HEALTH INFORMATION MANAGEMENT REIMAGINED: ASSESSING CURRENT PROFESSIONAL SKILLS AND INDUSTRY DEMAND

by

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DEDICATION

All challenging work needs self-worth, as well as guidance. I dedicate this thesis, first and foremost, to God Almighty, to my son, for standing by me as I accomplished this goal, to my family and friends for their support, and to my professor, Alex McLeod for his guidance and constant tutelage to help me achieve such a major accomplishment.

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I would like to thank everyone that supported me in this endeavor. I thank God for granting me the patience and resolve to get this thesis completed. I am deeply grateful to my son, Zach, and my family and friends for their continued support throughout these trying times. I am also grateful to my professor, Alex McLeod for his encouragement and direction to get this thesis completed. I am very thankful to the American Health Information Management Association (AHIMA) for allowing me to use some of their information for comparison while working on this research.

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LIST OF ABBREVIATIONS

Abbreviation	Description
AAMRL	American Association of Medical Record Librarians
AAPC	American Academy of Professional Coders
AARLNA	American Association of Record Librarians of North America
AHA	American Health Association
AHIMA	American Health Information Management Association
AMRA	American Medical Record Association
ARRA	American Recovery and Reinvestment Act
CCHIM	Commission on Certification for Health Informatics and Information Management
CCS	Certified Coding Specialist
CEE	Council for Excellence in Education
CEU	Continuing Education Unit
CHPS	Certified in Healthcare Privacy and Security
CPC	Certified Professional Coder
EBM	Evidence-based medicine
EBP	Evidence-based practice
HER	Electronic Health Record
HCISPP	Healthcare Information Security and Privacy Practitioner
HEDIS	Healthcare Effectiveness Data and Information Set
HIE	Health Information Exchange
HIM	Health Information Management
HIMR	Health Information Management Reimagined Initiative

HITECH	Health Information Technology for Economic and Clinical Health Act
MPI	Master Patient Index
MRC	Medical Research Council
RCT	Randomized Controlled Trials
RHIA	Registered Health Information Administrator
RHIT	Registered Health Information Technician

ABSTRACT

Martin Luther King, Jr., once said, "Change does not roll in on the wheels of inevitability but comes through continuous struggle." This paper discusses the changes that are affecting the Health Information Management professional's skill set and where these changes are leading these individuals. As the industry continues to experience changes, so will the responsibilities of the HIM professional. The problem with these changes is determining whether the HIM professional has the necessary skill set to adapt to the changing environment.

1. INTRODUCTION

Health Information Management (HIM) continues its transformation toward health informatics, big data and analytics with traditional coding competencies waning as computer assisted coding moves to the forefront of healthcare information systems (Bresnick, 2016). Compounding this skill shift is the adoption of the electronic health record that allows data to be digitally and globally collected on cheaper more efficient computers with software capable of handling big data and enable predictive analytics (Cukier & Mayer-Schoenberger, 2013). The American Health Information Management Association (AHIMA) has struggled to improve the HIM professional skill set enabling the profession to provide valuable insights into patient care for their organizations (Bresnick, 2015c; HIM Reimagined Primary Taskforce, 2017). The demand for HIM professionals capable of modeling and performing predictive analytics is growing exponentially, forcing many organizations to scramble to find suitably skilled personnel (Health Information Management System Sciences, 2018). These shortages provide insight into the changing "supply side" of the Health Information Management Reimagined (HIMR) equation, but offer little understanding of the demand side of the equation (Bresnick, 2015a). This work assesses the Health Information Management career skill set and examines current industry needs to evaluate the alignment of skills, knowledge, and abilities with HIMR.

The Health Information Management profession has existed for almost 100 years (American Health Information Management Association, 2018a). Early in the profession's history, "record librarians" saw the medical value of keeping track of patient care information and how documenting this information would be beneficial in treating

patients with complications thus improving patient outcomes. Once this value proposition was recognized, medical record documentation became crucial to the quality and safety of the patient experience (Brooks, 2015). Subsequently, the American Association of Record Librarians of North America (AARLNA) was established by the American College of Surgeons in 1928. AARLNA was created to, "elevate the standards of clinical records in hospitals and other medical institutions" (American Health Information Management Association, 2018a). These early professionals were called "Record Librarians" because the information was documented and stored on paper, requiring organization and cataloging (Brooks, 2015). In 1938, the professional organization's name was changed from the American Association of Record Librarians to the American Association of Medical Record Librarians (AAMRL) to better represent the work of its members. Technological advancements in the 1960's and 1970's caused the name to change again (Brooks, 2015). In 1970, the name became the American Medical Record Association (AMRA) due to members increasing their involvement to include not only hospitals, but community health centers and other health services as well. They were not only taking care of paper records, but were also expanding their roles to include record management of federal programs (American Health Information Management Association, 2018a). Software development impacted the profession in the 1980's and 1990's with the introduction of programs to manage patient data such as the Master Patient Index (MPI), radiology programs, and laboratory programs (Brooks, 2015). With the new technological developments and data driven decisions, the name was changed once again in 1991 to its current name, the American Health Information Management Association (AHIMA). This change incorporated the reality that patient data extends

beyond the hospital medical record, is shared across healthcare providers, and includes the entire patient care record (American Health Information Management Association, 2018a). Figure 1 shows the historical name changes of the organization.

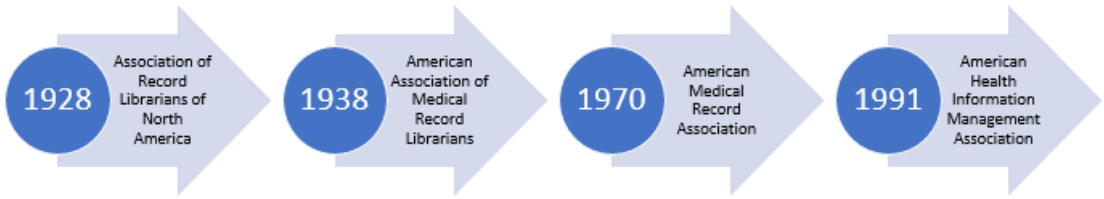


Figure 1. Health Information Management Professional Organizational Name Changes

(American Health Information Management Association, 2018a).

Transitioning from paper medical records to electronic medical records has had a remarkable impact on Health Information Management departments, causing organizations to downsize and eliminate positions (Dimick, 2012). The dominance of paper medical records has declined as healthcare organizations adopt electronic healthcare records mandated in the Health Information Technology for Economic and Clinical Health Act (HITECH) (Adler-Milstein & Jha, 2017). The federal meaningful use requirement caused coding and transcription positions to be outsourced while creating new roles and competencies that needed to be addressed such as informatics, data analytics, information governance, clinical documentation improvement, big data, project management, value-based purchasing, and other payment restructuring requiring higher education (Abrams et al., 2017; Butler, 2016). Technological change continues, as newer systems are developed and consolidations occur (Zuckerman, 2011). Traditional jobs related to billing and coding are still available, but newer, lesser known careers, are evolving that require skills, knowledge, and abilities related to the Healthcare

Effectiveness Data and Information Set (HEDIS), information systems interface analysts, business intelligence, informatics analytics, data integrity, positions supporting Health Information Exchanges (HIE), Electronic Health Record (EHR) consultants, and clinical taxonomy and terminology roles. Along with these new roles, new credentials are being introduced in addition to the time honored AHIMA certification, the Registered Health Information Administrator (RHIA).

According to Adler-Milstein and Jha (2017), the Health Information Technology for Economic and Clinical Health Act (HITECH), mandated hospitals adopt EHR systems. Prior to the implementation of meaningful use incentive programs only about a 3.2% of eligible hospitals were onboard using electronic systems. Following implementation of a $27 billion incentive program, the adoption rate grew by 14.2% annually. Eligible hospitals are those facilities that met requirements to receive meaningful use benefits and ineligible hospitals are those that do not qualify to receive those benefits. Notably, ineligible hospitals did not increase adoption as much as their eligible counterparts, with only 3.3% moving to electronic systems after the incentive program was implemented. This 7.9% difference between eligible and ineligible hospitals adopting EHR systems demonstrates how federal government incentives have encouraged healthcare organizations to accept EHR systems. Using studies from 2008-2015, the American Hospital Association (AHA), which surveys hospitals annually, compared data from three years prior to meaningful use and five years following the incentives. AHA noted, “Our results support the argument that recent gains in EHR adoption can be attributed specifically to the HITECH Act of 2009 and could serve as a

model for ways to drive the adoption of other valuable technologies" (Adler-Milstein & Jha, 2017).

The HITECH Act (2009) was enacted as part of the American Recovery and Reinvestment Act (ARRA) and included provisions to ensure workforce training in the use of EHR systems. HITECH also specified a set of health information technology (IT) competency examinations which were adopted by AHIMA and supported the need for new credentials (Palkie, 2013; Sandefer, DeAlmeida, Dougherty, Mancilla, & Marc, 2014). The Commission on Certification for Health Informatics and Information Management (CCHIM) responded to changes in competencies by developing and accrediting data analytics competencies. CCHIM surveyed 834 HIM respondents, finding that 86% recognized the need for education in health data analytics demonstrating the need for education and redefinition of HIM professional duties (Marc, Robertson, Gordon, Green-lawson, & Gibbs, 2017)

Using evidence-based medicine (EBM), teams of clinicians, HIM professionals, and systems personnel create and test predictive models to improve care decisions and reduce risk. Since risk in healthcare was traditionally related to malpractice, the ability to predict such need is important. Regarding risk prevention, predictive analytics provides the tools to forecast probabilities and trends. For example, if a physician could predict that a patient would be compliant with medication based on demographic information or if a hospital could predict which patient groups would be at high risk for infections or readmissions, they would be able to take a more proactive preventative role (Health Information Management System Sciences, 2018). According to the Society of Actuaries

(2016), the most valuable data for predictive work is clinical outcomes, as shown in Figure 2.

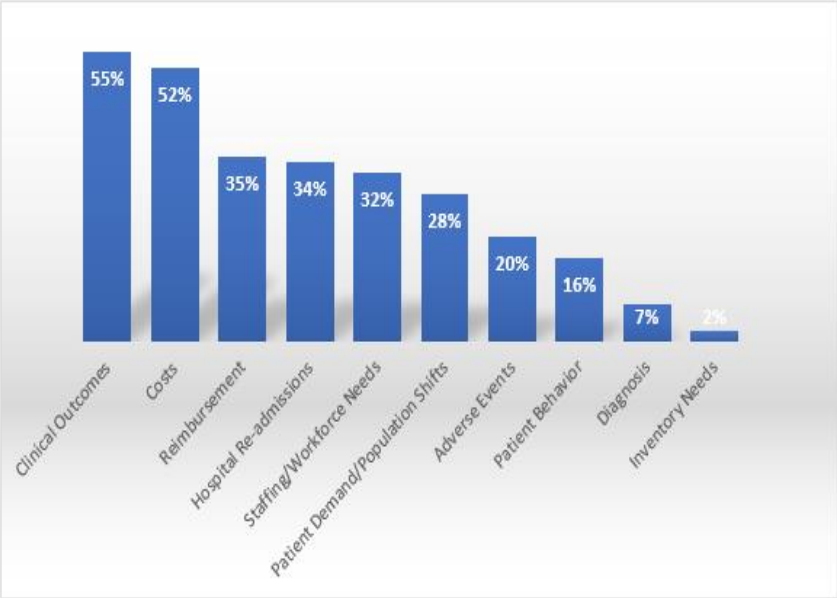


Figure 2. The Most Valuable Data to Predict (Health Information Management System Sciences, 2018)

HIM professionals are well positioned to take advantage of clinical outcome data. From the perspective of challenges, incomplete data was found to be the biggest obstacle in working with predictive data as seen in Figure 3.

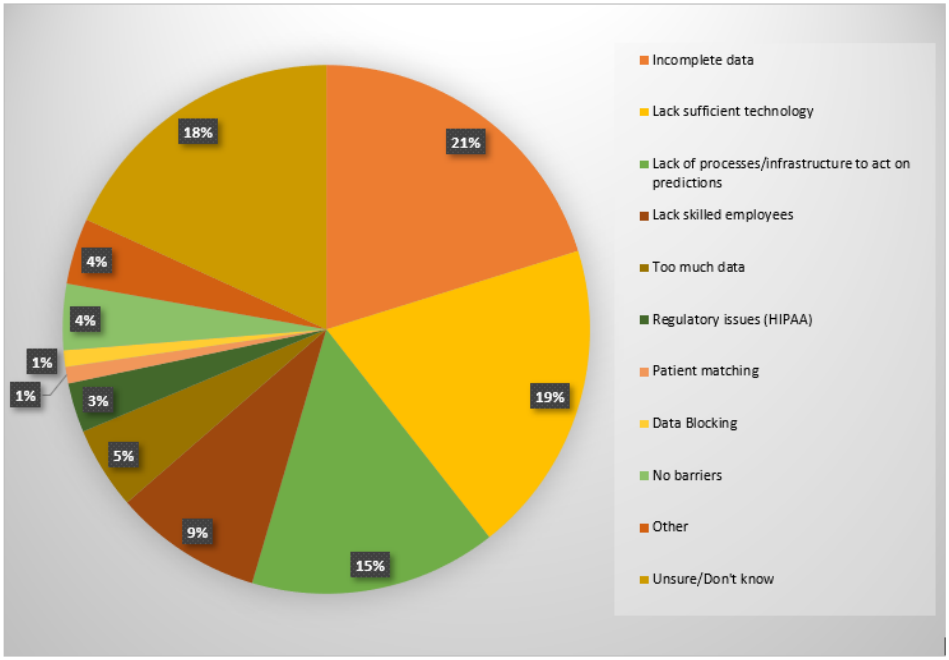


Figure 3. A Healthcare Organization's Biggest Obstacle is….(Health Information Management System Sciences, 2018)

According to the article, *The State of Predictive Analytics in Health Care,* predictive analytics opportunities will help healthcare professionals make better decisions in both financial and clinical outcomes. With these opportunities come challenges, such as incomplete data and insufficient technology (Society of Actuaries, 2016). HIM professionals are aware of the challenges of incomplete records as evidenced by clinical documentation improvement programs.

The healthcare industry has been slow to implement predictive analytics, but as more organizations adopt analytical tools to support decision making, the need for individuals with these skills becomes apparent. Savage (2016) suggests that analytical workers are needed in clinical, financial, and operational areas, as shown in Figure 4.

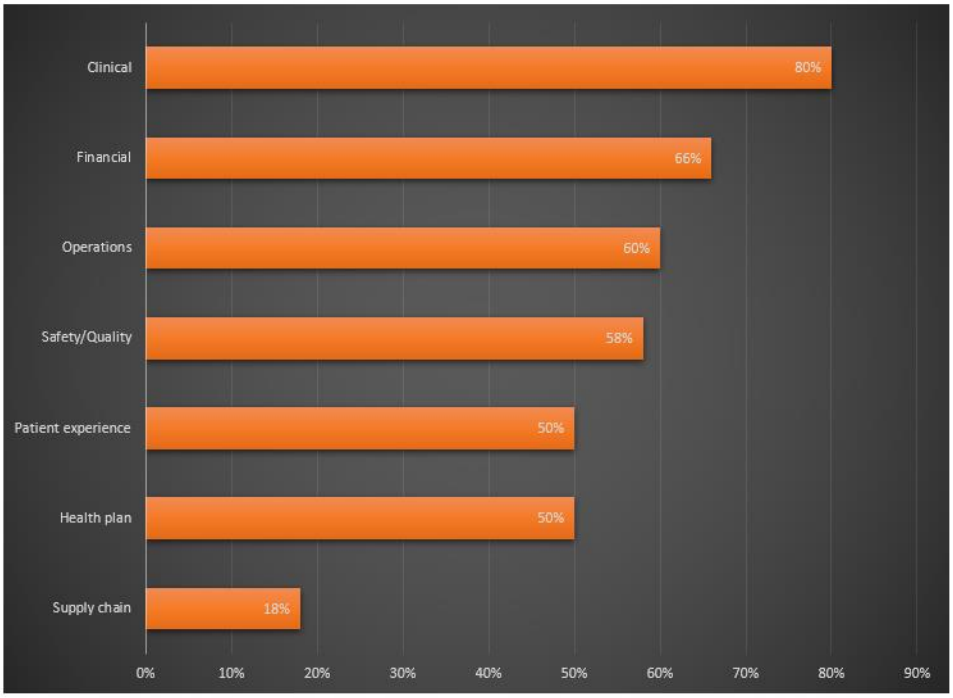


Figure 4. Roles are swelling. Where are they increasing? (Health Information Management System Sciences, 2018)

To be successful, an HIM professional will have to shift skills, education, and credentials to meet the modern technological changes occurring in healthcare organizations. The need for HIM professionals in traditional roles will decrease as more professionals will be needed in leadership, teaching, and informatics roles. AHIMA has recognized the need to create pathways that support its members to prepare for roles in informatics, analytics, information governance, and consumer engagement. Thus, a change to a more technical career and advancement in education is necessary to meet the industry's changing needs (Marc et al., 2017). HIMR has provided a pathway to successfully updating workforce skills, but are those skills demanded by industry today?

Purpose

HIM continues its transformation realigning competencies and skills to meet the perceived changing needs of the healthcare industry. Compounding this skill shift is the global availability of affordable computers and software to handle big data and perform predictive analytics (Cukier & Mayer-Schoenberger, 2013). The need for HIM professionals capable of using big data, modeling, and performing predictive analytics is increasing. Many organizations struggle to find adequately skilled personnel (Health Information Management System Sciences, 2018). Researchers and policy makers have noted that when job demands exceed workers' abilities, a shortage occurs when the skills of those looking for employment mismatches the skills required for the jobs in the labor market (Michael J Handel, 2003). These perceived shortages provide insight into the changing supply side of the HIMR equation, but offer little understanding of the demand side of the equation for employment and career change (Bresnick, 2015a). The differences between the HIMR skill set, and proficiencies currently required by industry represent a skill, knowledge, and abilities gap which must be addressed through training and education. The purpose of this thesis is to assess the current HIM professional skill set and examine alignment with current industry demand to provide greater insight into the path forward for those adopting the guidance of HIMR.

2. CHANGING ROLES AND SKILL SET

Without a doubt, the HIM professional's roles and skill set will continue to change to meet industry needs (HIM Reimagined Primary Taskforce, 2017). The basic functions of HIM departments will remain the same, but people's roles in healthcare information systems will realign with technological improvements (Person & Terlep, 2013). With functional changes, it is anticipated that departmental responsibilities will evolve from traditional director, privacy officers, coding staff, and release of information professionals to more modern roles involving big data, statistical analysis, project management, and data analytics (Butler, 2016). The traditional HIM department is already becoming obsolete due to the technological changes associated with the meaningful use and electronic health record adoption (Adler-Milstein & Jha, 2017). Given these technological improvements, HIM professionals will transition into roles that focus on revenue cycle management, information technology, electronic health records data management and user support, quality, compliance, health information exchange, and clinical documentation improvement (Fenton, Low, Abrams, & Butler-Henderson, 2017). The current skills and competencies of HIM professionals will evolve to encompass competencies and skills more related to information management (Abrams et al., 2017).

An AHIMA Salary Snapshot (2016), shows the effects of changing skill sets in terms of salary outcomes as seen below in Figure 5. Some roles that could become obsolete or change due to technological change include file clerks, coders, transcriptionists, and clerical staff. Salaries for lower skilled positions already earn less than those requiring more technologically advanced skills (American Health Information

Management Association, 2016). With the meaningful use rollout of the electronic health record systems, file clerks will no longer be needed as medical records will no longer be created on paper. Instead, HIM professionals could be transitioning into data analysts type roles. Coders and transcriptionists will not become obsolete but assume more of an auditor role to review computer-generated codes and voice-translated files to ensure accuracy and accountability. Clerical positions could likely transition into a more electronic data analyst position with a requirement for more education and information literacy. While some positions will disappear, other positions will become more important or evolve into more technologically demanding roles.

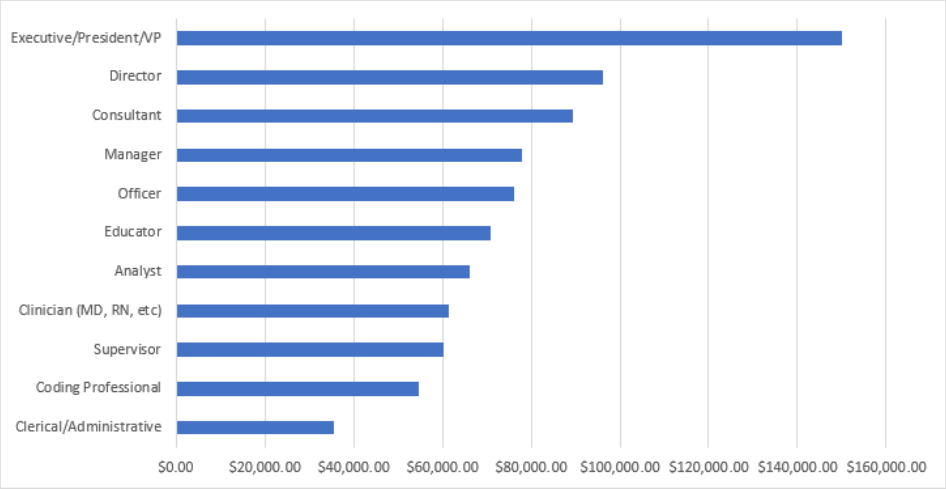


Figure 5. AHIMA Salary Snapshot (American Health Information Management Association, 2016)

Competing for these new evolving HIM professional roles will require baccalaureate and master's degree with strong backgrounds in statistics, national quality indicators, and electronic data management. The HIM professionals will need to know all the competencies of general information management skills with the understanding they will no longer be utilized in the traditional HIM roles (Marc et al., 2017). Also included in new learning opportunities will be more hands-on experience with electronic

health records and how health information technology is built, designed, tested, managed, and leveraged for better outcomes. Educational organizations will have to adapt their programs to ensure that students will learn about data and analytics (Dimick, 2012).

Updating Competencies

Big data, analytics, and informatics competencies will be among the strongest industry demands for HIM professionals in the coming years according to a survey by the AHIMA (Sandefer, Marc, Mancilla, & Hamada, 2015). The survey was collected over a three-year period from September 11, 2014 and October 3, 2017 with both qualitative and quantitative sections to identify expected competencies. The AHIMA survey is provided in Appendix B. The findings from this survey demonstrate that role changes will occur among HIM professionals in the future (Sandefer et al., 2015). Individuals analyzing big data are often referred to as data scientists. A data scientist is simply described as, "a hybrid of data hacker, analyst, communicator, and trusted advisor," (Davenport & Patil, 2012). It is a person who can use Python, develop a hypothesis test, complete a regression analysis, or develop an algorithm in Hadoop to make sense of the data and competently communicate the results with others (Loukides, 2011). Figure 6 shows the relationships between analytics and education.

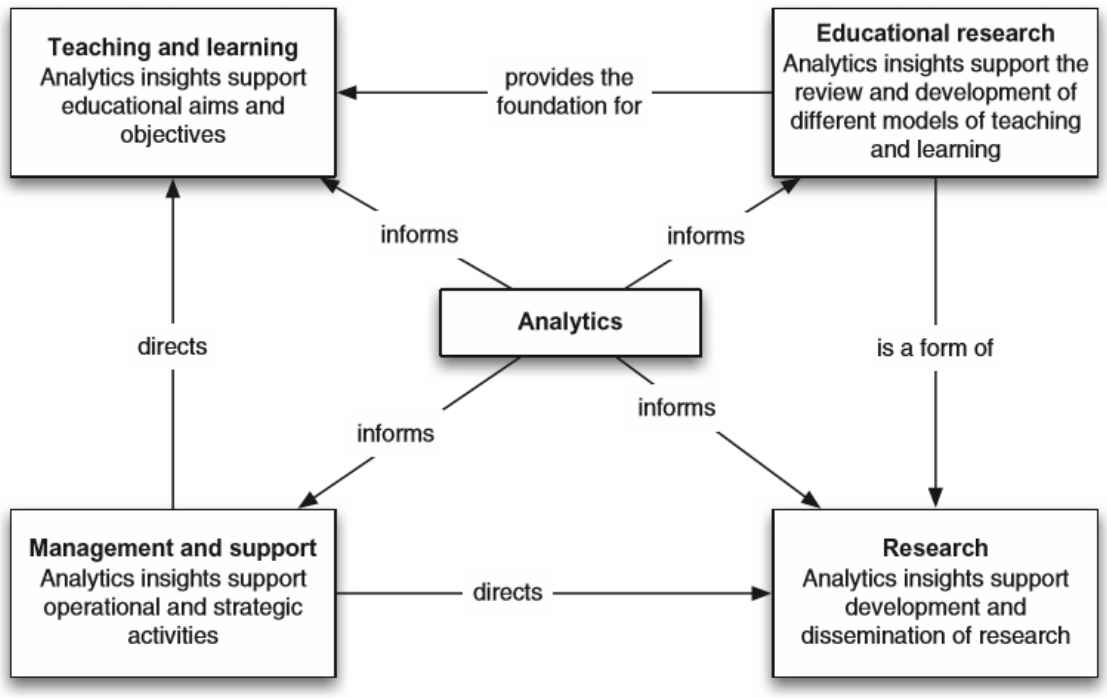


Figure 6. A domain model of health professional education analytics (Cooper, 2012)

To support HIMR, AHIMA recently published a draft of the 2018 curricula competencies. The new competencies are focused on future HIM jobs in data analytics, auditing, and information governance. The domain competencies for all academic levels were realigned as shown in Table 1.

Table 1. AHIMA 2018 Domain Competencies (2018b)	
Domain I	Data Structure, Content, and Information Governance
Domain II	Information Protection: Access, Use, Disclosure, Privacy and Security
Domain III	Informatics, Analytics, and Data Use
Domain IV	Revenue Cycle Management
Domain V	Health Law and Compliance
Domain VI	Organizational Management and Leadership

Competencies were added to address data management and revenue cycle management to support the new roles and bodies of knowledge. Progression and laddering are two critical components of the HIMR. Progression means that HIM skills are learned in a hierarchical fashion as one increases academic level. Laddering is like progression with one exception, it relates to education as well as industry. These new competencies will help transition HIM practitioners from entry- to mid- to advance- to mastery-level positions. (American Health Information Management Association, 2018b)

Big Data, Analytics and Informatics

Some of today's most frequently discussed topics in both research and practice are big data, analytics, and informatics. Big data involves large and complex volumes of information which are difficult to manipulate with traditional systems, problematic to store, and challenging to analyze with everyday statistical tools (Tole, 2013). It is the ever-growing volume, variety, velocity, and veracity of data that presents these operational challenges (Debortoli, Müller, & vom Brocke, 2014). For example, imagine calculating descriptive statistics or a linear regression involving millions of data points stored in the cloud. This type of analysis is compounded by the problem of finding someone with adequate skills to perform that analysis. According to Russom (2011), the biggest problem in implementing big data and analytics programs are inadequate staffing and skills. According to James Manyika of the McKinsey Global Institute, "the United States alone faces a shortage of 140,000 to 190,000 people by 2018 with deep analytical skills as well as 1.5 million managers and analysts to analyze big data and make decisions based on their findings" (Manyika et al., 2011). Healthcare executives know big data,

and analytics are becoming increasingly desirable, but what they do not know is how to collect, store and analyze the right data once they have it. AHIMAs 2015 president-elect, Melissa Martin and outgoing president Cassi Birnbaum both feel this issue is best addressed in the HIM department (Bresnick, 2017).

Big data and analytics can help providers make a more informed and timely decision, better disease diagnoses, and more effective treatment decisions (Bresnick, 2016). HIM should work closely with informatics personnel to develop information governance plans that include big data and analytics. HIM, physician staff, and clinical documentation information (CDI) departments also need to develop a good working relationship to improve the patient care using big data and analytics. Physician buy-in will be key to adopting and using big data (Morton & Wiedenbeck, 2010). One way to have that physician buy-in is to show them the data in terms of evidenced-based practice (Murdoch & Detsky, 2013). The American Medical Association has agreed to commit to three goals that will alleviate some of the roadblocks that are impeding big data analytics. First, big data will help physicians understand and reduce hypertension and keep pre-diabetics from becoming diabetic. Second, the American Medical Association will create a medical school of the future. Lastly, they will restore joy in medicine. By putting information governance at the forefront, providing accurate and high-quality information for patient care, and making sure that the providers feel they have the tools needed to better support medical decision making, will positively endorse better patient care. (Bresnick, 2015b)

3. SUPPORTING EVIDENCE-BASED PRACTICE

Many researchers have explained the need to extend evidence-based practices (EBP) because of variations in clinical medicine (Bakken, 2001; Dang & Dearholt, 2017; Rankin et al., 2018; L. H. Smith & Besser, 2000). In addition, training and credentialing differ by region introducing further variation in practice, strengthening the argument for EBP and its potential in improving care (Greenlee et al., 2017). Changing competencies lend themselves to supporting EBP using informatics and data analytics.

What is Evidence-Based Practice?

EBP is simply defined by Sackett, Rosenberg, Gray, Haynes, and Richardson (1996) as "the integration of best research evidence with clinical expertise and patient values." Making the most effective use of these three elements occurs when clinicians and patients can form a diagnostic and therapeutic alliance, to optimize clinical outcomes and improve quality of life. Practitioners have the continued obligation to stay up to date on developments in clinical research and include them in their daily care. According to Thyer (2004) "…there are five steps in conducting EBP:

1. Convert one's need for information into an answerable question.
2. Track down the best clinical evidence to answer that question.
3. Critically appraise that evidence in terms of its validity, clinical significance, and usefulness.
4. Integrate this critical appraisal of research evidence with one's clinical expertise and the patient's values and circumstances.
5. Evaluate one's effectiveness and efficiency in undertaking the four previous steps and strive for self-improvement." (Thyer, 2004)

Considering these five steps in a cyclical model provides a feedback loop to evaluate performance and implement improvements. EBP involves skills related to understanding clinical information, coordinating patient care, researching healthcare treatments, collecting data, analyzing results, and providing feedback to clinicians. Figure 7 shows the EBP Cycle.

Figure 7. Evidence-Based Practice Cycle

Origins of Evidence-Based Practice

Evidence-based medicine (EBM) is defined as "conscious, indisputable, and critical use of the best actual evidence for decision making in care for a patient," according to David Sackett (Sackett et al., 1996). EBM was believed to date back as far as Avicenna, a physician and philosopher who had a major influence on medical practice and logic that closely resembles modern EBM (Shoja et al., 2011). It was not in the

forefront of modern medicine until after World War II, with the pioneering work of Sir Richard Doll, an epidemiologist who believed routine practices in medicine should be subjected to well-controlled studies instead of based on expert opinions (Haskins, 2018). During the 1940's and 1950's, randomized control trials (RCTs) were introduced causing a resurgence in the concepts of EBM. One of the first RCTs was a 1946 study that explored using streptomycin to treat pulmonary tuberculosis. Another took place in 1954 during the U.S. polio vaccine trials conducted by Jonas Salk (1956). The "…use of the best actual evidence for decision making in care for a patient…" is the foundation for evidence-based practice and this process is supported by HIM professionals using data and analytical tools. Subsequently, in the 1980's, EBM evolved using Randomized Controlled Trials (RCT) as introduced by Sackett et al. (1996).

The History of Evidence-Based Practice

The term EBM was introduced in the 1990's (Guyatt et al., 1992); however, the practice originated much earlier and was originally called critical appraisal (R. Smith & Rennie, 2014). Clinical judgment and scientific methods were introduced into Western medicine in the mid-to-late 19th century, with the introduction of clinical trials in the 1930's and 1940's in the United Kingdom; however, the launch of evidence-based medicine resulted in less than ideal outcomes and the Medical Research Council (MRC) refuted the concept. Since these early trials failed, critical appraisal reemerged in the 1980s and 1990s when it was reintroduced and better supported by evidence (Johnson, 2013). "The father of evidence-based medicine," David Sackett, a former professor of medicine at McMaster University, was one of the first to study the problems of patients using epidemiology. He published articles on the "critical appraisal" method of research.

The EBM program sought physicians managing patients based on evidence rather than authoritative practices. His first suggestion was “scientific medicine”, which the science community rebuffed him for using the word science for medicine which is thought of as an art, leading to the introduction of EBM (R. Smith & Rennie, 2014).

Limitations and Criticism of Evidence-Based Practice

EBM creates both positive and negative reactions from researchers. For example, limitations impacting the effectiveness of EBM include the lack of consistent scientific evidence, the difficulty of applying the evidence in the care of real patients, and barriers to the performance of high-quality medicines (Tonelli, 1998). As healthcare organizations adopt EBM, the need for skilled clinicians increases. In other words, practitioners who are going to apply EBM must add new skills which include conducting literature reviews and making critical research appraisal into their training (Straus & McAlister, 2000). Physicians will either need to learn these new sills while obtaining their degrees, taking additional classes, or rely on others to perform these functions (Tonelli, 1998). Another criticism of EBM is the lack of available information for use by practitioners. Clinicians would need access to databases with critically appraised topics that would allow them to make efficient, effective and quick decisions on treatments options for patient care (McColl, Smith, White, & Field, 1998). Even though EBM makes sense, the demand for appropriate evidence is still in limbo because many are still concerned whether it actually improves patient care out-comes (Greenhalgh, Howick, & Maskrey, 2014). Many also question how to teach EBM to practitioners. It is not about whether evidence-based medicine is appropriate as much as it is how to teach it using available research and latest scientific information (Guyatt et al., 1992). HIM professionals are

uniquely positioned to support evidence-based practices since they already have a rounded knowledge about healthcare including anatomy, diseases, and treatments, but they lack the appropriate skills and will need training that includes data informatics and information governance.

HIM Changing Competencies

The demand for skilled professionals to support scientific processes is growing even though criticism of competencies, scale of information available, and inflexible rules coupled with technology, have caused alarm (Greenhalgh et al., 2014). Simultaneously, with the ongoing change in competencies for the HIM professional, there will be more analytical jobs focusing on big data, analytics, informatics, and data mining (Sandefer et al., 2015).

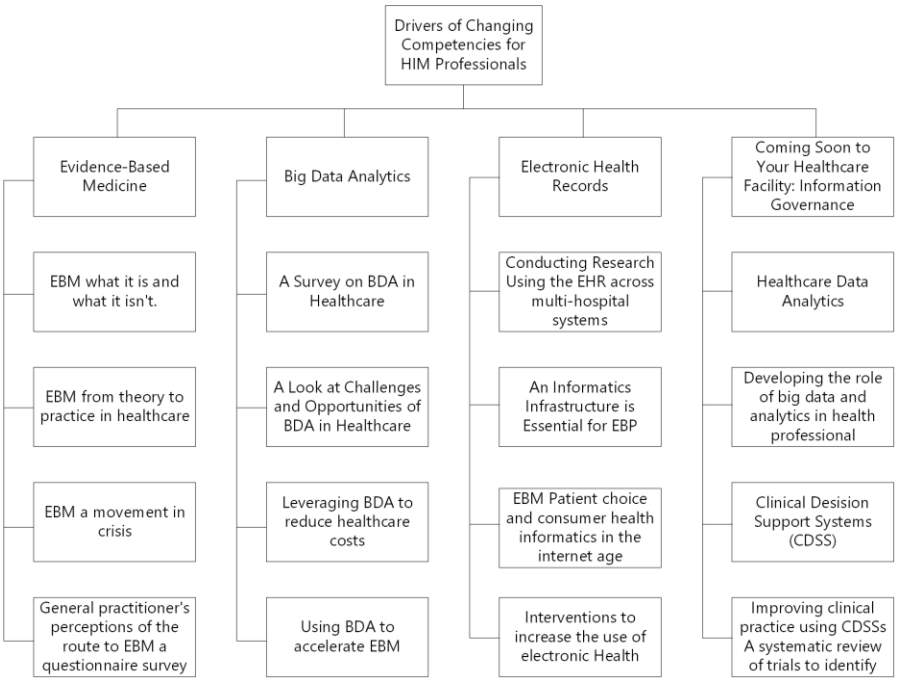


Figure 8. Drivers of Changing Competencies in HIM

This need provides an opportunity for HIM professionals to support EBM via big data, analytics, and informatics. Decisions concerning what data should be gathered, how it can be stored and formatted, and how information can be extracted lay within the realm of information governance and HIM (Nelson & Staggers, 2016). Demands for those with skills and competencies related to big data, information governance, and analytics are increasing while typical HIM skills such as operations, coding, and records management are declining, driving opportunities to engage and support evidence-based medicine (Bresnick, 2015c). Figure 8 shows some of the drivers of changing competencies in HIM.

Table 2. Health Information Management Job Families (AHIMA, 2006)

HIM Professionals 2016 Survey Job Family
REVENUE CYCLE MANAGEMENT/CODING AND BILLING JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $60,740
Coding Professional, Revenue Cycle Manager, Clinical Documentation Improvement Specialist, HIM Revenue Cycle Auditor, Benefits Coordinator, Collections Clerk, and more
OPERATIONS/MEDICAL RECORD ADMINISTRATION JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $70,790
Health Information Technician, Meaningful Use Specialist, Patient or Cancer Registrar, Health Information Management Clerk or Manager, Director of HIM, and more
INFORMATICS/DATA ANALYTICS JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $71,050
Data Integrity Analyst, Clinical Informatics Coordinator, Project Manager, Research and Development Scientist, Director of Clinical Informatics, and more
EDUCATION/COMMUNICATION JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $72,330
HIM Professor, Health Sciences Information Librarian, ICD-10 Educator, Program Director, or Department Chair
COMPLIANCE/RISK ASSESSMENT JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $74,880
Credentialing Specialist, Quality Improvement Analyst, Compliance Auditor, Privacy Officer, Information Security Manager, Director of Risk Management, and more
IT/INFRASTRUCTURE JOB FAMILY
SELF-REPORTED SALARY AVERAGE (ROUNDED): $83,790
Implementation Support Specialist, Data Quality Manager, System Analyst, Data Architect, Chief Technology Officer, and more

Competencies represent skills used in jobs. These skills can be aggregated around job families and AHIMA has created a list of job families based on its most current survey that includes job family, average salary and example job titles. Table 2 shows the job families as described by the AHIMA survey (AHIMA, 2006).

4. HEALTH INFORMATION MANAGEMENT REIMAGINED

The HIMR initiative was developed to help transform the HIM profession and position professionals to be aware of future job skills, competencies, and role specialties. The initiative recommends three categories including advanced education, specialized education, and evidence-based practice. HIMR success depends on how the profession responds to the required changes in the delivery of healthcare and the competencies needed to support those changes. They focus on educational aspects of skills, abilities, and leadership, streamlining education pathways and advancement at the entry level (Abrams et al., 2017).

The HIMR framework supports transformation of the HIM field into a strong and vibrant profession. AHIMA tasked the Council for Excellence in Education (CEE) with developing a new educational strategy to reexamine current roles, identify future roles and embrace the opportunities in a rapidly changing profession by instilling processes that build on the strong foundation of skills and knowledge. This venture will introduce new career pathways and academic curriculum to meet the future workforce needs including informatics, big data, analytics, and information governance. With the transforming scope of healthcare delivery today, it is more important to pay attention to the P-4 Medicine concepts. The P-4 concept, which refers to preventative, predictive, participatory, and personalized, will impact the delivery of healthcare for the future. Preventative represents the risky behaviors that could be alleviated by proactive strategies. Prevention affects the HIM professional in multiple ways such as the collection, transmission, use and access of digital data from wearable devices. With

proper training, the HIM profession will be able to provide this type of analytic information to help healthcare providers make better decisions for patient healthcare. Predictive refers to managing and interpreting data and not just generating data. The increase in the amount of electronically stored data will allow healthcare to be predictive. P-4 Medicine will drive the predictive environment by cutting unnecessary costs while improving patient care. It will help with things such as, readmission rates, fraud and abuse, reliability of big data, and value-based healthcare.

Participatory medicine will rely on the HIM professional's ability to support EHR systems, big data that is compiled from these systems, and patient involvement in their care. Some of the factors that are driving this type of medicine are privacy and security, IT tools, education, digital devices, and cloud integration. Education of healthcare professionals will reflect these changes and barriers to ensure all disciplines are included. The participatory trends will evolve the make-up of healthcare delivery team. Personalized care is shifting toward patient-centered delivery of healthcare. With the implementation of the EHR, personalized healthcare is evolving from patient-centered technologies to personal health information management to patient-specific communication preferences. With technological advancement, treatment can be modified based on an individual's genetics such as for breast cancer, colorectal cancer, or strokes. Personalized care is a shift from the practitioner driven to the patient-driven healthcare decisions.

The influx of online learning opportunities in higher education has eliminated the barriers of geographical location, work-related issues, and other commitments that keep many from returning to school (AHIMA & Haugen Consulting Group). However, due to

most states lowering their appropriations to institutes of higher education, most of these programs are having to increase tuition making it more expensive to obtain these much needed skills (AHIMA & Haugen Consulting Group). Micro-credentialing is an emerging trend that allows students to navigate educational or credential pathways to better fit skills gaps (AHIMA & Haugen Consulting Group)..

Higher education HIM programs are also challenged with locating qualified faculty to teach, especially those with doctoral degrees (AHIMA & Haugen Consulting Group). Many existing faculty lack the knowledge and skills to teach about EHR systems and other technological advances showing the need to bring in more advanced faculty (AHIMA & Haugen Consulting Group). Recruiting faculty members with technological content expertise, the ability to apply that knowledge, and advanced degrees will be also be a challenge.

Employers in the HIMR era will look for reputable certifications to guarantee those they are hiring are capable of performing the work in these changing HIM roles (AHIMA & Haugen Consulting Group). Both public and private facilities are faced with the dilemma of identifying competent knowledge and skills regardless of whether those knowledge and skills were learned at an institute of higher education or on the job. For example, it is a waste of time and money to require an individual to take a course in which they already possess proficient knowledge. Therefore, the development of apprenticeship programs are also being reviewed by the government (AHIMA & Haugen Consulting Group). Apprenticeship programs allow someone already working to use job experience to prove their competencies.

This initiative produced recommendations for four main areas (AHIMA & Haugen Consulting Group):

1. Increase the AHIMA members to 20% within 10 years who hold relevant graduate degrees.

   This recommendation was for AHIMA to increase their members to 20% in the next 10 years by facilitating educational skills for future roles and commitment to lifelong learning. The plan to meet this goal will be addressed by offering more scholarship opportunities for members to access higher levels of education, by increasing the number of faculty with the expertise to teach in HIM programs, and by improving the value of obtaining graduate-level health informatics curriculum and increasing the number of students enrolling in these programs. The development of these educational competencies allows more AHIMA members to earn degrees in HIM and informatics.

2. Ensure research is available in both the public and private health organizations to support health informatics and information management.

   Supporting the research aspect of the future professionals will entail providing research grants annually that support informatics and HIM practices, dissertation scholarships, and research that supports the values of HIM skills. Advancing educational opportunities requires bodies of knowledge and research and will support the growth of the profession.

3. Revise HIM curricula to add specialized skills while maintaining existing skills needed within the workforce.

The revised curriculum for associate level specializations will be available for use in August 2019 but will not be required to be implemented until 2021 or later. The increase in specialization levels across all levels of HIM education including associate, bachelor and master degrees through curricular revisions that will focus on future HIM skills to meet workforce needs in areas such as data analytics, informatics, and information governance. While they suggest broadening the core at the baccalaureate level, the plan is to consolidate at the graduate level to allow for specialized concentrations.

4. Registered Health Information Administrator (RHIA) will be recognized as the standard for HIM generalist practice and the Registered Health Information Technician (RHIT) (+ specialty) will be the technical level of practice.

   Transitioning to the RHIT specialty will be multi-year and multi-phased. Those who receive their RHIT January 2017-July 2021 will retain that credential. Those who would like to transition from the RHIT on to the RHIA will have from August 2021- December 2026 to do so. The pathways currently exist for HIM programs to encourage professionals to earn a baccalaureate degree and a RHIA credential. AHIMA wishes to increase this from 26% to 40% by 2027. This will align the certification processes and will address workforce requirements, by promoting employability and positions that professionals will desire to obtain in the workplace. This will allow the continuing education unit (CEU) requirements to be better managed while focusing on the employer needs.

HIM professional success will depend on how well changes in competencies related to the four pillars (data analytics, entrepreneurship, patient advocacy, and information governance) and the delivery of healthcare through the P-4 medicine concept (AHIMA & Haugen Consulting Group). Curriculum competencies are essential to ensure the educational process impacts workforce change. The HIM profession needs to guarantee success for future generations.

5. RESEARCH QUESTIONS

"HIMR is an AHIMA initiative to transform Health Information Management and position professionals for the future" (Abrams et al., 2017). While limited, reliable data representing workforce competency requirements exists, the development of the internet and job posting websites provides some data on industry demands (Michael J Handel, 2003). Because the HIMR initiative was introduced almost three years ago, some analysis of career transition would benefit the thousands of HIM professionals making the decision to take this skill set journey. AHIMA has provided some data with regard to skill sets for the supply side via a recent publication: Salary Snapshot: HIM Professionals in 2016 (American Health Information Management Association, 2016). Therefore, to investigate the alignment of HIM skills, knowledge and abilities with industry needs, the following research questions were considered.

RQ1 – Considering the HIMR initiative, what measurable, definable skill sets are associated with industry demand?

RQ2 –Has there been a deskilling of HIM professionals' overtime?

RQ3 – Is there a gap between workforce skills and industry competency demands?

RQ4 – How are the required skills changing about technological change, innovation, competitiveness and education?

6. HYPOTHESES

Several theories exist that are related to 1)workers' skills and the level of education including the Deskilling of Workers (Braverman, 1974), 2) the difficulties of training workers in theory and moving them to practice termed the Theory-Practice Gap (Maben, Latter, & Clark, 2006; Scully, 2011), and 3) workers motivations to obtain education and training as an economic driver in Human Capital Theory (Tan, 2014). For Western education, Human Capital Theory is considered the most influential theory since the 1960s (Fitzsimons, 2015). Changes introduced using economic depictions have included terms such as technological change, innovation, competitiveness, and education; however, earlier economic descriptions failed to consider education in the skilled worker equation (Schultz, 1960).

According to Braverman (1974), new technologies tend to negatively impact a profession by causing the "deskilling of workers". In accordance with the increased reliance on technology in healthcare (Lu, 2016), the healthcare industry is experiencing a demand for skills based employees which runs counter to Braveman's theory. Attewell (1987) provides a counter to this theory as well, arguing that the notion of deskilling workers is incorrect. His research found that work redistribution occurred in an insurance company where claims were examined by skilled workers assessing validity of claims whereas unskilled workers performed data entry. This example of redistribution showed the "countertendency to deskilling".

In another examination of deskilling theory, Penn and Scattergood (1985) found little evidence in three British Mills undergoing computerization and job redesign. Similarly DiPrete (1988) criticized deskilling theory noting that many of the deskilling

studies were insensitive to how the boundaries between occupations can shift overtime. The authors note that there is compelling evidence for clerical downgrading and status redefinition during the process of professionalization.

A common, though imperfect measure, for skills is educational attainment (Michael J. Handel, 2008). To determine how new technologies might be affecting HIM skills, this study will consider educational attainment as a measure of Deskilling Theory. While other measures may perform better, educational attainment is readily available as it is captured regularly by AHIMA, the professional organization for HIM professionals. In addition to deskilling, some have suggested that education in theoretical aspects does not meet practice needs (Greenway, Butt, & Walthall, 2018). This phenomena has been termed the Theory-Practice Gap and has recently been noted in dental education (August, Boyd, & Giblin-Scanlon, 2018), nursing education (Roberts & Williams, 2017), professional sales (Pullins, Timonen, Kaski, & Holopainen, 2017), teacher education, (McGarr, O'Grady, & Guilfoyle, 2017), physical therapy (Tarrant, 2018) and other professions. The theory-practice gap is mentioned routinely in literature often associated with "bridging the gap", "closing the gap", or "avoiding the gap." With regard to nursing, Greenway et al. (2018) defines theory-practice gap as "*The gap between the theoretical knowledge and the practical application of nursing, most often expressed as a negative entity, with adverse consequences.*"

In this work, the Theory-Practice Gap will be used to examine differences between existing workforce skills (theory) and industry demands (practice) and provide insight into the formation of this gap with regards to HIM professionals. Given the HIMR initiative, gaps may exist between education in HIM and industry demand. This study

compares HIMR prescribed competencies with current industry needs to determine if a theory-practice gap is present.

Another influential theory related to education and workplace skills is the Human Capital Theory (Fitzsimons, 2015). Economic depictions of workforce transformation have included terms such as technological change, innovation, competitiveness and education (Becker, 1992). Earlier economic descriptions failed to consider education in the skilled worker equation (Schultz, 1960). In modern Human Capital Theory, education increases earnings and adds to a person's quality of life as investments in human capital (Becker, 1992). In addition, professional certifications can also indicate specialty training and education obtained by workers (Rollins, 2010).

HIMR suggested traditional roles in coding and record processing will decline while technological improvements will drive new roles in data analytics, information governance, and auditing requiring additional human capital investment (HIM Reimagined Primary Taskforce, 2017). This study will consider whether HIMR human capital investment is needed to meet current industry needs shifting from the perspective coding, records administration to compliance, analytics, and informatics by comparing skill sets. The following hypotheses were created to examine the research questions by measuring deskilling, theory-practice gap and human capital comparisons.

Hypothesis 1: There will be an increase in educational attainment of HIM professions.

Hypothesis 2: A Theory-Practice Gap exists between workforce skills and industry needs.

Hypothesis 3: Industry competencies will align with HIMR perspectives on technology, innovation, competitiveness and education affecting traditional HIM roles.

7. METHODOLOGY

This research uses several approaches to evaluate the research questions. To examine the question regarding "deskilling", AHIMA annual salary surveys were obtained (American Health Information Management Association, 2016) so that a comparison could be made over time. Historically, the most frequently used measure of worker skill is education received. In addition, a more granular view was needed to evaluate the research question considering the theory-practice skill gap. An analysis of job board posts took place to determine current practice skills required by the health care industry. This information was then compared to the current Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM) educational competencies as adopted by AHIMA (2016). To evaluate aspects of Human Capital Theory, the researchers performed an analysis of job postings from the major job boards to determine relevance regarding demand and to compare differences between prescribed education and current practice needs.

Procedures

In organizing the data to review the question of deskilling of workers, this study explored educational attainment from 2003 to 2016. Salary snapshot surveys from the American Health Information Management Association contain data indicating the level of individual education and this information was used to compare changes over time (American Health Information Management Association, 2016). The level of education included High School, Associates, Bachelors, and Masters degrees obtained.

To evaluate the theory-practice gap, the researchers obtained online job listings from careerbuilder.com, monster.com, glassdoor.com, LinkedIn, indeed.com, AHIMA.com,

and AAPC.com which announced job openings for HIM professionals. These searches were conducted from August to November of 2018 and a total of 200 active jobs listings were included in the analysis. To identify job announcements, the researched limited results to those that included the term "health information management," in the job title. The search information exacted wording for the most recent uploads of full-time positions in the Health Information Management field. To ensure that only unique job announcement was included in the analysis, each day the researchers search for duplicate announcements. The information downloaded from the job boards was consistent with job titles, specific experience skills, software skills, salary, and specific job requirements, for each job listing within sites. These searches provided the "Practice" or "Industry Need" data for analysis. Regarding the "Theory" portion of the data, the AHIMA surveys of salaries and job skills were downloaded for the years 2003-2016.

Next, to analyze industry competencies required for current jobs, the active job postings coded to identify the different skills, certifications, competencies, and education and aggregated to test alignment with HIMR perspectives on technological change, innovation, competitiveness and education, data. Data were coded and summarized based on textual analysis. AHIMA is working to update the 2018 educational requirements to meet current and future workforce needs as described in the HIMR (American Health Information Management Association, 2018b). The latest competencies have been posted for discussion and are awaiting adoption at the time of this writing, hence the industry job listings should be considered using previous standards from 2016.

8. RESULTS

The first analysis considered the deskilling hypothesis, analyzing educational attainment over time to see if HIM professional's level of degree increased or decreased. Using the AHIMA annual salary snapshot surveys from 2002-2016, the percentage of high school, Associates degree, Bachelor degree, and Master degrees, by year, were calculated. Table 3 shows the percentage of respondent's educational attainment by degree level by year. It should be noted that data was not captured for each year and therefore gaps exist.

Table 3. Educational Attainment

Highest Degree	High School	Associates	Bachelors	Masters
2002	14%	38%	38%	10%
2003	13%	40%	38%	10%
2004	3%	33%	39%	11%
2006	4%	34%	35%	11%
2010	4%	42%	40%	14%
2016	2%	37%	37%	15%

From the first survey in 2002 to the latest survey in 2016, this table shows a decrease in highest level of education at the high school level, a stable attainment of education in the Associates and bachelor's levels and an increase in the Master degree level. Compared to 2002 when 14% of HIM professionals had only attained a high school education, this number has steadily declined over the years to only 2% in 2016. The percentage of HIM professionals holding an Associate or Bachelor degree remained constant from 2002 to 2016 with a drop of less than 1 percent over this 14-year period indicating that no significant deskilling occurred at the Associate or Bachelor degree level. Looking at Master degrees, there has been a steady increase over the fourteen

years of surveys. While in 2002 and 2003 roughly a 10% of those surveyed had attained a Master degree, over the next ten years that percent increased to 14% in 2010 and 15% in 2016. Figure 9 shows educational attainment as reported by year.

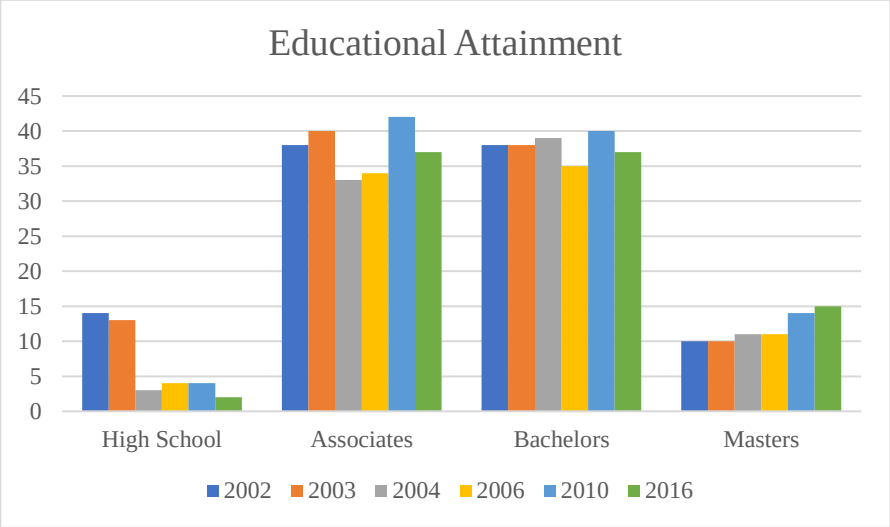


Figure 9. Educational Attainment (American Health Information Management Association, 2018b)

A t-test performed, determined if the percent of people holding a High School degree, Associate degree, Bachelor degree, or Master degree changed over time. Figure 10 shows the percentage of High School and Associate degree for comparative purpose.

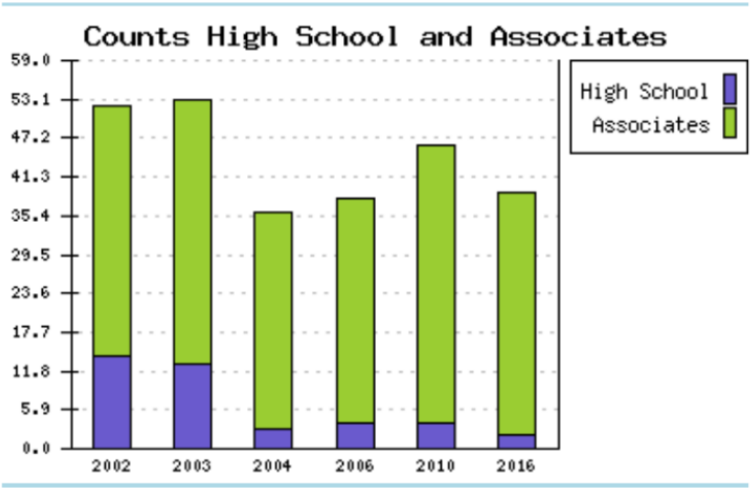


Figure 10. Percent of High School to Associate Educational Attainment

The t-statistic was significant at the .05 level with t ($_{78}$) = 3.073, *p*=.0015; therefore, it can be concluded that the percent difference in change between High School and Associate degree was significant. Deskilling did not occur, and the level of educational attainment increased because the percentage of High School degrees declined, and the difference was significant. A similar examination occurred between Bachelor and Master degrees. Figure 11 shows the percent of each degree for comparative purposes.

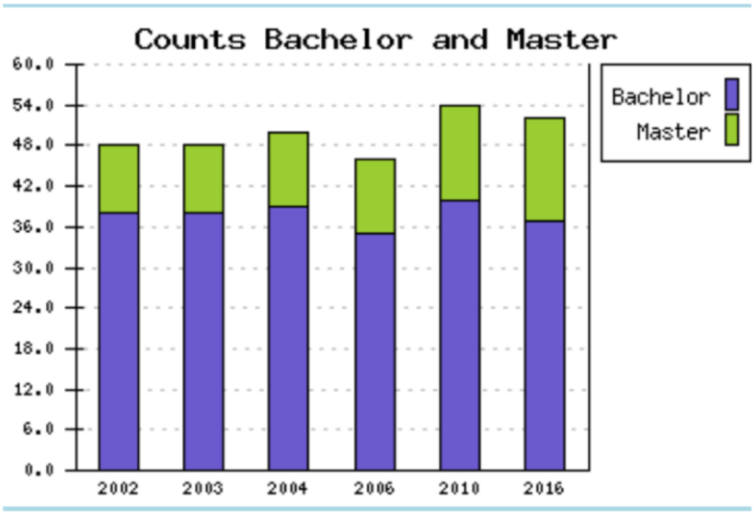


Figure 11. Percent of Bachelor and Master Educational Attainment

A t-test was performed to determine whether there was a difference between the percent of people holding a Bachelor degree or a Master degree over time. The t-statistic was not significant at the .05 level with t ($_{97}$) = 0.093, *p*=.0176. Therefore, it can be concluded that the percent difference in change between Bachelor and Master degrees was not significant. Because the percentage of both Associate and Bachelor degrees remained similar, and the difference was not significant, this indicates deskilling did not occur and the level of educational attainment remained relatively constant for Bachelor

degrees while increasing slightly for Master degrees. Three important outcomes extracted from these results are:

1) The number of HIM professionals with only a High School degree has decreased substantially from 14% to 2%.

2.) Associate and Bachelor degrees obtained by HIM professionals have been unchanging over the 14-year span of AHIMA surveys.

3.) The number of HIM professionals receiving a Master degree has increased from 10% to 15% during this period.

Next a comparison of current industry demands to HIMR skills to determine if a Theory-Practice gap exists. Figure 12 shows the compilation of industry needs from the extracted job listings. This graph represents a snapshot in time of the current job market. From this data, 35% of job listings were coding and billing related. This was the largest group and indicates that Coding and Billing remain important to organizations hiring HIM professionals today. Medical Record Administration was next with 26%, then Informatics/Data Analytics at 22%, and 6% each for Compliance/Risk Management, IT/Infrastructure and Education/Communications.

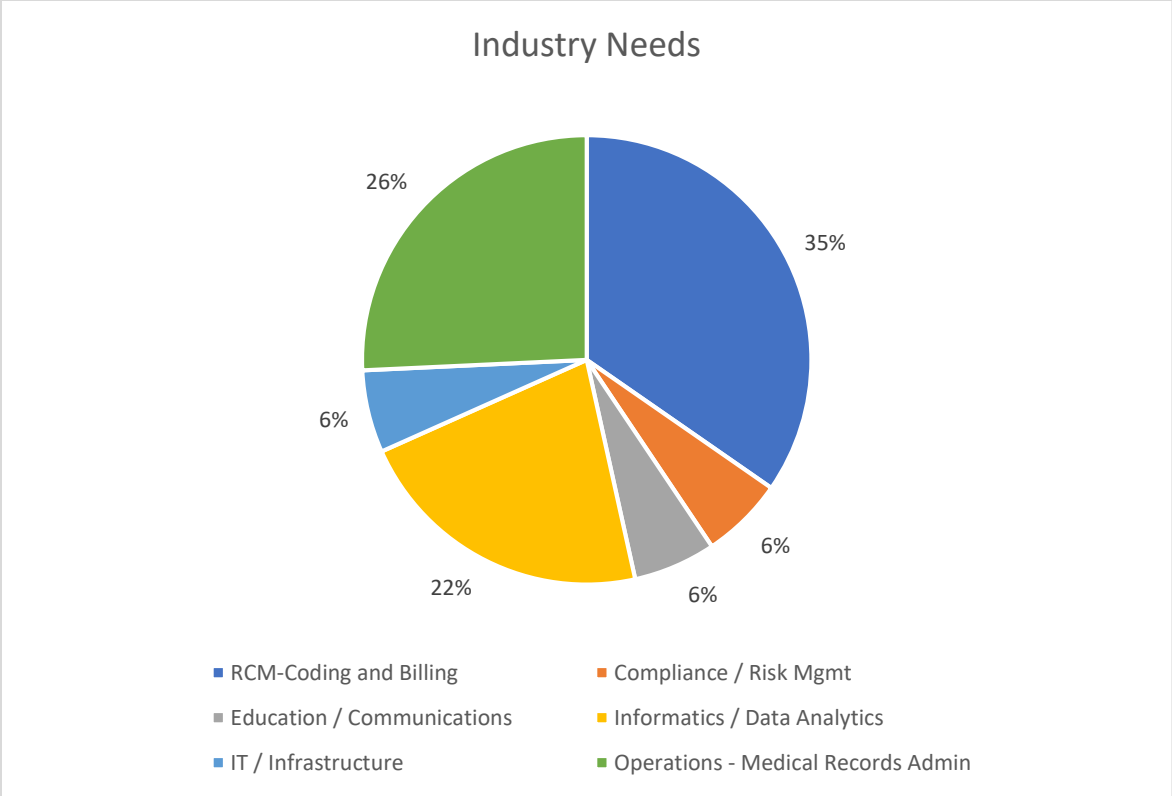


Figure 12 - Industry Needs from Job Listings

Following the industry needs analysis, a similar effort was applied to the 2016 AHIMA job survey data to see in what positions HIM professionals were working as shown in figure 13. In the 2016 AHIMA survey, more than half of the professionals surveyed work in Coding and Billing at 53%. The next highest group is the Operations – Medical Records Administration at 25%, with Compliance/Risk Management and Education/Communications reporting 7% each, and Informatics/Data Analytics and IT/Infrastructure at 5% and 3% respectively. For examples of each of these categories, see the interactive AHIMA (2019) career map available at https://my.ahima.org/careermap.

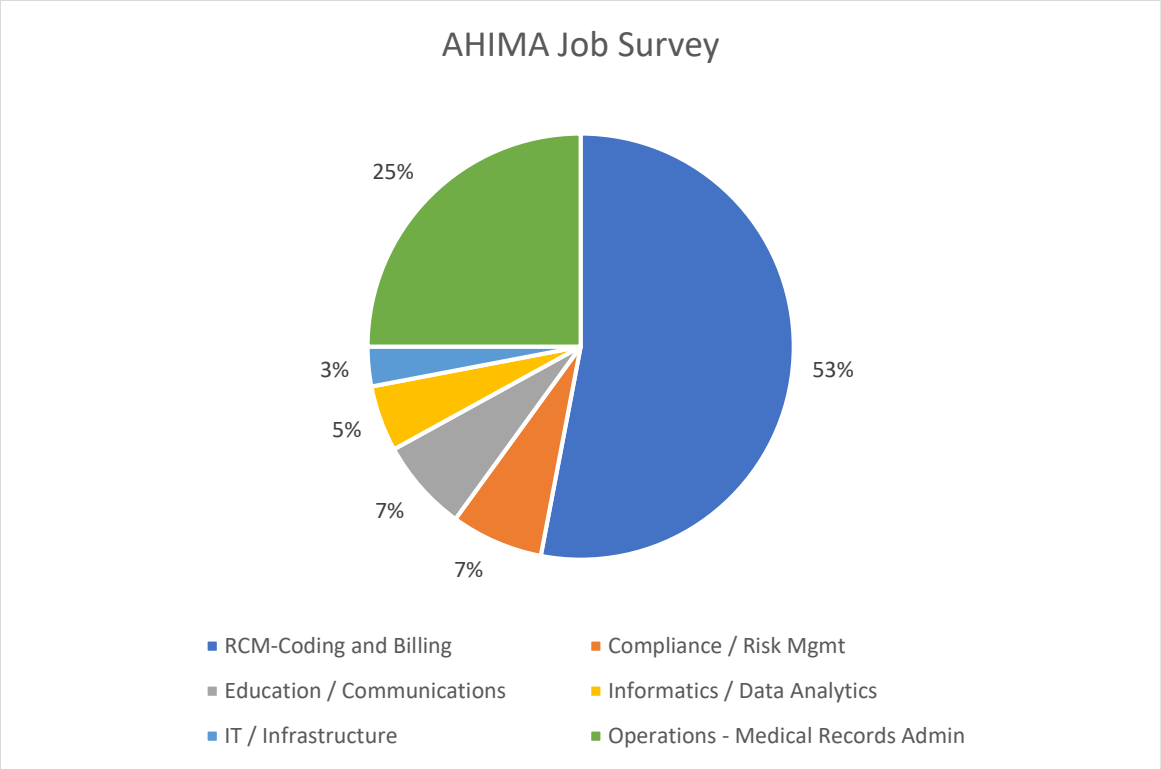


Figure 13 - AHIMA Job Survey Results

Comparing the 2016 AHIMA job survey to the current industry needs jobs listings, indicates similarity across four job families – Education/Communication, IT/Infrastructure, Compliance/Risk Management and Medical Records Administration. Major differences between the theoretical job family skills and industry needs exist in Coding/Billing and Informatics/Data Analytics. The data from the job skill set which is more akin to theoretical needs, show a stronger existing competency for Coding/Billing than industry is currently demanding – an 18% difference. This Theory-Practice gap indicates there are more Coding/Billing skills currently held by practitioners than industry is demanding, thus a decrease in demand for these skills is occurring. In the case of Informatics/Data Analytics, the data suggests an undersupply with 5% of professionals currently holding these skills and industry demanding 22% or a 17% increase in demand

for Informatics/Data Analytics capabilities. These job family differences, suggests a theory-practice gap.

To analyze if skills are changing regarding technological change, innovation, competitiveness and education, 200 job postings were gathered, and data was coded to align with the AHIMA job survey categories. Percentages were calculated for each job family category based on four levels – Entry Level, Mid-Level, Advanced and Master.

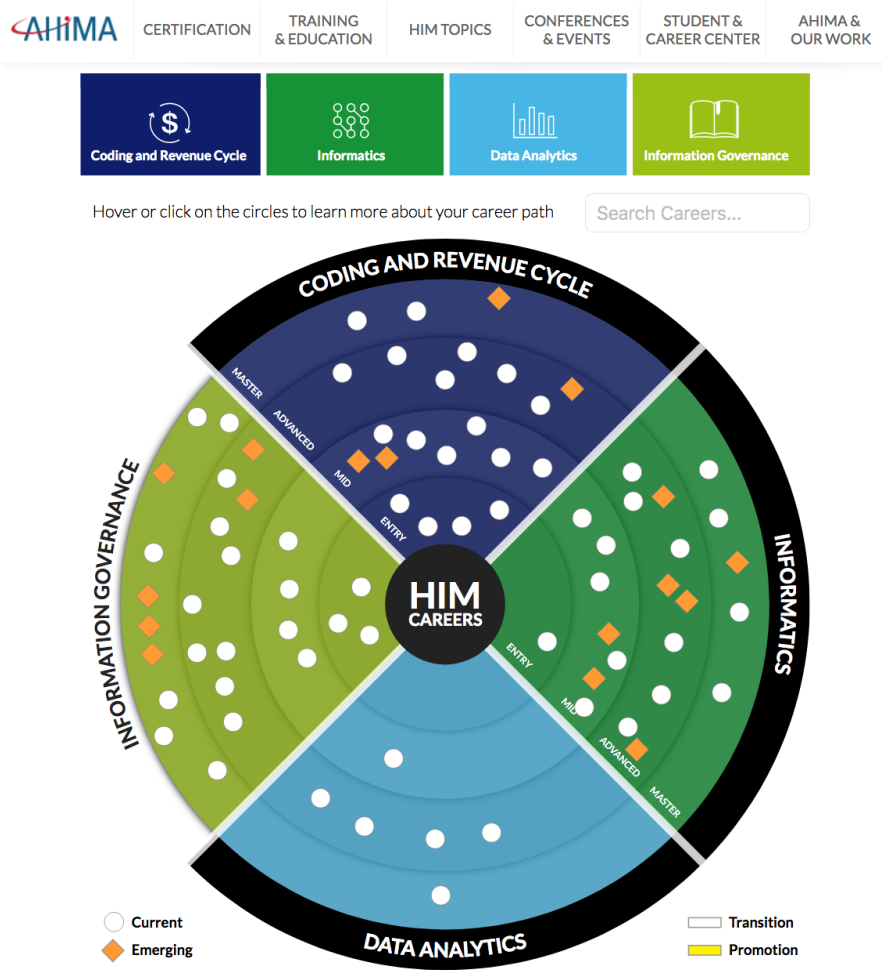


Figure 14 - AHIMA Career Map (HIM Reimagined Primary Taskforce, 2017)

Percentages were also calculated by category providing insight into the relationship between technological change, innovation, competitiveness and education.

Greater skill level and education would be required to support more technical, innovative and competitive categories seen in Figure 14.

Positions listed for Operations Medical Records Administration and Revenue Cycle Management aligned with lower level technical skills and requiring a High School or Associate Degree. More advanced skills such as Informatics/Analytics and Education/Communication relied on advanced or master skills and higher levels of education – Bachelor's or Master's Degrees. Most of the job postings for Informatics/Data Analytics and Education/Communication positions required advanced technical, innovative, or competitive skills, while those in alignment with IT/infrastructure and revenue cycle management, coding and billing required entry-level skills. Privacy and security roles were represented across multiple categories including Compliance/Risk Management and IT/Infrastructure.

Table 4. Percentage of Job Postings by Skill Level and Education

Job Category	**Entry-level/ High School Degree**	**Mid-level/ Associate Degree**	**Advanced/ Bachelor Degree**	**Master/ Master Degree**	**Category Total**
Operations Medical Records Administration	7.19%	51.80%	8.15%	8.15%	**75.29%**
Revenue Cycle Management Coding and Billing	0.00%	8.39%	0.48%	0.00%	**8.87%**
IT/Infrastructure	0.00%	6.00%	0.24%	0.00%	**6.24%**
Informatics/Data Analytics	0.00%	1.92%	4.08%	0.00%	**6.00%**
Education/Communication	0.00%	0.00%	1.92%	0.48%	**2.40%**

Compliance/Risk Management	0.24%	0.24%	0.72%	0.00%	**1.20%**
Skill Level Total	**7.43%**	**68.35%**	**15.59%**	**8.63%**	**100%**

The same categories were organized and sorted by percent of individual indicating in what category they work from the AHIMA (2016) Survey. Currently, 83% of those working is in jobs that require low technical and less innovative skills in positions such as Medical Records Administration or Coding and Billing. Only 6% of participants held skills related to higher technology and innovation work of Informatics / Data Analytics. Table 5 shows the percent by job category.

Table 5. Mappings to the AHIMA Survey

Job Posting Category	**Percent**
Operations Medical Records Administration	75%
Revenue Cycle Management Coding and Billing	9%
Informatics / Data Analytics	6%
IT / Infrastructure	6%
Education / Communication	2%
Compliance / Risk Management	1%
Skill Level Total	**100%**

A similar mapping was created for the job listings yielding a different perspective. For example, 74% of the jobs were seeking Medical Records Administration and Coding and Billing. Industry is seeking less individuals with low tech/low innovation skills when compared to the AHIMA (2016) Survey. In addition, a higher level of technology and innovation is needed by industry with Informatics / Data Analytics at 13%, more than twice the percentage as those working in the industry according to the AHIMA study. Table 6 shows the percent by category from job listings.

Table 6. Mappings to Job Listings	
Job Category	**Percent**
Operations Medical Records Administration	41%
Revenue Cycle Management Coding and Billing	33%
Informatics / Data Analysis	13%
Compliance / Risk Management	5%
Education / Communication	5%
IT / Infrastructure	4%
Skill Level Total	**100%**

Summarizing, there appears to be a shift toward higher level skill sets requiring more education and a decrease in the number of people needed to fill lower level industry jobs. Currently, many HIM professionals operate in record administration, coding and billing positions, but if job listings are any indication, those with lower levels of education performing lower level skills should be aware of industry's shifting needs.

9. DISCUSSION

This Health Information Management job posting study considered current skills and education to industry needs. Results show that HIM administrative jobs and information technology jobs are undergoing transformation to meet industry needs and that the need for more individuals that can fill positions in leadership, governance, and informatics as more less clerical-type positions will exist. The AHIMA 2016 education and skills survey suggests, that AHIMA will align organizational objectives and goals around supporting informatics, analytics, and information governance, while creating new pathways for emerging new roles. Considering the identified industry demands, there will be a shift towards the more technical aspects of HIM driving the need for more education.

To help determine how this shift will affect the future of HIM professionals, this study was conducted using common phrases to determine health organization requirements compelling greater educational support, credentials, and job responsibilities. There were 200 full-time jobs announcements reviewed from across the United States, both remote vacancies and in-house positions. Jobs were categorized based on AHIMA's job family categories - operations-medical records administration, revenue cycle management coding and billing, informatics and data analysis, compliance and risk management, education and communication, and information technology and infrastructure. Analyzing this data by category showed some job families increasing in demand and some decreasing based on industry need.

The HIM profession is changing. While HIM professionals know this, several question must be asked. What exactly is changing about the field? Who is making these

changes? Who do the changes affect? These are but a few of the questions that need to be answered. AHIMA initiated a process, updating HIM skills by writing the *"HIM Reimagined Transformation Starts with you (HIMR),"* whitepaper. In this paper AHIMA addresses the skills and abilities of Registered Health Information Technicians (RHIT) and Registered Health Information Administrators (RHIA). To keep the field relevant and up to date, AHIMA suggests changing the professional association's focus on education and credentials. Today, professionals operate not only in the HIM department of hospitals, but also in many other health care settings outside the hospital.

As health care needs grow, changes in skills and abilities must change as well. Technology introduces roles changes and many HIM professionals will enter coding related fields today, only to shift to an auditing role in the future. This does not mean that coding will no longer be necessary, but it will require higher skill levels focused on advances such as auditing, reimbursement or case finding. With AHIMA focusing on educational changes, the future HIM professional will be in a better place. This paper examined the past and future of the HIM profession, considering AHIMA's forward looking plan and the current needs of the health care industry. Compiling and analyzing job postings from online search engines such as Indeed, AHIMA, American Academy of Professional Coders (AAPC), Monster, LinkedIn, and Career Builder.com, this work considered the skills and educational requirements for these positions. Looking at tabulated results based on job listings, data suggests there exists a high need for the HIM administrative positions and revenue cycle/billing skills and abilities. This aligns with the research and proposal put forth by HIMR. The educational requirements for these positions, are similar across the HIMR proposal and current needs. The skill set required

did change. In the past, having new employees with no training or certification function in an entry level position might have been acceptable. AHIMA suggests increasing educational requirements so that the individual can function in more definitive roles such as auditing or billing. This research supports this assessment and the gap between the workforce skills and what the industry requires. AHIMA provides opportunities to help fill gaps for those individuals that need additional training. There may be educated individuals with no actual work experience that may have to obtain additional credentials, such as Certified Coding Specialist (CCS) or Certified Professional Coder (CPC), depending on the needs of the facility. Conversely, there might be those individuals who have years of work experience and minimal education. Results here indicate that today's HIM jobs require more technological skills to coincide with the changes in the industry. Considering the abundant amount of data available from electronic health record systems, job announcements are starting to include more advanced departments relying heavily on data analytics and information technology. Many HIM professionals may have the years of experience to help them get into these positions but may lack the educational background to support software use and analysis. Professional organizations such as AHIMA must make changes to their educational requirements to help these professionals attain the skill set required by these positions. With other organizations that credential HIM professionals may not chose to follow AHIMA guidelines. For many AHIMA certifications, other organizations offer similar certifications. If the industry standard is consistent, there will be conflicting certification requirements. Some organizations may prefer the CPC credential because they feel the RHIA credential is geared more towards

the HIM professional regardless of their job title, whereas the CPC certification is geared more towards the coding aspect.

The educational levels noted in this study show that the Associate's and Bachelor's degrees are still the most sought-after degrees in terms of numbers. AHIMA's forward looking proposal will have to provide competencies for this group to meet workforce needs. The changes AHIMA makes in certification requirements will be the standard for most of the HIM workforce for future jobs.

10. CONCLUSION

As the HIM profession has evolved over the past 91 years, moving from paper medical records to the electronic health record system, the job requirements have transformed from the entry-level clerical jobs to administrative and highly skilled and knowledgeable worker roles. These changes will continue evolving as today's technology improves and the amount of data increases due to the implementation of the EHR. Specific credentials related to data analytics, such as the Certified Health Data Analyst (CHDA), or the security related Certified in Healthcare Privacy and Security (CHPS) may grow in the future. Today they represent a small proportion of HIM professionals with RHIT dominating credentials. While AHIMA has announced it will no longer offer the CHDA, perhaps, perhaps they will create other credentials to address the transformation occurring in the HIM profession. How these professionals respond to growing industry needs and changing competencies will set the standard for the future HIM professional. New and exciting opportunities are arising for the HIM field due to technological improvements, but some people fear change and the fear of the unknown could hinder progress. How we proceed now will set the precedence for the future.

APPENDIX SECTION

APPENDIX A

AHIMA HISTORICAL TIMELINE WITH CERTIFICATIONS

1928	Association of Record Librarians of North American (**ARLNA**) founded
1929:	*Bulletin of the Association of Record Librarians of North America* published
1933:	Registered Record Librarian (**RRL**) credential established.
1938	*Bulletin, American Association of Medical Record Librarians*, replaces the *Bulletin of the Association of Record Librarians of North America*
1938:	Name of association changed to American Association of Medical Record Librarians (**AAMRL**)
1944	*Journal of the American Association of Medical Record Librarians* replaces *Bulletin, American Association of Medical Record Librarians*
1953:	Accredited Record Technician (**ART**), credential established.
1954:	Certified Record Librarian (**CRL**) designation established to recognize RRLs who had been in the field for at least 15 years and had made significant contributions to the profession. It was discontinued in 1964 because the general membership thought its use detracted from that of the RRL.
1964	*Medical Record News, the Journal of the American Association of Medical Record Librarians* replaces *Journal of the American Association of Medical Record Librarians*
1970:	Name of association changed to American Medical Record Association (**AMRA**)
1970	*Medical Record News, the Journal of the American Medical Record Association* replaces *Medical Record News, the Journal of the American Association of Medical Record Librarians*
1978:	Registered Record Administrator (**RRA**) credential replaces the Registered Record Librarian (RRL) credential
1980	*Journal of the American Medical Record Association* replaces *Medical Record News*
1991:	Name of association changed to American Health Information Management Association (**AHIMA**)
1991	*Journal of the American Health Information Management Association* (*Journal of AHIMA*) replaces *Journal of the American Medical Record Association*

1992:	Certified Coding Specialist (**CCS**) credential established
1997:	Certified Coding Specialist - Physician-based (**CCS-P**) credential established
1999:	Fellow of the American Health Information Management Association (**FAHIMA**) designation established to recognize members who have made significant and lasting contributions to the HIM profession
2000:	Registered Health Information Technician (**RHIT**) credential replaces the Accredited Record Technician (ART) credential; Registered Health Information Administrator (**RHIA**) credential replaces the Registered Record Administrator (RRA) credential.
2001:	Certified Coding Associate (**CCA**) entry-level coding credential established
2002:	Certified in Healthcare Privacy (**CHP**) credential created
2002:	Certified in Healthcare Security (**CHS**) credential, sponsored by HIMSS and administered by AHIMA created
2002:	Certified in Healthcare Privacy and Security (**CHPS**) credential, sponsored jointly by AHIMA and HIMSS, created
2008:	Certified Health Data Analyst (**CHDA**) credential created
2011:	Certified Documentation Improvement Practitioner (**CDIP**) credential created
2011:	Certified Healthcare Technology Specialist (**CHTS**) credential created (this credential was originally known as HIT Pro)

APPENDIX B

SURVEY

Survey: AHIMA Workforce Survey

AHIMA Workforce Study

WELCOME

AHIMA Workforce Study

The American Health Information Management Association (AHIMA), the premier association of health information management (HIM) professionals worldwide, has commissioned this study of the knowledge and skill that will be required of the health information management workforce 10 years from now. The results will be used to inform AHIMA's leaders as they plan education and certification programs to meet the future needs of the profession.

Your participation will help to ensure that the information gathered accurately reflects the thoughts of health information management professionals and those individuals and organizations that employ them.

It will take you about 15 minutes to respond to these questions.

Please be certain that you have answered all of the questions on a page before you continue to the next page.

You will not be able to go back and add or change answers once you have left a page.

You may leave the survey and return at another time if you need to. The system will record your responses for all completed pages. If you do leave the site, be sure to click on the "Save Page and Continue Later" button at the bottom of the page. The system will send you a link for you to use to continue the survey.

Each person can take the survey only one time.

Thank you for your participation in this important study!

Which statement best describes your current relationship to health information management? *

- I am a practicing health information management professional (including HIM, informatics and health information technology related professionals)
- I employ or supervise health information management professionals.
- I am an educator of health information management professionals.
- I recruit health information management professionals.
- I develop technology used by health information management professionals.
- I am a health care professional/consultant/vendor who works with health information management professionals.
- I am a student pursuing a degree in health information management.
- Other (enter relationship in box and then check the circle to the left)

TASKS

This section presents a list of tasks that health information management professionals MAY perform. "*Tasks*" are things that professionals DO to carry out their job.

The question asks the percentage of your time you typically devote to performing the task. Enter your responses as whole percentages (such as 10%, 25%, etc.)

The system will automatically total your responses. The total of your responses MUST equal 100%.

What percentage of your time do you spend in your current position performing each of the following tasks? (Sum of all tasks must equal 100%)

Analytics & Data Use		%
Analyzing/managing data		%
Business process analysis		%
Clinical process analysis		%
Coding (diagnosis/procedure)		%
Developing data structure and standards		%
Ensuring compliance with regulatory guidelines and reporting requirements		%
Ensuring data quality (auditing)		%
Informatics		%
Information technologies (design, selection, implementation)		%
Leadership		%
Legal and ethical issues (including fraud detection)		%
Protecting information (Access, Disclosure, Archival, Privacy & Security)		%

Revenue Management		%
Teaching		%
Other		%
	0	

Do you expect to be engaged in health information management 10 years from now?

- Yes
- No

What percentage of your time do you think you will spend performing each of the following tasks 10 years from now? (Sum of all tasks must equal 100%)

Analytics & Data Use		%
Analyzing/managing data		%
Business process analysis		%
Clinical process analysis		%
Coding (diagnosis/procedure)		%
Developing data structure and standards		%
Ensuring compliance with regulatory guidelines and reporting requirements		%
Ensuring data quality (auditing)		%
Informatics		%
Information technologies (design, selection, implementation)		%
Leadership		%
Legal and ethical issues (including fraud detection)		%
Protecting information (Access, Disclosure, Archival, Privacy & Security)		%
Revenue Management		%
Teaching		%
Other		%
	0	

Important Skills for HIM Professionals

The next two pages contain tables listing skills/competencies that MIGHT be required of health information management professionals.

Please indicate how important each skill/competency is in performing your present job and how important you expect that the skill will be in performing your job 10 years from now.

Select N/A if you do not presently use the skill in your current job or if you do not expect to use that skill in the future.

Please rate the importance of each skill/competency today and 10 years from now.

	Importance Today						Importance 10 Years from Now					
	Not Important				Very Important		Not Important				Very Important	
	1	2	3	4	5	*N/A*	1	2	3	4	5	*N/A*
Administration/staff supervision	o	o	o	o	o	o	o	o	o	o	o	o

Analytical thinking	o	o	o	o	o	o	o	o	o	o	o	o
Analyzing big data	o	o	o	o	o	o	o	o	o	o	o	o
Assessing and/or developing clinical and non-clinical processes	o	o	o	o	o	o	o	o	o	o	o	o
Auditing	o	o	o	o	o	o	o	o	o	o	o	o
Business analytics	o	o	o	o	o	o	o	o	o	o	o	o
Business/financial management	o	o	o	o	o	o	o	o	o	o	o	o
Change management	o	o	o	o	o	o	o	o	o	o	o	o
Clinical documentation improvement	o	o	o	o	o	o	o	o	o	o	o	o
Clinician and patient education	o	o	o	o	o	o	o	o	o	o	o	o
Coding (medical record)	o	o	o	o	o	o	o	o	o	o	o	o
Communication (written, spoken and/or presentation)	o	o	o	o	o	o	o	o	o	o	o	o
Compliance/value based purchasing	o	o	o	o	o	o	o	o	o	o	o	o
Conducting/interpreting applied research	o	o	o	o	o	o	o	o	o	o	o	o
Consumer engagement and service	o	o	o	o	o	o	o	o	o	o	o	o
Critical thinking	o	o	o	o	o	o	o	o	o	o	o	o
Data analysis	o	o	o	o	o	o	o	o	o	o	o	o
Data integrity	o	o	o	o	o	o	o	o	o	o	o	o
Data mining	o	o	o	o	o	o	o	o	o	o	o	o
Design/innovation	o	o	o	o	o	o	o	o	o	o	o	o
Developing and promoting HIM standards	o	o	o	o	o	o	o	o	o	o	o	o

Please rate the importance of each skill/competency today and 10 years from now.

	Importance Today						Importance 10 Years from Now					
	Not Important				Very Important		Not Important				Very Important	
	1	2	3	4	5	*N/A*	1	2	3	4	5	*N/A*
Developing innovative systems/processes	o	o	o	o	o	o	o	o	o	o	o	o
Electronic health records management	o	o	o	o	o	o	o	o	o	o	o	o
Ensuring clinical and business efficiency	o	o	o	o	o	o	o	o	o	o	o	o
Fraud surveillance	o	o	o	o	o	o	o	o	o	o	o	o
Health informatics/data analytics	o	o	o	o	o	o	o	o	o	o	o	o
Information Technology (IT)/software programming	o	o	o	o	o	o	o	o	o	o	o	o

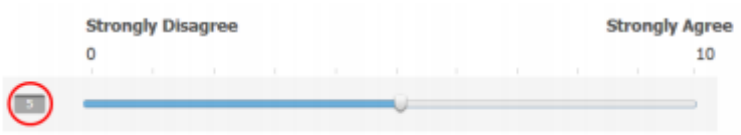
Information governance	o	o	o	o	o	o	o	o	o	o	o	o
Information privacy & security	o	o	o	o	o	o	o	o	o	o	o	o
Information technology (IT) networking	o	o	o	o	o	o	o	o	o	o	o	o
Information technology (IT)/computer systems support	o	o	o	o	o	o	o	o	o	o	o	o
Leadership	o	o	o	o	o	o	o	o	o	o	o	o
Medical terminology/pharmacology	o	o	o	o	o	o	o	o	o	o	o	o
Negotiation	o	o	o	o	o	o	o	o	o	o	o	o
Problem solving	o	o	o	o	o	o	o	o	o	o	o	o
Project management	o	o	o	o	o	o	o	o	o	o	o	o
Quality assurance	o	o	o	o	o	o	o	o	o	o	o	o
Records process analysis	o	o	o	o	o	o	o	o	o	o	o	o
Risk management	o	o	o	o	o	o	o	o	o	o	o	o
Statistics	o	o	o	o	o	o	o	o	o	o	o	o
Systems interoperability	o	o	o	o	o	o	o	o	o	o	o	o

Changes that Will Occur in the Future for the Health Information Management Profession

The following pages present a series of statements about the future of health care and the health information management profession.

Using the sliders to the right of each question, please indicate the degree to which you agree or disagree with the statement. (You can click and drag the slider to the right or you can click on a point in the slider scale and the slider will jump to that position.)

Note that the slider is on a 10 point scale. "0" Strongly Disagree is on the left and "10" Strongly Agree is on the right. The rating in the middle, a rating of "5", indicates that you neither agree nor disagree with the statement. The numeric value of your rating appears in the box to the left of the slider as shown below.

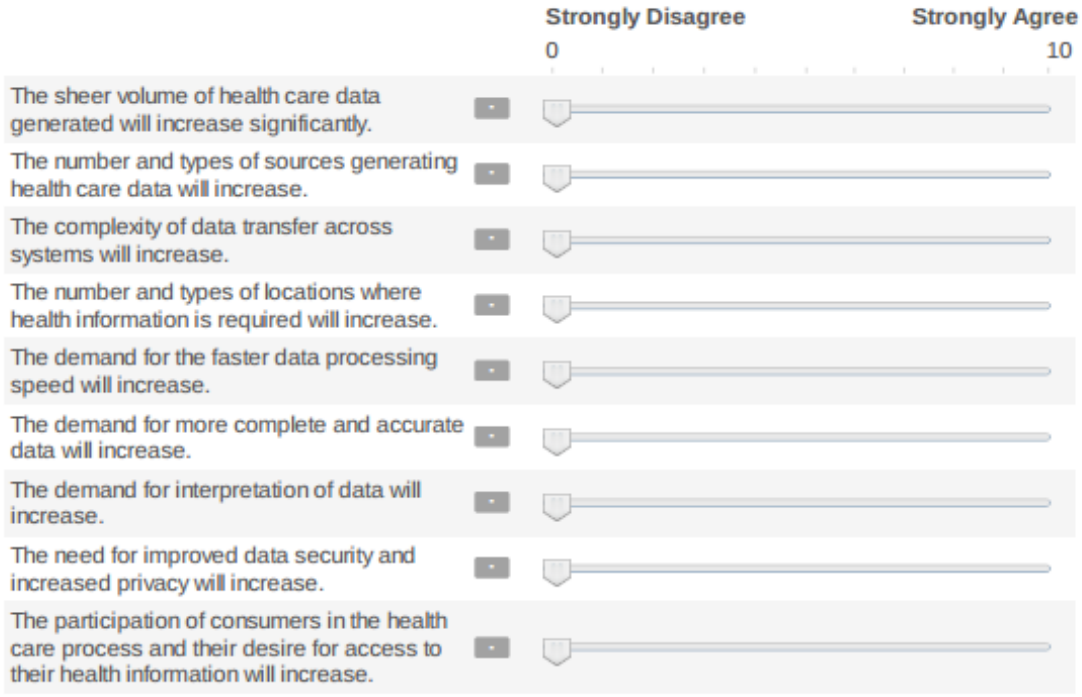


Indicate the degree to which you agree or disagree with each statement below concerning the forces that will shape the future of health information management?.

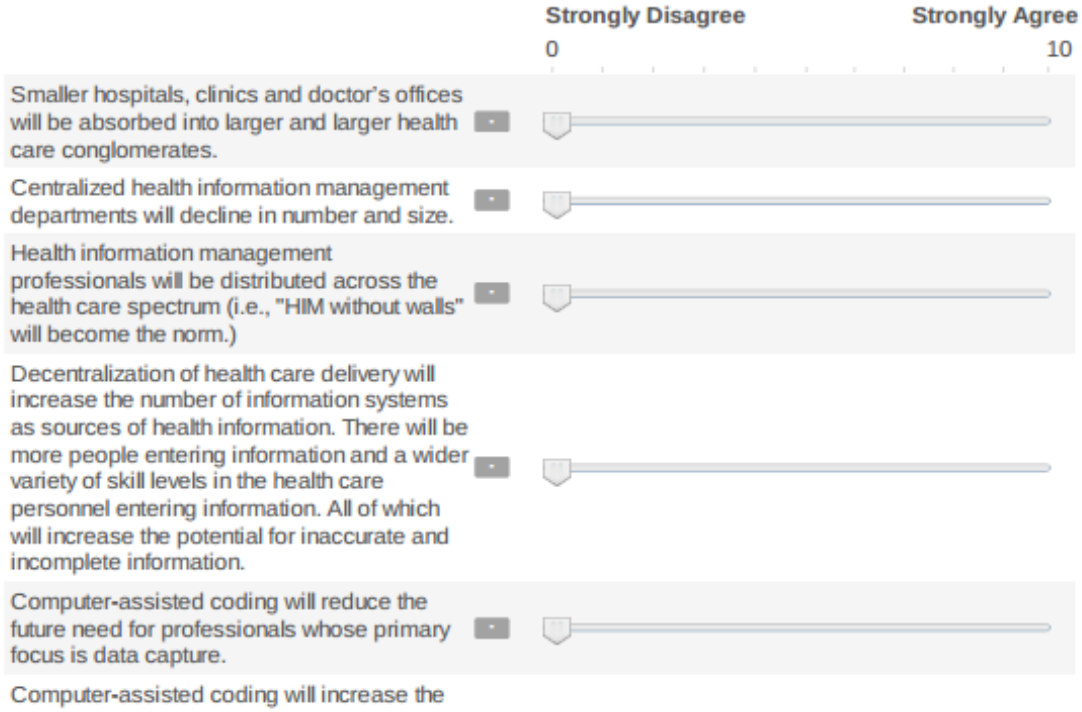
	Strongly Disagree 0 — Strongly Agree 10
Ongoing changes in government initiatives, rules and regulations (especially those impacting how health care providers are compensated) will be a major force in impacting the future of health information management.	
The decentralization of health care away from acute care centers to a wide variety of delivery environments will significantly impact the future of the health information management profession.	
The introduction of new technologies will have a major impact on the future of health information management.	
Economic pressures on healthcare providers to deliver better healthcare at lower costs will have a major impact on the future of health information management.	
The increased role of the consumer in healthcare. will have a major impact on the future of health information management.	

Indicate the degree to which you agree or disagree with each statement about future

changes that will impact the health information management profession?



Indicate the degree to which you agree or disagree with each statement below about future changes that will impact the health information management profession?



need for auditing and clinical documentation improvement professionals in the future.	-
More employers will look for health information management professionals to analyze health information for ways to improve the quality of service, increase efficiency and reduce costs.	-
Informatics will become increasingly more important to employers of health information management professionals.	-
Information governance will become increasingly more important to employers of health information management professionals.	-

Questions About Health Information Management Education

The following questions ask your opinion about educational programs for health information management professionals and about your personal future education plans.

What level of education do you feel will be the minimum required of health information management professionals 10 years from now?

- o High School degree
- o Associates degree
- o Bachelor's degree
- o Master's degree
- o Doctoral degree
- o Other

Are you considering entering a junior college, community college, state university, private university or online degree program within the next 5 years?

- Yes
- No

Approximately when are you considering enrolling?

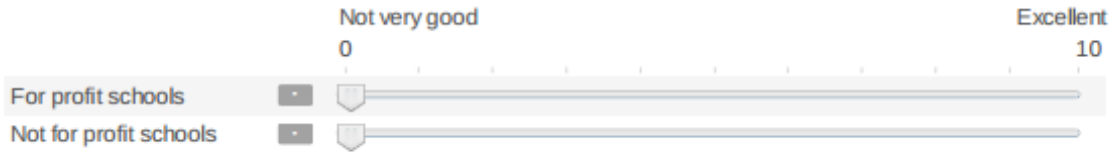
- Within the next 1.5 years
- Within the next 1.5 to 3 years
- Within the next 4 to 5 years

In which of the following programs are you most likely to consider enrolling?

- Continuing Education or Certificate Program
- Associates degree
- Bachelor's degree
- Master's degree
- Doctoral degree
- Other
- Don't know what degree yet

In what subject area are you considering a program?

Please use the slider to indicate your views about the quality of types of schools that currently offer educational programs for health information management professionals.



Please list any For Profit Schools that you view as being of very high quality. (List up to five schools.)

Please list any For Profit Schools that you view as being of very low quality. (List up to five schools.)

Please list any Not For Profit schools that you view as being of very high quality. (List up to five schools.)

Please list any Not For Profit Schools that you view as being of very low quality. (List up to five schools.)

DEMOGRAPHIC QUESTIONS

The following demographics questions are optional, but can help us determine if there are trends within certain populations. The questions do not ask that you identify

yourself and the responses will only be used to analyze groups of respondents.

How do you identify yourself?

- ○ Male
- ○ Female

What is your ethnic background (Select all that apply)?

- ☐ White
- ☐ Hispanic
- ☐ Black/African American
- ☐ American Indian / Aleut Eskimo
- ☐ Asian or Pacific Islander
- ☐ Prefer not to answer

What is the highest level of formal education that you have completed?

- ○ I did not graduate from high school
- ○ High school, high school equivalent or baccalaureate degree
- ○ Technical school
- ○ Some college, no degree
- ○ Associates degree or certificate program (two-year degree)
- ○ University - undergraduate (bachelor's degree)
- ○ University - graduate (master's degree)
- ○ University - post graduate (doctoral degree, etc.)

Which health information management related certification(s) do you hold? (Select all that apply.)

- ☐ CAHIMS
- ☐ CCA
- ☐ CCDS
- ☐ CCS
- ☐ CCSP
- ☐ CDIP
- ☐ CHCIO
- ☐ CHDA
- ☐ CHDS
- ☐ CHPS
- ☐ CPHIMS
- ☐ RHDS
- ☐ RHIA
- ☐ RHIT
- ☐ N/A

- [ ] Other

Which best describes your job setting?

- Acute care
- Ambulatory
- Behavioral/mental health
- Clinic/physician
- Consulting
- Education
- Home/Hospice
- Integrated health care
- Long-term
- Non-provider setting
- Other provider
- Other

Which best describes your job level?

- Clerical/Administrative Support
- Clinician (MD, RN, etc.)
- Coding Professional
- Compliance Officer
- Consultant
- Director (HIM)
- Director (other than HIM)
- Educator
- Executive/President/Vice President
- IS/IT Director
- Manager
- Other HIM Technician Roles
- Other Officer
- Privacy Officer
- Security Officer
- Supervisor
- Technology Role
- Other

What is your total annual compensation (including salary and bonus but excluding benefits)?

- Less than $20,000
- $20,000 to $39,999
- $40,000 to $59,999
- $60,000 to $79,999

- $80,000 to $99,000
- $100,000 to $119,999
- $120,000 to $139,999
- $140,000 to $159,999
- $160,000 or more

What is your job title?

What is your age?

- Younger than 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 or older
- Prefer not to answer

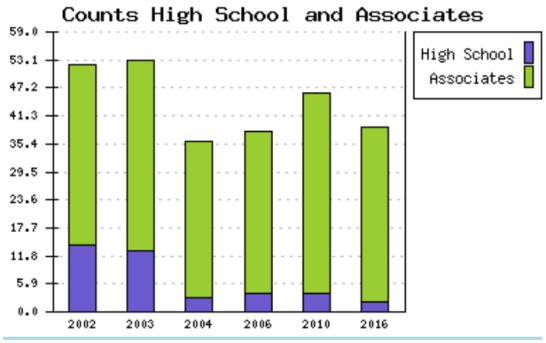
In what state do you primarily work?

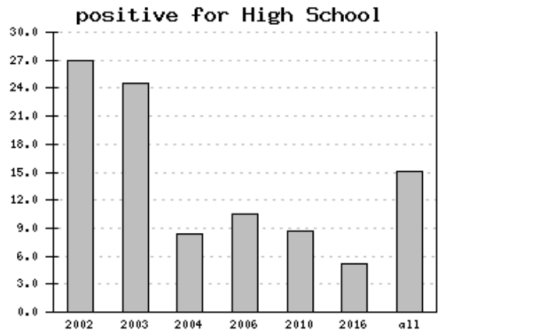
-- Select --

AHIMA Workforce Study

APPENDIX C

COMPARISON OF HIGH SCHOOL AND ASSOCIATE DEGREE ATTAINMENT OVER TIME





T-tests (ri-rj):

2002-2003=0.2692-0.2453=0.0239; t=0.281; df=102.2; p=0.3901
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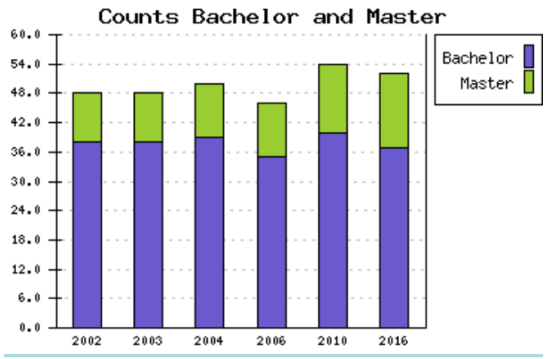
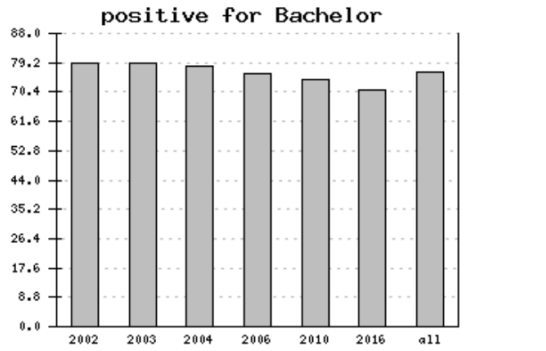
2002-2006=0.2692-0.1053=0.164; t=2.072; df=87.3; p=0.0205
2002-2010=0.2692-0.087=0.1823; t=2.456; df=87; p=0.0079
2002-2016=0.2692-0.0513=0.2179; t=3.073; df=78.2; p=0.0015
2003-2004=0.2453-0.0833=0.1619; t=2.161; df=86.3; p=0.0171
2003-2006=0.2453-0.1053=0.14; t=1.812; df=88.5; p=0.0367
2003-2010=0.2453-0.087=0.1583; t=2.192; df=90; p=0.0157
2003-2016=0.2453-0.0513=0.194; t=2.818; df=81; p=0.003
2004-2006=0.0833-0.1053=-0.0219; t=-0.323; df=71.3; p=0.3735
2004-2010=0.0833-0.087=-0.0036; t=-0.058; df=75.5; p=0.4768
2004-2016=0.0833-0.0513=0.0321; t=0.552; df=66.4; p=0.2913
2006-2010=0.1053-0.087=0.0183; t=0.282; df=75.6; p=0.3893
2006-2016=0.1053-0.0513=0.054; t=0.884; df=66.6; p=0.19
2010-2016=0.087-0.0513=0.0357; t=0.654; df=82; p=0.2581

APPENDIX D

COMPARISON OF BACHELOR AND MASTER DEGREE ATTAINMENT OVER TIME





T-tests (ri-rj):

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2002-2016=0.7917-0.7115=0.0801; t=0.933; df=97.4; p=0.1766
2003-2004=0.7917-0.78=0.0117; t=0.141; df=95.5; p=0.4442
2003-2006=0.7917-0.7609=0.0308; t=0.358; df=90.7; p=0.3599
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2003-2016=0.7917-0.7115=0.0801; t=0.933; df=97.4; p=0.1766
2004-2006=0.78-0.7609=0.0191; t=0.223; df=92.3; p=0.4121
2004-2010=0.78-0.7407=0.0393; t=0.47; df=101.5; p=0.3198
2004-2016=0.78-0.7115=0.0685; t=0.797; df=99.3; p=0.2134
2006-2010=0.7609-0.7407=0.0201; t=0.232; df=95.7; p=0.4085
2006-2016=0.7609-0.7115=0.0493; t=0.555; df=95.1; p=0.2897
2010-2016=0.7407-0.7115=0.0292; t=0.337; df=103; p=0.368

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