where faculty members were hired they were often identified by existing university staff members (via industry connections) as specialists in particular topic areas. Additionally, many universities used local industry experts as guest lecturers to increase students' exposure to the industry and to allow them to establish valuable industry connections.

Learning Platforms. The UBT programs offered a combination of online and in-person learning formats. Several grantees also offered courses via a hybrid model. While many of the online courses were structured along a set timeline, some online courses were asynchronous (self-paced) and offered more flexibility for the largely adult, working student body to complete the program while still addressing other responsibilities. For example, one course taught online used recorded lectures, two textbooks, audio files, quizzes, and group projects. Students also had a specified time each week to call in and speak with faculty members to ask questions.

Additionally, students met in-person one day each month. Further, schools also used online discussion tools and virtual office hours to ensure students enrolled in the online and hybrid models received the level of attention they needed.

Projects, Activities, and Hands-On Learning. UBT grantees and their faculty members used an array of methods to engage students in projects and other hands-on learning activities. In many instances, faculty members were able to use existing materials for courses newly created under the UBT program. Faculty also used the literature, best practices, and informatics professional guidelines to design new curricula. To do so, faculty pulled materials and information from a number of diverse fields including public health, biostatistics, health policy, nursing, and business.

Like community college instructors, many UBT faculty members incorporated case study examples from their professional experience into courses to demonstrate real-world applications of their knowledge. Further, faculty members from two universities sought to expand students' applied skills by incorporating use of commercial and open-source software into their classes. All of the universities used group projects in their programs. Faculty, leadership, and students alike felt that group projects were a good way for students to learn from one another, and to participate in hands-on learning. Faculty members at several universities explained that their programs use a team-based learning approach through which students with diverse backgrounds are assigned to groups to review quizzes and complete weekly projects together. Programs also used assigned study groups as a way to prepare students for the type of real-world collaboration that will likely be required in their future jobs.

Additionally, at all of the universities, students were required to complete an internship or practicum. There was some variation between the universities in the specific requirements of the internships. For instance, some universities required that students outline their goals for improvement prior to beginning their internship so that they could track their progress over time. The lengths and requirements for completion of the internships also varied across the universities.

Creation of the HIT Pro Competency Exams

To gather guidance for the exam-development process, the grantee team charged with developing and administering exams in each of the six workforce roles established an advisory council that included representatives from the Curriculum Development Centers, the community colleges participating in the Workforce Program, the Regional Extension Centers, the Department of Labor, and various employers. The exam developer convened teams to work on each role and to identify—in consultation with industry leaders—the knowledge, skills, and abilities (KSAs) necessary to fulfill the responsibilities associated with each role. Item writers then drafted questions for alpha exams for review by subject matter experts. To ensure their relevance, the exam developer cross-walked the questions to a jobs analysis, which AHIMA had performed, as well as to the curriculum materials created by the Centers and the learning objectives contained in those curriculum materials. NoVA noted that these cross-walking exercises yielded largely consistent results, suggesting that their initial work to define KSAs aligned well with the learning objectives in the curriculum materials.

Vouchers. The exams, each of which is comprised of 125 questions, are open to individuals who participated in the community college program, as well as to other professionals in the field. A limited number of vouchers for free exams were made available through ARRA funding. Individuals interested in taking the exam have been able to receive vouchers from one of the ONC-funded community colleges, other eligible academic institutions, or health-care employers. Individuals not affiliated with any of those entities can request a voucher directly from AHIMA.

The grantees issued more than 350 packs of vouchers (with 10 vouchers in a pack) as of March 26, 2012. However, as shown in Table 2, only approximately 3,800 exams had been delivered by the beginning of April 2013. The majority of the exam takers have been students who enrolled in one the Workforce Program community colleges.

Table 2. Number of Exams/Vouchers (as of 4/2/12)[vi]

Number of exams delivered, by role:	
• Clinician/Practitioner Consultant	534
• Practice Workflow & Information Management Redesign Specialist	880
• Implementation Manager	693
• Implementation Support Specialist	687
• Technical/Software Support Specialist	487
• Trainer	490
Total number of exams delivered	3,771
Number of exams scheduled	293

Recruiting Exam Takers. In order to publicize the exam and encourage individuals to take it, the exam developer advertised on the radio, on the internet (including social media such as Facebook and Twitter), in newspapers, via professional organizations, and at professional conferences. The exam developer also sent information directly to health IT employers. The exam developer conducted special outreach to the Program's community colleges and provided them a "toolkit" to help them further spread the word about the exam. However, the extent to which the community colleges communicated with their students about the exam has varied. Several schools began emphasizing its importance to students from the very beginning of the program. On the other hand, as of the end of March 2012, three of the colleges had not requested any vouchers.

Reasons for Taking the Exam. As shown in Table 3, the individuals who took the exam represent a broad array of professional and educational backgrounds.

Table 3. Demographic information about exam takers (As of 7/6/12**)**

Percentage of exam takers with a background in each industry:	
• Health Care IT	23%
• Health Care – Non-clinical	23%
• Health Care – Clinical	15%
• IT - Not health-care related	12%
• Other	9%
• Unemployed	19%
Percentage of exam takers who reported the following as their highest level of education:	
• PhD/MD	5%
• MA	19%
• BA	41%
• AA	16%
• Non-degree certificate	14%
• High school	5%

Individuals (both those who had completed CCC programs and those who had not) noted many reasons for taking the exam, including:
- o To assess themselves against a national standard;
- o To gain validation for what they felt they had learned on the job;
- o To test gaps in their personal knowledge base; and
- o To support career development/ advancement (i.e., to be able to include it on a resume or to help make the case for a promotion).

Many individuals also acknowledged that the ability to take the exam free of charge was appealing. Several individuals stated that they were interested in taking the exam now—while the vouchers are available—in the hope that it would become a credential in the future.

Preparation for the Exam. A small number of community colleges offered review sessions for the exam; more frequently, however, community college students noted they would have liked to participate in a review session but were unaware of any being offered by their program. Some community college students used the materials provided by the Curriculum Development Centers as a refresher prior to sitting for the exam. They highlighted the assessments included in those materials as being particularly helpful for exam preparation. Furthermore, some of the individuals who did not enroll in one of the community college programs also used those materials, while others were unaware of them or were unable to locate them. Exam takers could also review the HIT Pro Candidate Exam, which includes a list of the domains addressed in each of the exams.

Relationships with Employers

The CCCs and UBTs alike built relationships with local employers for a variety of reasons and through a number of approaches.

The Community College Consortia Program. Community colleges engaged in outreach to potential employers of their program graduates, both to inform the employers of the program's existence and to garner feedback on how to improve the program. Some of the community colleges contacted local hospitals and/or provider organizations directly to market the program or gather feedback on the program's effectiveness in preparing employable graduates. Other colleges conducted these activities with the assistance of a local networking group (e.g., a local hospital in-house counsel) or local chapters of related professional organizations (such as AHIMA and the Healthcare Information Management and Systems Society (HIMSS)). During these outreach efforts, the community colleges specifically emphasized that those enrolled in and graduating from the Workforce Program are generally not high-school graduates or freshly out of an undergraduate institution—they are older, experienced workers, some with advanced degrees.

The community colleges helped prepare their students and graduates in a number of ways. Some community college programs had staff specifically assigned to provide career assistance to students, others had career staff that were part of the larger department, but not specifically assigned to the workforce program's students. As discussed, some of the community colleges assisted in finding internships for students that would provide valuable experience for program graduates—others did not emphasize internships as strongly. The community colleges also provided other resources and services to help prepare students for employment, including job-search skills, techniques for creating an effective resume, and preparation advice for a job interview.

The University-Based Training Program. The universities performed outreach to local employers for the same reasons as community colleges: to inform potential employers of their program's existence and to gather input on how to provide the skills that will make program graduates most employable.

All of the universities conducted outreach to potential employers. One major component of the outreach was explaining to potential employers the skillset acquired by the students, as many employers are confused by exactly what support a health informatics graduate can provide. To supplement this, some universities have sent students and graduates to various employers simply to demonstrate the skills that many program graduates possess. University staff have noted that, although they have conducted outreach with many employers, several of whom have been impressed with the university programs, many other potential employers are not aware of the programs and thus widespread awareness of the program remains an issue. The universities have also leveraged various professional organizations, such as AHIMA and HIMSS, to help publicize their programs among employers. In addition to outreach directly by the university, program graduates who have found employment in various settings have used their positions to promote the programs and inform others about the skill of program graduates.

Many universities have also provided career services for their students, including assistance in finding job opportunities, and holding networking events and seminars. Like the community colleges, universities vary in the staffing they provide for career services and preparing students and graduates for the job market. Some programs have dedicated career staff within their specific program, others have career staff that are part of their overall school, but not assigned specifically to help workforce program graduates. University career centers have also performed other career assistance activities, such as creating LinkedIn groups that program graduates can use for networking.

Conclusion

Since the beginning of the evaluation of the Workforce Program, NORC at the University of Chicago has gathered a wealth of information about the various activities of the four interrelated components of the Program as a whole: the community college training programs, the university-based training programs, the Curriculum Development Centers, and the development of the competency exam.

The 82 community colleges in the five consortia around the country have developed varying approaches to structuring the program and teaching the curricula—some taught solely in-person courses, others solely online, and others created a hybrid format. Various community colleges have adjusted their approaches as the program progressed. The instructors that the community colleges used to teach the programs were, for the most part, adjunct faculty employed in the health IT field. The community colleges approached teaching the roles differently, with some colleges teaching each role individually and others bundling roles together into single programs, whereby a student graduating from the program would have competencies in multiple roles. However, due to the difficulty that some students have had with the course material, many community colleges developed orientation sessions where the content and work expectations of the program are outlined to give prospective students a better understanding of the commitment that the program entails. Collaboration among consortium member and the consortium lead have also varied in their nature and extent. Emphasis on the HIT Pro examination has also varied among the colleges, with some strongly encouraging that all students sit for a HIT Pro exam, and other colleges simply informing the students of the exam, but not providing strong encouragement to take it. Career services varied among the community colleges; some community colleges have dedicated staff helping students write resumes and cover letters, and find job opportunities. Others had more limited assistance or referred students to an institution- or department-wide career office that does not specialize in health IT.

The university-based training portion of the Workforce Program consists of nine universities from around the country. Every university had an existing health IT program prior to their participation in the Program. The universities used the program funding to enhance and expand their existing health IT programs with some also adopting online learning aspects of their programs. Most of the universities used existing faculty at their institutions to staff the expanded health IT programs. Many universities also used guest lecturers to provide students with different perspectives from the industry. The universities mostly used existing materials to create new courses for their school's programs. Some universities also used self-paced courses with regularly scheduled "virtual" office hours to offer more flexibility to their students. All of

the universities use group projects and many use case studies to analyze "real-world" problems. Internships or practica were also required at all of the universities.

The curriculum development portion of the Workforce Program consisted of five curriculum development centers around the country. The Centers created the curricula for the community college portion of the program. Each Center developed four components covering various topics. The content for these components included PowerPoint slides, quizzes/tests, supplemental readings, and other materials. The Centers worked collaboratively with ONC and with each other to create a cohesive approach across the 20 components. Every Center used a team approach, where one team of people (including curriculum/instructional designers, technical writers, and content experts) created the content for all of their center's components or multiple teams each developed one component. They also used community colleges and advisory boards (consisting of local clinicians and employers) to either help develop the material or to review the material after it had been developed. The Centers updated the materials based on suggestions sent by the community colleges to the NTDC and a "gap analysis" that the Centers asked AMIA to perform.

The HIT Pro exams were developed jointly by three organizations: NoVA, AHIMA, and Pearson VUE. The developers established an advisory council consisting of community colleges in the Workforce Program, Regional Extension Centers, various employers, and other stakeholders to gather input on the development of the exam. Based on these discussions, they developed initial questions for a test version of the exam. The exam developers checked questions for their relevance to specific job positions. They advertised the exam through newspaper advertisements, letters to professional organizations, and presentations at conferences. The program also sent advertisements directly to the community colleges participating in the Workforce Program.

Appendix A: Site Visits and Surveys

This report primarily highlights findings from a series of site visits. The majority of the site visits were conducted in person. For each of these visits, three members of the NORC evaluation team conducted a series of conversations with program administrators, instructors, career counselors, students, and local employers. Because several of the community colleges offer all of their courses online, NORC conducted "virtual site visits" with four community colleges. For each virtual site visit, the research team held three to five phone conversations with college representatives, students, and employers.

Appendix Table 1 lists the community colleges that NORC visited prior to drafting this report. NORC held conversations with all five of the consortium leads either as part of the site visit or via phone.

Appendix Table 1: CCC Site Visits

Community College Name (State)	Date Visited
Mt. Hood Community College (Oregon)	June 2011
Portland Community College (Oregon)	June 2011
Community College of the District of Columbia (DC)	June 2011
Tidewater Community College (Virginia)	July 2011
Orange Coast College (California)	August 2011
East Los Angeles College (California)	August 2011
Cuyahoga Community College (Ohio)	August 2011
Macomb Community College (Michigan)	August 2011
Community College of Baltimore County (Maryland)	August 2011
Lake Region State College (North Dakota)	October 2011
Midland Community College (Texas)	October 2011
Atlanta Technical College (Georgia)	October 2011
Maricopa College (Arizona)	November 2011
Bronx Community College (New York)	March 2012
Westchester Community College (New York)	March 2012
Milwaukee Area Technical College (Wisconsin)	March 2012

In addition, NORC evaluators attended two CCC meetings. In July 2011 we attended the Region D Consortium meeting and in September 2011 we attended the Region E Consortium meeting. At those meetings we had the opportunity to speak with program leads from some of the member institutions.

Appendix Table 2 lists the university-based training programs that NORC visited prior to drafting this report. All of these universities, except for Indiana University also received funding to serve as Curriculum Development Centers. For these site visits, our discussions addressed both the UBT and the Center. We also held a phone interview with the University of Alabama at Birmingham—the only Center that is not also a UBT—in January 2012. The evaluation team held discussions via phone with the remaining four UBTs and will visit them in Fall 2012.

Appendix Table 2: UBT Site Visits

University Name	Date Visited
Oregon Health and Sciences University	July 2011
Johns Hopkins University	September and October 2011
Columbia University/Cornell University	November 2011
Indiana University	November 2011
Duke University	December 2011

This report is also informed by several surveys. Throughout the course of this evaluation, NORC is conducting baseline surveys in order to capture students' impressions of the program at the approximate time they are expected to complete the community college or university program. In addition, NORC is conducting follow-up surveys six months after the baseline surveys to learn more about student employment outcomes. The study includes three cohorts of baseline and follow-up surveys for both CCC and UBT students. In addition, NORC conducted one survey of all the community college faculty members in September 2011. Table 3 provides additional information about those surveys.

Appendix Table 3: Surveys

Survey	Date Opened	Date Closed	Sample Size	Response Rate
Community College Cohort 1 Baseline	3/29/2011	7/5/2011	623	77% (n=481)
Community College Cohort 2 Baseline	8/11/2011	12/3/11	616	75% (n=465)
Community College Cohort 1 Follow Up	11/17/11	3/6/12	623	74% (n=463)
UBT Cohort 1 Baseline	8/19/2011	11/22/11	476	76% (n=360)
UBT Cohort 2 Baseline	12/15/11	2/24/12	124	76% (n=94)
Community College Faculty	9/22/2011	1/2/12	648	80% (n=460)

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[i] Based on information provided on the ONC CCC website and in the Funding Opportunity Announcement, both of which are available here: http://healthit.hhs.gov/portal/server.pt?open=512&objID=1804&mode=2

[ii] Based on information provided on the ONC UBT website and in the Funding Opportunity Announcement, both of which are available here: http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__university-based_training_program/1808

[iii] Based on information provided on the ONC Curriculum Development Center website and in the Funding Opportunity Announcement, both of which are available here: http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__curriculum_development_program/1807

[iv] Based on information provided on the ONC Competency Examination website and in the Funding Opportunity Announcement, both of which are available here: http://healthit.hhs.gov/portal/server.pt/community/healthit_hhs_gov__competency_examination_program_%282%29/1809

[v] Swain M, Vibbert D, Furukawa MF. ONC's Community College Program Trains Over 12,000 Health IT Professionals. ONC Data Brief, no. 3. Washington, DC: Office of the National Coordinator for Health Information Technology, May 2012. http://www.healthit.gov/sites/default/files/pdf/0512_ONCDataBrief3_TrainingHITProf.pdf
[vi] Personal correspondence with Matthew Swain, July 27, 2012.