# Technical Report on the Development and Pilot Testing of the Certified Healthcare Interpreter™ (CHI™) Examination for Arabic and Mandarin
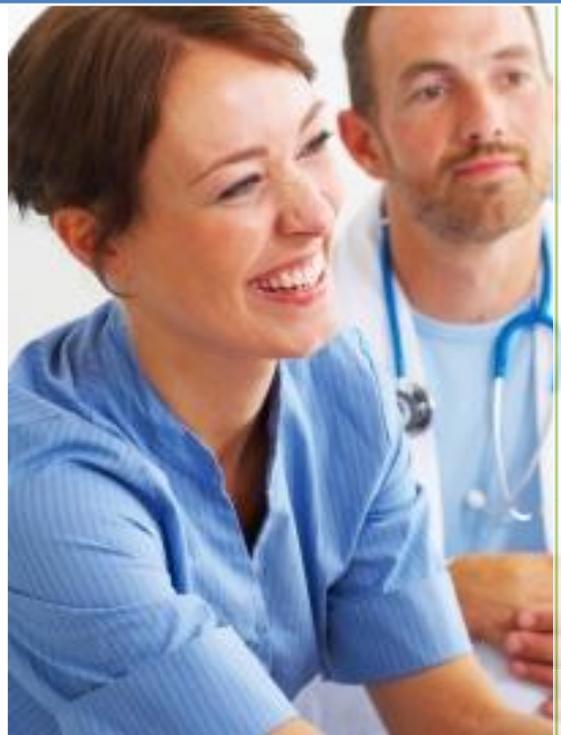
June 26, 2012

# For more information about CCHI's credentialing programs, please visit CCHI's website at www.healthcareinterpretercertification.org

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# Acknowledgments

This Report on the development and pilot testing of the CCHI certification examinations for healthcare interpreters was conducted on behalf of the Certification Commission for Healthcare Interpreters (CCHI) by McCann Associates under the supervision of Matthew T. Schultz, Ph.D. This document is copyrighted and is intended for the sole use of CCHI.

The researchers conducting this study would like to thank the people who generously contributed their time, energy, and expertise toward the completion of this study.

This study could not have been completed without the effort and diligence of the CCHI Test Development Steering Committee, the leadership of CCHI, the subject matter experts, and the advice and counsel of Cheryl L. Wild, Ph.D. of Wild & Associates, and Georgia Patrick of The Communicators. These individuals are individually recognized below.

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# Forward

The Certification Commission for Healthcare Interpreters (CCHI) is a credentialing agency responsible for the development and implementation of all policies related to the certification of healthcare interpreters. As part of this responsibility, CCHI develops and administers professional competence tests, and awards Associate Healthcare Interpreter™ (AHI™) credential and Certified Healthcare Interpreter™ (CHI™) certification.  Healthcare interpreters relay messages accurately from a source language to a target language in a culturally competent manner and in accordance with established ethical standards. The proficiency statement as defined in the Job Task Analysis, conducted by CCHI in 2010, is as follows:

> "A person who is able to perform the functions of an entry-level healthcare interpreter competently and independently in a healthcare setting with the knowledge, skill, and ability required to relay messages accurately from a source language to a target language in a culturally competent manner and in accordance with established ethical standards."

In this context "entry level" means "the level required to be able to begin to perform unsupervised healthcare interpreting competently." To be eligible to sit for the certification examination, candidates must meet the following criteria:
- Minimum age of 18 years
- Have a minimum of a U.S. high school diploma (or GED) or its equivalent from another country
- Have at least 40 yours of healthcare interpreter training (academic or non-academic program).
- Have linguistic proficiency in English and the target language (here, either Arabic or Mandarin).

The first component of the CCHI certification is the Associate Healthcare Interpreter™ (AHI™) examination which consists of 100 four-option, multiple-choice items, is administered in English, and measures knowledge that is essential to competence in managing the functions of healthcare interpreters.

The Certified Healthcare Interpreter™ (CHI™) component of the CCHI certification is an oral performance test, designed to assess the candidate's ability to interpret in healthcare encounters at a level of ability that is commensurate with certification. The assessment addresses the interpretation of spoken communication as well as sight translation and written translation of healthcare documents. The performance test is delivered by computer through the internet and scored by trained raters, who use four anchored rating scales for each component. The test is specifically structured and weighted (by percents) in accordance with specifications based on the CCHI Job Task Analysis, as follows:

Interpret Spoken Communication:
- Perform Consecutive interpreting                                    75-80%
- Perform Simultaneous Interpreting                                  10-15%

Sight Translate/Translate Healthcare Documents:              10-15%

CCHI contracted with Castle Worldwide, Inc (Castle) for the development, administration, and scoring of the Associate Healthcare Interpreter™ (AHI™) and Certified Healthcare Interpreter™ (CHI™) examinations. The development of the AHI™ examination and the CHI™ examination is reported in a separate report, Technical Report on the Development and Pilot Testing of the CCHI Examinations, available on CCHI's website at: http://www.healthcareinterpretercertification.org/certification/technical-reports.html. The methodology used to develop each examination is summarized in the report along with documentation that the tests were developed in a manner that meets the most recent National Commission for Certifying Agencies (NCCA) standards.

The CHI™ examination was developed originally in English, and then translated/trans-adapted into Spanish.  The first administration of the Spanish CHI™ took place in 2010.  CCHI contracted with McCann Associates (McCann) for the development, administration, and scoring of Arabic and Mandarin versions of the CHI™ examination. This report provides comprehensive information about the development of these examinations and their results.

Of utmost importance in all phases of work related to the CCHI certification program was the plan to apply for accreditation through the National Commission for Certifying Agencies (NCCA).  NCCA requirements regarding psychometrics, which concern how items are developed and validated, how tests are designed and assembled, how standards are set, how test are scored (including the training of raters for performance tests), and how forms of a test are equated, provided direction throughout test design, development, administration, scoring and equating of the pilot examination.  The following report illustrates how CCHI has addressed NCCA standards.

<div align="right">

Matthew T. Schultz, Ph.D [1].
McCann Associates
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# Certified Healthcare Interpreter™ Examination

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[1] Dr. Schultz is involved in all research design, data collection and analysis activities. He has over 20 years of varied research experience in the areas of educational research, personnel selection and market research.  His work has focused on the application of analytic methodologies and statistical approaches for practical solutions to business and research questions.  Prior to joining McCann Associates' Holdings LLC, Dr. Schultz worked as a Test and Measurements Specialist for the City of New York, a Research Scientist for the Law School Admissions Council and a Statistician/Analyst at GlaxoSmithKline.  He has taught statistics, research methods, tests and measures, and industrial psychology courses at Moravian College.  Dr. Schultz earned his B.A. from Rutgers University and his M.A. and Ph.D. from Fordham University's Psychometrics program.

# Arabic and Mandarin Versions

## Design and Development

The Certified Healthcare Interpreter™ (CHI™) test, which is the second part of the CCHI certification, is an oral performance test that assesses interpretation for spoken communication and translation for written communication, skills that (as specified in the Job Task Analysis study completed in 2010) are essential to competence. The first language-specific test was developed for Spanish interpreters. Arabic and Mandarin versions were released subsequent to the Spanish version, and include the same test item content translated/trans-adapted, recorded and presented in these two target languages.

Each assessment, regardless of language, includes the same types and weightings of content. The first six problems assess consecutive interpretation, and consist of a typical dialog involving a healthcare provider and an Arabic or Mandarin-speaking patient, sometimes with family members or care givers. The next set of three problems assesses simultaneous interpreting, from English into either Arabic or Mandarin, and from Arabic or Mandarin into English. The sight translation problems include three brief sections of documents that are typical of those used in healthcare settings: educational, legal, and institutional. Finally, written translation is assessed by means of multiple-choice questions that require candidates to recognize the best translation for a passage. The test is administered by computer in secure, proctored settings, with responses stored immediately as they are entered on McCann servers.

Items were originally translated from English into Arabic and Mandarin by professional translators contracted by McCann, who have been approved by CCHI and followed CCHI's translation instructions (see Appendix A). Then, for the item review, CCHI recruited subject matter experts (SMEs) who are Arabic and Mandarin interpreters, making sure they represent the profession's diversity in terms of work history, interpreting settings and mode of employment as well as demographically and geographically (see Appendix B about SME qualifications). CCHI specifically strove to ensure SMEs' diversity of regional dialects and countries since both Arabic and Mandarin are spoken by patients from various countries. The four Arabic SMEs are native speakers from Egypt, Jordan and Libya, with extensive experience of living or working in other Arabic countries, such as Iraq, Lebanon, Saudi Arabia and Syria. The seven Mandarin SMEs are native and non-native speakers representing various regions of the People's Republic of China, Hong Kong and Taiwan. These panels of SMEs, Arabic and Mandarin respectively, reviewed the test items translation for linguistic accuracy and culturally adapted it to assure the appropriateness of the content and language, and absence of bias. This item review/ trans-adaptation process took place via teleconferencing and email communication with both panels under the guidance of McCann's psychometrician and

representatives of CCHI's Test Development Steering Committee in November 2011 - January 2012. Items were preselected to be on one of the two examination forms, which were to be psychometrically parallel across languages. Castle used test specifications and various measures of complexity and length (word count, number of seconds for read prompts, number of second to deliver response) and difficulty (number of medical terms, preliminary rating of difficulty) to select problems that would result in two comparable forms per language. The two forms represented the greatest breadth of content possible, as determined by the type of healthcare provider, setting, and patient conditions. Finally, to provide common items as the basis for an equating study, there were common consecutive and simultaneous problems in each form, presented in the same sequential location, on the two forms. McCann preserved these original test specifications and forms construction parameters in the Arabic and Mandarin versions.

Recordings of the test items were made by a professional voice recording company, contracted by McCann. Each voice talent for the recordings was approved by Arabic and Mandarin SMEs respectively for pronunciation clarity and consistency. During the voice talent selection, a special attention was given to regional accents representation. For the Arabic items, the recordings are done in Modern Standard Arabic (MSA) by voice talents with various accents, such as Egyptian, Iraqi, Jordanian, Lebanese, and Syrian. For the Mandarin items, the accents represented are from the People's Republic of China, Hong Kong and Taiwan. Each recording was timed carefully and re-recorded as necessary to ensure that members of the target audience could perform them as intended. After the recordings had been made, CCHI subject matter experts reviewed them independently to verify that candidates could perform them and that the recordings met essential requirements for speed of delivery and clarity. Some items required re-recording based on the recommendations of the pilot test raters and cut score SMEs related to the voice talents' quality of speech, delivery emphasis, and speed, which was completed in April and May 2012.

# Pilot Test Administration

## Sample

CCHI recruited samples of Arabic- and Mandarin-speaking individuals to participate in the pilot testing of the Arabic and Mandarin forms of the CHI™ examination. In recruiting the sample for the pilot test administration, CCHI indicated that all participants who achieved a passing score and have passed the AHI™ test would receive certification. Participants made appointments to take the test by computer under secure, proctored conditions at approved testing centers throughout the United States. Participants understood that they would receive their scores only after McCann had completed all statistical studies, including standard setting, and

quality checks. The recruited samples of Arabic and Mandarin candidates did not allow for testing two forms of each test as was done by Castle for the Spanish CHI™. Therefore, a "long" form consisting of all test items was created specifically for the pilot. After the standard setting study, this "long" form has been re-assembled and equated into the two standard forms corresponding to the original CHI™ examination.

## Test Administration

The CHI™ examination is an internet-based test delivered to candidates in secure, proctored settings (CCHI's network of testing centers which have been administering Spanish CHI™ along with additionally recruited centers was used). Candidates used headsets supplied by McCann with earphones and microphones through which they could listen and record their responses. After being admitted to the testing center, candidates were logged into the system and given instructions and a short practice examination. After completing the practice problems, candidates started the actual test, for which they were permitted 90 minutes (as compared to the final examination of 60 minutes, due to a need to deliver additional pilot content). Candidates were responsible for monitoring their own time during the test, assisted by on-screen timers. Each of the four problem types had unique functionality in the pilot test administration.

For the six consecutive problems, each problem screen opened with a written statement of the scenario followed by the vignette that required interpretation of all utterances into English and Arabic or Mandarin. Candidates were presented with two opportunities to play each recorded utterance, though they were not required to play an utterance twice. After playing an utterance, candidates could click to record their interpretation. The delivery system recorded the interpretation immediately on McCann servers.

The three simultaneous problems started with a written scenario description, and when candidates were ready, they clicked to begin the problem in which the source material was delivered and the interpretation was recorded simultaneously. Rules for the simultaneous portion of the test established by CCHI were that candidates could not play the source material more than a single time, and that they were expected to record their interpretation during the playback.

The two sight translation problems had three components, each presented in writing on the screen. When they were ready, candidates could click to record their interpretations. This was done separately for each component of the problem. Finally, the written translation multiple-choice problems were presented with McCann's standard display for multiple-choice questions, and the candidates recorded their responses by clicking a radio button.

Most candidates completed the examination without technical problems or disruption; however a number experienced difficulty. McCann monitored the examination administration to ensure that the system was recording responses as they were delivered and, in instances where there were issues, contacted the testing sites to direct personnel in how to resolve the issue.

## Determination of the Passing Standard

Accreditation standards for certification examinations indicate that the method used to determine the level of performance required to pass a test be consistent with the design and purpose of the test. CCHI employed the Extended Angoff Technique, which is a criterion-referenced procedure adapted from the Angoff Modified Technique. McCann conducted the standard setting study on May 21 and 22, 2012, in Dallas, Texas. Selected as participants were panels of expert interpreters in Arabic and Mandarin, representing a variety of employment settings and experience, demographic and geographic diversity. As for the cultural and linguistic diversity, the six Arabic-speaking SMEs represented Egypt, Iraq, Lebanon and Libya, and the seven Mandarin-speaking SMEs represented the People's Republic of China, Hong Kong and Taiwan.

Based on the data collected from the panels, using the Angoff Modified Technique, McCann computed a recommendation that CCHI Commissioners considered during a conference call on May 29, 2012, and then the resulting decision, expressed as the minimally acceptable raw score for the "long" form, was implemented in scoring the test and making pass/fail decisions.  The passing standard established for the long forms for Arabic and Mandarin was applied to create the standard forms for each language through equating.

## Rating, Scoring and Equating

Trained raters (n = 6 Arabic, n = 11 Mandarin) used four behaviorally anchored rating scales to evaluate candidate responses. The scales and their anchoring definitions are the same as in the CHI™ Spanish exam. The rater training program, which took place on April 19-21, 2012, in Dallas, Texas, was designed to standardize rater attention to specific criteria for each scale point, and to create a shared understanding of the appropriate standard for scale points. Raters were selected by CCHI because of their expertise in their Arabic-language and Mandarin-language interpreting, following the same professional diversity standards used for the other SMEs with the additional years of healthcare interpreting experience required. The Arabic and Mandarin panels worked together and separately to refine the focus for reach scale, negotiate how the scales were to be interpreted (criterion ratings), and reach consensus on a number of principles that guided the scoring process. CCHI contracted Cheryl Wild, their psychometrician and certification consultant, to work

with McCann, to assure that a psychometrician was present during the Arabic and Mandarin panels discussions done separately because of the language-specific nature. The training of both panels was video-recorded so that it could be used for future rater trainings.

The rater training began first with a lecture and discussion of key concepts and threats to the validity of ratings. Alignment of raters to the process was accomplished through listening first to model responses for each problem type and then to several actual candidate responses for each problem.  Raters rated the responses, discussed their ratings, and revised their ratings. For all of these, each group agreed on criterion ratings (correct ratings) and then practiced applying the scales and standards to problems independently. The agreement of raters to criterion ratings was monitored throughout the rater training in order to ensure that a consistent interpretation of the standard was applied by all raters. With few exceptions, each group's preliminary ratings were within one point of each other on the rating scale, which confirmed rater agreement to criterion ratings. Through consensus, all agreed with the resulting standard. An important point to understand about the rating system is that raters applied the four scales to the response(s) for each problem as a whole, not for the separate utterances of consecutive and sight translation problems.  McCann recorded ratings as they were given through the online system, identifying them with a response identification number, rater identification number, and problem identification number. Each problem was scored independently by two raters.

Raters worked independently for several weeks following the training session to score responses. The scoring process was designed so that problems were assigned to raters randomly, meaning that the problems constituting a candidate's examination were broken up and distributed across raters.  The benefit of this approach was to minimize the impact of intra-rater tendencies (sources of variation within a rater, e.g., central tendency, etc.) in the scoring process, and by minimizing it, enhancing the alignment to the agreed-upon standards.  When scoring, raters could play the source material and then listen to the candidate's interpretation.  For consecutive and sight translation problems, raters listened to the entire set of utterances that make up the problem before recording the appropriate rating by clicking the radio button that corresponded with their assessment/rating.

During the scoring cycle, raters were given model, or anchor, responses to score. The anchor responses were administered to raters randomly, but in such a way that raters had to score all anchor problems. This process enabled McCann to give raters feedback during and upon completion of the scoring cycle about their ongoing agreement with criterion ratings for anchor responses, typically one for each problem.  This process will be automated in future scoring cycles.

McCann downloaded the candidate response information into Excel from the scoring tool.  The first step was to validate the data; that is, to verify that the ratings

were present and within the specified range. Then for each candidate and problem, McCann averaged the ratings across all four scales for each rater. McCann then applied the weighting as dictated by test specifications for each problem using multiplication, and added in the weight for the written translation problems, such that a perfect response across all problems for a candidate would total 100. Test specifications were established in CCHI's Job Task Analysis for the testable sections of the outline for the CHI™ examination and distributed evenly among the problems in each section. CCHI established the passing standards using a criterion-referenced procedure known as the Extended Angoff Technique. McCann reviewed the results to identify all instances where missing data could explain a candidate's failure – no instances were so noted. In any situation where the two raters' summed ratings for a candidate were different by a scale score point, questions were immediately sent to a judge (a third rater) who added a third rating to the item.

After the third ratings had been accomplished, McCann averaged them in equally with those of the first two raters, applied the weights, added in the weight for the written translation problems, and developed the final weighted raw score for each candidate. McCann then employed classical linear equating to create two standard forms (Form 1 and Form 2) to calculate the scores candidates on these forms would have earned had they not taken the "long" form.

Statistical studies were also performed. Interrater reliability is the estimation of consistency between raters when they are scoring a test using subjective methods, such as anchored rating scales. Based on the ratings provided for each scale, McCann prepared a summary of rater agreements. Inter-rater reliability studies indicated a high level of agreement between raters.

After determining weighted raw scores, McCann computed descriptive statistics. The mean (average) weighted raw score, which could conceivably range from 0 to 10, for the "long" Form for Arabic was 59.01 with a standard deviation of 11.43. For Mandarin it was 65.74 with a standard deviation of 15.08.

When the two standard forms were assembled, every effort was made to ensure comparability in content and difficulty. Forms assembly also adhered to a common items design to permit statistical equating, and after weighted raw scores were computed, McCann prepared the data for classical linear equating following the Tucker approach. The common problems were identical for each form and located in precisely the same sequence to control for fatigue and order effects. As a result, differences that are found in candidate performance on the common items can be attributed to actual differences in the candidate groups taking each form. Linear equating uses candidate performance on the common items as a statistical control for candidate ability in computing equated scores. Both standard forms for Arabic and Mandarin were equated to the "long" forms used during pilot testing. The pass/fail standard for the CHI™ examination was established for the pilot test using the Extended Angoff Technique, a method that in recent years has become a

standard for tests of this type. The final step in scoring the CHI™ examination was to scale the final equated, weighted raw scores to a range of 300 to 600, with the passing standard anchored at 450.

# Appendix A:  CHI™ Examination Translator Standards

Standards for Translators who will be Translating CCHI's CHI™ oral performance examination:

- CCHI's Test Development Steering Committee (TDSC) reviews the resumes of each translator working on the project and a sample of their English>non-English (NE) translation (approx 3 paragraphs in length, non-technical text).
- In addition, CCHI obtains the following information about each translator: 1) native/primary language, 2) specific regional variation of the language (for Mandarin – country and region of the country; for Arabic – country), 3) for Mandarin translators – ability to translate into Simplified and Traditional Chinese (CCHI will specify which written variant should be used in the translation before the project starts).
- Translators with a Master's degree in Translation, Interpretation, or Foreign Language (from any country) are preferred.  ATA certification is a plus, however, not a requirement.
- Translation should be done as a two-step process by two equally qualified translators:  one should translate the text and the other should review the translation.
- In the translation pair, the lead translator must be a native speaker of the selected non-English language.  If the selected language has regional variations, TDSC will provide suggestions as to the country of origin for the native speaker.
- Recordings of the translated text should **NOT** be undertaken until the translation is reviewed and approved by CCHI.

In addition to the above qualifications all translators working on CCHI's CHI™ examinations must:

- Sign CCHI's Confidentiality Agreement
- Agree to keep all test content and any information or documents provided in conjunction with the test content completely confidential, and dispose of all files, copies, notes upon the completion of the project
- Agree not to seek CCHI certification
- Agree not to disclose his/her work on CCHI's CHI™ examination

# Appendix B: Qualifications and Expectations For CCHI Subject Matter Experts For the Certified Healthcare Interpreter™ Examination

CCHI engaged in a rigorous process to screen and select all of its Subject Matter Experts (SMEs) to represent the depth and breadth of the interpreting profession. A national call for Arabic and Mandarin SMEs was posted in CCHI's monthly newsletter, on its website, and on various other listservs. CCHI recruited three different groups of SMEs – item reviewers, raters, and cut score experts.

Each SME had to agree to CCHI's "Criteria & Policies for Advisors, Committee/Working Group Members and Subject Matter Experts" and sign CCHI's "Participation Agreement for Advisors, Committee/Working Group Members and Subject Matter Experts" in addition to specific Confidentiality Agreements required by McCann.

Subject Matter Experts donated their time and experience. CCHI reimbursed SMEs only for reasonable travel expenses.

For each panel of SME reviewers, raters and cut score setters, CCHI strove to ensure diversity based on a number of factors including:

- Geography – diversity by areas of the U.S. as well as diversity by urban, suburban and rural;
- Gender;
- Race and ethnicity;
- Age;
- Education;
- Regional language variation of the Arabic and Mandarin languages respectively;
- Cultural diversity based on the country of origin;
- Language background – native speakers, non-native speakers, and heritage speakers;
- Years of experience in healthcare interpreting;
- Interpreting delivery method – face-to-face/in-person, telephonic, video; and
- Practice setting – hospital, outpatient clinic, small private practice, public health, health plan/insurer.

Some SMEs participated in more than one panel so that they could help inform new SMEs of the prior work and answer any questions that arose. CCHI Commissioners did not serve as SMEs but attended SME meetings to assist with logistical matters or answer questions related to CCHI's operations.

The identification of CCHI's Subject Matter Experts is confidential information to ensure that candidates do not attempt to contact SMEs to obtain confidential examination information.

**Required Prerequisites for all SMEs:**

- Minimum age of 18 years.
- Have a minimum of U.S. high school diploma (or GED) or its equivalent from another country.
- Have at least 40 hours of healthcare interpreter training which may include any combination of the following:
  - adding up hours from multiple academic/non-academic courses;
  - completing continuing education courses;
  - attending interpreter conferences at which you participated in workshops that discussed issues related to the practice of interpreting (rather than on issues related to policy developments or general research on language access);
  - developing and/or teaching healthcare interpreter training courses; or
  - on-the-job training.
- Have linguistic proficiency in English and the non-English language (see description at http://www.healthcareinterpretercertification.org/certification/apply-now/143.html).
- Have a reliable Internet connection and are able to participate in SME Webinar trainings, conference calls, and work via email assignments.
- Agree to abide by CCHI's *Conflict of Interest Policies* and sign CCHI's *Participation Agreement for Advisors, Committee/Working Group Members, and Subject Matter Experts* (see http://www.healthcareinterpretercertification.org/about-us/policies.html).
- Agree to all requirements to keep exam and scoring materials confidential.
- Agree not to take CCHI's oral performance Certified Healthcare Interpreter™ (CHI™) examination during the pilot examination period.
- If you are currently an interpreter trainer/educator or expect to be involved in training of healthcare interpreters after 2011, you agree not to utilize information received as an SME to develop or adapt a training program to help candidates prepare for CCHI's examination.

You agree to all of the following standards:

- You will participate in the required training.
- You will not use any test content in any way.
- You will not willfully or negligently compromise the security of any test materials including, but not limited to, test CDs and test scripts.
- You will comply with the rules, and directions contained in the SME Manual.

**Required Prerequisites for Raters:**

- All of the above plus a minimum of five (5) years of experience as a healthcare interpreter.

Notes:
- Applicants with AHI™ credential are preferred.
- SMEs are volunteers and will not be compensated for their time; however, CCHI will reimburse SMEs for any CCHI-related travel expenses in accordance with CCHI's reimbursement policy.
- SMEs will be dismissed for failure to meet deadlines and/or submission of poor quality work.