Confidential

A National Job Analysis Study of the Certified Healthcare Technology Specialist Management Role 2016

Conducted for:

American Health Information Management Association

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Executive Summary

The Job Analysis described in this report was conducted in 2016 at the request of the American Health Information Management Association (AHIMA). The purpose of the study was to describe the job activities of the healthcare technology specialist in a management role in sufficient detail to provide a basis for the development of a professional, job-related certification examination.

A Job Analysis Advisory Committee (AC) was appointed by AHIMA to conduct the activities necessary to identify job responsibilities and develop the test specifications for the Certified in Healthcare Technology Specialist - Management (CHTS-M) examination. The AC represented varied national regions and practice settings. All AC members were experts in the duties and activities associated with the profession.

The study involved developing a job task list and survey, distributing the survey, and analyzing the survey responses. Test specifications for the CHTS-M examination were developed based on survey responses. The AC was responsible for the following functions regarding Job Analysis survey development:

- developing a sampling plan for the survey,
- identifying task statements for the survey instrument,
- determining the survey rating scales,
- determining the relevant demographic variables of interest, and
- integrating tasks, rating scales, and demographics into a survey instrument.

AMP, a PSI business (PSI/AMP) project staff modified and created an online survey for distribution to a sample of healthcare technology specialists. The target professional was defined as follows:

CHTS Management Role:

Individuals in this role plan and coordinate workflow and provide management of health IT systems in healthcare organizations. The previous background of those in this role may include experience in health and/or IT environments, as well as administrative and managerial experience. The CHTS Management Role includes:

- *Facilitating workflow design that accommodates quality improvement and reporting*
- *Evaluating process workflows to validate or improve healthcare systems*
- *Applying project management and change management principles to create implementation project plans to achieve the project goals*
- *Interacting with stakeholders to ensure open communication with the support team*
- *Managing vendor relations, providing feedback to health IT vendors for product improvement*
- *Leading implementation teams consisting of workers in the roles described above.*

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Hyperlinks to a web-based survey were distributed by electronic mail to 1,333 healthcare technology specialists, with 32 survey invitations returned as undeliverable. Three hundred forty nine (349) participants responded and provided usable responses to be included in the analysis, which resulted in an overall return rate of 27%. After a demographic section, respondents were routed to either one or up to all four specialist role surveys, depending on their choice. There were a total of 213 respondents who completed the CHTS Manager Role survey, 109 respondents completed the CHTS Technical Role survey, 105 respondents completed the CHTS Trainer Role survey, and 75 respondents completed the Clinician/Practitioner Consultant Role survey. The results from the 213 CHTS Management Role respondents are presented in this report. The results from the three other specialist role surveys are also reported but documented elsewhere. Responses to the demographic questions indicated that there were sufficient numbers from relevant groups for subsequent analyses.

Survey data were presented to the AC at the second job analysis meeting for review and comment. The survey was divided into three parts – Task Inventory, Knowledge/Skill Inventory, and Background Information sections. The Task Inventory consisted of five major areas:

1. Project Management
2. Change Management
3. Personnel
4. Technology
5. Quality and Risk Management

The AC developed and used exclusion decision rules to identify tasks appropriate for the examination content outline. Of the 72 tasks on the original survey, 8 tasks were excluded based on the following exclusion criteria.

Rule 1 *Keep only tasks performed by 71.5% or more of respondents.*
Applying this rule eliminated 5 tasks (M1: Create charter; M46: Administer applicable competency exams, evaluate results, and take actions; M20: Manage contract specifications; M55: Create a process and document health information exchange requirements; M61: Perform SWOT analysis).

Rule 2 *Keep only tasks rated at least Significant (2.00) by respondents.*
Applying this rule eliminated three additional tasks. (M57: Identify and mitigate legal issues, M52b: Manage and monitor systems, b-development, M39: Identify organizational structure).

Rule 3 *Keep only tasks rated at least Significant (1.90) by 3 out of 4 region subgroups (Northeast, Midwest, South, and West).*
Applying this rule did not eliminate any additional tasks.

Rule 4 *Keep only tasks rated at least Significant (1.90) by 3 out of 3 years of experience in health IT workforce roles subgroups (0-5 years; 6-16 years; and more than 17 years).*
Applying this rule did not eliminate any additional tasks.

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Rule 5 *Keep only tasks rated at least Significant (1.90) by 3 out of 3 levels of education (High school graduate, GED, or associates degree; Bachelor's degree; Master's and above).*
Applying this rule did not eliminate any additional tasks.

Rule 6 *Keep only tasks rated at least Significant (1.85) by 6 out of 6 certifications held subgroups (CP, IM, IS, PW, TR, and TS).*
Applying this rule did not eliminate any additional tasks.

Rule 7 *Keep only tasks rated at least Significant (1.90) by 3 out of 4 job title subgroups (Director/Executive; Manager; Technical; and Other).*
Applying this rule did not eliminate any additional tasks.

Rule 8 *Keep only tasks rated at least Significant (1.90) by 2 out of 3 number of employees subgroups. (Less than 100; Between 101 and 1,000; and More than 1,000).*
*Appl*ying this rule did not eliminate any additional tasks.

In summary, the decision rules resulted in identifying tasks comprising the content domain that were performed by 71.5% of the respondents. Also, the tasks identified were considered at least significant by the respondents. Finally, the tasks were viewed similarly regardless of the location, years of work experience, highest level of education, certifications held, primary job level, and number of employees.

The AC also developed and used exclusion decision rules to identify knowledge/skill statements appropriate as supplemental information on the examination content outline. The Knowledge/Skill Inventory consisted of four major areas:

1. Technical Knowledge: Health Data Management
2. Technical Knowledge: Health Information Technology & Systems
3. Non-Technical Knowledge: Hard Skills
4. Non-Technical Knowledge: Soft Skills

Of the 80 knowledge/skill statements (topics) on the original survey, 4 statements were excluded based on the following exclusion criterion.

Rule 1 *Keep only those topics rated at least Significant (1.70) by respondents.*
Applying this rule eliminated three statements (K17: General hardware maintenance; K32: Servers; K45: Ergonomics; K50: Inferential statistics).

One purpose of the knowledge/skill statements is to provide guidance to the item writers/exam committee. As such, the AC assigned priority designations (low, medium, or high) to each knowledge/skill statement to provide some additional detail on the level of emphasis for each statement.

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The AC reviewed and considered all respondent comments. No additional tasks or knowledge statements were added or removed. Six tasks and one knowledge statement was slightly edited before final inclusion. The final 64 tasks comprising the content domain were used to construct the detailed content outline, consisting of five major content areas. The AC members assigned cognitive complexity designations to each critical task according to their perceptions of job conduct. Items linked to these tasks should closely align with the complexities of the job. The AC members were confident candidates' scores should reflect critical job content and complexity when tests are developed to the new set of specifications. It was decided that a 125-item examination sufficiently samples the content domain to render a pass or fail decision based on examination scores. The resulting examination matrix and detailed content outline will be used by AHIMA to assemble future examination forms.

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Introduction

The Job Analysis described in this report was conducted in 2016 at the request of the American Health Information Management Association (AHIMA). The purpose of the study was to describe the job activities of the healthcare technology specialist in a management role in sufficient detail to provide a basis for the development of a professional, job-related certification examination.

A Job Analysis Advisory Committee (AC) was appointed by AHIMA to conduct the activities necessary to identify job responsibilities and develop the test specifications for the Certified in Healthcare Technology Specialist - Management (CHTS-M) examination.

The AC developed a comprehensive inventory of activities that the healthcare technology specialist in a management role may perform by brainstorming job activities and reviewing both the current detailed content outline and the previous Job Analysis study. In addition, demographic variables were developed, and a rating scale was selected for use on the survey. After pilot testing, the Job Analysis survey was distributed to 1,333 healthcare technology specialists. The returned surveys were analyzed to determine the significance of each task to the healthcare technology specialist in a management role.

Job Analysis survey data were evaluated to determine the degree of consensus among professionals on critical aspects of the job. Data were specifically analyzed to answer the following questions:

1. What percentage of professionals performs each job task?

2. Which tasks are more significant to the job?

3. Which knowledge/skill statements are more significant to the job?

These questions helped identify the more significant job activities and knowledge from which the content of the CHTS-M examination was specified.

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Methodology

Forming the Job Analysis Advisory Committee

The AC was consulted throughout the survey development stages to ensure that expert judgment was available to AMP staff. The responsibilities of the AC are listed in the following section. The members of the AC were experienced professionals, all thoroughly familiar with the skills and activities of the profession. Listed below are the AC members.

Name	Credentials	Organization
Valerie Ball	IS	NC State University College of Veterinary Medicine
Tammie Bolling	TR	Pellissippie State Community College
Cynthia Buege	IM	Michigan Public Health Institute
Tamara Flynn	IM	Pitt Community College
Paula Arceneaux Ivey	IM	Hospital Corporation of America - Gulf Coast Division
Diane Lerch	PW, TR	Tampa General Hospital
Daphnie Mustafa	IM	Inova Health System
Geri Newman	IM	UF Health Shands Hospital
Issac Perkins	IM	Johns Hopkins EPIC Training
Tamara Rodriguez	PW	Tallahassee Memorial Healthcare
Nancy Rosivack	IM, IS, PW, TR	NJ-HITEC
LaShunda Smith	IM, PW, TR	Baptist Health
Tatyana Pashnyak	TR	Bainbridge State College
Shelley Safian		Safian Communications Svs. Inc.
Tanya Scott	CP, PW	Lemont Scott Group
Melinda Teel		Midland College

Job Analysis Advisory Committee Responsibilities

1. Provide PSI/AMP current information about the job.
2. Develop the Job Analysis survey:
   a. develop a sampling plan,
   b. identify tasks for the survey instrument,
   c. determine the survey rating scales,
   d. determine the relevant demographic variables of interest, and
   e. integrate the definition, tasks, rating scales, and demographics into a survey instrument.
3. Review the final form of the survey for completeness, relevance to the profession, appropriate language, and clarity of instructions.

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A significant investment of time by the AC members ensured a successful Job Analysis study. We are grateful to each of these professionals for their guidance, expertise, and devotion to this complex project.

Developing the Job Analysis Survey

Developing the Task List

With the assistance of PSI/AMP project staff, the AC drafted an inventory containing a comprehensive list of job activities. The task list was drafted from various sources, including the previous test specifications and other descriptions of the healthcare technology specialists in a management role. The final document consisted of 72 tasks presented in content order.

Selecting Rating Scales

The AC also assisted in the selection of the rating scale used in the survey. The scale was based on similar scales used by PSI/AMP in previous national job analysis surveys by other professions. A significance scale, including a "not applicable for my role" data point, was selected by the AC to include on the survey for the tasks.

The scale was designed to identify the job activities that are most significant to achieving the healthcare technology specialist in a management roles' job objectives. Such information was necessary to demonstrate that the examination measures significant aspects of the job and covers appropriate content.

The following scale was used:

Please use the scale shown below to express your judgment of the significance of each task as it applies to your current role in the health IT workforce.

0 = Not applicable for my role
1 = Minimally significant
2 = Significant
3 = Very significant

Selecting Background Information Questions

The Background Information section was designed to gather information about the respondents' demographic characteristics. Demographic questions were used to help the AC evaluate potential bias in the respondent group. Therefore, the following information about the survey respondents was available:

- work location
- facility setting
- primary job level category
- years of relevant work experience
- highest level of education
- whether education included healthcare/medicine or IT
- hold the CHTS credential
- years holding the CHTS credential

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- which of the CHTS credentials held
- other certifications held
- licenses held
- primary work setting
- number of employees in your organization
- age
- gender

Region, years of work experience, level of education, additional certifications held, primary job level, and number of employees were used to identify subgroups for analyses and to describe the sample.

Integrating the Definition, Tasks, Rating Scales, and Demographics into a Survey

Following the first AC meeting, survey components were compiled into draft form. The draft survey was reviewed by the AC. The pilot survey was distributed to all AC members and a sample of potential participants for review and comment. The purpose of the pilot study was to determine (1) if the directions were clear, (2) if any important tasks were missing from the survey, (3) if the tasks were clearly worded, and (4) if the rating scale was easy to use and understand. The AC also reviewed comments from the pilot study participants. Any needed modifications to the survey were made prior to distribution. The final survey is shown in Appendix A.

Sample Selection

In an effort to obtain information from respondents who represented professionals throughout the United States and other countries, 1,333 surveys were e-mailed to the certified healthcare technology specialists by PSI/AMP. This group of names was selected by AHIMA, and represented a target sample of the population of the healthcare technology specialists.

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Results

Return Rate and Sample Size

Hyperlinks to a web-based survey were distributed by electronic mail to 1,333 healthcare technology specialists, with 32 survey invitations returned as undeliverable and 0 opted out. Three hundred forty-nine (349) participants responded and provided usable responses to be included in the analysis, which resulted in an overall return rate of 26.8%. After a demographic section, respondents were routed to either one or up to all four specialist role surveys, depending on their choice. There were a total of 213 respondents who completed the CHTS Manager Role survey, 109 respondents completed the CHTS Technical Role survey, 105 respondents completed the CHTS Trainer Role survey, and 75 respondents completed the Clinician/Practitioner Consultant Role survey. Table 1 below shows the summary of survey invitations sent and response rate. The results from the 213 CHTS Manager Role respondents are presented in this report. The results from the three other specialist role surveys were reported and documented elsewhere. Responses to the demographic questions indicated that there were sufficient numbers from relevant groups for subsequent analyses.

A general approach was incorporated to evaluate the standard error of the ratings. An approximate standard error was used for the rating scale by applying the equation:

Standard error = $1/\sqrt{213}$, where 213 = sample size

The resulting standard error of the ratings was 0.069. This indicates that ratings were highly stable, and reflective of the population of professionals.

Table 1. Response Rate Summary

Credential	No. Sent
Clinician/Practitioner (CHTS-CP)	169
Implementation Manager (CHTS-IM)	292
Implementation Support Specialist (CHTS-IS)	167
Practice Workflow and Information Management Redesign Specialist (CHTS-PW)	360
Trainer (CHTS-TR)	228
Technical/Software Support Staff (CHTS-TS)	117
Total Invitations Sent	**1,333**
Undeliverable	32
Opt-out	0
Valid Overall Response	**349**
Overall Response Rate	**26.8%**
# who responded to Management Role survey	213
# who responded to Technical Role survey	109
# who responded to Trainer Role survey	105
# who responded to the Clinician/Practitioner Consultant survey	75

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Task and Respondent Rating Reliability Estimates

To find the extent to which *tasks* were consistently rated within each survey section, a statistic known as coefficient alpha (Norusis, 1994, p. 204; Hopkins, Stanley & Hopkins, 1990, p. 133-134) was used. Coefficient alpha is an estimate of the amount of error reflected by the scores associated with the instrument. Higher estimate values (e.g., .90 or higher) reflect smaller amounts of error. To determine the extent to which the *respondents* were consistent in rating inventory activities, a statistic known as the intraclass correlation (Guilford, 1956) was used. Separate reliability estimates were calculated for content areas and are displayed in Table 2. Since the maximum reliability coefficient is represented by a value of 1.00 and the total reliability estimate for the whole task list was 0.98 (alpha) and 0.96 (intraclass), the respondents' task ratings were considered highly reliable. Based on these data, it is very likely that a different sample from the same population would have produced similar task ratings.

Table 2. Task and Respondent Rating Reliability Estimates

Survey Section	Reliability (consistency)			
	# of Tasks	Between Tasks (Coefficient Alpha)	Between Respondents (Intraclass Correlation)	Number of Respondents*
1. Project Management	23	0.966	0.971	195
2. Change Management	15	0.951	0.948	191
3. Personnel	8	0.908	0.973	194
4. Technology	14	0.957	0.955	190
5. Quality and Risk Management	12	0.933	0.965	186
Total	72	0.982	0.959	156

*Only those who responded to every task in each section with a rating of 0 to 3 were included for these analyses.

Demographic Analyses

The following figures and tables present background information collected from the respondents (also see Appendix B). These demographic data helped describe the sample.

A typical respondent is described below:

- Works in the South of the U.S.
- Facility is in an urban setting
- Works in a hospital setting
- Describes their primary job level category as director/office or manager/supervisor
- Holds the IM and/or PW certification
- Has 13 years of relevant work experience
- Holds a Master's degree
- Education included both healthcare/medicine and information technology
- Has held the CHTS credential for 4 years
- Also holds the RHIA and/or the RHIT credential
- Has more than 1,000 employees in their organization
- Female over the age of 40

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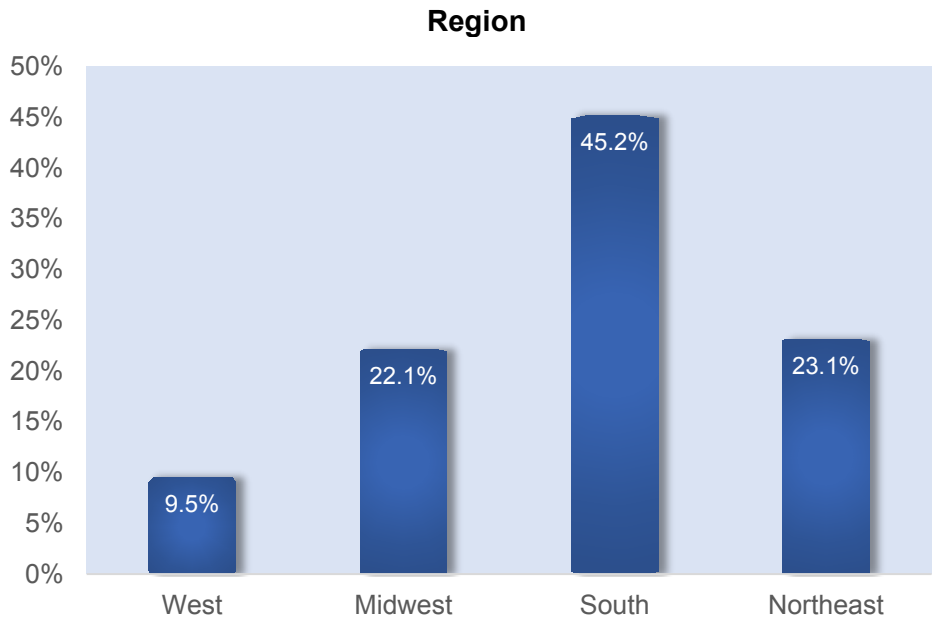

Figure 1. Location (recoded into Region) (n=199)

Survey respondents were first asked to indicate the location in which they work. As shown in *Figure 1,* the respondents were distributed across the U.S. The largest group (45.2%) of respondents was from the South. This demographic variable was used to create subgroups for task analysis (see Appendix F).

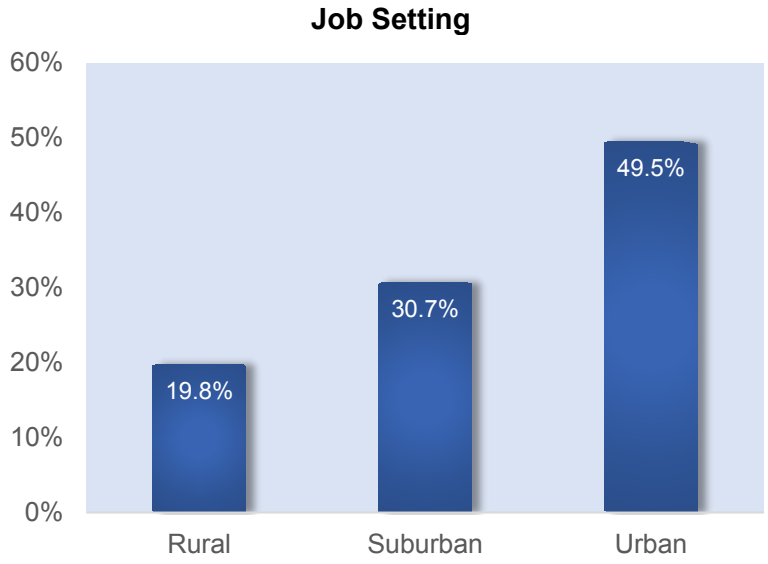

Figure 2. Job Setting (n=212)

Figure 2 shows the job setting respondents held. Approximately 49.5% of the respondents reported they worked in an urban setting, while 19.8% reported a rural setting.

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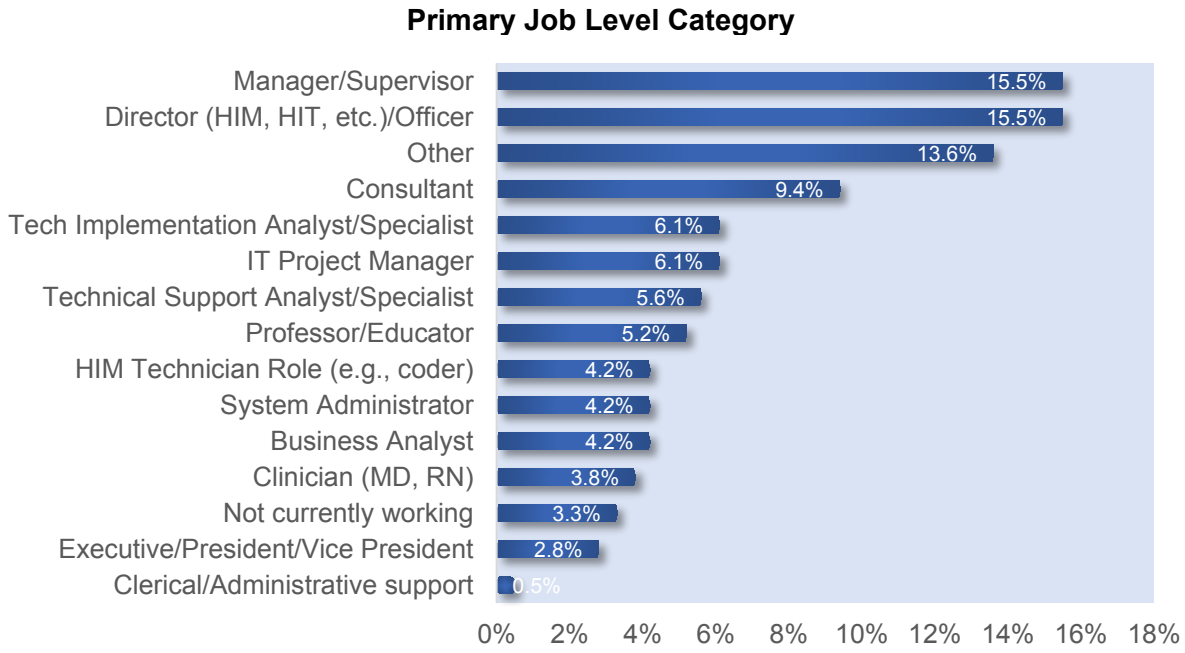

Figure 3. Primary Job Level Category (n=213)

Figure 3 shows the primary job level categories that respondents described themselves. The largest groups described themselves as either Manager/Supervisor (15.5%) or Director/Officer (15.5%). This demographic variable was used to create subgroups for task analysis (see Appendix J).

Figure 4. Years of Work Experience (n=184)

Figure 4 shows the years of work experience held by the respondents. This demographic variable was used to create subgroups for task analysis (see Appendix G). The average years of experience among the respondents was 13 years.

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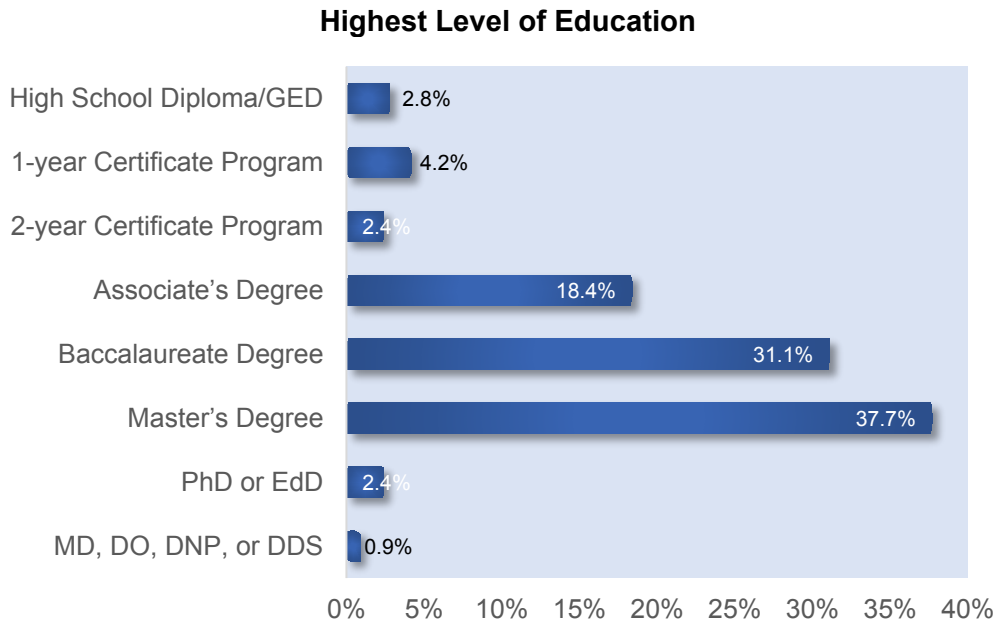

Figure 5. Highest Level of Education (n=212)

Figure 5 shows the highest level of education that was achieved by the respondents. A majority (68.8%) hold either a Baccalaureate or Master's degree. This demographic variable was used to create subgroups for task analysis (see Appendix H).

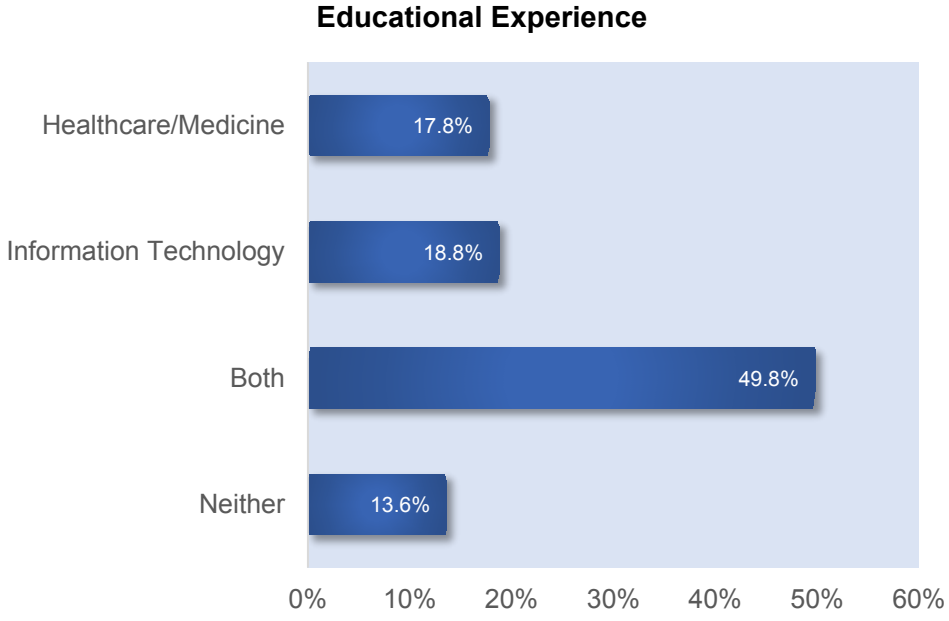

Figure 6. Educational Experience (n=213)

In *Figure 6*, survey respondents were asked to indicate whether their educational experience included healthcare/medicine or information technology. Almost half (49.8%) of the respondents indicated that they have experience in both Healthcare/Medicine and Information Technology.

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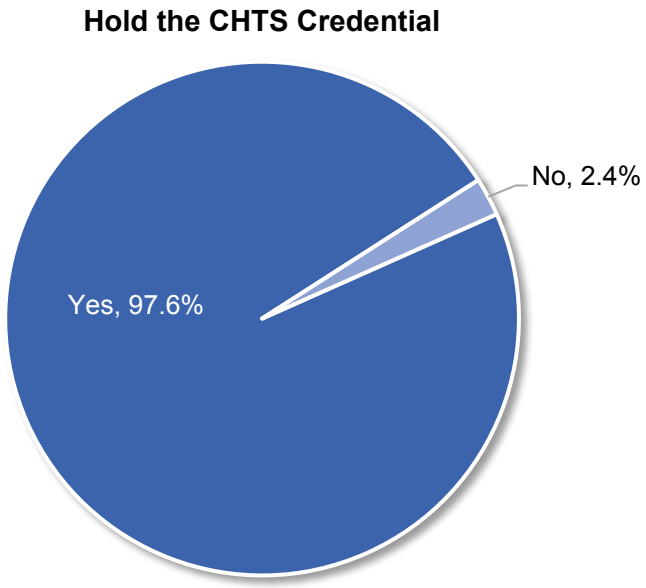

Figure 7. Hold the CHTS Credential (n=212)

In *Figure 7*, survey respondents were asked to indicate whether they hold the CHTS credential. Nearly all (97.6%) of the respondents hold a CHTS credential.

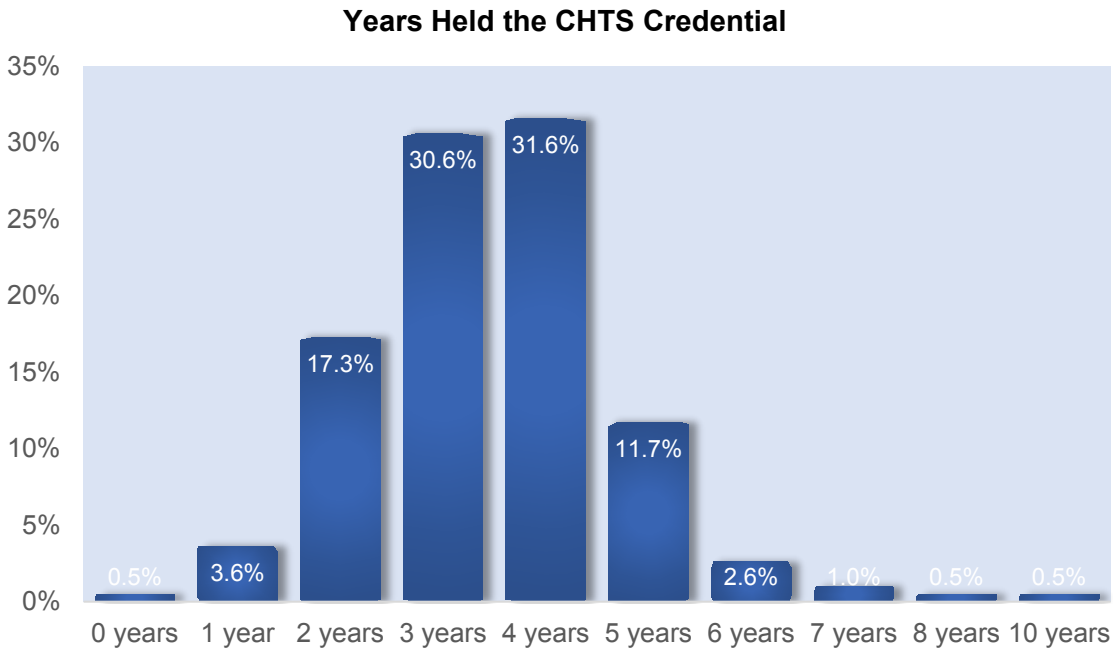

Figure 8. Years held the CHTS Credential (n=196)

Figure 8 shows that most respondents have held the CHTS credential between 2 and 5 years. The average length of time holding the CHTS credential is 3.5 years.

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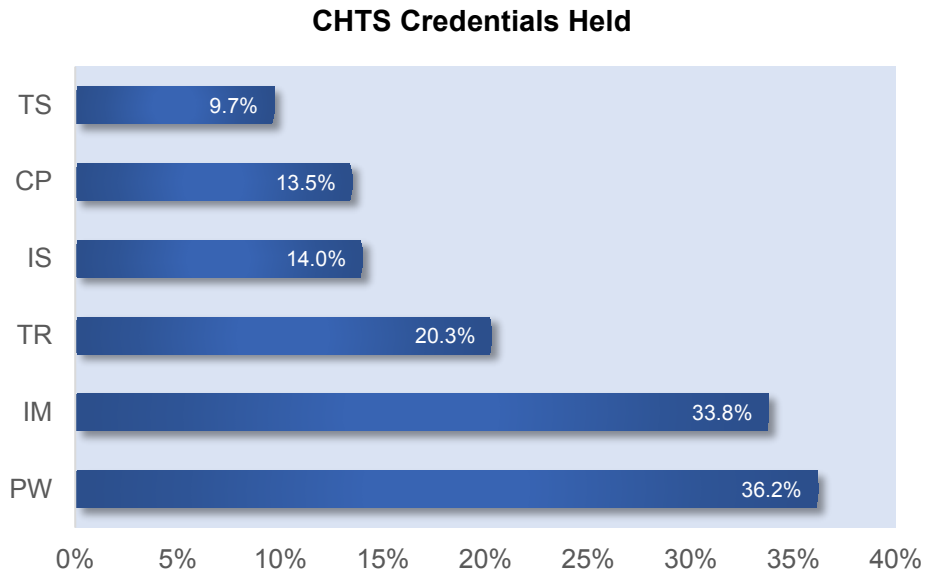

Figure 9. CHTS Credentials Held (n=207)

Figure 9 shows that most respondents (70.0%) held the Implementation Manager (IM) and/or the Practice Workflow and Information Management Redesign Specialist (PW) credential. This was a select all that apply variable. This demographic variable was used to create subgroups for task analysis (see Appendix I).

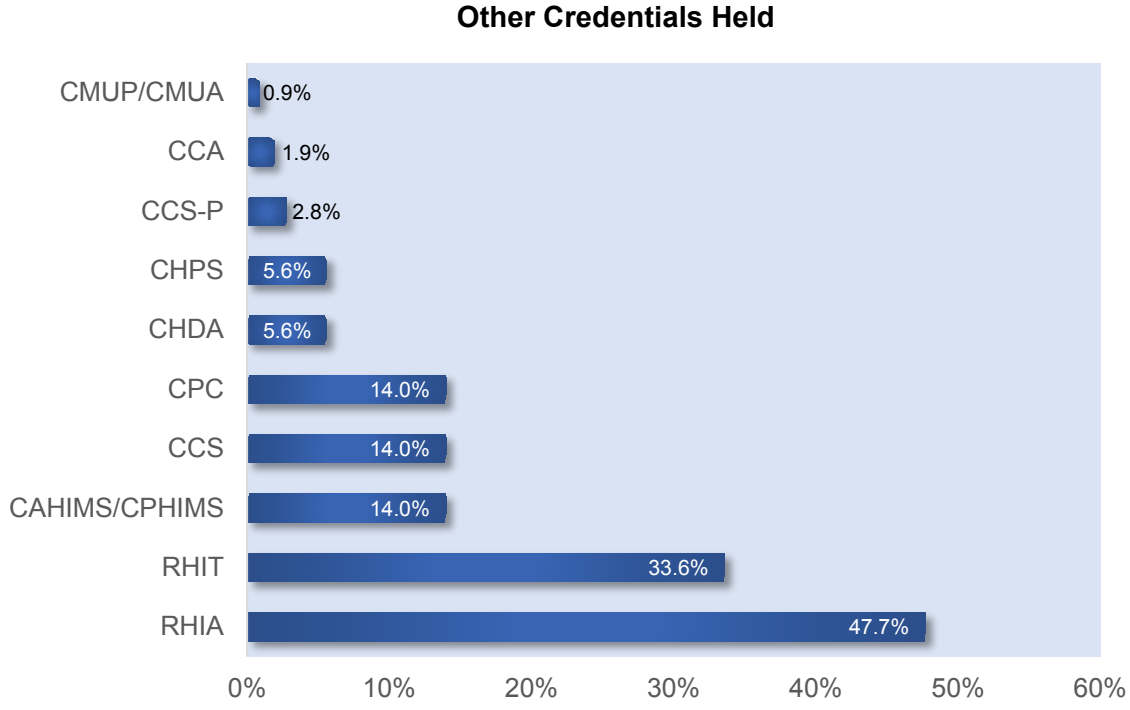

Figure 10. Other Credentials Held (n=107)

Survey respondents were asked about other credentials they may hold. *Figure 10* shows that nearly half (47.7%) of the sample also held the RHIA credential while a third (33.6%) held the RHIT credential. This was a select all that apply variable.

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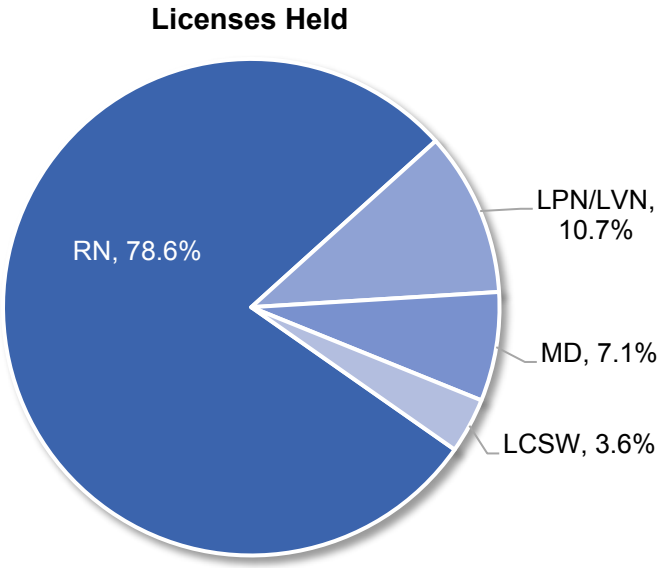

Figure 11. Licenses Held (n=28)

Figure 11 shows that 28 respondents held a license; most (78.6%) held the RN license.

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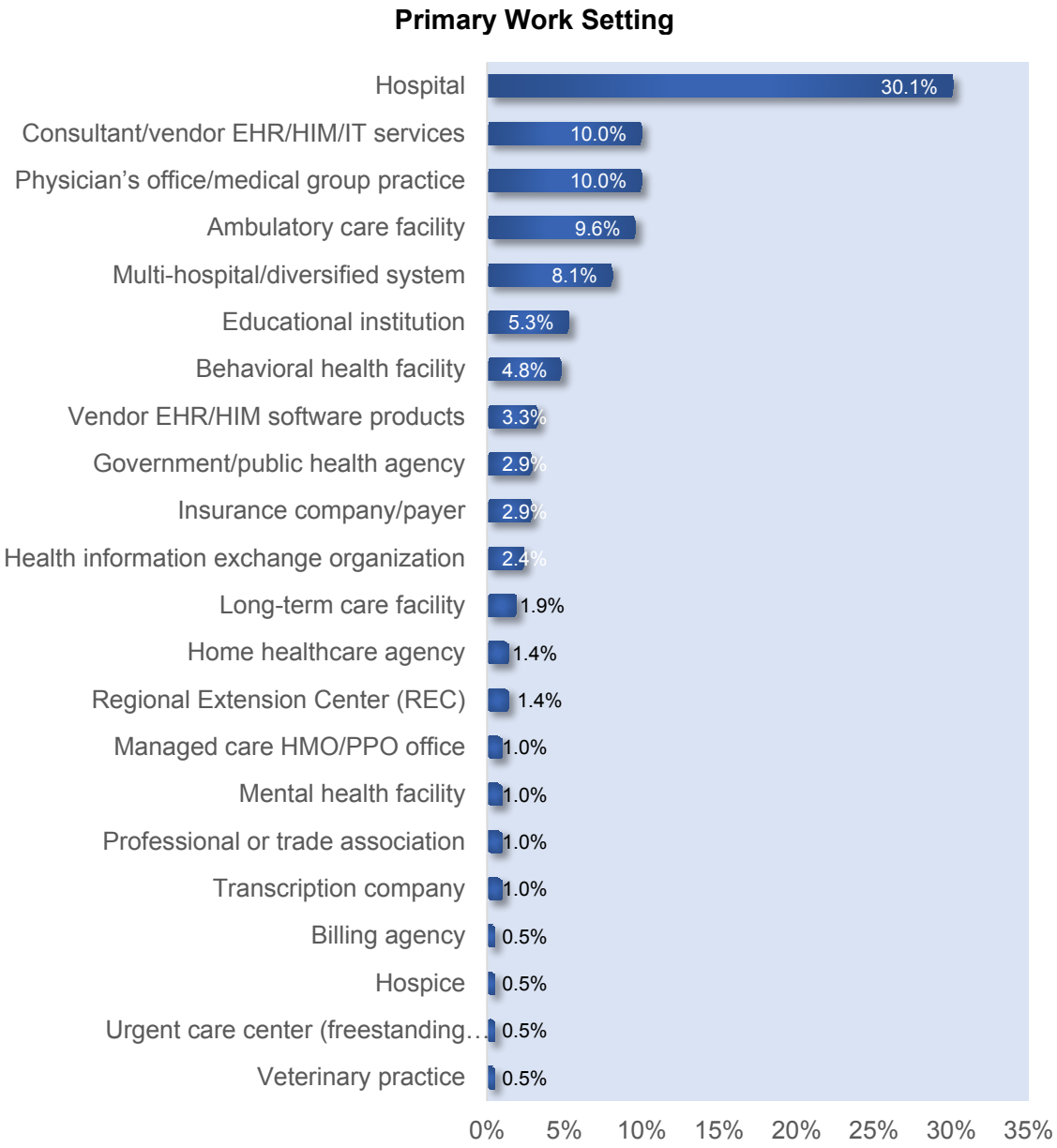

Figure 12. Primary Work Setting (n=209)

The respondents were asked the following question: "Which of the following best describes your primary work setting?" *Figure 12* shows that the majority (30.1%) of respondents describes their work environment as a hospital.

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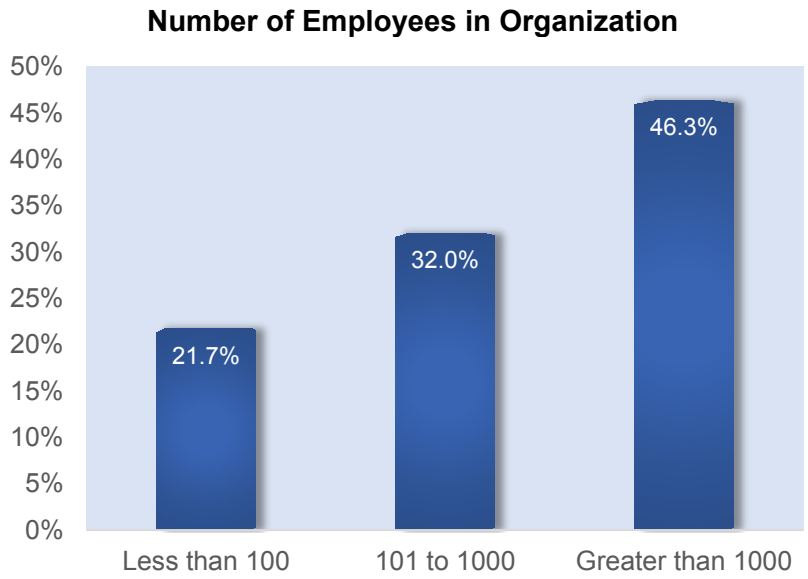

Figure 13. Number of Employees in Organization (n=212)

Figure 13 shows that the majority (46.3%) of respondents work in organizations with more than 1,000 employees. This demographic variable was used to create subgroups for task analysis (see Appendix K).

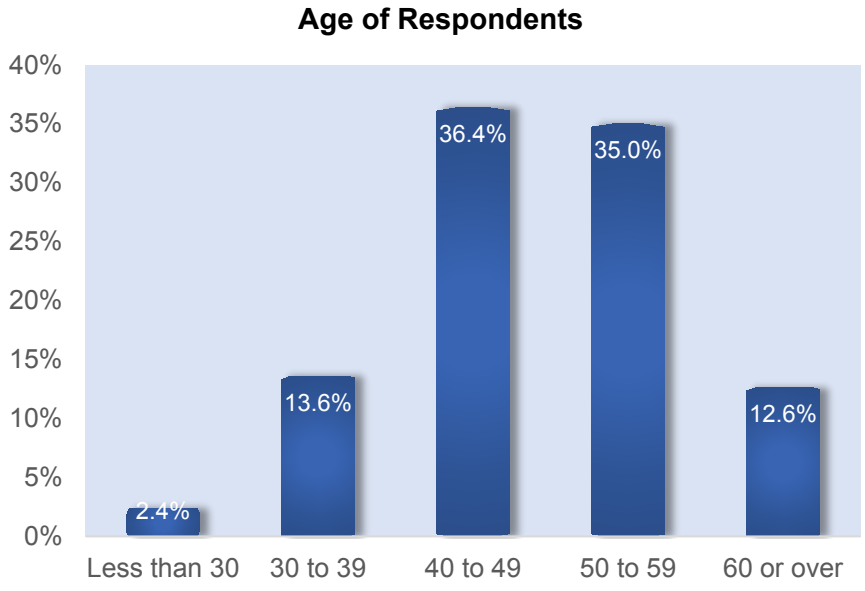

Figure 14. Age of Respondents (n=206)

Figure 14 shows that the majority (71.4%) of respondents are between the ages of 40 and 59.

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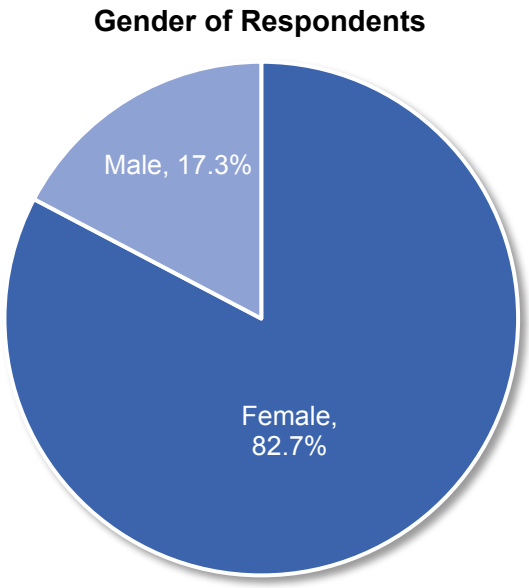

Figure 15. Gender of Respondents (n=208)

Figure 15 shows that most (82.7%) respondents were female.

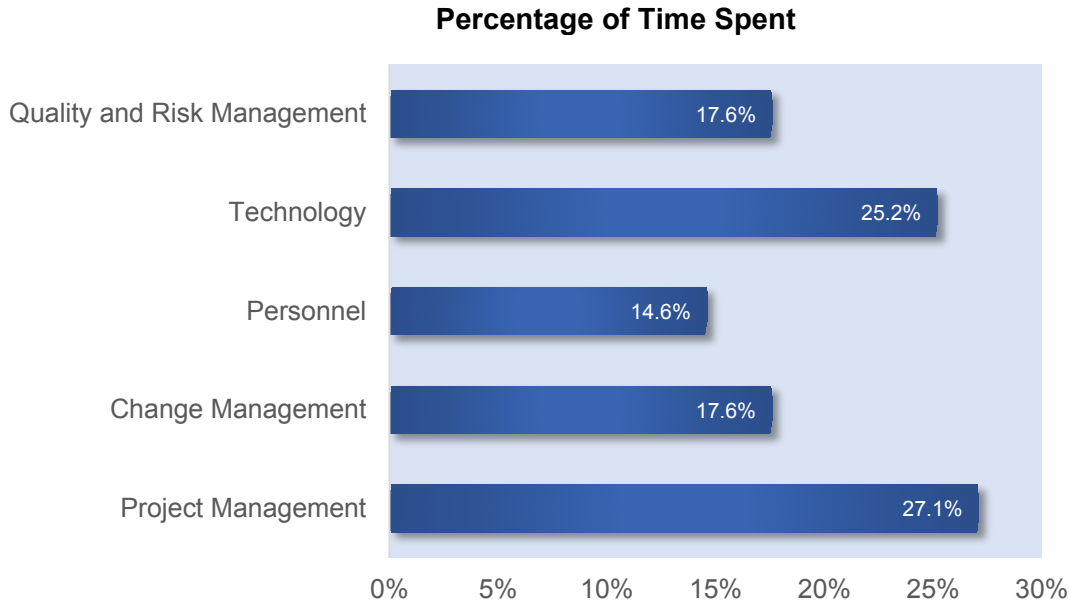

Figure 16. Percent of Time Spent

At the end of the survey, survey respondents were asked to indicate the percent of their time spent in different roles. As shown in *Figure 16*, respondents reported over one-half of their time was spent in project management or technology.

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Respondents were asked to what extent they thought the task and knowledge/skill inventory adequately covered the important job tasks and required knowledge in their role. *Figure 17* below shows that nearly all (99.5%) respondents stated that the task inventory adequately or completely covered the essential job tasks. *Figure 18* shows that all (100%) respondents felt that the Knowledge/Skill inventory adequately covered all knowledge requirements that underlie essential job tasks.

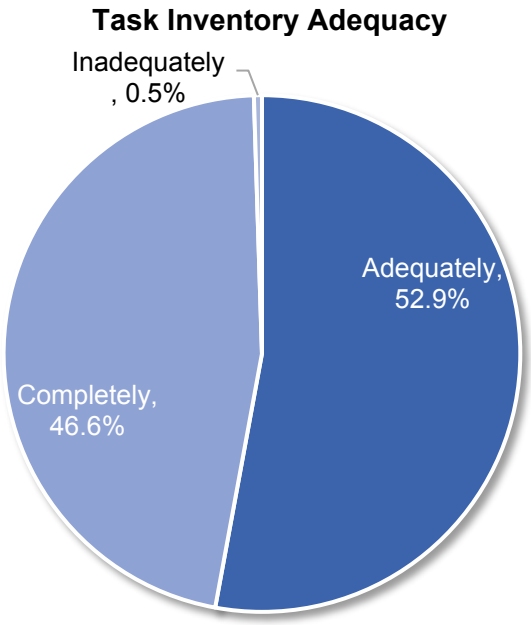

Figure 17. Task Inventory Adequacy (n=189)

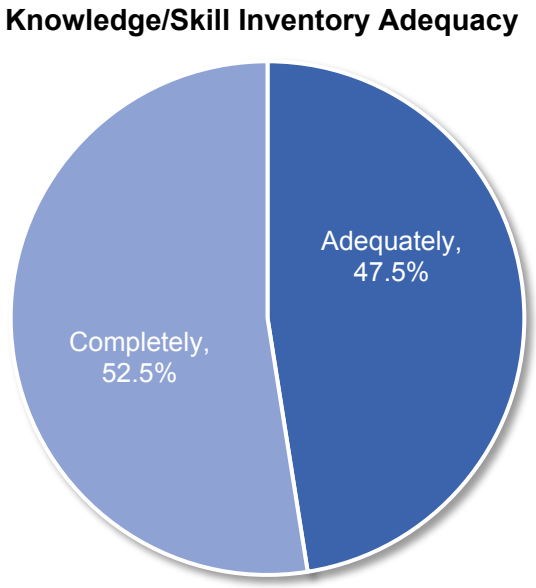

Figure 18. Knowledge/Skill Inventory Adequacy (n=158)

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Mean Task Ratings and Percent Performing

To determine which tasks were more significant and performed by respondents, descriptive data were calculated for each task (see Appendices C – E). Additionally, for each task, the frequency of those who selected each significance rating was calculated. The purpose of these data was to determine which tasks would remain on the final content outline.

For example, task 1 (Create charter) had a mean significance rating of 1.82. Ninety-seven (97) respondents provided a "not applicable for my role" or "0" rating for the task. The tasks presented in Appendix C are sorted in the order they appear on the survey. Tasks presented in Appendix D are sorted in ascending order by the frequency of respondents who do perform the task. Appendix E provides the same descriptive information as Appendices C and D, but the tasks were sorted in ascending mean significance order.

Table 3. Summary of Mean Significance Task Ratings

Significance Value Label	Mean Values Range	Frequency	Percent
Very Significant	2.50 – 3.00	0	0.0
Significant	1.50 – 2.49	72	100.0
Minimally Significant	1.00 – 1.49	0	0.0
	Total	**72**	**100.0**

The significance scale had values ranging from 1 (Minimally Significant) to 3 (Very Significant). A summary of the ratings for the significance scale for task ratings is shown above in Table 3. None of the average task ratings were rated as "Minimally Significant." All the task ratings were rated at least "Significant" by respondents (mean significance rating of at least 1.50).

The AC reviewed the data for each task. They concluded that the ratings obtained from the Job Analysis survey were in agreement with their judgments about the job. Consequently, the AC also concluded that the survey data adequately defined the profession on a national basis. Moreover, the AC judged the results sufficient for the purpose of delineating the structure and content of a national certification examination.

It is critical that the test specifications reflect the responsibilities of the broadly defined population who might be eligible to take the examination. Therefore, it was vital to ensure that the test specifications and resulting examination content included tasks considered important to job success by those for whom the examination was intended. While developing the test specifications, the AC used their collective judgment to interpret the survey results and ensure that the content of the examination was appropriate for a national sample from a variety of backgrounds.

As indicated previously, Appendices D and E show mean significance ratings and percent performed for each task across the whole sample. Appendices F-K show mean task significance ratings for sample subgroups. The AC was encouraged to consider how best to limit the content eligible for the test specifications to only the broadly performed and significant tasks. Therefore, the AC adopted 8 decision rules to identify tasks *ineligible* for assessment, as summarized in Table 4.

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Table 4. Decision Rules

Appendix	Variable	Number and Description of Decision Rule*		Threshold
D	Percent Not Performing	1	Keep only those tasks performed by at least 71.5% of the respondents.	"Not Performed" rating >28.5%
E	Mean Rating	2	Keep only those tasks rated by respondents as at threshold.	2.00
F	Region	3	Keep only those tasks rated at least at threshold by 3 out of 4 subgroups.	1.90
G	Years of Experience	4	Keep only those tasks rated at least at threshold by 3 out of 3 subgroups.	1.90
H	Degree	5	Keep only those tasks rated at least at threshold by 3 out of 3 subgroups.	1.90
I	Certifications Held	6	Keep only those tasks rated at least at threshold by 6 out of 6 subgroups.	1.85
J	Level in Organization	7	Keep only those tasks rated at least at threshold by all 3 out of 4 subgroups.	1.90
K	Number of Employees	8	Keep only those tasks rated at least at threshold by 2 out of 3 subgroups.	1.90

Note: To account for error in the mean ratings based on this sample of respondents, means for all tasks were evaluated for inclusion/exclusion within the 95% confidence interval (1.86-2.14) for each variable.

Making Decision Rules Operational

Having judged that the sample sufficiently represented the population, the AC applied the following criteria to implement its decision rules.

Rule 1. Keep only tasks performed by 71.5% or more of respondents.
Tasks with "not performed" rating frequencies of more than 28.5% were considered ineligible. Applying this rule five tasks were eliminated (M1: Create Charter; M46: Administer applicable competency exams, evaluate results, and take actions; M20: Manage contract specifications; M55: Create a process and document health information exchange requirements; M61: Perform SWOT analysis).

Rule 2. Keep only tasks rated at least Significant (2.00) by respondents.
Realizing that error occurs in every measurement, the AC defined the lower boundary of Quite Significant as a mean rating of 2.00 for tasks. They examined all tasks within a 95% confidence interval (2.00 ± 2* standard errors of .029) for inclusion. Applying this rule three additional tasks were eliminated (M57: Identify and mitigate legal issues; M52b: Manage and monitor systems; M39: Identify organizational structure).

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Rule 3. Keep only tasks rated at least Significant (1.90) by 3 out of 4 region subgroups (Northeast, Midwest, South, West).

Because healthcare compliance professionals across the country should endorse the content of a nationally applied examination, the task ratings were examined by geographic region. Therefore, the AC defined a mean importance rating of 1.90 (+/- 2 SEs) for tasks by 3 out of 4 location subgroups as criteria. Applying this rule to subgroup regions, no tasks were eliminated.

Rule 4. Keep only tasks rated at least Significant (1.90) by 3 out of 3 years of experience subgroups (0-5 years, 6-16 years, and 17 or more years).

Because professionals with different years of experience may view the job differently, the AC examined task ratings by years of experience. The AC defined a mean significance rating of 1.90 (+/- 2 SEs) for tasks for 3 out of 3 subgroups as the criteria. Applying this rule did not eliminate any additional tasks.

Rule 5. Keep only tasks rated at least Significant (1.90) 3 out 3 by all levels in the organization subgroups (High School thru associates, baccalaureate, or master's +).

Because professionals at different educational levels in the organization may view the job differently, the AC examined task ratings by level of education in the organization for all 3 subgroups as the criteria. Applying this rule did not eliminate any additional tasks.

Rule 6. Keep only tasks rated at least Significant (1.85) by 6 out of 6 certifications held subgroups (CP, IM, IS, PW, TR, and TS).

Because professionals at with various types of certifications may view the job differently, the AC examined task ratings by level in the organization. The AC defined a mean significance rating of 1.85 (+/- 2 SEs) for tasks for 6 out of 6 subgroups as the criteria. Applying this rule did not eliminate any additional tasks.

Rule 7. Keep only tasks rated at least Significant (1.90) by 3 out of 4 primary job levels. (Director/Executive, Manager, Technical, and Other).

Because professionals with different levels of experience may view the job differently, the AC examined task ratings by level of experience. The AC defined a mean significance rating of 1.90 (+/- 2 SEs) for tasks for 3 out of 4 subgroups as the criteria. Applying this rule did not eliminate any additional tasks.

Rule 8. Keep only tasks rated at least Significant (1.90) by 2 out of 3 number of employees subgroups (Less than 100, 101 to 1,000, and more than 1,000).

Because professionals at different sized institutions may view the job differently, the AC examined task ratings by level of education. The AC defined a mean significance rating of 1.90 (+/- 2 SEs) for tasks for 2 out of 3 subgroups as the criteria. Applying this rule did not eliminate any additional tasks.

After all decision rules were applied, the AC reviewed and considered all respondent comments, no tasks were removed.

Table 5 presents information used by the AC to determine the number of items for each of the major areas of practice. The goal was to distribute items in accordance with observed working patterns across the major content areas. Respondent data were used to suggest a starting point

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for the content experts. The AC discussed the respondents' time spent in the five content domains and considered their time spent as how the items should be distributed. The AC decided to start with the respondent's response to percentage of time spent in each of the major domains, and make adjustments based on their expert opinion.

Table 5. Respondent Time Spent

What percentage of your time in the Management Role is spent in each of these areas?

	N	Min.	Max.	Mean	SD
1. Project Management	178	0	80	27.1	17.8
2. Change Management	173	0	75	17.6	11.8
3. Personnel	168	0	70	14.6	12.6
4. Technology	178	0	80	25.2	17.9
5. Quality and Risk Management	172	0	75	17.6	12.7

Cognitive Complexity

After the number of items was determined for each major domain, the next step involved defining the cognitive complexity of the content domain. A complexity scale was used to determine at what cognitive level individual tasks were performed. The information provided a basis for matching test item complexity to job complexity. The AC discussed each task in each section and considered the typical complexity of task performance using the descriptions described in Table 6. They then determined a distribution for each major category by the cognitive categories of recall, application, and analysis, using Table 7 as a guideline. The AC then finalized the exact distribution based on its experience and perceptions about each major content domain.

Section and task complexity is based on Bloom's *Taxonomy of Educational Objectives* (1956, pp. 201-207) and follows:

Table 6. Cognitive Complexity Scale

Recall	Requires only the identification, recall, or recognition of isolated information, such as specific facts, generalizations, concepts, principles, or procedures. The information generally does not vary relative to the situation.
Application	Requires comprehension, interpretation, or manipulation of limited concepts or data, in which the response or outcome is situationally dependent, but not overly complex (e.g., application of knowledge which varies based on patient characteristics and environment). Activities that require candidates to recognize elements and relationships among data and to classify, explain, or differentiate are usually application level.
Analysis	Requires the integration or synthesis of a variety of concepts or elements to solve a specific problem situation (e.g., evaluating and rendering judgments on complex problems with many situational variables).

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Table 7. General Guidelines for Item Distribution by Cognitive Level based on Mean Cognitive Level by Major Content Domain

	<1.45	<2.05	<2.45	>2.449
Recall	100%	40%	20%	20%
Application	0%	60%	60%	20%
Analysis	0%	0%	20%	60%

Test Specifications

The AC reviewed 64 tasks that remained eligible for the examination, assigned cognitive levels to each, and determined the number of items in each category to develop the final detailed content outline. To determine the allocation of content, the AC members expressed independent judgments about the percentage of the examination that should be allocated to the five major domains (content areas) on the examination. They were asked to consider the mean percentage of time in the domains indicated by the survey respondents (Table 5), the number of tasks in each content area, the breadth of those tasks, as well as the mean importance of the tasks expressed by the survey respondents. After discussion, the AC agreed upon the percentage of the examination to be allocated to each area. The AC then considered whether 100 items would be sufficient to adequately sample the content, and they concluded it was not. After discussion, the AC decided that a 125-item examination sufficiently samples the content domain to render a pass or fail decision based on examination scores. The resulting examination matrix and detailed content outline will be used by AHIMA to assemble future examination forms. An overview of the final test specifications is shown in Table 8. The full specifications, including the final detailed content outline, is presented in Appendix M. Test developers, item writers, and the Examination Committee will use the test specifications and detailed content outline to build future forms of the examination.

Table 8. CHTS-M Test Specifications

Content Area	Cognitive Level			Total
	Recall	Application	Analysis	
1. Project Management	10	20	10	**40**
2. Change Management	6	12	12	**30**
3. Personnel	6	7	1	**14**
4. Technology	4	10	8	**22**
5. Quality and Risk Management	4	9	6	**19**
Total	**30**	**58**	**37**	**125**

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Knowledge/Skill Areas

In addition to the task inventory, survey respondents were asked to rate the significance of 80 knowledge/skill statements identified by the AC. The eighty knowledge/skill statements were organized into the following four major domains:

1. Technical Knowledge: Health Data Management
2. Technical Knowledge: Health Information Technology & Systems
3. Non-Technical Knowledge: Hard Skills
4. Non-Technical Knowledge: Soft Skills

To determine which knowledge/skill statements were rated more significant by respondents, descriptive data grouped by CHTS role was calculated for each statement (see Appendix L). The purpose of these data was to determine which tasks would remain on the final content outlines. The AC developed and used an exclusion decision rule to identify knowledge/skill statements appropriate as supplemental information to the examination content outline. Of the 80 knowledge/skill statements on the original survey, 4 statements were excluded based on the following exclusion criterion.

Rule 1 *Keep only tasks rated at least Significant (1.70) by respondents.*
Applying this rule eliminated three statements (K17: General hardware maintenance; K32: Servers; K45: Ergonomics; K50: Inferential statistics).

One purpose of the knowledge/skill statements is to provide guidance to the item writers/exam committee. As such, the AC decided to use priority designations (low, medium, or high) to provide some additional detail on the level of emphasis for each knowledge/skill statement. Table 9 below shows the criteria used by the AC when assigning level of priority to each statement. Full details of the final list of knowledge/skill statements sorted by priority can be viewed in Appendix M, after the task inventory.

Table 9. Knowledge/Skill Statement Thresholds

Mean Threshold	Priority
if mean > 1.995	High
if mean is 1.90 to 1.99	Medium
if mean is < 1.90	Low
if mean is < 1.70	Not included[1]

[1] Unless included by unanimous AC vote due to its importance.

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Conclusions

The Job Analysis described in this report was undertaken to provide evidence supporting content valid inferences from examination scores. The study was conducted to determine and comprehensively describe the job of the healthcare technology specialists in a management role, to evaluate this description through the ratings of job experts, and to define areas that should be assessed in CHTS-M examination.

The AHIMA formed the AC, who prepared a comprehensive list of tasks describing the job. A representative sample of job experts completed the survey. The AC reviewed the survey results and used the survey ratings to develop test specifications directly related to the significant tasks that the healthcare technology specialists perform. These test specifications will be used to ensure the examination is current and job-related. Each future form of the examination will contain the specified number of items distributed across the content areas. Because each test form will be developed to match these job-related test specifications, valid content-related inferences can be drawn about candidates' abilities to perform the job of the healthcare technology specialist in a management role.

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Appendix A. Job Analysis Survey

Welcome to the Job Analysis Survey for Healthcare Technology Specialists

This survey will be used to help define the content for the Certified Healthcare Technology Specialist (CHTS) Exams. You will be asked demographic questions about your background and profession, and then asked to rate tasks, knowledge and skills that may be applicable to your work. Your ratings will provide information about the requirements related to the effective job performance as a healthcare technology specialist.

The survey should take approximately 15 minutes to complete. You will be able to close the survey and begin again where you left off if you do not complete the survey in one session.

If you experience any technical difficulties, please email: AHIMAJASurvey@goamp.com.

This survey is being conducted by American Health Information Management Association (AHIMA).

Please click 'Next' below to begin the survey.

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Role Description

The CHTS certification program intends to assess basic competency of individuals who are seeking to demonstrate their proficiency in certain health IT workforce roles integral to the implementation and management of electronic health information in ***one or more*** of these roles:

- Assess workflows
- Manage projects
- Select hardware and software
- Work with vendors or users
- Install or test systems
- Diagnose IT problems
- Train practice staff on systems

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Demographics

Please answer the following questions about your background. This information is confidential and will be used only to analyze the data across different groups of respondents (e.g., respondents from different geographical region; respondents with different level of education).

Please indicate the location of the facility in which you primarily work.

Is the facility in which you work located in a rural, suburban, or urban area?

- ◯ Rural
- ◯ Suburban
- ◯ Urban

Which of the following best describes your primary job level category?

- ◯ Executive/President/Vice President
- ◯ Director (HIM, HIT, etc.)/Officer
- ◯ Professor/Educator
- ◯ Manager/Supervisor
- ◯ Consultant
- ◯ Clinician (MD, RN)
- ◯ IT Project Manager
- ◯ Other (please specify)
- ◯ Business Analyst
- ◯ System Administrator
- ◯ Tech Implementation Analyst/Specialist
- ◯ Technical Support Analyst/Specialist
- ◯ HIM Technician Role (e.g., coder)
- ◯ Clerical/Administrative support
- ◯ Not currently working

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Demographics

How many years of relevant work experience related to this role do you have?

What is the HIGHEST level of education you have completed?

- ◯ High School Diploma/GED
- ◯ 1-year Certificate Program
- ◯ 2-year Certificate Program
- ◯ Associate's Degree
- ◯ Baccalaureate Degree
- ◯ Master's Degree
- ◯ Professional Doctorate Degree (e.g., PT, PharmD, JD, DVM)
- ◯ PhD or EdD
- ◯ MD, DO, DNP, or DDS

Did your education include healthcare/medicine or information technology?

- ◯ Healthcare/Medicine
- ◯ Information Technology
- ◯ Both
- ◯ Neither

Do you hold the CHTS credential?

◯ Yes ◯ No

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Demographics

How many years have you held the CHTS credential?

Which of these CHTS certifications do you hold?

Select all that apply.

- [ ] CP
- [ ] IM
- [ ] IS
- [ ] PW
- [ ] TR
- [ ] TS

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Demographics

What other certifications do you hold?

Select all that apply.

- [ ] CAHIMS/CPHIMS
- [ ] CCA
- [ ] CCS
- [ ] CCS-P
- [ ] CHDA
- [ ] CHPS
- [ ] CMUP/CMUA
- [ ] CPC
- [ ] RHIA
- [ ] RHIT
- [ ] Other (please specify)

What licenses do you hold?

Select all that apply.

- [ ] APRN (NP or CNS)
- [ ] DO
- [ ] LPN/LVN
- [ ] LVT/RVT
- [ ] MD
- [ ] PA
- [ ] RN
- [ ] LCSW
- [ ] Other (please specify)

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Demographics

Which of the following best describes your primary work setting?

- ◯ Ambulatory care facility
- ◯ Behavioral health facility
- ◯ Billing agency
- ◯ Consultant/vendor EHR/HIM/IT services
- ◯ Correspondence company
- ◯ Educational institution
- ◯ Government/public health agency
- ◯ Health information exchange organization
- ◯ Home healthcare agency
- ◯ Hospice
- ◯ Hospital
- ◯ Insurance company/payer
- ◯ Jail/corrections facility
- ◯ Law firm
- ◯ Long-term care facility
- ◯ Managed care HMO/PPO office
- ◯ Mental health facility
- ◯ Military health facility
- ◯ Multi-hospital/diversified system
- ◯ Outpatient/ambulatory surgery center
- ◯ Pharma/medical device/biotech manufacturer
- ◯ Physician's office/medical group practice
- ◯ Professional or trade association
- ◯ Regional Extension Center (REC)
- ◯ Rehabilitation facility
- ◯ Transcription company
- ◯ Urgent care center (freestanding emergency care center)
- ◯ Vendor EHR/HIM software products
- ◯ Veterinary practice

Approximately how many employees are in your organization?

- ◯ Less than 10
- ◯ 11 to 50
- ◯ 51 to 100
- ◯ 101 to 500
- ◯ 501 to 1000
- ◯ More than 1000

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Demographics

Optional Questions

What is your age?

- ◯ Less than 30
- ◯ 30 to 39
- ◯ 40 to 49
- ◯ 50 to 59
- ◯ 60 or over

With which sex do you identify?

- ◯ Female
- ◯ Male

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CHTS Management Role

CHTS Management Role:

Individuals in this role plan and coordinate workflow and provide management of health IT systems in healthcare organizations. The previous background of those in this role may include experience in health and/or IT environments, as well as administrative and managerial experience. The CHTS Management Role includes:

- Facilitating workflow design that accommodates quality improvement and reporting
- Evaluating process workflows to validate or improve healthcare systems
- Applying project management and change management principles to create implementation project plans to achieve the project goals
- Interacting with stakeholders to ensure open communication with the support team
- Managing vendor relations, providing feedback to health IT vendors for product improvement
- Leading implementation teams consisting of workers in the roles described above

Does this role describe you?

- ◯ Yes
- ◯ No

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Task Rating Scale Instructions

Please use the scale shown below to express your judgment of the**significance of each task as it applies to your current role in the health IT workforce**.

Not applicable for my role
Minimally significant
Significant
Very significant

Please consider whether this task is performed in your current role in the health IT workforce; if you do not need to deal with the task, select "not applicable for my role." If you do need to have the knowledge related to the task, select the rating corresponding to how significant it is to your role in healthcare IT workforce.

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Management Role Tasks

Please indicate the significance of each task as it applies to your current role in the health IT workforce.

Project Management

	Not applicable for my role	Minimally significant	Significant	Very significant
1. Create charter	○	○	○	○
2. Evaluate current environment	○	○	○	○
3. Describe future environment	○	○	○	○
4. Perform gap analysis	○	○	○	○
5. Develop project plan	○	○	○	○
6. Create timeline and identify milestones	○	○	○	○
7. Establish roles and responsibilities	○	○	○	○
8. Create and monitor the communication plan	○	○	○	○
9. Report project plan and issues to stakeholders	○	○	○	○
10. Manage workflow changes	○	○	○	○
11. Manage scope	○	○	○	○
12. Monitor adherence to timeline	○	○	○	○
13. Manage go-live	○	○	○	○
14. Conduct regular meetings	○	○	○	○
15. Establish reporting mechanisms	○	○	○	○
16. Establish rapport with vendor	○	○	○	○
17. Assess skill level of project team	○	○	○	○
18. Establish escalation process	○	○	○	○
19. Manage transition between systems/products/vendors	○	○	○	○
20. Manage contract specifications	○	○	○	○
21. Serve as facilitator among stakeholders	○	○	○	○
22. Recommend operational changes	○	○	○	○
23. Facilitate transition to maintenance	○	○	○	○

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Management Role Tasks

Please indicate the significance of each task as it applies to your current role in the health IT workforce.

Change Management

	Not applicable for my role	Minimally significant	Significant	Very significant
24. Assess the organization's readiness for change (e.g., historical perspectives, current attitudes)	○	○	○	○
25. Review and flowchart the current workflow and processes	○	○	○	○
26. Determine current state	○	○	○	○
27. Perform needs assessment and gap analysis	○	○	○	○
28. Define future state	○	○	○	○
29. Establish and prioritize goals	○	○	○	○
30. Identify roles and responsibilities	○	○	○	○
31. Determine best practices	○	○	○	○
32. Measure and manage stakeholder engagement and expectations	○	○	○	○
33. Increase efficiency of operations	○	○	○	○
34. Create flowcharts of redesigned process	○	○	○	○
35. Integrate information technology functions into workflow	○	○	○	○
36. Evaluate and revise the redesigned process	○	○	○	○
37. Facilitate the rewriting of policies and procedures	○	○	○	○
38. Perform impact analysis	○	○	○	○

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Management Role Tasks

Please indicate the significance of each task as it applies to your current role in the health IT workforce.

Personnel

	Not applicable for my role	Minimally significant	Significant	Very significant
39. Identify organizational structure	◯	◯	◯	◯
40. Identify owners, decision-makers, and physician champions	◯	◯	◯	◯
41. Educate owners and decision-makers	◯	◯	◯	◯
42. Create interview document and solicit feedback from key stakeholders	◯	◯	◯	◯
43. Identify super-users	◯	◯	◯	◯
44. Identify subject matter experts (SMEs)	◯	◯	◯	◯
45. Identify and allocate personnel (e.g., IT support, training)	◯	◯	◯	◯
46. Administer applicable competency exams, evaluate results, and take actions	◯	◯	◯	◯

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Management Role Tasks

Please indicate the significance of each task as it applies to your current role in the health IT workforce.

Technology

	Not applicable for my role	Minimally significant	Significant	Very significant
47. Evaluate EMR/EHR/HIS vendor functionality	◯	◯	◯	◯
48. Identify data sources, needs, and formats	◯	◯	◯	◯
49. Identify all departments' structured data elements	◯	◯	◯	◯
50. Capture data (i.e., electronic and non-electronic)	◯	◯	◯	◯
51. Identify naming conventions	◯	◯	◯	◯
52. Manage and monitor systems (e.g., infrastructure, hardware, software): a. design	◯	◯	◯	◯
b. development	◯	◯	◯	◯
c. testing	◯	◯	◯	◯
d. training	◯	◯	◯	◯
e. implementation	◯	◯	◯	◯
f. support and maintenance	◯	◯	◯	◯
53. Manage product customization	◯	◯	◯	◯
54. Manage interfaces	◯	◯	◯	◯
55. Create a process and document health information exchange requirements	◯	◯	◯	◯

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Management Role Tasks

Please indicate the significance of each task as it applies to your current role in the health IT workforce.

Quality and Risk Management

	Not applicable for my role	Minimally significant	Significant	Very significant
56. Identify and mitigate potential risks	○	○	○	○
57. Identify and mitigate legal issues	○	○	○	○
58. Identify and manage compliance with regulatory requirements	○	○	○	○
59. Identify quality measures, benchmarks, and best practices	○	○	○	○
60. Evaluate customer service and patient satisfaction	○	○	○	○
61. Perform SWOT analysis	○	○	○	○
62. Manage standardization/mappings	○	○	○	○
63. Manage and prioritize change requests	○	○	○	○
64. Develop and update disaster recovery plan	○	○	○	○
65. Develop and monitor downtime processes	○	○	○	○
66. Determine cutover time period	○	○	○	○
67. Prioritize multiple projects	○	○	○	○

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Management Role Tasks

How well do you feel the task list covered the important job tasks in the Management Role?

- ◯ Completely
- ◯ Adequately
- ◯ Inadequately (please specify why)

Were any important job tasks in the Management Role omitted from the survey?

What percent of your time in the Management Role is spent in each of these area?

Please type your numeric response below (i.e., 25, not 25%). Your choices must sum to 100.

Project Management	
Change Management	
Personnel	
Technology	
Quality and Risk Management	

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Knowledge and Skills Rating Scale Instructions

Please use the scale shown below to express your judgment of the**significance of each knowledge/skill as it applies to your current role in the health IT workforce**.

Not applicable for my role
Minimally significant
Significant
Very significant

Please consider whether this knowledge is used in your current role in the health IT workforce; if you do not need the knowledge, select “not applicable for my role.” If you do need to have the knowledge, select the rating corresponding to how significant it is to your role in healthcare IT workforce.

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Technical Knowledge: Health Data Management

	Not applicable for my role	Minimally significant	Significant	Very significant
1. Data analysis	○	○	○	○
2. Health care delivery systems	○	○	○	○
3. Health care regulation	○	○	○	○
4. Health care revenue cycle	○	○	○	○
5. Health informatics	○	○	○	○
6. Health information management concepts & principles	○	○	○	○
7. Diagnostic and procedural coding (e.g., ICD-CM/PCS, CPT, HCPCS)	○	○	○	○
8. Information governance	○	○	○	○
9. Meaningful use	○	○	○	○
10. Medical sciences	○	○	○	○
11. Medical terminology	○	○	○	○

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Technical Knowledge: Health Information Technology & Systems

	Not applicable for my role	Minimally significant	Significant	Very significant
12. Audio/visual skills (e.g., LCD projector)	○	○	○	○
13. Computer systems	○	○	○	○
14. Database structures (e.g., SQL)	○	○	○	○
15. EHR/EMR/PHR principles	○	○	○	○
16. Flowchart applications	○	○	○	○
17. General hardware maintenance	○	○	○	○
18. Health information exchange	○	○	○	○
19. Health information systems	○	○	○	○
20. Health IT applications	○	○	○	○
21. HL7	○	○	○	○
22. Implementation life cycle	○	○	○	○
23. Interface integration	○	○	○	○
24. Interoperability	○	○	○	○

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Technical Knowledge: Health Information Technology & Systems (Continued)

	Not applicable for my role	Minimally significant	Significant	Very significant
25. IT fundamentals	○	○	○	○
26. IT security principles	○	○	○	○
27. Network technology (e.g., VPN, cloud-based)	○	○	○	○
28. Platforms and operating systems (e.g., Windows, Mac, Linux, Mobile devices)	○	○	○	○
29. PC skills (e.g., Microsoft Office, internet)	○	○	○	○
30. Performance improvement	○	○	○	○
31. Peripheral devices (e.g., printers)	○	○	○	○
32. Servers	○	○	○	○
33. Software development life cycle	○	○	○	○
34. Standard technical language	○	○	○	○
35. Technical specs (hardware, software)	○	○	○	○
36. Writing test scripts	○	○	○	○

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Non-Technical Knowledge: Hard Skills

	Not applicable for my role	Minimally significant	Significant	Very significant
37. Accreditation standards	○	○	○	○
38. Adult learning principles	○	○	○	○
39. Basic statistics	○	○	○	○
40. Best practices	○	○	○	○
41. Budget management	○	○	○	○
42. Change management	○	○	○	○
43. Clinical and operations workflow	○	○	○	○
44. Consumerism and marketing	○	○	○	○
45. Ergonomics	○	○	○	○
46. Facilitation skills	○	○	○	○
47. Gov't agencies associated with healthcare	○	○	○	○
48. Human resource management	○	○	○	○
49. Industry trends	○	○	○	○
50. Inferential statistics	○	○	○	○
51. Legal and ethical issues	○	○	○	○
52. Nomenclatures	○	○	○	○

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Non-Technical Knowledge: Hard Skills (Continued)

	Not applicable for my role	Minimally significant	Significant	Very significant
53. Operations management	○	○	○	○
54. Organizational structure	○	○	○	○
55. Process improvement	○	○	○	○
56. Project management	○	○	○	○
57. Public health	○	○	○	○
58. Quality control	○	○	○	○
59. Quality improvement	○	○	○	○
60. Quality of patient care	○	○	○	○
61. Report writing principles	○	○	○	○
62. Resource management	○	○	○	○
63. Risk management	○	○	○	○
64. Simulation technology	○	○	○	○
65. Telehealth and telemedicine	○	○	○	○
66. Training methodologies	○	○	○	○
67. Virtual training or meeting tools	○	○	○	○
68. Work flow improvement & management	○	○	○	○

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Knowledge and Skills

Please indicate the significance of each knowledge/skill as it applies to your current role in the health IT workforce.

Non-Technical Knowledge: Soft Skills

	Not applicable for my role	Minimally significant	Significant	Very significant
69. Analytical skills	○	○	○	○
70. Communication skills (written & oral)	○	○	○	○
71. Conflict resolution	○	○	○	○
72. Cultural competency	○	○	○	○
73. Culture of health care	○	○	○	○
74. Issue management	○	○	○	○
75. Leadership	○	○	○	○
76. Linguistic competency	○	○	○	○
77. Organizational culture	○	○	○	○
78. Presentation skills	○	○	○	○
79. Time management	○	○	○	○
80. Working with teams	○	○	○	○

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Knowledge and Skills

How well do you feel the knowledge and skills list covered the important knowledge and skills in your role?

- ◯ Completely
- ◯ Adequately
- ◯ Inadequately (please specify why)

Were any important knowledge and skills omitted from the survey?

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Thank you

Thank You for Completing the Job Analysis Survey for Healthcare Technology Specialists

If you have any additional questions or comments about this survey, please e-mail:
AHIMAJASurvey@goamp.com

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Appendix B. Job Analysis Survey Demographics

CHTS Management (N=213)

Table 1. Please indicate the location of the facility in which you primarily work.

	Frequency	Percent
FL	28	13.8
TX	16	7.9
CA	10	4.9
NC	10	4.9
NY	10	4.9
OH	10	4.9
MD	9	4.4
MI	8	3.9
AL	7	3.4
GA	7	3.4
IL	7	3.4
VA	7	3.4
KY	6	3.0
PA	6	3.0
LA	5	2.5
IN	4	2.0
MA	4	2.0
MO	4	2.0
NJ	4	2.0
SC	4	2.0
WI	4	2.0
CO	3	1.5
DC	3	1.5
KS	3	1.5
MN	3	1.5
OK	3	1.5
WV	3	1.5
AZ	2	1.0
ME	2	1.0
TN	2	1.0
WA	2	1.0
AR	1	.5
CT	1	.5
HI	1	.5
IA	1	.5
MS	1	.5
ND	1	.5
PR	1	.5
Total	203	100.0

Table 2. Region

	Frequency	Percent
A	19	9.5
B	44	22.1
C	90	45.2
D	46	23.1
Total	199	100.0

Region A: AK, CO, ID, MT, ND, OR, SD, UT, WA, WY, AZ, CA, HI, NV
Region B: IL, IN, IA, KS, MI, MN, MO, NE, OH, WI
Region C: AL, AR, FL, GA, KY, LA, MS, NM, NC, OK, SC, TN, TX
Region D: CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, VA, WV

Table 2B. Regions grouped for subgroups

	Geographic Area
A	West
B	Midwest
C	Southeast
D	Northeast

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Table 3. Is the facility in which you work located in a rural, suburban, or urban area?

	Frequency	Percent
Rural	42	19.8
Suburban	65	30.7
Urban	105	49.5
Total	212	100.0

Table 4. Which of the following best describes your primary job level category?

	Frequency	Percent
1 - Director (HIM, HIT, etc.)/Officer	33	15.5
2 - Manager/Supervisor	33	15.5
4 Consultant	20	9.4
3 - IT Project Manager	13	6.1
3 - Tech Implementation Analyst/Specialist	13	6.1
3 - Technical Support Analyst/Specialist	12	5.6
4 Professor/Educator	11	5.2
4 Business Analyst	9	4.2
4 System Administrator	9	4.2
3 -HIM Technician Role (e.g., coder)	9	4.2
4-Clinician (MD, RN)	8	3.8
1- Executive/President/Vice President	6	2.8
4 Clerical/Administrative support	1	.5
4Not currently working	7	3.3
4 Other (please specify)	29	13.6
Total	213	100.0

Table 4B. Primary job level for subgroups

	Frequency	Percent
Director/Executive	39	18.3
Manager	33	15.5
Technical	47	22.1
Other	94	44.1
Total	213	100.0

Table 4C. Subgroup certifications

	CP	IM	IS	PW	TR	TS
Yes	28	70	29	75	42	20
No	15	21	19	26	38	16

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Table 5. How many years of relevant work experience related to this role do you have?
Mean: 13.1 years
SD: 9.6 years

	Frequency	Percent	Cumulative Percent
.0	1	.5	.5
1.0	4	2.2	2.7
2.0	6	3.3	6.0
2.5	1	.5	6.5
3.0	13	7.1	13.6
4.0	7	3.8	17.4
5.0	24	13.0	30.4
6.0	7	3.8	34.2
7.0	9	4.9	39.1
8.0	9	4.9	44.0
9.0	1	.5	44.6
10.0	12	6.5	51.1
11.0	5	2.7	53.8
12.0	4	2.2	56.0
13.0	3	1.6	57.6
14.0	5	2.7	60.3
15.0	10	5.4	65.8
16.0	2	1.1	66.8
17.0	2	1.1	67.9
18.0	3	1.6	69.6
19.0	4	2.2	71.7
20.0	14	7.6	79.3
21.0	4	2.2	81.5
22.0	1	.5	82.1
23.0	3	1.6	83.7
24.0	1	.5	84.2
25.0	11	6.0	90.2
26.0	2	1.1	91.3
27.0	1	.5	91.8
28.0	2	1.1	92.9
30.0	4	2.2	95.1
31.0	1	.5	95.7
33.0	1	.5	96.2
34.0	1	.5	96.7
35.0	1	.5	97.3
36.0	1	.5	97.8
38.0	1	.5	98.4
40.0	1	.5	98.9
41.0	1	.5	99.5
45.0	1	.5	100.0
Total	184	100.0	

Table 5B. Years of experience for subgroups

	Frequency	Percent
0 – 5	56	30.4
6 – 16	67	36.4
17+	61	33.2
Total	184	100%

Table 6. What is the HIGHEST level of education you have completed?

	Frequency	Percent	Cumulative Percent
High School Diploma/GED	6	2.8	2.8
1-year Certificate Program	9	4.2	7.1
2-year Certificate Program	5	2.4	9.4
Associate's Degree	39	18.4	27.8
Baccalaureate Degree	66	31.1	59.0
Master's Degree	80	37.7	96.7
PhD or EdD	5	2.4	99.1
MD, DO, DNP, or DDS	2	.9	100.0
Total	212	100.0	

Level 1: High School Diploma/GED, 1-year Certification program, 2-year certification program, Associates degree
Level 2: Baccalaureate degree
Level 3: Master's degree, PhD, EdD, MD, DO, DNP, or DDS

Table 6B. Highest level of education for subgroups

	Frequency	Percent
Level 1	59	27.8%
Level 2	66	31.1%
Level 3	87	41.1%
Total	212	100%

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Table 7. Did your education include healthcare/medicine or information technology?

	Frequency	Percent
Healthcare/Medicine	38	17.8
Information Technology	40	18.8
Both	106	49.8
Neither	29	13.6
Total	213	100.0

Table 8. Do you hold the CHTS credential?

	Frequency	Percent
Yes	207	97.6
No	5	2.4
Total	212	100.0

Table 9. If yes - How many years have you held the CHTS credential?
Mean: 3.5 years

SD: 1.3 years	Frequency	Percent	Cumulative Percent
0	1	.5	.5
1	7	3.6	4.1
2	34	17.3	21.4
3	60	30.6	52.0
4	62	31.6	83.7
5	23	11.7	95.4
6	5	2.6	98.0
7	2	1.0	99.0
8	1	.5	99.5
10	1	.5	100.0
Total	196	100.0	

Table 10. If yes - Which of these CHTS certifications do you hold? (Select all that apply.) (N=207)

	Frequency	Percent
PW	75	36.2
IM	70	33.8
TR	42	20.3
IS	29	14
CP	28	13.5
TS	20	9.7
Total	264	127.5

Table 10B.

	Yes	No
PW	75	138
IM	70	143
TR	42	171
IS	29	184
CP	28	185
TS	20	193
Total	264	

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Table 11. What other certifications do you hold? (Select all that apply.) (N=107)

	Frequency	Percent
RHIA	51	47.7
RHIT	36	33.6
CAHIMS/CPHIMS	15	14.0
CCS	15	14.0
CPC	15	14.0
CHDA	6	5.6
CHPS	6	5.6
CCS-P	3	2.8
CCA	2	1.9
CMUP/CMUA	1	.9
Total	150	140.2

Table 12. What licenses do you hold? (Select all that apply.) (N=28)

	Frequency	Percent
RN	22	78.6
LPN/LVN	3	10.7
MD	2	7.1
LCSW	1	3.6
Total	28	100.0

Table 13. Which of the following best describes your primary work setting?

	Frequency	Percent
Hospital	63	30.1
Consultant/vendor EHR/HIM/IT services	21	10.0
Physician's office/medical group practice	21	10.0
Ambulatory care facility	20	9.6
Multi-hospital/diversified system	17	8.1
Educational institution	11	5.3
Behavioral health facility	10	4.8
Vendor EHR/HIM software products	7	3.3
Government/public health agency	6	2.9
Insurance company/payer	6	2.9
Health information exchange organization	5	2.4
Long-term care facility	4	1.9
Home healthcare agency	3	1.4
Regional Extension Center (REC)	3	1.4
Managed care HMO/PPO office	2	1.0
Mental health facility	2	1.0
Professional or trade association	2	1.0
Transcription company	2	1.0
Billing agency	1	.5
Hospice	1	.5
Urgent care center (freestanding emergency care center)	1	.5
Veterinary practice	1	.5
Total	209	100.0

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Table 14. Approximately how many employees are in your organization?

	Frequency	Percent	Cumulative Percent
Less than 100	48	21.7	21.7
101 to 1000	68	32	53.7
Greater than 1000	98	46.3	100
Total	212	100	

Table 15. What is your age?

	Frequency	Percent
Less than 30	5	2.4
30 to 39	28	13.6
40 to 49	75	36.4
50 to 59	72	35.0
60 or over	26	12.6
Total	206	100.0

Table 16. With which sex do you identify?

	Frequency	Percent
Female	172	82.7
Male	36	17.3
Total	208	100.0

Table 17. Task Coverage

	Frequency	Percent
Adequately	100	52.9
Completely	88	46.6
Inadequately (please specify why)	1	.5
Total	189	100.0

Table 18. Knowledge Statement Coverage

	Frequency	Percent
Adequately	75	47.5
Completely	83	52.5
Total	158	100.0

Table 19. What percent of your time in the Management Role is spent in each of these area?

	N	Min.	Max.	Mean	SD
Project Management	178	0	80	27.1	17.8
Change Management	173	0	75	17.6	11.8
Personnel	168	0	70	14.6	12.6
Technology	178	0	80	25.2	17.9
Quality and Risk Management	172	0	75	17.6	12.7

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Table 20. Reliability - Task

Survey Subsection	N	Reliability (consistency) Between Tasks (Coefficient Alpha)	Between Respondents (Intraclass Correlation)	# of Tasks
Project Management	195	0.966	0.971	23
Change Management	191	0.951	0.948	15
Personnel	194	0.908	0.973	8
Technology	190	0.957	0.955	14
Quality and Risk Management	186	0.933	0.965	12
Total	156	0.982	0.959	72

Table 21. Reliability – Knowledge Statement

Survey Subsection	N	Reliability (consistency) Between Topics (Coefficient Alpha)	Between Respondents (Intraclass Correlation)	# of Topics
Technical Knowledge: Health Data Management	153	0.881	0.947	11
Technical Knowledge: Health Information Technology & Systems	152	0.947	0.981	25
Non-Technical Knowledge: Hard Skills	151	0.959	0.977	32
Non-Technical Knowledge: Soft Skills	156	0.927	0.974	12
Total	135	0.976	0.976	80

Demographic Questions (Open-ended Question Responses)

Which of the following best describes your primary job level category? – Other (please specify)

1. Account Manager
2. and Systems Administrator for our EHR
3. Application Analyst
4. Auditer
5. CDI Specialist
6. clinical analyst
7. Clinical Applications Analyst (Build and Support)
8. Clinical Data Analyst
9. Clinical Documentation Specialist
10. Clinical Informaticist
11. Clinical IT
12. Clinical Nurse Educator
13. Clinical System Analyst
14. Clinician (RN) working as a Tech Implementation/Support Analyst/Specialist
15. Coder
16. coding compliance auditor
17. Combination of IT PM and System Administrator
18. Credentialed Epic Trainer
19. Demand Management Analyst
20. Director of Finance in a Department
21. Director, Audits and Special Projects
22. Epic Trainer
23. Graduate Medical Education Residency Program Coord
24. health information exchange
25. HIM Assistant Director
26. HIM Educator
27. HIT Adviser on the Iowa Health Information Network IHIN
28. I am an RN in a Neonatal Intensive Care Unit
29. Informatics Manager
30. Joint Venture Integration Manager
31. Meaningful Use and Performance (i.e. Quality) Specialist
32. Medical Transcriptionist
33. NLU Adoptions Specialist
34. Nurse Informaticist
35. PCMH Manager
36. Performance Mangement Specialist/currrently installing EPIC
37. Physician Coding Educator Liaison
38. Practice Coach

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39. Programmer analyst
40. Programmer, not Healthcare related
41. Project Coordinator
42. Project Manager (2)
43. Quality
44. Quality abstractor
45. receptionist
46. Reimbursement Coordinator
47. Revenue Cycle specialist
48. RN Clinical App analyst, implement clinical programs process
49. Strategist (Informatics Strategist)
50. telehealth clinical technician
51. Trainer (3)

What other certifications do you hold? - Other (please specify)

1. A+, Network+, Epic ASAP, Medical Assistant, Emergency Medical Technician
2. AAPC
3. Administrative Assistant
4. ANCC Board Certification - Nursing Informatic
5. Approved AHIMA ICD-10 trainer
6. BPMP
7. CASCC, CRC
8. CBCS, CHI, CMAA, CERHS
9. CBCS, CMAA, CHI, CEHRS
10. CCDS, CDIP, CIC, COC
11. CCHT
12. CCMA
13. CCRN
14. CDIP (3)
15. CDIP, CCDS
16. CEHRS
17. Certified Health Education Specialist (CHES)
18. Certified Healthcare Compliance (CHC)
19. Certified Training Generalist
20. CHAM
21. CHC (3)
22. CHDS (2)
23. CHDS (Certified Healthcare Documentation Specialist (AHDI)
24. CHDS, CPEHR
25. CHP
26. CHTS-CP
27. CHTS-IM (2)
28. CIT
29. COC (5)
30. Comptia A+ and Network +
31. CompTIA A+ and Network+
32. CompTIA Healthcare
33. CPA, EA, QPA
34. CPC
35. CPC-I
36. CPHIE, CPEHR, CPHIT
37. CPHQ (8)
38. CPHQ, CHCA
39. CPHT
40. CPMA, CEMC,
41. CPMSS; CPCS
42. CPRP
43. CPT - phlebotomy
44. CRC CDM CFPP CPhT
45. CRCR
46. CSBI, LSSGB
47. CSM
48. CSM, CSPO, Ahima approved icd-10 cm trainer
49. CSSBB
50. CSSYB
51. CTR
52. CVRN, PCMH-CCE
53. EPIC Certifications
54. EPIC's Epiccare Ambulatory and MyChart Certifications
55. ERMp
56. Health Information Security Professional
57. HIPAA - CHTS certification expired
58. ICD 10 CM AND PCS TRAINER APRROVAL
59. Informatics Nurse
60. McIT
61. MCSE, MCSA
62. MHA, CHPQ, FNAHQ, FAHIMA
63. Midas+ Certified System Manager
64. mos
65. NetSmart System Administrator
66. NextGen Certified Professional (NCP)
67. OCSA
68. PMP (6)
69. PMP, scrum
70. Post Bacc. Paralegal certificate
71. PRO-TS
72. Project+
73. RAC-CT
74. RN Board Certified - Informatics
75. RN-BC
76. RN-BC, CDIP, CCDS
77. RNC-NIC, IBCLC
78. Security+, Healthcare IT Technician, A+, Network+
79. Six sigma yellow belt
80. SSMBB, CPHQ, PCMH CCE
81. will be sitting for RHIA exam soon

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What licenses do you hold? - Other (please specify)

1. CCDS
2. CERTIFICATE IN HEALTH INFORMATION TECH
3. Certified Pharmacy Tech
4. Clinical Laboratory Assistant
5. CMT
6. CNM
7. coa
8. CPA
9. EMT-A (former)
10. EMT-P
11. formerly EMT/Paramedic credential retired
12. Health Life & Accident
13. Licensed Nursing Home Administrator
14. LMT
15. Medical Assistant
16. Medical interpreter
17. PharmD
18. PMP
19. PMP, Scrum
20. Property & Causality Insurance License
21. RHIT
22. RRT PCT
23. RT
24. RT(R)(CT)
25. RTR

Survey Comments

Survey Adequacy

How well do you feel the task list covered the important job tasks in the Management Role? - Inadequately (please specify why)

1. The roles are different for technical and documentation expertise. Documentation specialist in my former organization did not have a role in the structure of the technical projects unless they were directly related to physician documentation or coding for EMR. We plan the training from scope to go liv for each department. We evaluated the EMR ability to replicate the written record and the short falls.

Were any important job tasks in the Management Role omitted from the survey?

1. -Research/know regulatory/accreditation requirements. -Understand operational issues.
2. Auditing for complexities for each department.
3. Developing/responding to RFP
4. Documentation, classroom training, maintaining CEUs
5. educators have different roles than those in healthcare settings.
6. Enterprise analysis; business case formulation Agile concepts
7. I am not in a management role, so cannot speak to this.
8. Information Governance
9. Interface between IS staff and clinical staff
10. More emphasis on Regulatory Compliance ... CMS and ONC have rapid fire regulatory changes that impact all future planning. A project manager must understand and start planning for the future of HIT well before a final rule is released.
11. None that I could tell; seemed to take care of past, present, and future concerns that all need to be considered when taking on a project or when reevaluating a process.
12. Quality reporting (recommend measures; train workflows; monitor progress; attest/report for MU & PQRS); database management; reporting; security risk assessments; security awareness training
13. Reporting - Not to a HIE; but, internal reporting needs and data collection. Consideration of furniture reporting needs and database structures is very important - i.e. does an SQL database have "views" for reporting (maybe via Crystal Reports); is there a Business Objects universe, do you need vendor assistance to produce all reports, etc. And, the data you need to collect to ensure proper reporting will continue. Health information collection is pointless without valid use of the information; reporting is a vital data usage.

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14. Supporting the end-users before, during and after go-live
15. Troubleshooting node and script failures, data feeds development, data feed validation, identifying business logic to be programmed into health IT systems, identification of technical specifications for measures (numerators, denominators, inclusions and exclusions), review of proposed rules from ONC and CMS on health IT and drafting official response to proposed rules, securing executive buy-in into the value statement and vision for investment in various health IT, creating toolkits that meet user needs.
16. Understand and keep up with changing regulation and payment opportunities.
17. when the new software requires change of process due

How well do you feel the knowledge and skills list covered the important knowledge and skills in your role? - Inadequately (please specify why)

1. I am not employed in the healthcare industry. I do not have experience, in spite of my certification.
2. I feel like the questions were geared toward a healthcare delivery facility employee or contractor. It is frustrating that AHIMA focuses so much attention at hospitals when there are so many other areas of health IT.
3. I haven't used any of the knowledge and skills yet. I can't really answer the questions. I haven't found any job requires or need to use the knowledge.
4. not currently employed.
5. The certification is a joke that no one recognizes
6. This is a clerical role

Were any important knowledge and skills omitted from the survey?

1. AHIMA CEU Grab.
2. Continuing education
3. How to develop a continuing educational program to continue to make yourself relevant to the ever changing HIT environment.
4. I believe those of us who are professional, accredited coders have been required to attain and demonstrate so many more skills and informational competencies.This survey is very general and really could benefit by focusing on specific HIM roles. What exactly is the point of this survey?
5. I was a systems analyst when I obtained the CHTS credential. At that time, the credential was very relevant to my job. I have since retired and do coding on a per diem basis. The CHTS credential is not relevant to my current role.
6. Just a comment. I hope that AHIMA does not eliminate the CP designation from the CHTS credential. It is valuable to demonstrate expertise in front end data capture and how data are then extracted from the system for reporting purposes. I just think that is getting lost in the shuffle.
7. Keeping up with current technology
8. Literature reviews
9. multitasking problem solving business ethics
10. need an option in the beginning that says N/A for not currently employed.
11. negotiations
12. No, my issue is getting to use the skills I have.
13. Public health
14. Quality Reporting Programs - VPPM, PQRS, MIPS
15. The questions about Projectors, Microsoft office and PC skills are way out of line. Those are basic competencies to the other skill sets listed; akin to being able to read and write before entering high school... It should be more like "Basic PC and User Profile management"...

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Appendix C. Task Ratings in Survey Order

Task Ratings and Percent Performing in Task Order

No.	Task Statement	N	Mean	SE	SD	% Perform
M1	1. Create charter	214	1.82	.068	.738	54.7
M2	2. Evaluate current environment	214	2.38	.047	.669	93.9
M3	3. Describe future environment	214	2.38	.050	.707	92.5
M4	4. Perform gap analysis	215	2.27	.053	.712	85.1
M5	5. Develop project plan	214	2.22	.052	.727	89.7
M6	6. Create timeline and identify milestones	215	2.26	.053	.745	90.7
M7	7. Establish roles and responsibilities	213	2.17	.052	.703	86.4
M8	8. Create and monitor the communication plan	212	2.18	.054	.731	86.8
M9	9. Report project plan and issues to stakeholders	212	2.27	.056	.748	83.5
M10	10. Manage workflow changes	212	2.34	.049	.681	91.0
M11	11. Manage scope	212	2.11	.056	.764	88.2
M12	12. Monitor adherence to timeline	213	2.23	.049	.675	88.7
M13	13. Manage go-live	212	2.23	.056	.763	87.3
M14	14. Conduct regular meetings	212	2.30	.052	.731	91.5
M15	15. Establish reporting mechanisms	212	2.20	.056	.761	88.7
M16	16. Establish rapport with vendor	211	2.23	.056	.743	84.8
M17	17. Assess skill level of project team	209	2.08	.059	.770	82.8
M18	18. Establish escalation process	210	2.07	.059	.765	80.5
M19	19. Manage transition between systems/products/vendors	210	2.14	.060	.813	86.7
M20	20. Manage contract specifications	212	1.84	.070	.831	67.0
M21	21. Serve as facilitator among stakeholders	210	2.26	.057	.758	83.3
M22	22. Recommend operational changes	211	2.27	.052	.729	91.9
M23	23. Facilitate transition to maintenance	211	2.11	.057	.755	84.4
M24	24. Assess the organization's readiness for change (e.g., historical perspectives, current attitudes)	200	2.02	.056	.734	85.0
M25	25. Review and flowchart the current workflow and processes	201	2.29	.053	.726	93.5
M26	26. Determine current state	199	2.35	.049	.671	96.0
M27	27. Perform needs assessment and gap analysis	198	2.26	.053	.709	91.9
M28	28. Define future state	200	2.24	.051	.688	90.0
M29	29. Establish and prioritize goals	200	2.30	.052	.708	94.0
M30	30. Identify roles and responsibilities	199	2.22	.055	.734	90.5
M31	31. Determine best practices	200	2.35	.052	.712	94.0
M32	32. Measure and manage stakeholder engagement and expectations	200	2.06	.056	.747	88.5
M33	33. Increase efficiency of operations	198	2.34	.049	.672	94.4
M34	34. Create flowcharts of redesigned process	201	2.13	.055	.740	89.6
M35	35. Integrate information technology functions into workflow	199	2.37	.047	.640	93.0
M36	36. Evaluate and revise the redesigned process	198	2.23	.051	.687	92.9
M37	37. Facilitate the rewriting of policies and procedures	201	2.11	.057	.752	87.6
M38	38. Perform impact analysis	199	1.96	.057	.739	84.9
M39	39. Identify organizational structure	200	1.94	.063	.796	80.5
M40	40. Identify owners, decision-makers, and physician champions	201	2.16	.055	.725	85.1
M41	41. Educate owners and decision-makers	200	2.35	.050	.672	90.5
M42	42. Create interview document and solicit feedback from key stakeholders	199	2.03	.063	.780	76.4

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No.	Task Statement	N	Mean	SE	SD	% Perform
M43	43. Identify super-users	200	2.18	.057	.745	86.5
M44	44. Identify subject matter experts (SMEs)	198	2.18	.054	.709	86.4
M45	45. Identify and allocate personnel (e.g., IT support, training)	199	2.05	.061	.773	80.9
M46	46. Administer applicable competency exams, evaluate results, and take actions	197	1.86	.072	.789	61.4
M47	47. Evaluate EMR/EHR/HIS vendor functionality	197	2.16	.061	.773	81.2
M48	48. Identify data sources, needs, and formats	196	2.21	.057	.759	90.3
M49	49. Identify all departments' structured data elements	196	2.02	.062	.800	84.2
M50	50. Capture data (i.e., electronic and non-electronic)	197	2.15	.058	.763	87.8
M51	51. Identify naming conventions	197	2.04	.062	.787	80.7
M52a	52a. Manage and monitor systems: a. design	196	2.06	.068	.810	72.5
M52b	52b. Manage and monitor systems:development	197	1.93	.066	.796	73.6
M52c	52c. Manage and monitor systems:testing	197	2.20	.063	.797	81.7
M52d	52d. Manage and monitor systems:training	197	2.26	.058	.765	88.3
M52e	52e. Manage and monitor systems:implementation	197	2.36	.057	.747	87.8
M52f	52f. Manage and monitor systems:support and maintenance	195	2.14	.062	.798	84.1
M53	53. Manage product customization	196	2.06	.061	.770	80.1
M54	54. Manage interfaces	196	1.91	.069	.812	69.9
M55	55. Create a process and document health information exchange requirements	196	1.99	.067	.792	70.4
M56	56. Identify and mitigate potential risks	192	2.12	.060	.763	85.4
M57	57. Identify and mitigate legal issues	191	1.93	.066	.776	72.3
M58	58. Identify and manage compliance with regulatory requirements	192	2.19	.058	.748	85.4
M59	59. Identify quality measures, benchmarks, and best practices	192	2.24	.053	.686	87.5
M60	60. Evaluate customer service and patient satisfaction	189	1.97	.060	.741	81.5
M61	61. Perform SWOT analysis	190	1.85	.066	.768	71.1
M62	62. Manage standardization/mappings	190	2.06	.064	.763	74.2
M63	63. Manage and prioritize change requests	190	2.15	.061	.753	80.0
M64	64. Develop and update disaster recovery plan	190	1.96	.071	.770	61.6
M65	65. Develop and monitor downtime processes	190	2.01	.067	.784	71.6
M66	66. Determine cutover time period	190	2.04	.069	.731	59.5
M67	67. Prioritize multiple projects	188	2.33	.058	.733	84.6

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Appendix D. Task Ratings in Descending Percent Not Performing Order

Task Ratings in Ascending Percent Performing Order

No.	Task Statement	N	Mean	SE	SD	% Perform
M1	1. Create charter	214	1.82	.068	.738	54.7
M66	66. Determine cutover time period	190	2.04	.069	.731	59.5
M46	46. Administer applicable competency exams, evaluate results, and take actions	197	1.86	.072	.789	61.4
M64	64. Develop and update disaster recovery plan	190	1.96	.071	.770	61.6
M20	20. Manage contract specifications	212	1.84	.070	.831	67.0
M54	54. Manage interfaces	196	1.91	.069	.812	69.9
M55	55. Create a process and document health information exchange requirements	196	1.99	.067	.792	70.4
M61	61. Perform SWOT analysis	190	1.85	.066	.768	71.1
M65	65. Develop and monitor downtime processes	190	2.01	.067	.784	71.6
M57	57. Identify and mitigate legal issues	191	1.93	.066	.776	72.3
M52a	52a. Manage and monitor systems: a. design	196	2.06	.068	.810	72.5
M52b	52b. Manage and monitor systems:development	197	1.93	.066	.796	73.6
M62	62. Manage standardization/mappings	190	2.06	.064	.763	74.2
M42	42. Create interview document and solicit feedback from key stakeholders	199	2.03	.063	.780	76.4
M63	63. Manage and prioritize change requests	190	2.15	.061	.753	80.0
M53	53. Manage product customization	196	2.06	.061	.770	80.1
M18	18. Establish escalation process	210	2.07	.059	.765	80.5
M39	39. Identify organizational structure	200	1.94	.063	.796	80.5
M51	51. Identify naming conventions	197	2.04	.062	.787	80.7
M45	45. Identify and allocate personnel (e.g., IT support, training)	199	2.05	.061	.773	80.9
M47	47. Evaluate EMR/EHR/HIS vendor functionality	197	2.16	.061	.773	81.2
M60	60. Evaluate customer service and patient satisfaction	189	1.97	.060	.741	81.5
M52c	52c. Manage and monitor systems:testing	197	2.20	.063	.797	81.7
M17	17. Assess skill level of project team	209	2.08	.059	.770	82.8
M21	21. Serve as facilitator among stakeholders	210	2.26	.057	.758	83.3
M9	9. Report project plan and issues to stakeholders	212	2.27	.056	.748	83.5
M52f	52f. Manage and monitor systems:support and maintenance	195	2.14	.062	.798	84.1
M49	49. Identify all departments' structured data elements	196	2.02	.062	.800	84.2
M23	23. Facilitate transition to maintenance	211	2.11	.057	.755	84.4
M67	67. Prioritize multiple projects	188	2.33	.058	.733	84.6
M16	16. Establish rapport with vendor	211	2.23	.056	.743	84.8
M38	38. Perform impact analysis	199	1.96	.057	.739	84.9
M24	24. Assess the organization's readiness for change (e.g., historical perspectives, current attitudes)	200	2.02	.056	.734	85.0
M4	4. Perform gap analysis	215	2.27	.053	.712	85.1
M40	40. Identify owners, decision-makers, and physician champions	201	2.16	.055	.725	85.1
M56	56. Identify and mitigate potential risks	192	2.12	.060	.763	85.4
M58	58. Identify and manage compliance with regulatory requirements	192	2.19	.058	.748	85.4
M7	7. Establish roles and responsibilities	213	2.17	.052	.703	86.4
M44	44. Identify subject matter experts (SMEs)	198	2.18	.054	.709	86.4
M43	43. Identify super-users	200	2.18	.057	.745	86.5
M19	19. Manage transition between systems/products/vendors	210	2.14	.060	.813	86.7

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No.	Task Statement	N	Mean	SE	SD	% Perform
M8	8. Create and monitor the communication plan	212	2.18	.054	.731	86.8
M13	13. Manage go-live	212	2.23	.056	.763	87.3
M59	59. Identify quality measures, benchmarks, and best practices	192	2.24	.053	.686	87.5
M37	37. Facilitate the rewriting of policies and procedures	201	2.11	.057	.752	87.6
M50	50. Capture data (i.e., electronic and non-electronic)	197	2.15	.058	.763	87.8
M52e	52e. Manage and monitor systems:implementation	197	2.36	.057	.747	87.8
M11	11. Manage scope	212	2.11	.056	.764	88.2
M52d	52d. Manage and monitor systems:training	197	2.26	.058	.765	88.3
M32	32. Measure and manage stakeholder engagement and expectations	200	2.06	.056	.747	88.5
M12	12. Monitor adherence to timeline	213	2.23	.049	.675	88.7
M15	15. Establish reporting mechanisms	212	2.20	.056	.761	88.7
M34	34. Create flowcharts of redesigned process	201	2.13	.055	.740	89.6
M5	5. Develop project plan	214	2.22	.052	.727	89.7
M28	28. Define future state	200	2.24	.051	.688	90.0
M48	48. Identify data sources, needs, and formats	196	2.21	.057	.759	90.3
M30	30. Identify roles and responsibilities	199	2.22	.055	.734	90.5
M41	41. Educate owners and decision-makers	200	2.35	.050	.672	90.5
M6	6. Create timeline and identify milestones	215	2.26	.053	.745	90.7
M10	10. Manage workflow changes	212	2.34	.049	.681	91.0
M14	14. Conduct regular meetings	212	2.30	.052	.731	91.5
M22	22. Recommend operational changes	211	2.27	.052	.729	91.9
M27	27. Perform needs assessment and gap analysis	198	2.26	.053	.709	91.9
M3	3. Describe future environment	214	2.38	.050	.707	92.5
M36	36. Evaluate and revise the redesigned process	198	2.23	.051	.687	92.9
M35	35. Integrate information technology functions into workflow	199	2.37	.047	.640	93.0
M25	25. Review and flowchart the current workflow and processes	201	2.29	.053	.726	93.5
M2	2. Evaluate current environment	214	2.38	.047	.669	93.9
M29	29. Establish and prioritize goals	200	2.30	.052	.708	94.0
M31	31. Determine best practices	200	2.35	.052	.712	94.0
M33	33. Increase efficiency of operations	198	2.34	.049	.672	94.4
M26	26. Determine current state	199	2.35	.049	.671	96.0

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Appendix E. Task Ratings in Ascending Mean Task Rating Order

Task Ratings in Ascending Mean Task Rating Order

No.	Task Statement	N	Mean	SE	SD	% Perform
M1	1. Create charter	214	1.82	.068	.738	54.7
M20	20. Manage contract specifications	212	1.84	.070	.831	67.0
M61	61. Perform SWOT analysis	190	1.85	.066	.768	71.1
M46	46. Administer applicable competency exams, evaluate results, and take actions	197	1.86	.072	.789	61.4
M54	54. Manage interfaces	196	1.91	.069	.812	69.9
M52b	52b. Manage and monitor systems:development	197	1.93	.066	.796	73.6
M57	57. Identify and mitigate legal issues	191	1.93	.066	.776	72.3
M39	39. Identify organizational structure	200	1.94	.063	.796	80.5
M38	38. Perform impact analysis	199	1.96	.057	.739	84.9
M64	64. Develop and update disaster recovery plan	190	1.96	.071	.770	61.6
M60	60. Evaluate customer service and patient satisfaction	189	1.97	.060	.741	81.5
M55	55. Create a process and document health information exchange requirements	196	1.99	.067	.792	70.4
M65	65. Develop and monitor downtime processes	190	2.01	.067	.784	71.6
M24	24. Assess the organization's readiness for change (e.g., historical perspectives, current attitudes)	200	2.02	.056	.734	85.0
M49	49. Identify all departments' structured data elements	196	2.02	.062	.800	84.2
M42	42. Create interview document and solicit feedback from key stakeholders	199	2.03	.063	.780	76.4
M51	51. Identify naming conventions	197	2.04	.062	.787	80.7
M66	66. Determine cutover time period	190	2.04	.069	.731	59.5
M45	45. Identify and allocate personnel (e.g., IT support, training)	199	2.05	.061	.773	80.9
M32	32. Measure and manage stakeholder engagement and expectations	200	2.06	.056	.747	88.5
M52a	52a. Manage and monitor systems: a. design	196	2.06	.068	.810	72.5
M53	53. Manage product customization	196	2.06	.061	.770	80.1
M62	62. Manage standardization/mappings	190	2.06	.064	.763	74.2
M18	18. Establish escalation process	210	2.07	.059	.765	80.5
M17	17. Assess skill level of project team	209	2.08	.059	.770	82.8
M11	11. Manage scope	212	2.11	.056	.764	88.2
M23	23. Facilitate transition to maintenance	211	2.11	.057	.755	84.4
M37	37. Facilitate the rewriting of policies and procedures	201	2.11	.057	.752	87.6
M56	56. Identify and mitigate potential risks	192	2.12	.060	.763	85.4
M34	34. Create flowcharts of redesigned process	201	2.13	.055	.740	89.6
M19	19. Manage transition between systems/products/vendors	210	2.14	.060	.813	86.7
M52f	52f. Manage and monitor systems:support and maintenance	195	2.14	.062	.798	84.1
M50	50. Capture data (i.e., electronic and non-electronic)	197	2.15	.058	.763	87.8
M63	63. Manage and prioritize change requests	190	2.15	.061	.753	80.0
M40	40. Identify owners, decision-makers, and physician champions	201	2.16	.055	.725	85.1
M47	47. Evaluate EMR/EHR/HIS vendor functionality	197	2.16	.061	.773	81.2
M7	7. Establish roles and responsibilities	213	2.17	.052	.703	86.4
M8	8. Create and monitor the communication plan	212	2.18	.054	.731	86.8
M43	43. Identify super-users	200	2.18	.057	.745	86.5
M44	44. Identify subject matter experts (SMEs)	198	2.18	.054	.709	86.4

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No.	Task Statement	N	Mean	SE	SD	% Perform
M58	58. Identify and manage compliance with regulatory requirements	192	2.19	.058	.748	85.4
M15	15. Establish reporting mechanisms	212	2.20	.056	.761	88.7
M52c	52c. Manage and monitor systems:testing	197	2.20	.063	.797	81.7
M48	48. Identify data sources, needs, and formats	196	2.21	.057	.759	90.3
M5	5. Develop project plan	214	2.22	.052	.727	89.7
M30	30. Identify roles and responsibilities	199	2.22	.055	.734	90.5
M12	12. Monitor adherence to timeline	213	2.23	.049	.675	88.7
M13	13. Manage go-live	212	2.23	.056	.763	87.3
M16	16. Establish rapport with vendor	211	2.23	.056	.743	84.8
M36	36. Evaluate and revise the redesigned process	198	2.23	.051	.687	92.9
M28	28. Define future state	200	2.24	.051	.688	90.0
M59	59. Identify quality measures, benchmarks, and best practices	192	2.24	.053	.686	87.5
M6	6. Create timeline and identify milestones	215	2.26	.053	.745	90.7
M21	21. Serve as facilitator among stakeholders	210	2.26	.057	.758	83.3
M27	27. Perform needs assessment and gap analysis	198	2.26	.053	.709	91.9
M52d	52d. Manage and monitor systems:training	197	2.26	.058	.765	88.3
M4	4. Perform gap analysis	215	2.27	.053	.712	85.1
M9	9. Report project plan and issues to stakeholders	212	2.27	.056	.748	83.5
M22	22. Recommend operational changes	211	2.27	.052	.729	91.9
M25	25. Review and flowchart the current workflow and processes	201	2.29	.053	.726	93.5
M14	14. Conduct regular meetings	212	2.30	.052	.731	91.5
M29	29. Establish and prioritize goals	200	2.30	.052	.708	94.0
M67	67. Prioritize multiple projects	188	2.33	.058	.733	84.6
M10	10. Manage workflow changes	212	2.34	.049	.681	91.0
M33	33. Increase efficiency of operations	198	2.34	.049	.672	94.4
M26	26. Determine current state	199	2.35	.049	.671	96.0
M31	31. Determine best practices	200	2.35	.052	.712	94.0
M41	41. Educate owners and decision-makers	200	2.35	.050	.672	90.5
M52e	52e. Manage and monitor systems:implementation	197	2.36	.057	.747	87.8
M35	35. Integrate information technology functions into workflow	199	2.37	.047	.640	93.0
M2	2. Evaluate current environment	214	2.38	.047	.669	93.9
M3	3. Describe future environment	214	2.38	.050	.707	92.5

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Appendix F. Mean Significance Ratings for Tasks by Region

Task Ratings by Region

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	West			Midwest			Southeast			Northeast			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	12	2.17	0.207	23	1.70	0.147	50	1.86	0.107	21	1.52	0.148	3
M2	18	2.39	0.164	41	2.22	0.124	87	2.38	0.072	42	2.52	0.085	0
M3	17	2.41	0.173	40	2.23	0.121	87	2.29	0.080	41	2.73	0.070	0
M4	15	2.40	0.190	38	2.29	0.119	78	2.23	0.081	39	2.31	0.117	0
M5	18	2.33	0.181	36	2.22	0.127	84	2.20	0.084	41	2.17	0.098	0
M6	16	2.38	0.180	39	2.21	0.117	86	2.26	0.086	41	2.22	0.113	0
M7	18	2.22	0.191	37	2.05	0.116	80	2.18	0.079	36	2.25	0.108	0
M8	16	2.31	0.176	37	2.11	0.121	81	2.23	0.083	37	2.03	0.113	0
M9	15	2.47	0.165	37	2.11	0.121	78	2.26	0.092	36	2.33	0.113	0
M10	17	2.35	0.191	42	2.17	0.102	83	2.39	0.072	39	2.33	0.118	0
M11	17	2.29	0.187	39	2.03	0.113	80	2.14	0.090	39	2.03	0.119	0
M12	17	2.35	0.147	37	2.05	0.109	83	2.27	0.075	40	2.33	0.115	0
M13	15	2.47	0.192	36	2.03	0.135	82	2.23	0.089	39	2.33	0.106	0
M14	18	2.22	0.191	39	2.15	0.125	84	2.39	0.078	40	2.25	0.112	0
M15	18	2.33	0.181	36	2.00	0.120	80	2.29	0.086	41	2.20	0.122	0
M16	17	2.29	0.166	38	1.87	0.114	78	2.31	0.086	35	2.37	0.124	1
M17	15	2.47	0.165	33	1.82	0.119	75	2.09	0.093	39	2.05	0.127	1
M18	15	2.20	0.145	34	1.88	0.125	73	2.14	0.096	36	2.00	0.126	1
M19	16	2.19	0.188	37	2.00	0.123	82	2.09	0.094	35	2.31	0.141	0
M20	12	1.92	0.229	31	1.61	0.128	61	1.92	0.110	27	1.89	0.180	2
M21	15	2.20	0.223	37	2.22	0.129	73	2.32	0.089	37	2.16	0.126	0
M22	18	2.22	0.173	37	2.11	0.127	85	2.24	0.080	41	2.46	0.111	0
M23	16	2.06	0.170	36	1.81	0.118	73	2.12	0.091	41	2.27	0.121	1
M24	12	2.25	0.179	35	1.97	0.104	78	1.97	0.091	33	1.94	0.130	0
M25	17	2.29	0.187	37	2.32	0.103	83	2.19	0.085	38	2.34	0.121	0
M26	16	2.38	0.155	39	2.31	0.117	86	2.26	0.076	37	2.51	0.092	0
M27	15	2.33	0.211	37	2.22	0.129	78	2.24	0.078	39	2.26	0.115	0
M28	14	2.50	0.174	37	2.14	0.117	79	2.20	0.075	37	2.30	0.115	0
M29	15	2.40	0.190	38	2.11	0.112	84	2.26	0.083	38	2.53	0.098	0
M30	14	2.43	0.202	37	2.14	0.096	81	2.17	0.089	35	2.34	0.123	0
M31	15	2.53	0.133	38	2.29	0.113	85	2.29	0.083	37	2.46	0.114	0
M32	15	2.20	0.200	38	2.00	0.119	75	2.11	0.084	36	2.03	0.135	0
M33	15	2.53	0.133	37	2.22	0.111	85	2.28	0.078	37	2.54	0.100	0
M34	17	2.12	0.189	34	2.12	0.092	80	2.10	0.088	36	2.14	0.133	0
M35	16	2.56	0.128	37	2.24	0.112	81	2.35	0.071	39	2.44	0.103	0
M36	16	2.31	0.151	36	2.17	0.109	81	2.17	0.080	39	2.31	0.117	0
M37	16	2.44	0.157	37	1.95	0.128	77	2.03	0.087	33	2.21	0.136	0
M38	14	2.29	0.163	32	1.88	0.108	78	1.91	0.092	33	2.03	0.134	1
M39	13	2.23	0.201	32	1.72	0.136	71	1.99	0.101	32	1.78	0.133	2
M40	15	2.33	0.187	36	2.03	0.116	72	2.17	0.086	35	2.14	0.137	0
M41	16	2.19	0.188	36	2.33	0.098	78	2.38	0.080	38	2.29	0.113	0
M42	13	2.31	0.208	29	1.86	0.138	67	2.09	0.101	31	1.74	0.122	2
M43	15	2.13	0.192	33	1.94	0.123	76	2.26	0.085	36	2.14	0.139	0
M44	14	2.36	0.169	34	2.15	0.105	73	2.19	0.089	37	2.11	0.127	0
M45	13	2.54	0.215	31	1.94	0.113	70	2.09	0.099	34	1.94	0.140	0
M46	14	1.93	0.221	26	1.54	0.127	53	2.00	0.111	18	2.00	0.214	1

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	West			Midwest			Southeast			Northeast			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M47	15	2.07	0.206	30	2.20	0.139	70	2.14	0.094	33	2.15	0.138	0
M48	17	2.12	0.189	35	2.17	0.112	75	2.16	0.097	38	2.34	0.115	0
M49	15	2.00	0.218	34	1.91	0.129	69	2.07	0.100	35	2.03	0.139	0
M50	15	2.33	0.159	35	1.86	0.117	75	2.16	0.095	36	2.28	0.124	1
M51	17	1.94	0.201	30	1.77	0.133	66	2.18	0.101	35	2.00	0.130	1
M52a	12	2.33	0.256	28	1.82	0.137	61	2.10	0.106	30	2.20	0.147	1
M52b	13	1.92	0.265	31	1.84	0.132	63	2.03	0.101	28	1.86	0.152	2
M52c	15	2.20	0.223	33	2.12	0.136	69	2.17	0.101	32	2.41	0.126	0
M52d	16	2.38	0.180	34	2.21	0.132	76	2.16	0.092	36	2.47	0.116	0
M52e	17	2.29	0.206	35	2.29	0.127	72	2.36	0.089	37	2.51	0.120	0
M52f	16	2.19	0.188	35	2.00	0.142	69	2.13	0.099	32	2.34	0.132	0
M53	15	2.00	0.258	30	1.77	0.133	68	2.15	0.092	34	2.18	0.130	1
M54	13	1.69	0.208	22	1.82	0.156	60	2.02	0.113	33	1.94	0.144	2
M55	13	2.00	0.226	26	1.96	0.130	60	2.07	0.111	27	1.89	0.163	1
M56	15	2.07	0.182	30	2.00	0.144	72	2.15	0.096	35	2.11	0.121	0
M57	12	1.92	0.193	25	1.64	0.140	63	1.98	0.105	26	2.04	0.152	1
M58	14	2.57	0.137	33	2.06	0.130	72	2.13	0.091	33	2.24	0.138	0
M59	16	2.31	0.176	33	2.15	0.124	72	2.26	0.086	35	2.26	0.103	0
M60	12	2.08	0.260	27	1.74	0.126	72	2.01	0.092	31	1.94	0.122	1
M61	12	1.92	0.229	26	1.73	0.131	57	1.95	0.113	28	1.71	0.135	2
M62	11	2.18	0.226	26	1.88	0.128	66	2.05	0.100	27	2.19	0.151	1
M63	14	2.21	0.214	27	1.96	0.155	69	2.14	0.091	30	2.23	0.124	0
M64	10	2.10	0.277	22	1.59	0.142	53	2.00	0.108	21	2.00	0.169	1
M65	11	2.18	0.226	27	1.70	0.149	59	2.12	0.103	27	1.93	0.150	1
M66	9	2.22	0.147	23	1.91	0.177	48	2.04	0.111	22	2.09	0.160	0
M67	15	2.40	0.163	31	2.19	0.157	71	2.34	0.087	30	2.37	0.131	0

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Appendix G. Mean Significance Ratings for Tasks by Years of Work Experience

Task Ratings by Years of Work Experience

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	0 – 5 years			6 – 16 years			17 years or more			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	24	1.92	0.158	33	1.79	0.129	40	1.80	0.120	2
M2	50	2.42	0.091	63	2.17	0.092	59	2.54	0.081	0
M3	49	2.39	0.104	63	2.24	0.098	57	2.47	0.080	0
M4	40	2.30	0.120	59	2.08	0.091	58	2.45	0.086	0
M5	43	2.26	0.120	63	2.08	0.089	58	2.31	0.096	0
M6	46	2.20	0.119	63	2.22	0.092	57	2.35	0.102	0
M7	46	2.11	0.117	58	2.12	0.089	53	2.36	0.086	0
M8	46	2.15	0.112	58	2.07	0.092	55	2.31	0.103	0
M9	43	2.14	0.131	58	2.16	0.091	53	2.45	0.095	0
M10	48	2.25	0.105	62	2.26	0.092	57	2.51	0.080	0
M11	48	2.10	0.116	57	2.02	0.105	56	2.20	0.100	0
M12	46	2.30	0.102	59	2.14	0.089	57	2.33	0.084	0
M13	45	2.31	0.118	59	2.15	0.099	55	2.27	0.102	0
M14	47	2.34	0.107	62	2.21	0.095	58	2.38	0.091	0
M15	47	2.28	0.117	59	2.08	0.103	57	2.25	0.095	0
M16	43	2.28	0.117	56	2.23	0.099	57	2.12	0.103	0
M17	44	2.02	0.132	52	2.08	0.102	53	2.06	0.099	0
M18	41	1.88	0.127	53	2.15	0.102	51	2.06	0.110	1
M19	44	2.14	0.124	57	2.11	0.108	55	2.13	0.113	0
M20	34	1.76	0.153	44	1.86	0.132	45	1.73	0.112	3
M21	45	2.24	0.115	56	2.09	0.109	50	2.36	0.106	0
M22	50	2.22	0.104	61	2.16	0.100	57	2.39	0.096	0
M23	41	2.02	0.123	58	2.12	0.096	54	2.09	0.110	0
M24	42	2.02	0.110	56	1.93	0.105	49	2.08	0.104	0
M25	46	2.30	0.107	60	2.22	0.095	55	2.40	0.092	0
M26	48	2.27	0.106	61	2.36	0.074	54	2.44	0.086	0
M27	41	2.24	0.125	60	2.18	0.084	54	2.39	0.093	0
M28	41	2.22	0.124	59	2.24	0.074	53	2.26	0.101	0
M29	44	2.25	0.122	62	2.32	0.088	55	2.33	0.090	0
M30	42	2.14	0.126	60	2.20	0.097	51	2.37	0.093	0
M31	44	2.27	0.114	61	2.26	0.093	55	2.60	0.076	0
M32	43	1.98	0.113	58	2.03	0.095	51	2.18	0.107	0
M33	46	2.33	0.112	58	2.26	0.087	56	2.46	0.076	0
M34	43	2.07	0.112	58	2.07	0.101	54	2.24	0.099	0
M35	48	2.23	0.100	60	2.35	0.082	52	2.48	0.085	0
M36	43	2.12	0.106	61	2.23	0.089	54	2.33	0.092	0
M37	43	2.02	0.113	55	2.05	0.108	53	2.15	0.102	0
M38	40	1.98	0.116	52	1.94	0.097	52	2.00	0.106	0
M39	39	1.85	0.125	50	1.80	0.114	46	2.07	0.126	2
M40	44	2.09	0.121	55	2.07	0.097	45	2.33	0.101	0
M41	45	2.20	0.113	62	2.23	0.081	48	2.56	0.094	0

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	0 – 5 years			6 – 16 years			17 years or more			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M42	35	1.77	0.130	52	1.90	0.107	42	2.26	0.123	1
M43	42	2.10	0.127	56	2.14	0.097	48	2.23	0.108	0
M44	41	2.10	0.125	58	2.16	0.084	45	2.36	0.106	0
M45	40	2.08	0.121	52	1.96	0.110	43	2.14	0.123	0
M46	31	1.68	0.134	40	1.85	0.132	31	2.06	0.146	2
M47	35	2.20	0.141	57	2.04	0.100	46	2.26	0.114	0
M48	44	2.30	0.115	59	2.14	0.101	49	2.24	0.111	0
M49	37	2.03	0.147	54	2.02	0.111	49	2.06	0.111	0
M50	40	2.15	0.116	59	2.19	0.101	49	2.14	0.113	0
M51	38	1.92	0.138	52	2.04	0.110	47	2.15	0.110	0
M52a	31	2.06	0.146	45	2.09	0.122	45	2.11	0.124	0
M52b	34	1.82	0.130	49	2.04	0.116	41	1.98	0.128	1
M52c	39	2.10	0.131	56	2.23	0.102	44	2.27	0.123	0
M52d	41	2.27	0.121	59	2.31	0.097	49	2.18	0.115	0
M52e	41	2.29	0.127	59	2.41	0.088	50	2.30	0.115	0
M52f	40	2.10	0.138	57	2.14	0.095	43	2.23	0.124	0
M53	37	1.92	0.136	56	2.02	0.100	42	2.19	0.119	0
M54	29	2.07	0.148	48	1.79	0.119	40	1.90	0.128	2
M55	29	2.14	0.147	44	1.84	0.121	43	1.93	0.122	1
M56	43	2.14	0.123	51	2.02	0.110	49	2.18	0.108	0
M57	31	1.90	0.156	44	1.89	0.123	43	2.00	0.110	1
M58	42	2.26	0.123	53	2.04	0.108	48	2.27	0.098	0
M59	44	2.30	0.111	54	2.13	0.099	47	2.32	0.097	0
M60	34	1.97	0.123	52	1.90	0.111	48	1.96	0.103	0
M61	30	1.77	0.141	43	1.81	0.121	42	1.93	0.125	2
M62	29	2.28	0.121	46	2.02	0.126	44	1.98	0.119	0
M63	36	2.22	0.139	49	2.14	0.105	45	2.11	0.116	0
M64	24	2.08	0.133	36	1.81	0.125	39	2.03	0.140	1
M65	32	1.78	0.140	42	2.00	0.128	42	2.19	0.119	1
M66	25	2.16	0.138	38	1.89	0.129	33	2.09	0.133	1
M67	39	2.36	0.130	54	2.26	0.106	44	2.41	0.099	0

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Appendix H. Mean Significance Ratings for Tasks by Highest Level of Education

Task Ratings by Highest Level of Education

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	HS - Associate			Baccalaureate			Masters or above			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	23	1.83	0.149	34	1.62	0.112	59	1.95	0.101	2
M2	52	2.33	0.102	61	2.36	0.084	87	2.44	0.069	0
M3	51	2.22	0.110	59	2.34	0.096	87	2.51	0.067	0
M4	47	2.04	0.105	53	2.34	0.097	82	2.38	0.075	0
M5	48	2.00	0.107	57	2.32	0.097	86	2.28	0.075	0
M6	49	1.98	0.111	60	2.37	0.095	85	2.35	0.076	0
M7	43	2.00	0.100	56	2.23	0.099	84	2.23	0.076	0
M8	46	2.07	0.105	55	2.20	0.098	82	2.24	0.082	0
M9	43	2.09	0.114	52	2.38	0.107	81	2.30	0.079	0
M10	49	2.29	0.101	58	2.36	0.088	85	2.36	0.073	0
M11	43	2.05	0.120	59	2.14	0.095	84	2.14	0.085	0
M12	45	2.18	0.097	61	2.20	0.090	82	2.29	0.075	0
M13	46	2.22	0.112	58	2.26	0.106	80	2.23	0.083	0
M14	48	2.15	0.103	60	2.28	0.098	85	2.41	0.077	0
M15	43	2.09	0.109	58	2.21	0.104	86	2.26	0.083	0
M16	46	2.11	0.109	55	2.31	0.100	77	2.27	0.084	0
M17	40	1.95	0.113	53	2.21	0.112	79	2.06	0.085	0
M18	39	2.00	0.127	51	2.22	0.098	78	2.00	0.089	0
M19	45	2.07	0.121	58	2.17	0.105	78	2.17	0.094	0
M20	33	1.52	0.131	45	1.91	0.130	64	1.95	0.101	1
M21	39	2.03	0.125	54	2.39	0.100	82	2.29	0.082	0
M22	46	2.24	0.117	61	2.25	0.092	86	2.31	0.076	0
M23	43	2.02	0.118	55	2.13	0.104	79	2.15	0.083	0
M24	41	2.02	0.133	51	1.96	0.101	77	2.05	0.078	0
M25	45	2.27	0.112	60	2.17	0.098	82	2.39	0.075	0
M26	47	2.28	0.104	59	2.31	0.094	84	2.43	0.066	0
M27	44	2.07	0.114	56	2.29	0.091	81	2.35	0.077	0
M28	42	2.12	0.114	55	2.22	0.092	82	2.32	0.073	0
M29	47	2.11	0.106	59	2.36	0.096	81	2.38	0.074	0
M30	42	2.12	0.114	59	2.29	0.100	78	2.22	0.081	0
M31	46	2.22	0.116	59	2.37	0.093	82	2.41	0.074	0
M32	42	1.81	0.129	54	2.11	0.094	80	2.18	0.079	1
M33	47	2.34	0.093	59	2.34	0.099	80	2.36	0.069	0
M34	42	2.12	0.114	57	2.00	0.097	80	2.23	0.083	0
M35	45	2.40	0.102	58	2.38	0.091	81	2.36	0.064	0
M36	47	2.17	0.115	55	2.20	0.088	81	2.28	0.073	0
M37	42	2.00	0.113	55	2.09	0.114	78	2.18	0.079	0
M38	41	1.80	0.127	51	1.90	0.102	76	2.09	0.080	1
M39	31	1.84	0.140	51	1.92	0.100	78	1.99	0.097	1
M40	36	2.03	0.109	53	2.15	0.102	81	2.23	0.083	0
M41	41	2.22	0.108	57	2.47	0.087	82	2.34	0.074	0

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	HS - Associate			Baccalaureate			Masters or above			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M42	31	2.00	0.139	48	2.04	0.107	72	2.03	0.097	0
M43	37	2.24	0.119	55	2.22	0.099	80	2.13	0.086	0
M44	33	2.06	0.123	54	2.19	0.096	83	2.23	0.079	0
M45	36	1.94	0.132	46	2.15	0.108	78	2.04	0.090	0
M46	24	2.00	0.170	37	1.68	0.129	59	1.92	0.101	1
M47	42	2.26	0.113	50	2.12	0.117	67	2.12	0.094	0
M48	45	2.07	0.121	57	2.19	0.095	74	2.31	0.088	0
M49	41	1.93	0.123	52	1.92	0.113	71	2.14	0.095	0
M50	46	2.07	0.114	51	2.14	0.112	75	2.21	0.086	0
M51	39	2.00	0.122	49	1.90	0.118	70	2.16	0.092	1
M52a	32	2.19	0.145	44	1.93	0.119	65	2.11	0.101	0
M52b	32	2.06	0.142	47	1.77	0.111	65	2.00	0.100	1
M52c	41	2.27	0.126	49	2.04	0.113	70	2.27	0.095	0
M52d	45	2.20	0.129	54	2.22	0.090	74	2.32	0.090	0
M52e	46	2.35	0.113	54	2.35	0.099	72	2.39	0.090	0
M52f	43	2.28	0.117	51	1.94	0.113	69	2.22	0.094	0
M53	39	2.00	0.122	48	2.02	0.109	69	2.12	0.096	0
M54	34	1.88	0.151	42	1.86	0.130	60	1.97	0.098	2
M55	33	1.91	0.153	45	1.96	0.114	59	2.05	0.101	0
M56	37	2.05	0.134	53	2.00	0.108	73	2.23	0.084	0
M57	28	1.93	0.154	43	1.72	0.112	66	2.08	0.095	1
M58	38	2.03	0.133	52	2.17	0.105	73	2.29	0.082	0
M59	39	2.10	0.121	54	2.22	0.098	74	2.32	0.072	0
M60	37	1.84	0.120	50	1.98	0.105	66	2.05	0.093	1
M61	27	1.81	0.142	43	1.74	0.111	64	1.94	0.102	2
M62	33	2.03	0.141	48	1.94	0.109	59	2.17	0.097	0
M63	33	2.18	0.127	51	2.12	0.107	67	2.16	0.094	0
M64	24	2.21	0.170	37	1.81	0.122	55	1.95	0.102	1
M65	30	2.20	0.139	42	1.81	0.119	63	2.05	0.100	1
M66	26	2.12	0.160	33	1.76	0.107	53	2.17	0.100	1
M67	34	2.21	0.125	53	2.47	0.096	71	2.28	0.090	0

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Appendix I. Mean Significance Ratings for Tasks by Certifications Held

Task Ratings by Certifications Held

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	CP			IM			IS			PW			TR			TS			
No.	N	Mean	SE	N	Mean	SE	N	Mean	C*	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	22	1.77	0.160	51	1.86	0.101	11	1.27	0.141	42	1.86	0.111	25	1.76	0.145	8	1.63	0.263	4
M2	27	2.59	0.110	69	2.43	0.073	27	2.52	0.124	71	2.32	0.085	39	2.36	0.113	20	2.20	0.172	0
M3	27	2.41	0.122	69	2.41	0.078	26	2.50	0.127	70	2.29	0.094	39	2.38	0.120	19	2.32	0.188	0
M4	25	2.28	0.147	68	2.37	0.078	27	2.00	0.131	63	2.37	0.086	35	2.37	0.109	16	2.13	0.155	0
M5	28	2.11	0.149	68	2.34	0.077	26	2.38	0.097	66	2.20	0.090	39	2.15	0.119	17	2.24	0.161	0
M6	27	2.22	0.154	69	2.38	0.078	27	2.44	0.111	67	2.27	0.089	39	2.28	0.127	18	2.22	0.191	0
M7	28	1.93	0.145	64	2.27	0.075	24	2.38	0.132	65	2.05	0.094	35	2.23	0.124	18	2.28	0.158	0
M8	26	2.04	0.141	65	2.22	0.086	26	2.23	0.139	62	2.16	0.095	35	2.26	0.118	20	2.15	0.182	0
M9	26	2.12	0.140	65	2.32	0.088	26	2.38	0.137	59	2.24	0.104	32	2.28	0.129	18	2.28	0.177	0
M10	26	2.23	0.150	66	2.36	0.074	26	2.46	0.127	67	2.36	0.087	37	2.43	0.113	20	2.05	0.185	0
M11	25	2.12	0.145	67	2.18	0.085	26	2.23	0.139	63	2.13	0.102	36	2.17	0.129	19	1.95	0.209	0
M12	25	2.12	0.145	67	2.22	0.073	27	2.44	0.097	65	2.17	0.089	35	2.31	0.098	20	2.00	0.162	0
M13	27	2.19	0.151	67	2.30	0.090	26	2.46	0.127	62	2.15	0.107	35	2.29	0.127	18	2.22	0.173	0
M14	27	2.19	0.160	67	2.40	0.083	27	2.33	0.131	67	2.24	0.093	38	2.37	0.122	18	2.11	0.196	0
M15	27	2.04	0.136	66	2.24	0.094	27	2.41	0.122	64	2.27	0.098	36	2.25	0.122	18	2.17	0.202	0
M16	27	2.11	0.163	63	2.41	0.089	26	2.58	0.126	62	2.23	0.096	32	2.22	0.133	18	2.44	0.185	0
M17	24	2.13	0.151	59	2.12	0.103	24	2.17	0.155	60	1.97	0.104	33	2.15	0.131	16	2.13	0.180	0
M18	24	1.92	0.146	61	2.13	0.092	25	2.28	0.147	56	2.05	0.109	33	2.09	0.140	17	2.12	0.189	0
M19	26	2.15	0.164	65	2.23	0.100	26	2.23	0.178	62	2.21	0.101	34	2.03	0.149	17	2.35	0.209	0
M20	17	1.65	0.209	56	1.88	0.105	21	1.81	0.190	48	1.88	0.118	27	1.81	0.169	13	1.54	0.215	4
M21	26	2.46	0.138	64	2.27	0.090	25	2.32	0.150	60	2.28	0.098	31	2.29	0.155	16	1.94	0.249	0
M22	27	2.37	0.143	68	2.25	0.085	26	2.42	0.126	66	2.23	0.091	40	2.30	0.130	16	2.31	0.176	0
M23	26	2.27	0.152	63	2.14	0.090	25	2.28	0.158	62	2.16	0.098	33	2.15	0.152	16	2.38	0.202	0
M24	25	2.28	0.136	59	2.03	0.087	23	1.96	0.133	60	1.98	0.105	34	2.12	0.118	17	2.06	0.201	0
M25	27	2.33	0.119	63	2.38	0.083	26	2.42	0.126	65	2.29	0.090	37	2.30	0.128	18	2.11	0.196	0
M26	28	2.43	0.120	63	2.51	0.067	26	2.46	0.114	69	2.22	0.087	36	2.39	0.107	19	2.26	0.168	0
M27	27	2.33	0.141	61	2.39	0.088	27	2.22	0.123	62	2.27	0.090	33	2.42	0.107	18	2.06	0.171	0
M28	27	2.15	0.138	61	2.38	0.075	26	2.19	0.136	63	2.21	0.085	34	2.32	0.117	18	2.28	0.158	0
M29	28	2.04	0.131	62	2.50	0.075	27	2.48	0.112	66	2.18	0.094	36	2.28	0.124	19	2.21	0.164	0
M30	26	2.00	0.157	61	2.41	0.075	23	2.35	0.149	63	2.05	0.094	34	2.29	0.116	17	2.29	0.206	0
M31	27	2.48	0.124	63	2.44	0.081	27	2.52	0.124	66	2.33	0.090	36	2.31	0.118	19	2.37	0.175	0
M32	27	2.07	0.159	61	2.18	0.092	26	2.08	0.146	62	2.05	0.099	33	1.97	0.127	17	1.82	0.196	1
M33	26	2.38	0.137	64	2.42	0.083	26	2.42	0.126	67	2.31	0.083	36	2.28	0.124	18	2.33	0.162	0
M34	25	2.20	0.153	62	2.21	0.092	27	2.07	0.150	63	2.16	0.094	34	2.29	0.130	16	2.00	0.204	0
M35	28	2.46	0.131	61	2.51	0.076	27	2.52	0.124	67	2.34	0.084	33	2.30	0.111	19	2.26	0.150	0
M36	27	2.30	0.139	59	2.44	0.070	27	2.30	0.129	66	2.26	0.084	35	2.17	0.126	20	2.00	0.162	0
M37	26	2.08	0.156	57	2.19	0.092	25	2.20	0.129	65	2.00	0.096	34	2.32	0.117	17	2.00	0.192	0
M38	26	1.96	0.152	61	2.08	0.088	22	2.14	0.136	61	1.87	0.095	32	2.13	0.133	15	2.00	0.195	0
M39	26	1.96	0.180	59	2.07	0.099	21	2.14	0.143	60	1.87	0.105	32	2.13	0.147	12	1.83	0.241	1
M40	27	2.07	0.130	60	2.27	0.092	24	2.33	0.130	62	2.06	0.100	35	2.14	0.131	14	2.07	0.195	0
M41	27	2.67	0.107	63	2.52	0.075	25	2.48	0.131	64	2.31	0.086	36	2.28	0.117	17	2.29	0.143	0
M42	24	1.96	0.175	56	2.18	0.089	22	2.09	0.146	51	2.04	0.105	32	2.03	0.138	13	1.85	0.222	1
M43	28	2.32	0.137	61	2.30	0.089	25	2.48	0.131	62	2.16	0.098	30	2.30	0.137	17	2.00	0.171	0

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	CP			IM			IS			PW			TR			TS			
No.	N	Mean	SE	N	Mean	SE	N	Mean	C*	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M44	27	2.48	0.112	62	2.29	0.084	25	2.24	0.145	60	2.10	0.094	31	2.32	0.126	16	2.06	0.170	0
M45	25	2.12	0.167	57	2.05	0.092	22	2.00	0.174	59	2.03	0.100	33	1.88	0.143	14	1.93	0.195	0
M46	16	1.94	0.193	45	1.76	0.106	14	1.79	0.214	40	1.78	0.127	29	1.97	0.136	6	2.00	0.365	3
M47	26	1.96	0.162	54	2.24	0.109	25	2.52	0.143	58	2.24	0.090	29	2.17	0.172	17	2.35	0.170	0
M48	27	2.19	0.131	60	2.32	0.084	25	2.44	0.142	64	2.13	0.098	34	2.26	0.142	17	2.47	0.125	0
M49	24	2.04	0.175	57	2.11	0.102	24	2.17	0.167	62	2.00	0.095	30	2.10	0.162	17	2.06	0.218	0
M50	26	2.15	0.143	59	2.22	0.094	23	2.35	0.149	64	2.11	0.095	32	2.28	0.144	17	2.29	0.187	0
M51	24	1.88	0.163	57	2.02	0.099	21	2.29	0.171	58	2.09	0.102	30	2.13	0.133	15	2.33	0.187	0
M52a	20	1.95	0.170	53	2.13	0.114	21	2.19	0.203	51	2.18	0.104	27	1.89	0.154	14	2.43	0.202	0
M52b	19	2.00	0.171	54	1.91	0.110	22	2.05	0.180	52	2.00	0.103	27	1.85	0.157	15	2.27	0.228	0
M52c	24	2.38	0.145	58	2.19	0.106	22	2.50	0.171	57	2.11	0.102	31	2.26	0.154	15	2.73	0.118	0
M52d	25	2.56	0.117	59	2.25	0.101	24	2.54	0.147	64	2.17	0.093	36	2.31	0.131	16	2.56	0.157	0
M52e	26	2.54	0.127	60	2.43	0.093	25	2.64	0.128	62	2.27	0.092	33	2.30	0.134	17	2.71	0.114	0
M52f	25	2.16	0.149	60	2.10	0.103	24	2.46	0.170	58	2.12	0.105	29	2.10	0.152	17	2.59	0.123	0
M53	22	2.09	0.160	55	2.09	0.105	22	2.27	0.164	58	2.09	0.093	30	1.93	0.159	17	2.24	0.182	0
M54	16	2.00	0.183	48	2.02	0.121	20	2.20	0.186	52	1.85	0.115	29	1.79	0.152	13	2.15	0.249	2
M55	20	1.80	0.186	51	2.04	0.108	19	2.21	0.181	51	1.90	0.106	28	1.79	0.149	13	1.92	0.211	2
M56	25	2.12	0.133	60	2.15	0.108	22	2.14	0.151	60	1.98	0.102	31	2.23	0.120	14	2.36	0.169	0
M57	22	1.86	0.165	51	1.92	0.100	18	2.11	0.179	51	1.84	0.113	28	2.11	0.149	11	2.00	0.270	1
M58	26	2.15	0.164	57	2.35	0.095	22	2.64	0.124	61	2.13	0.098	32	2.31	0.138	14	2.57	0.137	0
M59	27	2.41	0.134	59	2.29	0.094	24	2.38	0.145	58	2.28	0.084	33	2.33	0.128	14	2.21	0.214	0
M60	24	1.83	0.155	55	2.00	0.094	21	2.14	0.159	57	1.95	0.095	30	2.00	0.136	16	1.94	0.170	1
M61	20	1.50	0.154	53	1.85	0.099	19	1.89	0.169	50	1.90	0.108	24	1.96	0.175	14	1.64	0.199	3
M62	18	2.00	0.162	52	2.15	0.100	22	2.27	0.164	55	2.02	0.105	26	2.08	0.166	14	1.93	0.195	0
M63	23	2.13	0.170	55	2.22	0.099	22	2.50	0.143	57	2.05	0.098	27	2.11	0.154	14	2.21	0.155	0
M64	16	1.94	0.232	47	2.09	0.100	17	2.18	0.154	48	1.94	0.113	21	2.24	0.136	11	2.36	0.244	0
M65	22	2.14	0.165	54	1.98	0.104	21	2.29	0.156	52	1.98	0.108	21	2.29	0.140	14	2.43	0.228	0
M66	13	2.00	0.196	44	2.18	0.099	20	2.35	0.109	46	1.91	0.116	21	2.14	0.143	14	1.93	0.195	0
M67	23	2.26	0.169	57	2.33	0.091	23	2.65	0.102	59	2.31	0.088	31	2.26	0.139	14	2.36	0.169	0

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Appendix J. Mean Significance Ratings for Tasks by Job Title

Task Ratings by Job Title

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	Director/Executive			Manager			Technical			Other			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	34	1.88	0.125	18	1.78	0.191	21	1.76	0.181	44	1.82	0.104	4
M2	39	2.62	0.087	33	2.30	0.111	37	2.49	0.100	92	2.27	0.076	0
M3	39	2.56	0.088	33	2.27	0.139	38	2.29	0.113	88	2.38	0.078	0
M4	37	2.46	0.107	31	2.23	0.137	33	2.24	0.115	82	2.22	0.081	0
M5	39	2.33	0.106	33	2.21	0.129	36	2.36	0.107	84	2.11	0.085	0
M6	39	2.44	0.103	33	2.21	0.143	37	2.38	0.118	86	2.15	0.082	0
M7	38	2.37	0.116	34	2.35	0.119	37	2.16	0.120	75	2.00	0.076	0
M8	38	2.21	0.114	31	2.13	0.152	36	2.25	0.128	79	2.16	0.077	0
M9	35	2.37	0.117	29	2.24	0.154	36	2.22	0.127	77	2.25	0.085	0
M10	37	2.24	0.119	32	2.56	0.100	34	2.47	0.105	90	2.24	0.075	0
M11	37	2.22	0.117	31	2.29	0.124	37	2.03	0.137	82	2.04	0.086	0
M12	38	2.37	0.103	30	2.30	0.119	37	2.22	0.111	84	2.15	0.077	0
M13	36	2.17	0.123	31	2.16	0.115	37	2.54	0.107	81	2.15	0.093	0
M14	39	2.44	0.096	31	2.45	0.102	38	2.37	0.116	86	2.16	0.089	0
M15	39	2.28	0.104	29	2.28	0.130	38	2.13	0.132	82	2.17	0.090	0
M16	36	2.33	0.105	31	2.23	0.152	34	2.41	0.127	78	2.12	0.084	0
M17	37	2.32	0.123	28	2.07	0.145	35	1.94	0.136	73	2.01	0.088	0
M18	34	2.18	0.130	31	1.97	0.143	33	1.97	0.141	71	2.10	0.088	0
M19	35	2.17	0.126	30	2.10	0.162	38	2.16	0.144	79	2.13	0.089	0
M20	27	2.30	0.158	28	1.68	0.155	27	1.70	0.158	60	1.77	0.102	3
M21	35	2.34	0.116	29	2.21	0.152	36	2.17	0.129	75	2.29	0.089	0
M22	39	2.38	0.101	31	2.29	0.133	37	2.22	0.117	87	2.24	0.083	0
M23	35	2.11	0.141	29	2.07	0.121	34	2.21	0.132	80	2.08	0.085	0
M24	34	2.44	0.105	26	2.00	0.147	33	1.85	0.124	77	1.91	0.083	1
M25	38	2.42	0.123	29	2.34	0.143	34	2.35	0.119	87	2.18	0.076	0
M26	36	2.58	0.092	31	2.35	0.109	37	2.32	0.117	87	2.26	0.076	0
M27	36	2.42	0.101	27	2.22	0.134	34	2.24	0.120	85	2.21	0.082	0
M28	36	2.50	0.093	28	2.21	0.140	34	2.29	0.116	82	2.11	0.078	0
M29	37	2.51	0.100	30	2.40	0.141	36	2.28	0.124	85	2.19	0.076	0
M30	36	2.33	0.126	30	2.43	0.124	37	2.24	0.125	77	2.06	0.081	0
M31	37	2.59	0.091	30	2.57	0.104	36	2.28	0.124	85	2.20	0.083	0
M32	34	2.32	0.125	31	2.10	0.142	34	2.09	0.098	78	1.92	0.089	0
M33	37	2.32	0.110	30	2.40	0.113	36	2.33	0.120	84	2.33	0.074	0
M34	37	2.32	0.117	28	2.14	0.168	33	2.12	0.136	82	2.04	0.075	0
M35	35	2.51	0.086	29	2.21	0.144	37	2.32	0.110	84	2.39	0.068	0
M36	36	2.39	0.100	30	2.23	0.124	35	2.23	0.130	83	2.16	0.076	0
M37	37	2.27	0.126	29	2.31	0.132	34	1.97	0.137	76	2.01	0.083	0
M38	35	2.17	0.126	26	2.15	0.120	34	1.76	0.127	74	1.89	0.087	2
M39	34	2.21	0.132	28	1.96	0.167	32	1.78	0.140	67	1.87	0.092	2
M40	35	2.26	0.125	28	2.14	0.133	34	2.18	0.130	74	2.12	0.084	0
M41	33	2.48	0.108	31	2.26	0.122	36	2.36	0.121	81	2.33	0.075	0
M42	30	2.17	0.145	28	2.00	0.136	33	1.79	0.149	61	2.10	0.096	1
M43	32	2.16	0.143	31	2.06	0.139	37	2.19	0.122	73	2.23	0.084	0
M44	31	2.16	0.132	29	2.24	0.118	35	2.17	0.126	76	2.17	0.082	0
M45	31	2.29	0.141	30	2.03	0.140	32	2.00	0.135	68	1.97	0.094	0
M46	22	2.09	0.173	21	1.81	0.164	25	1.68	0.160	53	1.87	0.108	3

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	Director/Executive			Manager			Technical			Other			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M47	30	2.23	0.133	26	1.92	0.166	31	2.39	0.128	73	2.11	0.091	0
M48	33	2.33	0.142	28	2.29	0.124	35	2.37	0.124	81	2.06	0.085	0
M49	33	2.18	0.134	26	2.04	0.152	32	2.13	0.140	74	1.89	0.095	1
M50	33	2.21	0.136	25	2.24	0.133	35	2.23	0.130	80	2.06	0.088	0
M51	31	2.16	0.140	24	2.17	0.167	29	2.14	0.155	75	1.91	0.087	0
M52a	26	2.08	0.166	25	2.00	0.163	29	2.00	0.165	62	2.11	0.098	0
M52b	27	1.81	0.151	25	2.00	0.163	30	1.97	0.155	63	1.94	0.098	1
M52c	30	2.10	0.130	26	2.08	0.166	33	2.27	0.146	72	2.25	0.094	0
M52d	31	2.13	0.137	28	2.29	0.144	34	2.35	0.139	81	2.26	0.084	0
M52e	31	2.26	0.139	28	2.36	0.117	35	2.49	0.138	79	2.35	0.085	0
M52f	28	1.82	0.146	26	2.19	0.147	34	2.41	0.141	76	2.12	0.090	1
M53	30	2.00	0.144	26	2.04	0.141	31	2.35	0.136	70	1.96	0.092	0
M54	29	1.83	0.149	23	1.65	0.149	26	2.31	0.155	59	1.86	0.107	3
M55	31	2.13	0.145	22	1.91	0.146	25	2.08	0.162	60	1.90	0.105	1
M56	32	2.31	0.130	28	2.07	0.145	35	2.06	0.136	69	2.07	0.091	0
M57	29	2.24	0.128	26	2.12	0.150	28	1.75	0.160	55	1.78	0.099	2
M58	32	2.22	0.140	28	2.32	0.127	32	2.13	0.133	72	2.15	0.090	0
M59	31	2.35	0.109	29	2.24	0.118	33	2.27	0.125	75	2.17	0.084	0
M60	28	2.00	0.145	28	2.07	0.125	31	2.00	0.131	67	1.91	0.094	0
M61	28	2.21	0.119	25	1.88	0.156	26	1.92	0.166	56	1.63	0.097	2
M62	27	2.15	0.138	23	2.04	0.172	31	2.13	0.152	60	1.98	0.094	0
M63	29	2.10	0.135	23	2.13	0.170	33	2.30	0.134	67	2.10	0.091	0
M64	26	2.23	0.139	24	2.08	0.158	24	1.83	0.130	43	1.79	0.127	2
M65	27	2.15	0.127	27	2.15	0.148	26	1.92	0.166	56	1.91	0.109	0
M66	23	2.09	0.139	20	2.15	0.150	23	2.00	0.154	47	1.98	0.116	0
M67	29	2.38	0.126	28	2.39	0.130	34	2.35	0.139	68	2.26	0.090	0

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Appendix K. Mean Significance Ratings for Number of Employees

Task Ratings by Number of Employees

**The "C" column shows the count of subclasses with mean significance less than 1.90.*

	Less than 100			101 – 1,000			1,000 or more			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M1	28	1.71	0.135	39	1.67	0.112	49	2.00	0.109	2
M2	42	2.57	0.091	66	2.29	0.077	92	2.36	0.075	0
M3	43	2.49	0.102	66	2.21	0.088	88	2.45	0.076	0
M4	41	2.39	0.110	58	2.09	0.093	83	2.35	0.077	0
M5	43	2.30	0.108	61	2.13	0.092	87	2.24	0.080	0
M6	42	2.36	0.112	62	2.19	0.092	90	2.27	0.082	0
M7	41	2.29	0.112	58	2.05	0.079	84	2.21	0.081	0
M8	43	2.21	0.108	60	2.08	0.083	80	2.26	0.088	0
M9	41	2.27	0.111	54	2.22	0.094	81	2.31	0.089	0
M10	40	2.30	0.109	63	2.33	0.082	89	2.37	0.074	0
M11	41	2.17	0.110	62	2.03	0.095	83	2.13	0.089	0
M12	42	2.31	0.099	59	2.15	0.083	87	2.25	0.077	0
M13	41	2.07	0.128	57	2.32	0.084	86	2.24	0.087	0
M14	42	2.24	0.112	61	2.21	0.091	90	2.41	0.077	0
M15	42	2.21	0.111	61	2.05	0.100	84	2.30	0.083	0
M16	43	2.33	0.098	57	2.05	0.107	78	2.31	0.082	0
M17	39	2.23	0.119	56	2.04	0.099	78	2.03	0.091	0
M18	39	2.08	0.106	55	1.95	0.108	74	2.15	0.092	0
M19	42	2.19	0.119	59	2.02	0.109	80	2.21	0.090	0
M20	37	2.03	0.131	45	1.67	0.123	59	1.86	0.109	2
M21	41	2.37	0.115	56	2.20	0.106	77	2.27	0.084	0
M22	41	2.39	0.110	64	2.20	0.090	88	2.27	0.080	0
M23	39	2.10	0.126	55	2.05	0.095	83	2.13	0.085	0
M24	38	2.08	0.127	58	1.93	0.092	73	2.05	0.087	0
M25	39	2.23	0.130	63	2.27	0.085	85	2.33	0.079	0
M26	42	2.40	0.113	63	2.25	0.078	85	2.40	0.073	0
M27	41	2.34	0.119	62	2.16	0.084	78	2.29	0.082	0
M28	39	2.36	0.113	61	2.00	0.081	79	2.37	0.077	0
M29	41	2.46	0.105	63	2.11	0.082	83	2.39	0.080	0
M30	41	2.29	0.106	57	2.04	0.090	82	2.30	0.086	0
M31	42	2.45	0.098	62	2.13	0.093	83	2.46	0.077	0
M32	42	2.10	0.117	57	1.95	0.088	77	2.14	0.090	0
M33	40	2.40	0.106	62	2.21	0.089	84	2.42	0.070	0
M34	41	2.00	0.116	59	2.05	0.098	79	2.25	0.082	0
M35	41	2.41	0.105	60	2.30	0.083	83	2.40	0.068	0
M36	41	2.10	0.115	62	2.13	0.090	80	2.38	0.070	0
M37	40	2.13	0.125	59	1.97	0.087	76	2.21	0.090	0
M38	34	2.15	0.134	59	1.80	0.086	75	2.01	0.088	1
M39	37	1.97	0.137	55	1.78	0.096	68	2.04	0.101	1
M40	38	2.13	0.126	60	2.15	0.078	72	2.21	0.093	0
M41	40	2.35	0.111	61	2.36	0.081	79	2.34	0.078	0
M42	33	2.00	0.138	52	1.90	0.096	66	2.14	0.103	0
M43	39	2.15	0.125	57	2.28	0.089	76	2.12	0.090	0

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	Less than 100			101 – 1,000			1,000 or more			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
M44	37	2.08	0.131	56	2.21	0.071	77	2.21	0.089	0
M45	39	2.13	0.128	54	1.98	0.090	67	2.04	0.103	0
M46	28	1.82	0.163	42	1.76	0.101	50	1.96	0.121	2
M47	35	2.29	0.133	55	2.31	0.100	69	1.96	0.091	0
M48	40	2.20	0.130	58	2.24	0.093	78	2.19	0.088	0
M49	39	2.00	0.137	54	2.02	0.104	71	2.03	0.096	0
M50	36	2.28	0.124	58	2.22	0.092	78	2.04	0.092	0
M51	36	1.92	0.151	51	2.02	0.110	71	2.11	0.086	0
M52a	32	2.31	0.145	45	1.82	0.111	64	2.09	0.101	1
M52b	33	1.88	0.149	44	1.73	0.110	67	2.07	0.096	2
M52c	31	2.23	0.159	52	2.12	0.109	77	2.23	0.088	0
M52d	37	2.27	0.126	57	2.32	0.101	79	2.20	0.087	0
M52e	39	2.36	0.135	55	2.42	0.092	78	2.32	0.085	0
M52f	37	2.22	0.140	52	2.06	0.108	74	2.15	0.092	0
M53	33	2.15	0.152	51	1.92	0.100	72	2.10	0.089	0
M54	34	2.09	0.154	48	1.81	0.110	54	1.85	0.107	2
M55	34	2.12	0.145	45	1.91	0.114	58	1.97	0.104	0
M56	33	2.21	0.136	56	2.07	0.095	74	2.11	0.093	0
M57	27	2.11	0.154	50	1.80	0.107	60	1.98	0.099	1
M58	34	2.32	0.145	58	2.10	0.097	71	2.18	0.083	0
M59	32	2.34	0.132	60	2.10	0.085	75	2.29	0.078	0
M60	32	1.91	0.145	54	1.98	0.093	67	2.00	0.093	0
M61	27	1.96	0.155	44	1.75	0.103	63	1.87	0.102	2
M62	32	2.13	0.140	44	1.98	0.110	64	2.08	0.098	0
M63	31	2.19	0.150	52	2.10	0.096	68	2.18	0.094	0
M64	28	1.93	0.145	38	1.89	0.124	50	2.02	0.112	1
M65	29	2.00	0.149	43	1.91	0.104	63	2.08	0.107	0
M66	27	2.00	0.151	35	2.00	0.123	50	2.08	0.102	0
M67	31	2.35	0.109	52	2.31	0.101	75	2.33	0.092	0

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Appendix L. Mean Significance Ratings for Knowledge Statements

Knowledge Ratings by CHTS Role

**The "C" column shows the count of subclasses with mean significance less than 1.70.*

	Management			Technical			Trainer			Consultant			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
K1	151	2.25	0.059	82	2.34	0.082	86	2.26	0.076	71	2.21	0.094	0
K2	149	2.14	0.060	80	2.24	0.082	81	2.12	0.077	71	2.17	0.090	0
K3	149	2.36	0.059	81	2.35	0.081	87	2.25	0.077	69	2.41	0.088	0
K4	133	1.94	0.068	69	1.96	0.098	77	2.03	0.092	58	1.86	0.106	0
K5	149	2.26	0.057	80	2.35	0.078	87	2.18	0.079	71	2.24	0.084	0
K6	151	2.38	0.056	80	2.53	0.069	89	2.42	0.067	70	2.39	0.085	0
K7	138	1.94	0.067	76	1.89	0.093	84	2.06	0.085	66	1.92	0.095	0
K8	148	2.04	0.061	80	2.09	0.080	87	2.06	0.084	69	2.04	0.096	0
K9	143	2.37	0.059	81	2.43	0.080	81	2.44	0.077	69	2.42	0.084	0
K10	130	1.85	0.070	71	1.87	0.096	78	1.99	0.088	61	1.97	0.104	0
K11	149	2.11	0.067	82	2.12	0.091	87	2.28	0.078	69	2.25	0.096	0
K12	148	2.07	0.065	83	2.11	0.092	92	2.22	0.082	66	2.05	0.095	0
K13	156	2.53	0.051	85	2.60	0.063	92	2.52	0.066	71	2.49	0.077	0
K14	135	1.96	0.070	76	2.21	0.090	81	1.99	0.087	60	2.00	0.111	0
K15	159	2.53	0.052	86	2.60	0.067	94	2.51	0.067	72	2.67	0.066	0
K16	153	2.16	0.061	84	2.20	0.084	89	2.17	0.086	67	2.25	0.091	0
K17	112	1.69	0.074	65	1.80	0.106	67	1.82	0.102	50	1.50	0.104	2
K18	144	2.17	0.063	81	2.15	0.086	88	2.18	0.083	70	2.10	0.094	0
K19	155	2.38	0.056	86	2.49	0.070	90	2.41	0.067	72	2.38	0.078	0
K20	154	2.32	0.060	84	2.46	0.075	90	2.30	0.080	70	2.34	0.088	0
K21	133	1.91	0.071	77	2.00	0.094	78	1.90	0.092	61	1.89	0.102	0
K22	143	2.15	0.066	79	2.25	0.087	83	2.16	0.079	66	2.14	0.089	0
K23	134	1.94	0.068	75	2.11	0.092	76	1.96	0.089	59	1.86	0.101	0
K24	145	2.15	0.063	82	2.28	0.078	86	2.06	0.083	68	2.06	0.093	0
K25	145	2.27	0.061	83	2.33	0.077	83	2.18	0.081	68	2.24	0.094	0
K26	143	2.27	0.056	81	2.28	0.075	86	2.24	0.077	69	2.25	0.076	0
K27	141	1.85	0.059	80	1.96	0.082	79	1.84	0.085	63	1.71	0.092	0
K28	138	1.91	0.065	79	1.95	0.092	77	1.99	0.093	60	1.80	0.103	0
K29	156	2.56	0.049	85	2.56	0.070	91	2.49	0.067	71	2.45	0.080	0
K30	157	2.40	0.054	85	2.46	0.068	91	2.40	0.073	72	2.56	0.068	0
K31	144	1.88	0.064	78	1.96	0.090	84	1.96	0.085	60	1.68	0.090	1
K32	121	1.67	0.067	68	1.79	0.095	67	1.70	0.097	50	1.58	0.103	2
K33	113	1.97	0.077	70	2.14	0.098	67	2.01	0.103	48	1.88	0.125	0
K34	128	1.98	0.066	76	2.11	0.085	69	2.04	0.091	56	1.98	0.107	0
K35	129	1.77	0.067	76	1.91	0.090	69	1.83	0.099	56	1.75	0.103	0
K36	104	1.78	0.076	66	1.88	0.093	62	1.76	0.094	45	1.73	0.116	0
K37	136	2.18	0.066	74	2.12	0.088	83	2.28	0.083	64	2.27	0.100	0
K38	149	2.10	0.064	78	1.99	0.092	91	2.34	0.075	69	2.26	0.089	0
K39	143	1.98	0.064	76	1.99	0.087	89	2.07	0.084	69	2.04	0.098	0
K40	152	2.36	0.056	83	2.34	0.077	92	2.41	0.068	72	2.42	0.076	0
K41	124	1.88	0.070	58	1.79	0.104	74	1.80	0.096	61	1.82	0.106	0
K42	149	2.28	0.059	78	2.28	0.081	84	2.19	0.080	70	2.31	0.088	0
K43	153	2.36	0.056	82	2.49	0.070	86	2.42	0.073	72	2.54	0.074	0
K44	108	1.57	0.069	51	1.63	0.105	63	1.70	0.100	53	1.53	0.096	4
K45	114	1.61	0.071	60	1.65	0.097	75	1.77	0.092	54	1.59	0.101	3
K46	144	2.24	0.062	78	2.19	0.082	87	2.33	0.080	66	2.32	0.092	0

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	Management			Technical			Trainer			Consultant			
No.	N	Mean	SE	N	Mean	SE	N	Mean	SE	N	Mean	SE	C*
K47	149	2.23	0.063	79	2.14	0.090	88	2.28	0.074	72	2.38	0.078	0
K48	120	1.83	0.076	56	1.70	0.102	74	1.78	0.095	58	1.83	0.105	1
K49	149	2.17	0.065	82	2.02	0.090	87	2.22	0.081	70	2.23	0.089	0
K50	117	1.63	0.069	64	1.73	0.098	73	1.73	0.096	57	1.63	0.099	2
K51	151	2.09	0.064	80	1.98	0.091	90	2.22	0.077	69	2.07	0.093	0
K52	141	2.03	0.064	75	1.99	0.086	85	2.05	0.084	67	1.90	0.093	0
K53	150	2.05	0.063	82	2.11	0.085	86	2.10	0.083	70	1.99	0.090	0
K54	151	2.12	0.061	80	2.14	0.085	87	2.18	0.078	69	2.16	0.087	0
K55	155	2.46	0.050	85	2.45	0.064	91	2.46	0.069	73	2.62	0.061	0
K56	156	2.37	0.059	85	2.29	0.082	94	2.30	0.078	70	2.46	0.083	0
K57	143	1.83	0.064	74	1.88	0.092	82	1.96	0.086	69	1.99	0.089	0
K58	149	2.15	0.060	79	2.16	0.079	89	2.26	0.072	70	2.29	0.079	0
K59	152	2.34	0.056	81	2.30	0.075	92	2.36	0.068	73	2.49	0.068	0
K60	144	2.25	0.064	80	2.26	0.085	84	2.29	0.082	73	2.44	0.080	0
K61	139	1.99	0.065	75	1.96	0.088	86	2.03	0.087	65	1.98	0.102	0
K62	141	2.01	0.065	71	1.99	0.095	81	2.05	0.088	65	2.02	0.092	0
K63	143	2.00	0.064	75	2.04	0.088	83	2.11	0.086	67	2.04	0.089	0
K64	108	1.67	0.072	63	1.71	0.097	71	1.82	0.097	50	1.68	0.105	2
K65	122	1.69	0.068	63	1.76	0.100	75	1.79	0.094	60	1.70	0.096	2
K66	142	2.11	0.062	74	2.07	0.087	93	2.37	0.075	67	2.12	0.096	0
K67	147	2.16	0.063	77	2.17	0.088	93	2.27	0.080	68	2.09	0.095	0
K68	156	2.42	0.054	82	2.45	0.065	90	2.43	0.071	72	2.57	0.071	0
K69	154	2.51	0.053	84	2.58	0.068	93	2.52	0.069	73	2.48	0.085	0
K70	157	2.71	0.038	84	2.73	0.049	94	2.71	0.049	73	2.74	0.055	0
K71	153	2.37	0.057	82	2.33	0.080	91	2.42	0.072	70	2.46	0.090	0
K72	154	2.27	0.061	82	2.20	0.089	90	2.39	0.077	72	2.33	0.095	0
K73	154	2.39	0.056	82	2.40	0.079	89	2.44	0.075	73	2.38	0.084	0
K74	149	2.44	0.055	82	2.51	0.072	89	2.45	0.073	71	2.37	0.086	0
K75	156	2.49	0.051	82	2.50	0.070	93	2.57	0.066	73	2.53	0.081	0
K76	142	1.99	0.065	78	2.06	0.086	87	2.05	0.086	67	1.99	0.094	0
K77	153	2.30	0.060	82	2.28	0.084	92	2.34	0.082	72	2.29	0.092	0
K78	156	2.58	0.050	85	2.51	0.072	94	2.73	0.055	72	2.64	0.069	0
K79	156	2.62	0.045	85	2.58	0.068	93	2.68	0.055	72	2.67	0.069	0
K80	157	2.71	0.042	86	2.73	0.058	95	2.74	0.052	73	2.68	0.070	0

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Appendix M. Examination Specifications and Detailed Content Outline

American Health Information Management Association Certified Healthcare Technology Specialist (CHTS) ***Management Role*** **Detailed Content Outline**	Cognitive Level			Total
	Recall	Application	Analysis	
1. Project Management	**10**	**20**	**10**	**40**
A. Evaluate current environment B. Describe future environment C. Perform gap analysis D. Develop project plan E. Create timeline and identify milestones F. Establish roles and responsibilities G. Create and monitor the communication plan H. Report project plan and issues to stakeholders I. Manage workflow changes J. Manage scope K. Monitor adherence to timeline L. Manage go-live M. Conduct regular meetings N. Establish reporting mechanisms O. Establish rapport with vendor P. Assess skill level of project team Q. Implement escalation process (e.g., addressing issues related to customers, patient safety, and EHR support) R. Manage transition between systems/products/vendors S. Serve as facilitator among stakeholders T. Recommend operational changes U. Facilitate transition to maintenance				
2. Change Management	**6**	**12**	**12**	**30**
A. Assess the organization's readiness for change (e.g., historical perspectives, current attitudes) B. Review and flowchart the current workflow and processes C. Determine current state D. Perform needs assessment and gap analysis E. Define future state F. Establish and prioritize goals				

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American Health Information Management Association Certified Healthcare Technology Specialist (CHTS) ***Management Role*** **Detailed Content Outline**	Cognitive Level			Total
	Recall	Application	Analysis	
G. Identify roles and responsibilities H. Determine best practices I. Manage stakeholder engagement and expectations J. Increase efficiency of operations K. Create flowcharts of redesigned process L. Integrate information technology functions into workflow M. Evaluate and revise the redesigned process N. Facilitate the rewriting of policies and procedures O. Perform impact analysis				
3. Personnel	**6**	**7**	**1**	**14**
A. Identify owners, decision-makers, and physician champions B. Educate owners and decision-makers C. Create interview document and solicit feedback from key stakeholders D. Identify super-users E. Identify subject matter experts (SMEs) F. Identify and allocate personnel (e.g., IT support, training)				
4. Technology	**4**	**10**	**8**	**22**
A. Evaluate EMR/EHR/HIS vendor functionality B. Identify data sources, needs, and formats C. Identify all departments' structured data elements D. Capture data (i.e., electronic and non-electronic) E. Identify naming conventions F. Manage and monitor systems: a. design 1. design 2. testing 3. training 4. implementation 5. support and maintenance G. Manage product customization H. Demonstrate knowledge of interfaces among systems				

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American Health Information Management Association Certified Healthcare Technology Specialist (CHTS) ***Management Role*** **Detailed Content Outline**	Cognitive Level			Total
	Recall	Application	Analysis	
5. Quality and Risk Management	**4**	**9**	**6**	**19**
A. Identify and mitigate potential risks B. Identify and manage compliance with regulatory requirements C. Identify quality measures, benchmarks, and best practices D. Evaluate customer service and patient satisfaction E. Manage standardization/mappings F. Manage and prioritize change requests G. Participate in the development and maintenance of a disaster recovery plan H. Monitor downtime processes I. Determine cutover time period (e.g., move users to a new system) J. Prioritize multiple projects				
Total	**30**	**58**	**37**	**100**

Testable Knowledge

High Priority

- Accreditation standards
- Adult learning principles
- Analytical skills
- Audio/visual skills (e.g., LCD projector)
- Best practices
- Change management
- Clinical and operations workflow
- Communication skills (written & oral)
- Computer systems
- Conflict resolution
- Cultural competency
- Culture of health care
- Data analysis
- EHR/EMR/PHR principles
- Facilitation skills
- Flowchart applications
- Gov't agencies associated with healthcare
- Health care delivery systems
- Health care regulation
- Health informatics
- Health information exchange
- Health information management concepts & principles
- Health information systems
- Health IT applications
- Implementation life cycle
- Industry trends
- Information governance
- Interoperability
- Issue management
- IT fundamentals
- IT security principles
- Leadership
- Legal and ethical issues
- Meaningful use
- Medical terminology
- Nomenclatures

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- Operations management
- Organizational culture
- Organizational structure
- PC skills (e.g., Microsoft Office, internet)
- Performance improvement
- Presentation skills
- Process improvement
- Project management
- Quality control
- Quality improvement
- Quality of patient care
- Resource management
- Risk management
- Time management
- Training methodologies
- Virtual training or meeting tools
- Work flow improvement & management
- Working with teams

Medium Priority

- Basic statistics
- Database structures (e.g., SQL)
- Diagnostic and procedural coding (e.g., ICD-CM/PCS, CPT, HCPCS)
- Health care revenue cycle
- HL7
- Interface integration
- Linguistic competency
- Platforms and operating systems (e.g., Windows, Mac, Linux, Mobile devices)
- Report writing principles
- Software development life cycle
- Standard technical language

Low Priority

- Budget management
- Consumerism and patient engagement
- Human resource management
- Medical sciences
- Network technology (e.g., VPN, cloud-based)
- Peripheral devices (e.g., printers)
- Public health
- Simulation technology
- Technical specs (hardware, software)
- Telehealth and telemedicine
- Writing test scripts

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