Implementation of ONC's Workforce Development Program

January 2013

FINAL REPORT

Workforce Program Evaluation: Community College Consortium Site Visit Report (Rounds 1 & 2)

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NORC

at the UNIVERSITY *of* CHICAGO

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Executive Summary

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 comprises four constituent programs:

■ *Community College Consortia (CCC) to Educate Information Technology Professionals in Health Care.*[1] This program provides $68 million to five consortia, which supported a total of 81 community colleges covering all 50 states, to establish or improve non-degree health IT training programs that can be completed within six months. The funded community colleges will help train 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.

■ *Curriculum Development Centers (the Centers).*[2] ONC awarded a total of $10 million in cooperative agreements to five universities to develop health IT curriculum materials and educational materials for use in training students in the six professional roles described above. In addition to use by the CCC program, the materials have also been made available to other schools and individuals outside the Workforce Program for wider use across the country. The recipients created three versions of these materials, with each one improving technically and substantively upon the previous version. At the time that the first round of site visits occurred, only Versions 1.0 and 2.0 had been released. At the time the second round of site visits were conducted, Version 3.0 had also been released.

■ *Competency Examination for Individuals Completing Non-Degree Training.*[3] One two-year, $6 million, cooperative agreement was awarded to fund the design and initial administration of competency exams (also known as HIT Pro Exams) in health IT for the six professional roles that are the focus of the CCC program. Vouchers will be available to cover the cost of the exam for individuals who complete one of the CCC programs. Other health IT professionals will also be able to sit for the examination.

■ ***Program of Assistance for University-Based Training (UBT).***[4] This program provides grant funds totaling $32 million to nine colleges and universities to create or expand health IT training programs focused on six health IT roles that require a higher level of training.

This report focuses primarily on the first three programs. It discusses the CCC program's implementation activities, characteristics of the various programs at community colleges, and ways in which the CCC program has intersected with the Curriculum Development Center and Competency Exam programs.

Methodology

ONC funded NORC at the University of Chicago to conduct an independent evaluation of the Workforce Program that focuses on all four of the constituent programs. As part of this evaluation effort we completed two rounds of site visits to community colleges around the country, including individual member colleges and consortium leads. The first round of site visits took place from June 2011 to August 2011, and the second round took place from March 2012 to June 2012. To inform our site-selection process for both rounds, we held conversations with the leads of each community college consortium. Next, we considered a range of selection criteria for the colleges, including: the areas in which they are located (to help ensure a geographically diverse collection of sites in terms of both where they are located and whether they serve primarily rural or urban students); the particular workforce roles for which training is being offered; the number of students enrolled and early attrition rates; and state unemployment rates. We also looked for schools that offer at least some in-person courses in order to make it easier to meet with a significant number of students and faculty members during our visits. While new schools were selected for the second round of site visits, we also re-visited two schools that were part of the first round as well.

Based on these criteria and the qualitative information we learned from the consortia leads, we selected schools to visit from each region. During these site visits, we held small group discussions and focus groups with consortium directors (where applicable), program directors and administrative teams, career counselors, faculty members, students, and local employers (see the Methodology section in the body of the report for a list of the schools included in this round of site visits).

This report discusses key themes, information about the programs, and the perceptions and experiences of the various participants that emerged during both the first and second rounds of site visits.

Key Findings

While the findings from this evaluation will continue to evolve and be further tested through the NORC team's surveys, and additional data-collection activities, the chief conclusions to be drawn from the first and second round of site visits include the following:

Implementation and Program Design

- The flexibility afforded to grantees proved critical to their ability to launch the programs. For example, rather than teaching each student in one of the six Workforce roles defined by ONC, some colleges combined two or more roles into one.
- The majority of faculty members are employed in the health IT field. Students express appreciation for hearing about the "real-world" applications of the material they are learning.
- Many schools found that students were unprepared for the level of difficulty of the courses and/or the workload.
- Student's backgrounds have affected their experiences in the classroom as well as their ability to find jobs after the fact. In general, those with a health-care background found the course materials especially challenging, whereas those with an IT background expressed challenges breaking into the health-care field upon graduation (and often have higher salary expectations as well).
- Collaboration with the consortium leads and other consortium members varies across the regions.
- Students consistently referred to two areas for potential improvement in the program: additional opportunities for hands-on experience and a workload that is more appropriate for the amount of time allotted for the course.

Curriculum Materials and Competency Exam

- The schools appreciated the availability of ONC-funded curriculum materials. Although several programs raised concerns over the quality of some of those materials, many commented they noticed improvements since Version 1.0, but that some problems do still exist.
- The Curriculum Development Centers intentionally created a large volume of materials in order to create a "buffet" of options for instructors; however, some schools noted that the sheer volume of materials received was overwhelming, making it difficult for them to decide what to include in their courses.
- While some colleges left it to individual instructors to revise the materials on their own, in most cases, instructors received refined versions of the materials from the colleges.

■ While some schools require students to take the Competency Exam, many students at other institutions were unfamiliar with it.

Employment

■ Program directors, instructors, and students expressed anxiety about graduates' job prospects and were skeptical that a six-month, non-credit program without a certification would provide sufficient health IT training.

■ Regional labor market conditions are playing a critical role in the job-search experience.

■ Many schools would have liked other ONC-funded health IT grantees to be more involved in their programs, particularly in helping connect students to possible jobs.

■ The schools engaged in a variety of approaches to support their students in finding positions. Many program administrators talked about posting job openings either on their websites or in classrooms or otherwise disseminating potential opportunities.

■ Employers requested a central repository to help connect potential employers and students.

Changes Over Time

■ Some schools modified their learning platforms based on student feedback.

■ While some schools made minor changes to their marketing and orientation strategies, others left these processes unchanged.

■ One school visited during both rounds noted that students in later cohorts had significantly more education and training than did those from previous years, although it was unclear why this was the case.

■ While students and faculty members who had been exposed to multiple versions of the curriculum materials noted improvements over time, particularly related to technical issues, some substantive problems persisted.

■ Over the course of the grant, some schools made a greater effort to help students prepare for the HIT Pro exam. While some schools initiated more formal prep courses, this process was less formalized at other schools.

■ In many instances, students continue to struggle to find employment. They feel that, in general, employers are largely unaware of the program and wish that the colleges would conduct more outreach to potential employers. The evaluation will examine trends in employment over time in more detail using survey data.

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, the program has been designed to train and graduate high-caliber health IT professionals interested in supporting the growing and evolving health IT industry.

The Workforce Program comprises four constituent programs: the Community College Consortia to Educate Information Technology Professionals in Health Care program (CCC program), the Program of Assistance for University-Based Training (UBT program), the Curriculum Development Centers (the Centers) program, and the Competency Examination for Individuals Completing Non-Degree Training program (Competency Exam program, also known as the HIT Pro examination). In order to provide training in the appropriate areas needed in the growing health IT workforce, ONC defined a total of 12 professional roles that the various training programs will target. The CCCs are targeting six of these roles, while the UBTs are targeting a different six, which were determined to be more appropriate for university-based training.

Additionally, ONC funded NORC at the University of Chicago to conduct an independent evaluation of the Workforce Program that focuses on all four constituent programs. This evaluation is addressing a range of issues concerning the Workforce Program, including the challenges of integrating evolving and newly developed curricula, of recruiting and training faculty and prospective students, and of coordinating among the four grant programs and other efforts funded through the Health Information Technology for Economic and Clinical Health (HITECH) portion of the American Recovery and Reinvestment Act (ARRA) as well as with other prospective employers of students trained through the Program. The Workforce Program evaluation will explore these issues through both formative and summative evaluation approaches, provide critical formative feedback to the grantee institutions on their activities, and offer perspectives on the Program's contributions in helping to build a skilled workforce equipped to meet the current needs of a range of employers.

Methodology

ONC funded NORC at the University of Chicago to conduct an independent evaluation of the Workforce Program that focuses on all four of its constituent programs. As part of this evaluation effort, we have completed two rounds of site visits to community colleges around the country, including individual member colleges and consortium leads. The first round of site visits took place from June 2011 to August 2011, and the second round took place from March 2012 to June 2012. To inform our site-selection process for both rounds, we held conversations with the leads of each community college consortium. Next, we considered a range of selection criteria for the colleges, including: the areas in which they are located (to help ensure a geographically diverse collection of sites in terms of both regional location and whether they serve primarily rural or urban students); the particular workforce roles for which training is being offered; the number of students enrolled and early attrition rates; and state unemployment rates. We also looked for schools that offer at least some in-person courses in order to make it easier to meet with a significant number of students and faculty members during our visits. While new schools were selected for the second round of site visits, we also re-visited two schools that were also part of the first round.

Based on these criteria and the qualitative information we obtained from the consortium leads, we selected schools to visit from each of the five regions. In some cases, we were able to meet and/or speak with representatives from multiple schools as part of a given visit. We also attended Region D's meeting during a 2011 ONC Regional Meeting in Atlanta and Region E's consortium meeting with its member schools. As part of these trips, we were able to speak with both the consortium directors and the program directors from multiple member colleges in the two regions. Exhibit 1 displays the schools that we visited and/or spoke with during this round of site visits. Where not otherwise stated, a full site visit was conducted.

Exhibit 1: Members Colleges Included in Site Visits

Site Visit Round	College
	Region A: Northwest Region
1	Bellevue Community College* (spoke with consortium director only)
1	Lake Region Community College
1	Lane Community College (spoke with faculty only)
1	Mt. Hood Community College (spoke with faculty and observed an in-person class)
1	Portland Community College
1	Umpqua Community College (spoke with faculty only)
	Region B: Southwest Region
1	East LA Community College
1	Los Rios Community College* (spoke with consortium leadership team only)
1	Maricopa-Gateway Community College
1	Orange Coast Community College
2	Pima College
	Region C: Midwest Region
1	Cuyahoga Community College *
1	Macomb Community College
2	Milwaukee Area Technical College
	Region D: South Region
1	Midland Community College
1	Pitt Community College * (spoke with consortium director only)
1	All member schools (spoke with program directors only)
1 & 2	Atlanta Technical College
2	Dallas County Community College District
2	Houston Community College
	Region E: Northeast Region
1	Community College of Baltimore County
1	Tidewater Community College*
1	Selected member schools (spoke with program directors only)
1 & 2	Community College of DC
2	Bronx Community College
2	Westchester Community College

*Denotes Consortium Lead

During the full site visits, we held small group discussions and/or focus groups with consortium directors (where applicable), program directors and administrative teams, career counselors, faculty members, and students. We also spoke with at least one local employer during each site visit, including representatives from Regional Extension Centers (RECs), consultants, project managers at hospitals, and representatives from professional associations. Further, for schools that do not generally offer in-person learning, we conducted "virtual site visits," during which all of the conversations were held via teleconference. Discussions during both rounds of site visits focused on similar topics (as discussed below); however, the first round included more emphasis on startup processes, whereas the second round emphasized implementation and lessons learned. In instances when a school was visited during both rounds, the second round focused on newly implemented activities, as well as how the school addressed any challenges noted during the first round. This report discusses key themes, information about the programs, and the perceptions and experiences of the various participants that emerged during both rounds of site visits.

Program Characteristics

This section provides an overview of the program characteristics at the schools we visited. Most information in this section was gathered through conversations with consortium directors, program directors, and administrative teams.

Credit versus non-credit

The grants provided schools the option of delivering training programs for-credit or not-for-credit. Both across and within the consortia, schools are split in offering credit for their programs. Consortium and program directors reported that this characteristic of the programs has been a "hot topic" of discussion among the community colleges. Some schools who have taken the for-credit approach noted that they thought this approach may be more appealing to students, and may ultimately help with the programs' sustainability after funding from ONC ends.

> *One program administrator noted that, in his mind, the most important issue is to determine the content that needs to be learned, learners' skill sets, and the time period in which training must be achieved. Given the short time frame of six months, he feels that the non-credit delivery arm of the community college is often better equipped to handle this type of program.*

Cohorts of students

The majority of schools that the evaluation team visited thus far have "cohorts" of students that move through the six-month training program together; however, schools are taking different approaches to how these cohorts operate. At some schools, students who are training in the same role start the program together and attend classes at a set time each week. Every couple of weeks, the course topics and instructors change. In this regard, the students do not enroll in individual courses, but move through the program as a group.

At other schools, the cohorts function to bring students together and create "classes" of graduates, with the students all enrolling in individual courses of their choosing. At these schools, students all matriculate at the same time, and have the same targeted end date; however, during the six-month training, they are free to take classes in any order they please. At other schools, students are not in cohorts at all, and the training is offered asynchronously. Students at these schools can start the program whenever they choose, and have six months from their starting point to complete the training.

Fees and financial support

The terms of the grants also afforded the schools flexibility in whether or not they charge students tuition. The majority of schools are not charging their students full tuition for the program; however, some

schools are charging a portion of tuition. Other schools are requiring students to pay upfront and then provide a full or partial refund to students who complete the program within six months.

Learning platforms

Schools implemented a spectrum of learning platforms from fully online to mostly in-person. None of the schools that we visited offer fully in-person training programs; one school offers all in-person classes except for six online/in person hybrid courses. The schools that are taking a hybrid approach to training platforms are implementing their programs in a number of ways. One school structures the program so that students spend six hours on the weekends in in-person classes, with the remaining courses delivered online. Other schools offer students more flexibility in deciding the proportion of online and in-person classes that they take. At yet another school, all courses are online, but the students participate in regular "face to face" networking sessions, in which they hear from local employers, experts in the field, and faculty members.

During the second round of site visits, some schools noted they had changed their learning platforms as the grant progressed, due in part in reaction to student feedback. One school had considered offering more online and hybrid classes; however, in student surveys, students expressed 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 appreciate the in-person interaction.

Changes over time

With the exception of changes in learning format, there were very few differences in program characteristics observed during the first and second round of site visits.

Student Enrollment and Characteristics

This section describes student characteristics at the various colleges, including demographic and background information, and students' motivations for enrolling in the programs. The section then discusses the colleges' recruitment methods and application processes, and ends with a discussion of the schools' approaches to orientation.

Demographics

Students' age, educational attainment, and previous work experience are discussed below.

Age. In general, the students enrolled in the programs tend to be older than the typical community college student, but the student age distribution varies from school to school. One school reported that a number of their students are in their 20s; another said that a large portion of their students are between 50 and 60 years old.

Previous education. Schools are seeing a wide range of educational backgrounds in their students; however, most schools report that their students have at least bachelor's degrees, and in some cases master's and PhDs. There are also a number of students with nursing degrees enrolled in some programs. Schools require that students have previous experience in the field; therefore, it is not surprising that most students also have some form of higher education.

> *"Many of the students in the program are career changers, whereas the typical community college students tend to be individuals who held various jobs, but who never embarked on a true career." - Program director*

However, a notable exception is one school that is catering towards younger students. This college noted that the highest level of education most enrolled students have is either a GED or high school diploma.

Prior work experience. Some previous experience in IT or health care is a requirement of enrollment at all schools, therefore the majority of students have a number of years of work experience. There are a few exceptions; one school noted that, while most students have work experience in either health care or IT, it was generally not extensive.

Some students lost high-paying jobs in IT, and were finding it difficult to accept lower-paying opportunities. They are using this program to "break in" to the health-care sector, in hopes of landing a

job more suitable to their skill set. Other students worked in the health-care field for years, and are using the program in order to be qualified for health IT positions.

Faculty members found that, in general, students with an IT background are having an easier time learning the health-care material, while students with health-care backgrounds are having a more difficult time picking up the technical IT skills. When probed on possible reasons for this observation, faculty members suggested that the health-care materials may be more intuitive, while the IT topics require more practice and experience for proficiency.

Workforce program students in comparison to "typical" community college students. As stated, the students enrolled in the programs tend to be older than the colleges' typical students. Additionally, these students tend to have more experience and a higher level of educational attainment than other students. A number of schools noted that more students enrolled in the HITECH programs are currently employed than typical community college students.

Motivations for enrolling in the program

Students decided to enroll in the community college programs for a number of reasons. Some felt the program would provide additional training for jobs that they currently hold, while also improving their opportunities for promotion. Additionally, some employed students felt that the program would help them to secure a new, better job.

Other students saw the program as a good way to break into the health IT field and to gain additional skills. Many unemployed students are hoping that the program will help them to secure a job and given them additional credentials.

Recruitment and application processes

Schools used a variety of strategies to recruit students to the programs, including word of mouth and various forms of advertisements. Schools also took different approaches to the application and acceptance processes. These themes are discussed below.

Recruitment and marketing strategies. Many schools had success with word-of-mouth strategies and used minimal marketing activities. Further, during the second round of site visits, some schools commented that as the grant progressed word-of-mouth strategies became even more successful as the number of program completers increased. In some instances, schools were inundated with interested students, resulting in wait lists, and had to limit their recruitment activities. Students at a number of schools commented that they learned about the program through a co-worker, friend, or acquaintance, and

that they had not seen any sort of advertisement for the program. One school targeted students currently enrolled in other health care or IT programs at the college. This school has long wait lists for many of their allied health courses, so some students who had signed up for those programs decided to enroll in the health IT program instead.

Schools that engaged in marketing campaigns used a number of forums for doing so, including placing ads in local newspapers; running articles in the colleges' newsletters; using radio or classified ads; connecting with various networking groups; and participating in job fairs and relevant conferences. Programs also used their school's websites by placing pop-up boxes and banners on their home page to advertise the program. Some schools that engaged in extensive marketing campaigns faced some difficulties. For example, one consortium lead mentioned that advertisement and marketing for the programs proved difficult in part because their communications staff was overextended or overwhelmed by this new responsibility.

Another widely used recruitment tool is student referral. One administrative team explained that they relied heavily on this method, and set up a referral compensation program. If a student refers an accepted applicant to the program, that student receives $5. The administrative team commented that this effort has been successful.

Application and acceptance processes. As with other processes, schools have taken a variety of approaches to their application and acceptance processes. For example, some consortia agreed on baseline admissions criteria for all member colleges, while others have left this entirely up to each school.

Many administrative teams stressed the importance of ensuring that students have adequate backgrounds to be successful in the program. Schools are also being honest with their students as to what the local employment needs are in order to keep students' expectations realistic. In order to do this, one school developed a score for each applicant based on a pre-assessment test. This school also carefully reviews students' résumés and personal statements and weighs prior experience in either health care or IT. Another school implemented a vetting component of their application process, with applicants having to checking boxes to indicate their experience and education. Despite this process, this school is still seeing a number of unqualified applicants who are further deferred once the team assesses their application. At another school, after students submit their application and transcripts and are determined to meet the minimum requirements, they are brought in for small-group interviews. These discussions focus on students' backgrounds and career ambitions in order to determine if they are a good fit for the program.

Many schools take a proactive approach to placing students in the various roles offered. At one school, when admitted, students may provide their preference for a role, but the school ultimately selects the role for each student. This selection is based on the student's background and role preferences. Most students end up being given either their first or second choices. Another school evaluates the students' background and determines if their studies will focus on health-care or IT courses. Other schools provide counseling to students upon acceptance to the program on what roles might be most appropriate, but the student makes the ultimate role selection. In addition to helping students select role/s, some schools also permit students to place out of courses based on their background, so that each student takes a set of classes that is tailored to his or her particular needs.

Orientation

Many schools hold orientations to introduce the students to the program. Some orientations are mandatory, while others are optional. Administrators, faculty members and students alike have been pleased with the orientation process. One program administrator found that holding an orientation session helps provide potential students an understanding of what to expect and to weed out individuals who might not be well-suited for the program.

As opposed to the more traditional orientation sessions, one school held a one-week, intensive "boot camp" to introduce students to concepts that the program will cover and to impart a sense of the program's intensity. During the first round of site visits, this school commented that they planned to expand this boot camp to two weeks in order to help students with health-care backgrounds become acclimated to IT issues and vice versa. This school was re-visited during the second round of site visits by which point it had implemented this change.

Changes over time

In addition to some minor changes in marketing strategies and orientation processes, some schools saw changes in their student demographics. Notably, one school that was part of both rounds of site visits commented that students who enrolled in the program in later cohorts had more previous education than did those in earlier cohorts. The school was unsure why this change occurred, as they had not modified their marketing targets or approach. Most other student characteristics remained the same. We will use survey data to further examine changes in student characteristics over time.

Implementation

The schools decided to apply for and participate in the grant for a number of reasons. During each of our site visits, we asked the program directors, administrative teams, and faculty members to provide information on ways in which the program was implemented. In this section, we discuss the early decision-making process, whether or not the colleges had prior health IT programs, and the process of hiring new faculty members and additional staff.

Start-up processes

The five consortia were all formed in different ways and chose different models for running their respective training programs. At some lead institutions, the consortia leadership team also runs that school's training program; at others, there are separate teams that run the school's training program and serve as the leadership for the consortium as a whole.

At least two of the regions had several schools that were already working as a group on other efforts, both related to and not related to health IT. For example, in one region, a group of schools had previously collaborated on a statewide health IT certificate, so when ONC announced the funding opportunity, it was a natural progression for them to apply as a consortium. In other regions, the consortium was formed for the purposes of the grant. In many instances, member schools approached the lead about applying for funds; however, at least one lead institution noted that they leveraged already-existing relationships with schools in the region to recruit members.

Program directors also noted some challenges and frustrations with the start-up and implementation processes. Many felt unprepared for the beginning of the program, as they only received the curriculum materials shortly before courses began, as discussed below.

Prior health IT programs

Many of the schools had existing health IT programs, including associate's degree and certificate programs, and felt that this program would be a good addition. The schools that did not have health IT programs, but did have related health information management (HIM) programs, viewed the grant program as an opportunity to add to their curricula. One consortium lead noted

One program director commented that their existing associate's degree program in health IT is a more-intensive career-transformation program, as opposed to a full training program.

that about half of their member colleges had health IT or HIM programs prior to this funding opportunity. While those schools had some advantages—for example, they were more likely to have labs set up for student use—they were still essentially starting new programs, rather than tweaking existing ones, to meet the objectives of this grant, as some of the existing programs were very different from the HITECH program.

The lead institutions cited a range of reasons for applying for the consortium lead role. For example, one consortium director noted that it was an easy decision to apply for the lead position, as they are one of the region's largest community colleges and possess a robust infrastructure. Another consortium director commented that, although they did not have a previous health IT program, they did have experience leading large federal grants, and felt they were in a good position to provide leadership to the region.

Recruitment and background of faculty and additional staff

The vast majority of faculty members teaching in the programs are adjunct instructors that also work in the field. Many schools were able to use their advisory board members to find instructors. In some instances, the advisory board members themselves are teaching, and in other instances the members were able to help schools recruit staff from their organizations. Other schools took the approach of recruiting instructors that were already teaching health-care or IT courses at the college.

While a number of the instructors have previous teaching experience, most have an industry background as opposed to an academic background. Faculty members have found the teaching experience to be rewarding and enjoyed providing real-world examples in their classes. Students also commented that they appreciated the real-world perspective from their instructors. Some faculty members have, however, found the transition from industry to academia and balancing teaching with working to be difficult. At some schools, faculty members found the time commitment required for the teaching positions to be greater than they had initially been told and/or anticipated.

> *"It would not have been feasible for the school to establish a health IT program in a short time period if the college had been required to develop the curriculum from scratch." - Program director*

In addition to hiring faculty, many schools needed to hire administrative staff at the grant's outset. A number of schools hired grant coordinators and managers specifically for the purposes of this program; however, some program directors commented that it was difficult to figure out what types of staff to hire. Another school hired an administrative assistant who took on extensive marketing responsibilities after it was clear that the program coordinator needed assistance with this task.

Curriculum Materials Developed by the Centers

As discussed, the Centers were charged with producing multiple versions of the materials. The first half of Version 1.0 was released in August 2010, with the second half following in November of 2010. Version 2.0 was subsequently released in early spring of 2011, and Version 3.0 was released in March 2012. The revisions in Version 2.0 were mostly technical in nature (correcting typos, improving quality, etc.), while the revisions in Version 3.0 focused on substantive issues. Although Version 2.0 was released in the spring 2011, it took additional time for schools and faculty members to integrate the revised materials into their courses. Therefore, depending on the timing of our visits during the first round, some

faculty and student participants had been exposed to both Versions 1.0 and 2.0 of the materials, while other participants were only exposed to Version 1.0. During the second round of site visits, some faculty and students had been exposed to all three versions, but most had only been exposed to Versions 2.0 and 3.0, or Version 3.0 alone.

> *One instructor explained that it would be more valuable to provide instruction on how to read an HL7 message, rather than to describe the history of HL7.*

In general, the program administrators appreciated receiving materials produced by the Centers. However, all colleges noted that not having access to the full set of materials in advance of the programs' start made it difficult to recruit instructors and students and otherwise prepare for the program's launch in September 2010. It is important to note that the Centers received their cooperative agreement funds at the same time funds for the other three Workforce programs were released, and were therefore on a compressed timeline to create materials for the September 2010 launch of the CCC programs. Many participants commented that this parallel timing of the Centers and CCC programs was problematic, and it would have been beneficial had the government structured the programs to be implemented sequentially. While all programs we visited used the curriculum materials, they raised concerns related to the volume and quality, as discussed below. We also discuss the ways in which consortium leads and member institutions modified the materials to address these concerns. We end this section with a discussion of colleges' experiences and interactions with the Centers about the materials and other issues.

Feedback on the curriculum materials

One theme that was raised frequently on the site visits was the overwhelming volume of materials delivered by the Centers. Schools understood that the materials were meant to be a "buffet" from which they could select units to teach. However, many colleges were reluctant to remove materials out of fear that they would omit topics addressed on the HIT Pro exams. ONC provided a matrix of roles by component (often referred to as the "Set Table") described which of the components were of highest

priority for each of the Workforce roles. One community college estimated that teaching all of the materials associated with components that were considered Priority 1 or Priority 2 on the Set Table would comprise approximately 450 hours of instruction per role—far more than is feasible in a six-month time frame. One factor contributing to the volume of materials was the perceived redundancy—both within a single component and across components—of the content. Both instructors and students indicated that they felt some items were included multiple times. While some participants felt this was a problem, others noted that some redundancies in course materials can be a good thing in order to ensure students are adequately exposed to especially important information.

Several colleges indicated that this tendency for the same topic to appear in various places in the materials was a symptom of five different institutions developing the materials. Many schools noted that the materials seemed disjointed and that some terms (e.g., "confidentiality") are defined multiple times throughout the materials—each time with a different definition. In other instances, the materials use different terminology to describe the same concept. Additionally, schools noted inconsistencies in the way in which the materials were presented. Often, there was a clear mapping between the lesson objectives, the slide contents, and the quizzes and assessments. However, not all components shared that structure. Further there was consensus across schools that some of the components were of higher overall quality than others. Because of the limited time the Centers had to prepare the materials, there may not have been adequate opportunity for close coordination across the different universities awarded cooperative agreements to develop the materials.

With regard to the overall content of the curriculum materials, several instructors and employers commented on the comprehensiveness of the materials and felt that they would provide students with a solid knowledge base in health IT. However, some noted that the materials went into too much depth in some areas (e.g., detailed information about data modeling as part of the workflow course) and provided too basic an overview in other areas. The wide range in students' backgrounds and expertise may pose particular challenges in determining the appropriate level of detail. Both instructors and students raised concerns that the materials were too "academic" and not sufficiently focused on building the immediately applicable workforce skills that employers demand.

During each site visit, students, faculty, and program administrators raised concerns that there were numerous typos and other mistakes in the slides (this was primarily an issue with Version 1.0). Students were particularly frustrated when they encountered errors in the assessments. Students also noted some technical issues with some materials. For example, while several appreciated the availability of audio recordings, they explained that the recordings' quality was sometimes poor. It is important to note that

some students and instructors were exposed to the first version of the materials and thus that their feedback reflects their impressions of the materials before they were revised. As discussed below, participants acknowledged improvements in the second version.

Finally, individuals at some colleges felt that an instructors' manual that included guidance on how to most effectively deliver the materials to the class (e.g., instructions for setting up group assignments) would have been helpful to receive along with the materials. Interestingly, while several of the Developers mentioned having developed such manuals, the schools were not aware of them.

Modifications and additions to the materials and roles

In light of the concerns described above, the colleges took varying approaches toward revising the materials. In some instances, instructors used the materials in the exact form in which they came; at others, instructors received refined versions of the materials from the colleges. Additionally, some schools left it to individual instructors to revise the materials. At one school, instructors were given a $1,000 bonus if they chose to review and revise the components prior to starting the course.

To address the large volume of materials, some community colleges hired instructors or instructional designers to review all of the materials and select the most relevant ones for inclusion in the program. For example, one college noted that their instructional designer trimmed the materials down to roughly 200 hours of instruction, by removing redundant lessons and selecting the materials that were considered most likely to appear on the exam and/or to be useful in a job setting. Even still, one instructor in that program noted that there might be 300 slides to run through in one 5-6 hour course. This effort to systematically review the materials occurred on the consortium level in one region. When that lead first received the components' blueprints, staff at that institution created a framework of competencies for each role and fitted the components and units into this framework. As they complete the re-packaging, the new materials are distributed to member colleges.

It is important to note that, due to the condensed timeline, some member colleges have been unable to spend as much time as they would have liked in preparing the materials before courses began. Similarly, member institutions may have rolled out their courses before they received the re-packaged versions of the curriculum materials from their consortium lead (in the case of the region that did this at the lead level).

In an effort to enhance the courses' practical aspect, many instructors integrated examples from their professional lives into the courses they taught. Others identified YouTube videos to highlight stories from the field. Some schools added new activities to provide students with hands-on experience in tasks

that would be relevant to EHR implementation (e.g., one school created an exercise related to the vendor RFP process). One consortium focused its annual meeting of member institutions on the topic of patient safety, in order to help that region's colleges demonstrate to their students the link between EHRs and patient safety.

In addition to modifying the curriculum materials, several colleges altered the Workforce roles' structure. Instead of teaching each student one of the six roles developed by ONC, several schools merged two or more roles because they noted that there is a large amount of overlap in the components taught for each role. For example, one consortium lead developed a two-track model through which students with an IT background enroll in an engineering track (which merges the technical/software support staff and implementation support specialist roles) and students with a health-care background enroll in a consulting track (which merges the remaining four roles). While students in both tracks take some courses that focus on the same curriculum components, the courses' content may differ (e.g., more technical content for the engineering track). The program leaders believe that students who are trained for more than one role would be more desirable to employers than students with training in just one role. The consortium lead received feedback from industry representatives who agree with this approach.

Other community colleges implemented variations of this two-track model. For example, at one college, students either train as an EHR Specialist (a combination of the clinician/practitioner consultant role and the practice workflow and information management redesign specialist role) or as an EHR specialist IT (a combination of the implementation support specialist and the technical/software support staff roles). Upon successful completion of either track, students can apply to receive additional training for either the implementation manager role or the trainer role.

Experiences with the curriculum developers

In addition to making modifications to the curriculum materials themselves, community colleges provided feedback to Oregon Health & Science University (OHSU) in its capacity as the National Training and Dissemination Center (NTDC) for the Curriculum Development Centers program. On the NTDC website, schools have the opportunity to submit feedback. The colleges' had mixed perceptions of this function's usefulness. One program director commented that she routinely submits feedback via the website and the issues are usually quickly addressed, while other faculty members and directors felt that their feedback was not consistently addressed. The fact that not all feedback was addressed in the same manner or timeframe may be tied to the way the Centers went about revising the versions. The Centers concentrated on revising formatting and technical issues (including typos) in Version 2.0, and concentrated on revising substantive content in Version 3.0. Several schools noted that they were pleased

that the NTDC administered a survey to solicit their comments on the materials. They hoped the Centers would continue to gather feedback and take those comments into account when revising the materials. One college planned to survey other member institutions in its consortium to collect comments on the materials, which could be used to inform revisions by the Centers, as well as by the schools themselves.

Colleges also pointed out that it is challenging to keep up with the small changes made to the materials between the release of different versions. For schools that took a more proactive approach to revising the materials, it is particularly challenging to keep track of these mid-course corrections. There were also some concerns about the timing of the revisions. During the first round of site visits, colleges were unsure if they will use the third version of the materials, as the Centers may release the materials after they begin the program's final semester. During the second round of site visits, some schools had, in-fact, opted to not utilize Version 3.0.

Several colleges also raised concerns about the curriculum material's public release. Particularly in programs offered exclusively online, program administrators worry that individuals would simply download the materials themselves and forgo formal training, or that other colleges will use the materials to create their own programs. While the community colleges understood that the materials would eventually be made public, they hoped ONC would wait until the grant's program end in order to help the community colleges enroll their target number of students.

Changes over time

Faculty and students who had been exposed to multiple versions of the materials noted differences and improvements between them. For instance, many participants appreciated that most of the typos present in Version 1.0 were fixed in Version 2.0. Further, participants noted that Version 3.0 fixed a number of the substantive problems in Versions 1.0 and 2.0. Faculty members did feel that many of the problems discussed above, including disjointed lectures and gaps in materials, still existed in Version 3.0, albeit to a lesser extent.

While faculty members appreciated the revised materials, they did note that it was very time-consuming to transition to a new version. Faculty members at one school estimated it took between 30 and 50 hours to transition between versions and to update the supplemental materials included in their courses.

Further, one school that was part of both rounds of site visits greatly revamped its overall curriculum in hopes of reducing attrition. In addition to incorporating new versions of the Centers' materials, this school revamped quizzes and assignments, and added an assessment at the end of each course. In order to pass the course, students must score 80% or higher on this course assessment. The leadership at this

school noted that since making these changes, more students have been able to complete the program within 6 months of enrolling.

We will use survey data to further examine changes in use and perceptions of the curriculum materials over time.

Collaboration

Collaboration is a large component of the Workforce Program. Specifically, the community colleges must collaborate within their own consortium, as well as with other Workforce grantees and other ONC funded programs. The section below discusses the college's collaboration with the consortium lead, with other consortium members, Workforce grantees, ONC funded programs, and ONC.

Collaboration with the consortium lead

In general, member colleges are pleased with the consortium set up of the Program. The five consortia operate differently, and have taken different approaches to collaboration. Consortium leads have different levels of involvement with their members. However, all consortia have regular conference calls. Each consortium also holds regional meetings to bring all member colleges together. These meetings focus on different topics, from issues with the programs, to topics in the field such as patient safety.

Levels of involvement in curriculum materials and role definition. Consortia approached editing the curriculum materials and defining the roles in different ways. Some leads left this entirely up to the member schools, while others have been more involved in this process. Two examples (also mentioned above in the curriculum materials section) of leads taking an active role in this process include:

- One consortium lead worked to edit and repackage all the curriculum materials and then disseminated the repackaged materials to their member colleges.
- Another lead worked to re-define the roles into a two-track structure and gave their members the option of using this format instead of the six role structure provided by ONC.

Assistance to member colleges. Consortium leads are providing various types of assistance to their member colleges. In general, member schools are pleased with the support received from their consortium lead. One form of assistance that leads provide is serving as the primary point of contact with ONC and relaying information to the member colleges. While some schools were happy that the leads took some administrative burden off them, other schools noted that they would prefer a flatter organizational structure, as it often took a long time for the members to learn important information.

> *"While we understand the need to provide assistance to the member colleges, it has been difficult to provide everything that members request because we also need to work on our own program."*
>
> -*Consortium director*

Other types of assistance leads are providing include helping members implement their programs, bringing members together to share best practices, and providing templates and instructions for developing the budget. Some leads are also collecting information, including student demographics, employment and background information, from their member colleges and plan to use this information to further help their member colleges shape their programs.

Collaboration with other consortium members

Collaboration with consortium members varies across the regions. Some administrative teams and faculty members regularly share best practices and edited materials with other schools, while some have limited involvement with the other members. In addition to the regular consortium conference calls, many member colleges also communicate with each other informally though phone calls and email. Although there is collaboration among member colleges, many faculty and administers noted that

One project director commented that they regularly collaborate with the other member colleges in their state on recruitment and employer outreach.

they wish there was a mechanism for sharing best practices among all schools in the Workforce Program, not only those within their consortium.

Some consortium leads are working on additional ways to increase collaboration among member colleges. For instance, one consortium is using a virtual tool called ToolWire, which allows students from all member colleges to log on and use cloud-computing to complete their VistA labs.

There are other forms of collaboration within the consortium as well. In one region, there is a mini-consortium consisting of four schools. While these schools all collaborate regularly, the lead of this smaller consortium has the most contact with the actual regional consortium lead. While some members of this mini-consortium were happy with the structure, others found that this extra layer created difficulties, and felt that it inhibited the support that they received.

One representative from a college noted that their local REC had been focusing on creating sustainable business models in the early stages of its grant funding; however, as that program matures, new opportunities for collaboration may arise.

Collaboration with other Workforce grantees

In addition to collaborating with the other member colleges within their consortium, some program administrators thought it would be valuable to have more opportunities—particularly face-to-face meetings—to speak with individuals from the other consortia to learn from each other about what strategies were and were not working well. Instructors from one college talked about wanting to develop

a forum for instructors across the schools to seek and provide advice about how they are teaching the materials. In that way, if one instructor identifies useful videos or other supplementary materials, those resources could be shared with others who are teaching the same components.

We also identified a few colleges that were involved with the other grant programs within the Workforce program. For example, several schools provided input to the Centers as they designed the materials. However, in one case, a community college that originally had a partnership with a Center to help develop curriculum materials discontinued this partnership because the college felt that its representative's suggestions were not being heard.

Several instructors participated in the HIT Pro exam's alpha test. However, in general, the community college administrators felt that additional opportunities to collaborate with exam developers would have been beneficial.

Collaboration with grantees of other ONC programs

Community colleges also have the potential to work with other organizations that received funding through the HITECH Act, such as the Beacon Communities, the organizations awarded funds through the State Health Information Exchange (HIE) program, and the RECs. While none of the colleges we visited had established relationships with HIE or Strategic Health IT Advanced Research Projects (SHARP) Program grantees, several mentioned that they are eager to work with them. The RECs are the group of grantees with which the community colleges felt the strongest desire to strengthen ties. Not only are RECs potential employers, but they also have contact with many providers who will potentially want to train their employees in the CCC program or hire project graduates. Despite the value in building those connections, the colleges we visited had mixed experiences working with their local RECs.

Several schools commented that they had reached out to their RECs but had not been successful in engaging their support. However, there were several exceptions. One school had invited a representative from the local REC to speak with students about the field. That same individual also helped organize a career fair at the college. In several instances, even if the REC had not hired any community college graduates, consulting firms that contract with the REC had taken on students as interns or employees. We also spoke with one REC whose representatives took brochures about local community colleges with them when they were visiting practices during EHR implementation. To try to increase interest among practice staff in receiving training, the REC recently began bringing those brochures during the initial encounter with the practice. While connections between community colleges and RECs are not yet consistently in place, some community colleges expressed optimism that this may improve in the future.

Collaboration with ONC

During the site visits, we also asked about community colleges' experiences working with ONC. The community college representatives indicated that ONC remains responsive and supportive. One school highlighted ONC's support in addressing concerns related to the use of the VistA EHR. Another college noted that ONC responded to concerns that community colleges were asked to report a large amount of information about their students and that those data requirements changed frequently. Others appreciated that ONC has allowed sufficient flexibility in the cooperative agreement program to give the colleges leeway to innovate.

Community colleges requested that ONC be more engaged in several activities. They hoped that ONC would more actively encourage RECs (as well as other grantees, like the Beacon Communities) to interact more with the community colleges and to consider their graduates as potential employees. More broadly, schools would like ONC to engage in national marketing efforts targeted at physician offices and other providers to promote the importance of EHRs and to raise awareness that graduates from the community college programs are capable of assisting them with EHR implementation and support.

Changes over time

There were very few changes related to collaboration observed during the first and second round of site visits. Schools continue to be generally happy with the level of collaboration with other parts of the Workforce program. However, they continue to feel that increased collaboration with other ONC programs, including the RECs and Beacon Communities, would be beneficial and could help students gain employment.

Students' Experiences

During each of our site visits, we held a focus group with students or recent graduates. We also asked program administrators about the feedback received from students. In this section we provide a brief overview of students' perspectives on the instructors, curriculum materials, and learning format, as well as their suggestions for improvement. We conclude this section with a brief discussion about student attrition.

> *"Anyone could teach the course; all [the instructor] did was read the course materials."-Community college student*

Students' perspectives on instructors

Feedback about the instructors varied across the community colleges. When students were dissatisfied with their instructors, they tended to have one of three complaints. First, some students were frustrated by instructors who were slow to respond to emails, or who did not respond at all. This was particularly problematic when students had specific questions about quizzes and assignments. A second concern was that some instructors provided limited feedback on assignments. Students would like to receive more input on the papers and projects they completed so they will know how to improve in the future. A final concern was instructors who simply relayed the information on the slides without adding any additional insights.

> *"Some students prefer online learning, and others prefer in-person. It really varies by what you are comfortable with and what your needs are."-Community college student*

At the other end of the spectrum, participants of several focus groups praised their teachers. In general, students had the most favorable reviews of instructors who integrated into the course their own experiences in the field of health IT. Students also appreciated the instructors who were dedicated to helping them succeed. For example, at one college, instructors committed additional time preparing students for upcoming job interviews and otherwise helped mentor them as they sought careers in the field.

In some instances, students suggested that there may be a need for additional instructors. As enrollment increases, a larger number of instructors may be beneficial to maintain student-to-instructor ratios that are small enough to allow instructors to provide sufficient attention to their students.

Students' perspectives on the curriculum materials

The focus groups also offered an opportunity for students to weigh in on the materials developed by the Centers, although it must be noted that the students' experiences with the curriculum materials may be affected by the changes consortia, colleges, and individual instructors made to the curriculum materials received from the Centers. Students were generally unaware what aspects of the curriculum materials were developed by the Centers, and what aspects were added later. In general, the materials were seen as helpful; several students noted that they would serve as a valuable reference in their careers in health IT. However, several students commented that—while extensive—the materials sometimes lacked sufficient detail to thoroughly introduce them to the topic. As noted above, students also raised concerns about the overwhelming volume of information, the lack of cohesiveness in the materials, and the number of errors and typos.

Students also requested a clearer outline for their course of study, so that they would know from the time of enrollment what to expect in each class. Because community colleges did not receive the full set of curriculum materials prior to starting their programs, adjustments were made to the classes throughout the semester. This caused some confusion and frustration for students, although most acknowledged that in the beginning stages of the grant, program administration might not run as smoothly as would be ideal. Students also offered some specific feedback on the order in which materials were presented. For example, in one school, students suggested that there be a more complete introduction to EHRs and meaningful use from the program's start to provide context for other courses.

Students' perspectives on learning format

Students also offered their feedback on the format in which the program was delivered. Students noted that in-person courses gave them opportunities for additional discussions with their classmates and instructors. In some schools, this also fostered opportunities for students to get to know each other and to form study groups. The in-person format allowed students to network with instructors—some of whom are potential employers. In addition, in-person sessions made it easier to provide feedback to program administrators about how the program could be improved. However, online classes were viewed as more convenient. It was often challenging for students—particularly those who are currently employed—to arrive on time for classes. Some students at schools that had mostly or exclusively online learning noted they would have appreciated the opportunity for more in-person courses, whereas others were happy with all online learning.

Many courses also used Blackboard or other technology to allow for online discussions. There was some concern about the ease of using those technologies and the amount of time it took for students to become

comfortable with the technology. Students also mentioned that the effectiveness of those online discussion boards often depends on whether the instructor starts off the thread with a thought-provoking question that is likely to foster dialogue among students as opposed to a more factual question for which students might have less to say in response to their peers' posts.

Regardless of whether the colleges offered courses in-person, online, or a hybrid of the two, students often had access to the full set of materials developed by the Centers, including the slides with voiceovers. Students appreciated that these resources were available and several spoke about the convenience of being able to listen to the audio recordings. Many students noted that they would have liked a more traditional textbook as well, although the curriculum developers were not able to include such resources among their materials. In several focus groups, students raised concerns about the amount of time they spent printing slides.

Students' recommendations

Students consistently referred to two areas for potential improvement in the program: additional opportunities for hands-on experience and a workload that is more appropriate for the amount of time allotted for the course.

During all of the focus groups, students stressed the importance of spending time working with EHRs. For some colleges, technical problems limited their ability to use VistA. For those able to experiment with that application, they appreciated the chance to gain direct experience with an EHR. However, most would have preferred a commercial application. In particular, in some markets one vendor (e.g., Epic) predominates. Students felt disadvantaged in terms of their potential to find jobs because they lacked exposure to that EHR.

> *One student explained that she was so busy trying to do everything that was needed to pass the course, she was unable to absorb the materials.*

As will be discussed below, students also recommended that schools incorporate internships into the program so that program completers can demonstrate real-world applicability to potential employers.

Although workloads vary by schools, students from multiple schools raised concerns about the amount of material they are expected to learn in a six-month period. Others also mentioned that they felt that they were spending so much time doing "busy work" that they lacked the time to process what they were actually learning. Students recommended either increasing the program's duration or limiting the content included.

Attrition

Although attrition rates vary by school, in general, program administrators reported that attrition rates from the Workforce program are about the same as those from other programs at the schools. During the site visits, we also gained insights about why some students were unable to successfully complete the program, as well as some strategies colleges are employing to try to reduce the number of students who drop out. Administrators noted that some students drop the program once they understand the time commitment entailed. Some colleges suggested that, in general, students with health care backgrounds were more likely to struggle with the materials than those with IT backgrounds. Students mentioned that some of their classmates had opted not to complete the program because they were frustrated with the materials' quality or the lack of attention or feedback they received from instructors.

To reduce attrition, one school implemented a student intervention process. If a student does not attend a set number of classes, and/or has an average of less than 76%, the team follows up with the student to determine if he/she will be able to continue. The school provides support and additional time to finish the program. Other schools are focusing on making sure that the enrolled students are prepared for the program. Several colleges initiated orientation programs, in part, to help set realistic expectations about the amount of work to expect.

> *One employer said that he might encourage his employees who did not participate in the community college program to take the exam, as he felt it might provide external validation of their skills and knowledge.*

Changes over time

The overall experiences reported by students in the site visits did not change significantly over time. We will use survey data to further examine changes in student satisfaction over time, as well as student satisfaction in relation to specific program factors.

The HIT Pro Exam

Members of the CCCs, other accredited academic institutions, state and local employment agencies, and health-care providers can all request vouchers that allow individuals—including students who enrolled in the community college programs and others with relevant experience, training, or education in health care or IT—to take the exam free of charge. Although these vouchers are readily available, students' familiarity with the HIT Pro exam varied widely. At some colleges, the majority of students planned to take the exam. In fact, at least one community college made the exam a mandatory part of the program; however, students are still able to graduate even if they do not pass the exam. In contrast, at other institutions, many students had not yet determined whether or not they would sit for the exam, and some were unfamiliar with it. There was also some confusion about the exam. In particular, several students were under the impression that they would receive a credential if they passed the exam. They were disappointed to learn this was not the case. Indeed, some program administrators acknowledged that when prospective students learn about the lack of credential, some lose interest in the program.

The variation in students' intention to take the exam reflects their mixed views about the exam's value to potential employers. At some schools, most students plan to take the competency exam, as they believe it is the only way to demonstrate what they learned from their courses. They perceive successful completion of the exam as an indication that they met a national standard. However, even those students expressed some uncertainty about employers' awareness of the exam.

In fact, some employers with whom we spoke had not previously heard of the exam. Among those familiar with it, they were unsure how much effect it would have on their hiring decisions. Several employers said that it might help to distinguish between two similarly qualified candidates; however, in general, employers felt that it would take time for the exam to establish credibility. They explained that the exams that tend to most influence in the hiring process are ones that: a) have a credential attached to them—a particularly important factor in the health field; b) are sponsored by well-trusted organizations, like HIMSS; and c) have a proven track record of differentiating between more and less qualified candidates.

Preparing for the exam

Students, program administrators, and instructors also raised concerns about students' ability to succeed on the exam. Because there is a limited understanding about what materials will be covered on the exam, there is much anxiety that students will not learn the content necessary to pass it. Additional issues

surrounding the alignment between the exam and the materials covered in the program arise at schools that re-structured the curriculum materials or the roles. At one school that merged multiple roles, program staff advise students to consider which role they feel most comfortable with and sit for the exam in that area. However, to the extent that schools repackaged the materials to add and subtract content, there are concerns that some exam topics may not be raised in classes.

While few students we met had taken the exam prior to the site visit, we encountered a small number of students who had recently completed it. In those cases, students confirmed that some test questions reflected materials with which they were unfamiliar. Two students from one school took the exam and noted several sections contained information they not been exposed to. They both searched their coursework after the exam was over and were unable to find mention of those topics in their notes or slides. Several students who took the exam were also surprised that it seemed to focus disproportionately on IT, rather than on health-care topics.

To prepare students for the exam, one college is offering two four-hour review sessions at the program's conclusion. During those sessions, students are reviewing the questions from the assessments that were included in the curriculum materials. Students also explained that it would be helpful to be able to review a practice exam.

Changes over time

Over the course of the grant, some schools made a greater effort to help students prepare for the HIT Pro exam. While some schools initiated more formal prep courses; at other schools, students worked in less-formal study groups.

Employment

A critical component of this evaluation is gathering information on how successful schools are in preparing students for jobs in the field. The community colleges display varying degrees of awareness about how many of their students found health IT jobs. While some schools use surveys or other formal mechanisms to track the career outcomes of students post-graduation, others have no systematic approach for gathering such information. It is also important to keep in mind that some community colleges had just recently—or were about to—graduate their first cohort of students, making it premature to understand the job outcomes of their students. A further complicating factor is that many students had jobs prior to joining the program. For example, one school learned from a survey of its graduates that 30% had found new jobs. However, the college does not know what percentage of students were incumbent workers; therefore, it is possible that a greater proportion of job seekers found jobs than the 30% rate would suggest.

Although the site visits will not yield as reliable data on job placement as the student survey[5] will, in the plurality of schools we visited, there were a substantial number of individuals looking for jobs who had not yet found them. One exception to this trend is a community college in which a single hospital hired many students, which highlights the importance of regional labor market conditions in the job prospects of graduates. For example, areas in which there is high EHR penetration may have less need for individuals with this type of training. By the same token, community colleges in areas where providers in their local markets have not yet begun to adopt EHRs perceive a lack of demand for health IT employees as well.

This section begins with an overview of employers' workforce needs. Next, we offer perspectives from both students and employers about how well-prepared program graduates are for the industry and what characteristics might make some candidates more successful in the job market. We close with a discussion of the approaches the colleges are taking to conduct outreach to employers and help connect students to job opportunities.

Current workforce needs

As mentioned above, employers' needs vary across the country. However, we tried to get a snapshot of the workforce climate in the communities we visited. At several locations, program leadership perceived that demand for health IT workers had yet to hit their area. For example, one school was interested in

providing contract training to local hospitals, but most were not yet ready to articulate their training needs.

Among those employers interested in hiring new staff, many expressed difficulty identifying suitable candidates. Most health-care providers prefer to hire an individual experienced in using the EHR they are planning to or have already implemented, as that saves considerable time and money that would otherwise need to be invested in training. The individuals we spoke with predicted future employers would realize that there is a finite pool of applicants with experience using a particular application. Upon such a realization, employers may shift expectations and expand their searches.

Several employers indicated that small provider offices are unlikely to hire new staff for an EHR implementation. While larger health-care systems might hire program graduates, most small practices would be more likely to re-train existing staff. They did note that if a smaller office were selecting between two candidates for a medical assistant position, for example, the provider might opt for the one who also had some health IT training.

One student mentioned that, if he were to go into a hospital to assist with an EHR implementation, he would not know where to begin. He suggested that the program include a team project for which a group of students, with both health and IT backgrounds, work through an implementation together.

Employment prospects and perceived job readiness

Many instructors and students expressed anxiety about the prospects of program graduates finding jobs. Several graduates indicated that they recently accepted new positions resulting from participation in the program. Some successes came in community colleges where instructors work in large, local health-care systems. Those instructors had the opportunity to get to know students and often selected the most promising students to be interns or new employees. However, most students were skeptical that the six-month program would give them sufficient health IT training to be able to find jobs in the field. Students explained that most job openings request substantial experience (typically three or more years) and/or more education than they will have when they complete the program.

Students were also unsure that they had gained the skills necessary to implement an EHR. Many students, instructors, and employers echoed this perspective that additional hands-on experience is necessary to make students employable. One employer focus group believed that students would need a six- to nine-month internship in order to demonstrate to potential employers that they understood the on-the-ground realities of an EHR implementation.

Unfortunately, internships might not be appealing or feasible for some program graduates, many of whom are accustomed to significantly higher salaries. Even after completing an internship, program graduates

may still be better suited to relatively entry-level positions. Some employers explained that they reframed their approach to hiring students. When they first learned of the program, they thought they would be finding high-level experts; however, they are now retooling their job descriptions. For instance, many are looking to hire workers who work exclusively to support a go-live. Then, if students show potential, they will keep them on and help them to develop additional skills. All the same, it may be difficult for mid-career individuals to work for such a low salary. Small practices in particular will likely only be able to pay much lower salaries than the ones to which some students are accustomed.

In addition to the need for hands-on experience, many employers stressed the importance of "soft skills." Employers noted that they are looking for candidates with strong people and customer services skills, who are problem-solvers, and who are energetic and eager to learn. Students also need to know how to present themselves in job interviews. Graduates need to demonstrate how the skills they learned in the program are transferrable to positions they are applying for. Program administrators noted that many students had not looked for a job in many years and therefore were not familiar with how to make the most of networking opportunities—a particularly important skill in the close-knit health-care industry.

During the visits we also tried to identify which characteristics had helped some graduates succeed in finding jobs. Career counselors commented that the students who are successful in their job search tend to be the students who display the most professional maturity as well as students who previously held supervisory roles. At other colleges, the successful students were typically the ones who were motivated and persistent in approaching and following up with potential employers, including introducing themselves to employers at networking events and demonstrating a willingness to accept unpaid internships. At many colleges, there was a perception—among program administrators, students, and instructors—that students with prior experience in health care had an easier job finding work in health IT than those who were trying to transition from IT.

Community college activities to help students locate jobs

The schools engaged in a variety of approaches to support students in finding positions. Many program administrators talked about posting job openings either on their websites or in classrooms or otherwise disseminating potential opportunities. For example, career counselors at one college use a LinkedIn group and a listserv to distribute information on job openings. Others offered seminars or other resources—available either exclusively to the health IT students or as part of the overall career services at the college—with tips for how to conduct a job search, refine a résumé, or prepare for an interview.

To address the perceived need for hands-on experience, some colleges were actively engaged in trying to place students in internships. Students enrolled in the HITECH program at one college could enroll in the school's Intern Academy, through which they earn classroom hours through paid or unpaid internships. At the beginning of the internship students identify goals in conjunction with their employers upon which they are assessed at the program's end. Another school encouraged students to approach providers in the community and ask if they would be interested in receiving assistance from students in implementing an EHR. Through this program students engaged in such activities as presenting trainings on privacy, helping the office with vendor selection, and helping to digitize paper records.

In addition to offering services geared toward their students, many colleges engage in outreach activities to increase potential employers' awareness of the program. Some program administrators identified provider organizations in their communities who might hire their graduates as targets for communication efforts. Other colleges use local health and technology networking groups to help disseminate information about the program. At one college, they talked about the importance of reaching out directly to CIOs of health organizations and to vendors, as well as of working through local chapters of AHIMA or HIMSS.

Employers and instructors thought it is important for schools to convey the fact that many graduates from these programs have high levels of education and experience, which may not correspond with employers' expectations about community college students. In marketing the program, they also suggested that schools describe the types of skills that students gain. Several employers mentioned that it would be helpful if a central repository were developed to help connect potential employers to students enrolled in the community college program across the country. Employers also recommended that the colleges reach out to vendors and ask them to demonstrate their products or provide brief trainings to the students. Interviewees indicated that this might be seen as a positive marketing step from the vendor's perspective and might help students be able to point to some exposure to the product when they are applying for jobs.

Changes over time

In many instances, students continue to struggle to find employment. Additionally, employers broadly remain unaware of the program and continue to stress the importance of colleges conducting outreach to potential employers. We will use survey data to further examine specific trends in employment over time.

Conclusions

The site visits to the selected community colleges profiled above proved tremendously informative and offered numerous insights that can provide critical formative feedback to ONC and the grantees themselves and help inform the additional data-collection activities planned for the evaluation. As the details included above demonstrate, this is a rich and complex program with a diversity of experiences among the grantees, the students enrolled in the program, and others affiliated with or touched by the program in some way. While the findings from this evaluation will continue to evolve and be further tested through the NORC team's surveys and additional data collection, the chief conclusions drawn from this particular activity at this point in time include the following:

Implementation and Program Design

- The flexibility afforded grantees in terms of the learning format proved critical to the ability to launch the programs in a timely manner and to students' satisfaction. Some schools changed their learning platforms as the grant progressed, due in part to student feedback. For instance, one school initially considered offering more online and hybrid classes; however, in student surveys, students expressed a preference for in-person classes as they appreciated the chance for in-person interaction.

- Several colleges altered the structure of the Workforce roles. Instead of teaching each student one of the six roles developed by ONC, several schools merged two or more roles because they noted that there is a large amount of overlap in the components taught for each role.

- The vast majority of faculty members teaching in the programs are adjunct instructors who are employed in the health IT field. The perspectives these instructors bring to the classroom have been greatly valued by students who express appreciation for hearing about the "real-world" applications of the material included in the course materials. That said, several students expressed frustrations with the general lack of responsiveness among their instructors.

- Many schools found students were not sufficiently prepared for the level of difficulty of the courses and/or the workload. Orientations and "full-disclosure policies" have thus been especially important in terms of setting realistic expectations. Some of these orientations are mandatory, while others are optional. Regardless, these sessions appear to be useful in terms of giving potential students an understanding of what to expect and weeding out individuals who might not be well-suited for the program.

■ A challenge faced by the program is the fact that the students come from diverse backgrounds in part as a function of whether they come from an IT or a health-care background. These backgrounds affected students' experiences in the classroom as well as their ability to find jobs after the fact. In general, those with a health-care background found the course materials especially challenging, whereas those with an IT background had challenges breaking into the health-care field upon graduation (and often have higher salary expectations as well).

■ Collaboration with the consortium leads and other consortium members varies across the regions. Some administrative teams and faculty members regularly share best practices and edited materials with other schools, while some have limited involvement with the other members.

■ Students consistently referred to two areas for potential programmatic improvement: additional opportunities for hands-on experience and a workload that is more appropriate for the amount of time allotted for the course.

Curriculum Materials and Competency Exam

■ In general, the program directors and staff appreciated the materials produced by the Centers. This general satisfaction aside, all of the programs visited raised concerns related to the quality of the materials, noting that the materials contained errors and that there was some repetition and inconsistency within and across the components. These issues were especially troublesome with the first iteration of the materials.

■ The Centers intentionally created a large volume of materials in order to create a "buffet" of options for instructors; however, some schools noted that the sheer volume of materials received was overwhelming, making it difficult for them to decide what to include in their courses.

■ While some colleges left it to individual instructors to revise the materials on their own, in most cases, instructors received refined versions of the materials from the colleges.

■ Familiarity with the HIT Pro exam varied widely. At some colleges, the majority of students planned to take the exam. In fact, some community colleges made the exam a mandatory part of the program. However, at other institutions, many students had not yet determined whether or not they would sit for the exam, and some were unfamiliar with it.

■ Several instructors participated in the alpha test of the HIT Pro exam. However, in general, the community college administrators felt that additional opportunities to collaborate with the developers of the exam would have been beneficial.

■ Several colleges raised concerns about the public release of the curriculum materials prior to the end of the grant program and felt that it affected their ability to recruit students who could simply the download the materials on their own or obtain them through another school not participating in the Workforce Program.

Employment

■ Many program directors, instructors, and students with whom we spoke expressed anxiety about program graduates' job prospects, with regional labor market conditions playing a critical role in the job-search experience. For example, areas in which there is already a high EHR penetration may have less need for individuals with this type of training. By the same token, community colleges in areas where providers in their local markets have not yet begun to adopt EHRs perceive a lack of demand for health IT employees as well.

■ Many schools exhibited frustration by the lack of support from and engagement with the RECs as they feel this would have been a useful source of internships and/or permanent positions for students. While connections between community colleges and RECs are not yet consistently in place, one community college expressed optimism that this may improve in the future.

■ The schools engaged in a variety of approaches to support their students in finding positions. Many program administrators talked about posting job openings either on their websites or in classrooms or otherwise disseminating potential opportunities.

■ Several employers mentioned that it would be helpful if a central repository were developed to help connect potential employers to students enrolled in the community college program across the country. Employers also recommended that the colleges reach out to vendors and ask them to demonstrate their products or provide brief trainings to the students.

■ Most students were skeptical that a six-month non-credit program without a certification would give them sufficient health IT training to be able to find jobs in the field, especially ones that offer acceptable salaries. These concerns were reinforced by many employers' perceptions of the program as well.

■ A career counselor at one school commented that the students who are successful in their job search tend to be the students who display the most professional maturity as well as students who previously held supervisory roles. Previous experience in the health-care field also seems an important predictor of one's ability to find a position.

Changes Over Time

- Some schools made modifications to their learning platforms based on student feedback.

- While some schools made minor changes to their marketing and orientation strategies, others left these processes unchanged.

- One school visited during both rounds noted a significant increase in the amount of previous education students had in later cohorts, although they could not explain this change.

- While students and faculty members who had been exposed to both Versions 1.0 and 2.0 of the curriculum materials noted improvements to Version 2.0, particularly related to technical issues, substantive problems still existed. Although more of these issues were addressed in Version 3.0, participants noted some of the substantive problems remained.

- Over the course of the grant, some schools made a greater effort to help students prepare for the HIT Pro exam. While some schools initiated more formal prep courses; at other schools, students worked in less-formal study groups.

- In many instances, students continue to struggle to find employment. Additionally, employers broadly remain unaware of the program and continue to stress the importance of colleges conducting outreach to potential employers. Specific trends in employment over time will be further examined using survey data.

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[1] 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

[2] 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

[3] 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

[4] 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

[5] NORC is surveying a sample of the community college students. Three cohorts of students will receive a baseline survey around the time that they are expected to graduate from the program, and will then receive a follow-up survey six months after the baseline. These surveys address topics including student background; enrollment information; education and employment history; perceptions about the learning environment and job readiness; use of career counseling; salary and financial support information; the HIT Pro exam; and reflections and overall feedback on the program.