

**A Job Analysis
of the
Practice of Retinal Angiography**

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Performed for:

The Ophthalmic Photographers' Society, Inc.
Board of Certification
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Executive Summary

In February, 2008, the Ophthalmic Photographers' Society, Board of Certification (OPS BOC) set out to conduct a scientific research study to profile Retinal Angiographer practice in North America. The mechanism for this study was a full-scale Job Analysis survey. The results of the survey provided support of the relevance, validity and legal defensibility of the OPS BOC Certification Examination by establishing a link between what Retinal Angiographers do on the job, and successful examination performance (e.g., competent practitioners pass the examination). In support of these efforts, the OPS BOC contracted with Schroeder Measurement Technologies, Inc. (SMT), to develop and conduct a survey describing the critical tasks required for competent, entry-level Retinal Angiographer practice.

The OPS BOC appointed an Advisory Committee to provide content-area expertise. The Committee was comprised of Certified Retinal Angiographers (CRAs) representative of the diversity of practice, experience, location, education and ethnic backgrounds within North America. To inaugurate the study, a comprehensive literature search was initiated. Periodicals, federal and international rules and regulations, approved texts and websites, OPS BOC policy and bylaws related to the Certified Retinal Angiographer, and OPS BOC published research were reviewed. In addition, comprehensive phone interviews were conducted by psychometric staff and volunteer CRAs who provided candid insight into the tasks and responsibilities making up daily practice in diverse settings. The results of the literature search and interviews of practitioners were used to develop an exhaustive list of the skills required of competent practice. This list was presented to the first Advisory Committee of Subject Matter Experts (SMEs) for review on February 22, 2008. The outline was augmented and approved and a rating scale was adopted providing a mechanism for measuring task importance and frequency of practice. The survey included a demographic questionnaire designed to gather confidential data describing the survey respondents and the nature of their practice of retinal angiography. The survey also queried the relative comprehensiveness of the survey, and offered the opportunity for respondents to identify task statements that may have been inadvertently left off of the survey. The task list and demographic questionnaire was then translated into electronic format, and turned over to the BOC; using off-the shelf survey technology, the BOC converted the tasks into an online-electronic survey questionnaire, which they posted and monitored.

Invitations to participate in a beta-test of the survey were e-mailed to 25 volunteers, who tested the function and reviewed the language and format of the survey. Minor edits were incorporated based upon beta-test respondent feedback, and the survey was finalized. As a preamble to email invitations to participate in the survey, a postcard announcing the survey was mailed to 1,300 Ophthalmic Professionals in the United States, Canada and Mexico. Nine hundred twenty-six email invitations to participate in the survey were sent out on March 19, 2008 to Retinal Angiographers and Ophthalmic Photography Professionals currently practicing in the United States, Canada, Mexico and around the world. The survey was posted online for 28 days, taken off line on April 15, 2008. A total of 459 surveys were successfully completed, resulting in a return rate of 35%, an excellent return rate for an unsolicited survey. The standard error of .04 was calculated, based upon the 459 surveys completed, indicating that inferences from the survey appear to be associated with minimal error due to the stable sample size. This provides a high degree of reliability in the survey results.

Over 98.5% of the respondents indicated that the survey either completely or adequately described the critical tasks required of competent practice of the entry-level Retinal Angiographer. This supports near perfect confidence that the survey depth was reflective of practice across North America and among various work settings. As described above, reliability estimate calculations for both the instrument and the respondent group were very high, indicating that if the same survey was used with a different respondent sampling drawn from the same population, the results would likely be very similar, further reinforcing confidence in the survey results.

A second Advisory Committee meeting of Subject Matter Experts (SMEs) was held May 1, 2008 in Philadelphia to present, review and consider the results of the survey analysis. The primary goal of this meeting was to establish task exclusion criteria to differentiate between the important and non-important, performed and not-performed tasks. Of the original 253 tasks, 54 tasks were removed from the outline based upon statistically-based decision rules, content overlap or through editing and restatement of tasks. Review of the remaining 199 tasks confirmed that all were assessable and/or observable, and therefore appropriate for inclusion on the Certified Retinal Angiographer Examinations.

The final approved task listing was then translated into two Content Outlines, establishing the link between job performance of important tasks, and successful performance on the Certified Retinal Angiographer Multiple-Choice and Performance Examinations. Tasks were evaluated and decisions made concerning the optimal testing mode of the tasks, either via the Multiple Choice or Performance Examinations, or both. The majority of tasks (198) were selected for inclusions on the Multiple Choice Examination; Twenty-three (23) tasks were identified for inclusion on the Performance Examination, with 2 tasks exclusive to the Performance Examination and 176 tasks exclusive to the Written Examination.

Finally, the Advisory Committee was asked to consider the 13 content areas represented in the approved Content Outlines (Written and Performance). Discussion was held concerning the complexity of the tasks included in these content areas, importance ratings and time spent by Retinal Angiographers performing the tasks. Through this exercise, the Committee established content area weighting for the Written and Performance Examinations, with some minor organizational modifications of several content areas within both the Multiple-Choice and Performance Examinations. The Advisory Committee reached consensus on final content area distributions and weighting, as reflected in Appendices J and K.

Survey Overview: The Content Validation Model

The foundation of valid, reliable, and legally defensible professional certification program is the performance of a well-constructed Job Analysis study. The Job Analysis establishes the link between test scores and competency, supporting the inference that the scores achieved on the certification examinations are content valid, and therefore pass and fail decisions correlate to competent performance. When evidence of validity, based on examination content, is presented for a specific professional role it is critical to consider the relative frequency, importance, and criticality of the elements. *The Joint Standards for Educational and Psychological Testing (AERA, APA, and NCME, 1999)* state:

Standard 14.10

When evidence of validity on test content is presented, the rationale for defining and describing a specific job content domain in a particular way (e.g., tasks, knowledge, skills, abilities or other personal characteristics) should be stated clearly.

Standard 14.14

The content domain to be covered by a credentialing test should be defined clearly and justified in terms of importance of the content for the credential-worthy performance in an occupation or profession. A rationale should be provided to support a claim that the knowledge or skills being assessed are required for credential-worthy performance in an occupation and are consistent with the purpose for which the licensing or certification program was instituted.

The OPS Board of Certification has a long history of commitment to the goal of maintaining a certification credential that meets or exceeds these international standards: A full-scale job analysis was undertaken in 1992, with a focus group update performed in 1996. Another full-scale survey was performed in June 2004, with a focus-group survey update performed in April of 2005; all these steps support the BOC commitment to insuring that the CRA Certification keeps pace with the rapidly changing technology within the profession. Continuing this historical commitment to maintenance of the CRA according to the highest of standards, the OPS BOC conducted another full-scale job analysis survey in February of 2008 – which is the subject of this report.

To accomplish this goal, the OPS BOC enlisted the services of Schroeder Measurement Technologies, Inc. (SMT) and the aid of a subject-matter expert Advisory Committee to perform a literature search, establish an exhaustive tasking and translate that listing into a survey instrument describing the tasks required for competent, entry-level practice in North America.

As described above, in support of the Job Analysis performance, the OPS BOC identified a committee of Subject Matter Experts (SMEs) to act as an Advisory Committee to the SMT Psychometric Staff. SMT is grateful to the following eighteen professionals for their critical involvement in the Job Analysis process:

Timothy Bennett, CRA, OCT-C	Lancaster, Pennsylvania
Joseph T. Schmidt, CRA	Salisbury, Maryland
Sandra Anderson, CRA, FOPS	Nashville, Tennessee
Allen Katz, CRA, COT	Omaha, Nebraska
Leslie Bull, CRA, OCT-C	Norwood, Massachusetts
Peter Hay, CRA	Manlius, New York
John R. Carpentier, CRA, OCT-C	Green Cove Springs, Florida
Don Enkerud, CRA	Gainesville, Florida
Bruno Bertoni, CRA	Pasadena, California
Lydia Dimmer, COT, CRA, OCT-C	Bothell, Washington
Rona Lyn Esquejo-Leon, CRA	Durham, North Carolina
Sandor Ferenczy, CRA	Philadelphia, Pennsylvania
James Strong, CRA	Dover, Pennsylvania
Linda Azar, CRA	Bishopville, Maryland
William Nyberg, CRA	Marlton, New Jersey
Beth Ann Benetz, CRA	Cleveland, Ohio
Marriner L. Skelly, CRA	Durham, North Carolina
Sarah Moyer, CRA	Durham, North Carolina

Survey Methodology

Content Review and Survey Development

In support of the development of the survey task listing, SMT psychometric support staff performed a comprehensive job-related literature search including review of:

- Approved textbooks on the subjects of Ophthalmic Photography and Retinal Angiography;
- Laws and regulations governing practice;
- OPS BOC By-laws and the Code of Ethics;
- Current print and online periodicals and publications relating to Ophthalmic Photography;
- Data gathered during interviews of practitioners.

At the February 22, 2008 Advisory Committee meeting, the Committee was introduced to the following goals of the Job Analysis:

1. Provide background information about the profession;
2. Review and approve the draft task list;
3. Develop a rating scale;
4. Develop a demographic questionnaire;
5. Establish a sampling protocol.

As a preamble to analysis of the task listing, the Committee was provided with training and background information addressing the following concepts:

1. *The Role in of the Job Analysis in a Certification Program:* Using overhead technology, the committee was provided with an overview of the CRA Program, and the tasks that make up the full cycle of research, development, application, examination, psychometric review and continuing education. The Committee was provided with an overview on exactly how, why and where the conduct of a Job Analysis fits into this cycle, and how a properly executed and applied Job Analysis supports program content-validity and legal defensibility.

2. *Entry-Level, Minimal Competency:* In order to assess the meaningfulness of the task listing, and its inclusiveness of the tasks describing competent practice, it was first necessary to facilitate the development of a conceptualized entry-level, minimally competent Retinal Angiographer. To accomplish this task the committee reviewed the current eligibility requirements of the CRA candidates, including the education and experience requirements. A portfolio meeting CRA candidate application requirements was reviewed and discussion was held concerning the skill level needed to create just such an acceptable portfolio. This exercise allowed the committee to discuss the various pathways to the profession, the variety of education and experience and the meaningfulness of performance measures (in the submission of an acceptable portfolio) as part of the definition of the typical competent Retinal Angiographer. Please see Appendix M – *Eligibility Requirements* for information and web-links outlining current CRA eligibility and portfolio submission requirements, used in this training.

The Committee next reviewed the task listing, identifying all behaviors associated with current practice. Significant discussion was held concerning the role of the Angiographer, the rapid pace of technology and differences among practice setting. Despite these differences the Committee felt that creation of a description of the core tasks related to competent practice was possible. Tasks were evaluated for reasonableness, and a decision to be open to the consideration of a broad range of the newest technology was made: The Committee felt it was best to be as inclusive as possible of new technology and practice, to enable the collection of a full range of responses across the importance and frequency scales. Supporting this effort, the Committee eliminated tasks describing future professional issues that might not be readily measurable and at the same time arcane or obsolete content was identified and removed from the task listing. After generation and approval of the task listing, the tasks were framed in terms of observable/measurable behaviors.

Rating Scale

The task listing was placed into a survey format that included a welcome, instructions, a demographic questionnaire and a survey query that addressed both importance and frequency, with specific instructions on rating tasks that were not performed, as follows:

This survey includes a comprehensive list of tasks that may be used by a Certified Retinal Angiographer. Use the rating scale below to rate each task. Determine how significant each task is in your current practice as a Retinal Angiographer. If there are any important tasks you think have been omitted, please list them in the spaces provided at the end of the survey.

If you think the task is not performed by a Retinal Angiographer to successfully perform his/her job, please select "does not perform." Otherwise, rate the task(s) importance level, ranging from "Not Important" to "Extremely Important."

Importance Scale: How important is this task in relation to the effective and competent performance of a Retinal Angiographer?

- | | |
|----------|-----------------------------|
| <i>0</i> | <i>Not Performed</i> |
| <i>1</i> | <i>Of No Importance</i> |
| <i>2</i> | <i>Of Little Importance</i> |
| <i>3</i> | <i>Moderately Important</i> |
| <i>4</i> | <i>Very Important</i> |
| <i>5</i> | <i>Extremely Important</i> |

Demographic Questionnaire

In order to provide insight into respondent professional experience levels, education, practice settings, rural-vs.-urban influences, gender, age and ethnicity, a detailed demographic questionnaire was included, gathering the following information:

1. Primary Employment Responsibility
2. Time spent performing Ophthalmic Photography
3. Number of Retinal Angiograms performed Each Week
4. Years of Professional Experience
5. Primary Practice Setting
6. Age Range
7. Geographic Practice Setting
8. Certification Credentials Held
9. Gender
10. Highest Level of Formal Education
11. Racial/Ethnic Background

The results provided a means of evaluating the representativeness and adequacy of the sample, as well as framing a rubric in which respondent sub-group data could be further evaluated. Respondents were also asked a twelfth question – rating the adequacy of the scope of the survey – and were given the opportunity to identify any tasks left off of the survey, and were encouraged to make general comments.

At the end of the survey, respondents were offered the opportunity to link to an OPS web-page where they could register for a drawing for \$200, as incentive to participate. Respondents completing the entire survey were also offered the incentive to link back to the OPS website and receive one Continuing Education Credit for having participated (based upon the survey taking approximately one hour to complete.) No link was established between survey responses and respondents participating in the drawing or the earning of Continuing Education Credits.

At the May 1, 2008 second Advisory Committee meeting, the Committee reviewed the demographic data points as collected during the survey, and determined that the sample was representative of the typical Retinal Angiographer. Questions four (Years of Professional Experience), five (Primary Practice Setting) and seven (Geographic Practice Setting) were identified as variables on which to conduct subgroup data analysis. A copy of the questionnaire, including the demographic section, may be found in Appendix A; the raw frequency data for the demographic questions are presented in Appendix B and are also described in the text to follow.

Sampling Methodology

A majority of identified Ophthalmic Photographers practicing Retinal Angiography in North America and world-wide indicated a willingness to participate in an on-line survey. Use of the internet in this way facilitated the ability of the survey to reach the greatest number of practitioners, in the widest possible geographic web, including those practicing world-wide.

A protocol was established for the distribution of the survey to the Retinal Angiographer Professional Community. As the size of the profession is somewhat limited, and as an online-survey format would be implemented, it was decided to issue invitations to complete the survey to all known Retinal Angiographers/Ophthalmic Photographers, which number in excess of 1,300 professionals. To best support the survey efforts, the Board of Certification mailed 1,300 postcard invitations to participate in the survey. Included in the mailing were all current U.S. resident members of the Ophthalmic Photographers' Society, and all registrants to OPS courses from the past two years (photographers do not have to be OPS members to participate in OPS programming). In addition, 926 email invitations to participate in the survey were issued to the entire OPS member list, which includes U.S. and non-U.S. members, and therefore creates a 100% overlap with the OPS member mailing described above, but captured all non U.S. residents who did not receive the mailed invitation. In today's fast-paced world it can be very challenging to maintain current e-mail addresses and contact information – to address this fact the OPS email list is maintained diligently, and a reflection of its currency is that only three of the 926 emails were returned (*bounced-back*).

To further expand the reach of the survey, invitation notices were posted OPTIMAL, a web-based message board for Ophthalmic Diagnostic Imaging. The Optimal list of users is comprised of 1,236 members representing Ophthalmic Photographers, Physicians, Ophthalmic Technicians, Hardware and Software Engineers as well as Equipment Manufacturers. It can be assumed that the OPS member postcard invitation mailing list would include a majority of the OPTIMAL members, representing a high degree of overlap, while ensuring that all identifiable Retinal Angiographers were included in the survey invitation web. Appendix A includes the text used for the postcard, email and OPTIMAL postings.

Before the survey was posted and opened to general participation, a beta test was performed by 25 volunteers who logged on and tested all aspects of the survey. Data results were confirmed and minor edits and changes were made to ensure that the survey was easy-to-use, the language understandable, and all selection choices and text box collections were functioning properly. A PDF representation of the survey is found in Appendix A.

The survey was posted live online on March 19, 2008 and closed to respondents 28 days later on April 15, 2008. As an overview, 1,300 postcard invitations were mailed, 926 e-mail invitations were issued with only three undeliverable, 528 surveys were collected, and 459 of those had usable responses. This represents a response rate of 35%, which is a response rate more than adequate to support the data results.

Data Review

A second Advisory Committee meeting was held May 1, 2008 with the objective of reviewing and analyzing the survey results. At this meeting task exclusion criteria were established allowing the differentiation between critical and non-critical tasks. Of the original 253 tasks, 54 tasks were removed from the outline; One (1) task was removed because of a statistically-based decision rule relating to criticality – the task was identified as *not critical* to competent practice. Forty-Nine (49) tasks were identified as *Not Performed* by Retinal Angiographers, and four tasks that received lower-than average (*Not Performed* ratings were low but not low enough to warrant removal from the survey) were restated into two more general tasks relating to participation in studies and research related to Retinal Angiography.

The results of this survey were somewhat unusual in that the majority of tasks were identified for removal from the outline not based upon critically decisions, but by the large number of respondents who did *Not Perform* the task. This finding must be considered in light of the wide range of practice settings and use of technology among Retinal Angiographers. Most Retinal Angiographers' practice reflects the technology espoused by their employer – the cost of the various imaging technologies is a significant factor. Small private practices may never be able to take advantage of some of the newer and vastly expensive technologies and still provide cost-effective services to their patients. The change from digital image capture from film-based angiography is a good example of this dichotomy. While it is rare, there are still well-respected practices providing standards-based care using film cameras and darkrooms; but the vast majority of angiographic images are captured using digital technology. This factor impacted the survey results with the anomaly that while large numbers of respondents indicated that they did not perform the tasks, those that did indicate they performed the tasks rated the tasks as very-to-highly important. There was very little variability among the importance ratings for all of the tasks, but there was significant variability among the percentages of respondents who indicated that they actually performed the task described. This can be interpreted to mean two things: First we can assume that the survey was completed by a diverse and inclusive group of retinal angiographers, meeting the goal to invite participation in the survey to any and all of Angiographers, world-wide. Second, we can interpret the results to reflect that this profession honors the diversity among its practitioners. The results can be assumed to mean that there is room within the Angiographic Photographer's community for a diverse definition of what it means to practice, and that there is room within the CRA designation to be inclusive of that diversity.

After the survey was administered, data was collected and transferred into SPSS®, computer-based statistical software. After establishing that the data met quality analysis requirements, the survey data was analyzed. The data were presented to the Advisory Committee for review, approval and performance of the following tasks:

1. Review of the demographic data;
2. Development of the task exclusion criteria for importance;
3. Development of the task exclusion criteria for frequency/Not Performed;
4. Determination of the assessment mode (Multiple-Choice vs. Performance Examination formats);
5. Development of and approval of the final Content Outlines;
6. Establishment of the individual Content Area weighting.

Survey Results

Return Rate

As described, the postcard survey invitations were sent to 1,300 Ophthalmic Photographers practicing in the U.S., and email invitations were sent to 926 Ophthalmic Photographers worldwide, via email, including all currently certified CRAs. Survey information and invitations were posted on OPTIMAL, a web-based message board for ophthalmic imaging, which has 1,236 members. A total of 459 surveys were successfully completed. This resulted in an overall return rate of approximately 35%. The standard error of measurement for the survey, based on the sample size of 459, was calculated at .04. The confidence in the survey results and the statistics derived from the data were associated with limited error due to the stable sample size, the standard error of measurement calculation, and two reliability estimates.

Survey Adequacy

To determine how well the survey instrument performed, the following question was asked at the end of the survey:

How well, do you feel this survey covered the tasks performed by the competent, entry-level Retinal Angiographer?

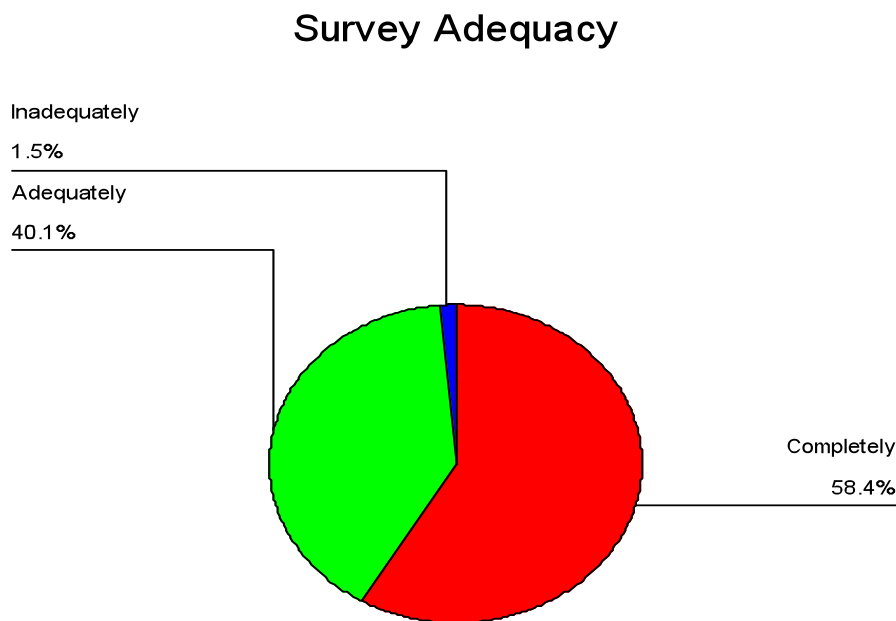
01 = Completely 02 = Adequately 03 = Inadequately

Of the 459 respondents, 125 failed to answer this question. An overwhelming 98.5% of respondents indicated that the survey adequately or completely addressed the tasks related to competency. Only five respondents (1%) of respondents felt that the survey was inadequate in its coverage, supporting the conclusion that nearly all respondents believed the survey completely or adequately described the role. This raw frequency data is outlined in Table 1; Figure 1 provides a graph of the data.

Table 1. Survey Adequacy



Figure 1.



Scale and Respondent Reliability Estimates

SMT calculated two reliability estimates to evaluate the amount of error associated with the survey responses and the agreement among the respondents. These calculations provided a measure of the internal consistency of the survey. To evaluate the instrument, SMT calculated a statistic known as coefficient alpha. The estimates are affected by the number of questions and the number of respondents. Alpha coefficients range from 0 to 1; a greater value than .7 is considered adequate. For this survey, all the content domains had Alpha reliability estimates greater than .79

A second reliability statistic was calculated to establish reliability estimates for the respondent group. This statistic is known as an intraclass correlation coefficient, which is a measure of

correlation, consistency or conformity for a data set when it has multiple groups (the groups in this case are the seventeen content areas). The correlation is calculated to show the strength and relationship among the groups. Each of the seventeen domains had coefficient values of .76 or greater, indicating high reliability among respondents within the domains. Separate analysis of the total number of tasks completed by all respondents provides an intraclass correlation reliability calculation of .98, further sustaining confidence in the overall reliability of the survey. Table 2. *Reliability Estimates* outlines these calculations.

Table 2. Reliability Estimates

Domain	No. of Elements	N*	Alpha Coefficient	Intraclass Rater
1. Applies the Principles of the Anatomy and Physiology of the Eye	6	448	.79	.99
2. Applies the Concepts of Pathology of the Eye	44	438	.98	.99
3. Patient Management	19	266	.92	.99
4. Patient/Operator Safety	4	437	.87	.93
5. General Photography-Film	27	230	.98	.98
6. General Photography - Digital	41	317	.98	.98
7. Data and Image Management	7	322	.91	.98
8. Image Grading: The use of and coordination with Reading Centers	5	376	.98	.93
9. Fundus Photography	21	376	.96	.98
10. Fluorescein Photograph	30	353	.96	.98
11. Fundus Autofluorescence/ Scanning Laser Ophthalmoscope	5	311	.96	.88
12. Indocyanine Green (ICG) Angiography	7	235	.96	.98
13. Optical Coherence Tomography (OCT)	6	265	.90	.98
14. External Photographs	3	250	.94	.76
15. Slit Lamp	4	265	.95	.97
16. Other Imaging Technologies	9	153	.94	.83
17. Pharmacology	15	249	.95	.97
Overall Survey	253	90	.99	.98

* The N calculation represents respondents who answered all questions in each content area. Only 90 respondents answered all questions in all 17 content areas.

Summary Information of the Respondent Group

The inclusion of a demographic data questionnaire provided a means of establishing a matrix with which the survey results could be further refined and interpreted. In addition to describing the respondent sample group, the demographic results were used to evaluate the generalizability of the results, for example, *was the task important across a variety of clinical settings, among Retinal Angiographers of differing experience levels, and across geographical locations?*

Profile of the typical respondent

The typical respondent was an Ophthalmic Photographer (70%); almost half of the respondents spent 35 hours or more performing tests related to Ophthalmic Photography. There is significant variability in the number of angiograms performed each week, with even distribution among the ranges. It can be extrapolated that over half of the respondents reported performing between 11 and 40 per week, but in truth it is difficult to create a characterization based upon this demographic question. The distribution of experience was also difficult to characterize, falling evenly across the scale. Those with 10 or less years of experience were equal in number to those having more than 20 years. The experience of the respondent group is therefore representative of the continuum of the profession, as it is represented by those newer to the field as well as those who are highly experienced.

Those reporting working in a private-practice retinal specialty office were the largest demographic (32%) within the practice settings, but by combining all University/Hospital respondents, and all private-practice respondents we found a relatively even split among the two groups. Thirty-nine percent were between the ages of 45 and 54, indicating some interesting things about the relationship between the respondent age and experience, as typically it would be expected that the two would correspond more closely. This may indicate that the profession is attracting more second-career professionals. A regrouping of the geographic areas into a typical 4 sector disbursement indicated that the respondents were well distributed across the United States – with a slightly higher response rate from the Eastern portion. Over half of the respondents reported holding the CRA credential, and 104 respondents held the COA (Certified Ophthalmic Assistant) credential as well: respondents could mark more than one certification. Gender was evenly distributed. Forty percent of respondents had earned a Bachelor's (4-year) degree, and overall the entire respondent group was well-educated, with 70% holding a recognized diploma or degree. The respondents were predominantly self-identified Caucasians, with ethnic representation among minorities reasonably representative of the U.S. population.

Raw frequency data for each demographic question can be found in Appendix B and Figures 2-11 and Tables 3-19 to follow.

Primary Employment Responsibility

In an effort to determine the primary responsibilities of the Retinal Angiographer, the question listed below was posed. Of the 459 respondents, 4 did not answer this question. Approximately 70% (235) of the respondents indicated ophthalmic photography as their primary responsibility. Figure 2 presents the data; the frequency distribution is shown in Table 3.

Which of the following best describes your primary employment responsibility?

- 01 = OPHTHALMIC PHOTOGRAPHER
- 02 = OPHTHALMIC TECHNICIAN
- 03 = MEDICAL PHOTOGRAPHER
- 04 = MANAGER
- 05 = EQUIPMENT VENDOR/ SERVICE TECHNICIAN
- 06 = INFORMATION TECHNOLOGY/SYSTEMS SPECIALIST
- 07 = ORTHOPTIST
- 08 = OPTITIAN
- 09 = OPTOMETRIST
- 10 = NURSE
- 11 = PHYSICIAN

Figure 2. Primary Employment Responsibility



Table 3. Primary Employment Responsibility – Frequency Distribution



Time Spent performing tests related to Ophthalmic Photography

To better understand the amount of time devoted to ophthalmic photography within the profession, the question listed below was asked. Approximately 66% of the population indicated spending 24 hours or more each week on tests related to Ophthalmic Photography. Figure 3 presents a graph of the data; Table 4 includes the frequency distribution of the data.

How much time do you spend per week performing tests related to ophthalmic photography?

- 01 = 35 HOURS OR MORE PER WEEK
- 02 = 24 - 34 HOURS PER WEEK
- 03 = 15 - 23 HOURS PER WEEK
- 04 = 10 - 14 HOURS PER WEEK
- 05 = 5 - 9 HOURS PER WEEK
- 06 = LESS THAN 5 HOURS PER WEEK
- 07 = NOT CURRENTLY PRACTICING OR RETIRED

Figure 3 – Time Spent performing tests related to Ophthalmic Photography

Time Spent Per Week Performing Tests

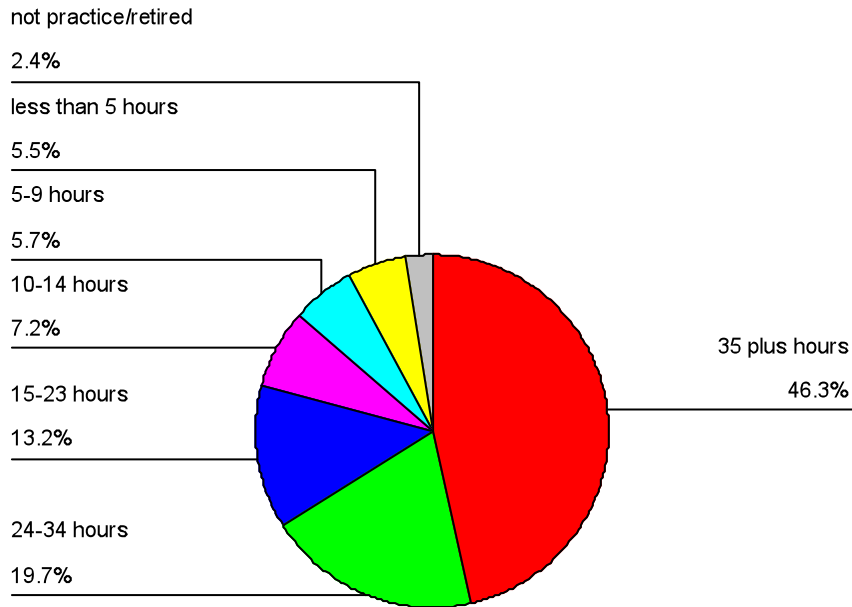


Table 4. Time spent performing tasks related to Ophthalmic Photography – Frequency Distribution



Number of Angiograms Performed Each Week

To gain a characterization of the number of angiograms performed by the respondents each week, the question below was posed. Of the 459 respondents, only 5 failed to answer this question. As described in the typical respondent profile, there is marked variability in the number of angiograms performed each week, with near even distribution among the ranges beyond respondents indicating they performed no angiograms. It can be extrapolated that over half (52.9%) of the respondents reported performing between 11 and 40 angiograms per week indicating the importance of the task, but grouping at the lower bounds (from zero to 20 angiograms per week) indicates 61% of respondents falling in that range. In truth, the data does not support a characterization based upon this demographic question, except to say that there is wide variability among the respondents. Figure 4 presents this data graphically; Table 5 offers a frequency distribution representation.

How many angiograms do you perform, on average, per week?

- 0 = none
- 1 = 1-5
- 2 = 6-10
- 3 = 11-15
- 4 = 16-20
- 5 = 21-30
- 6 = 31-40
- 7 = 41 or more

Figure 4. Number of Angiograms performed each week

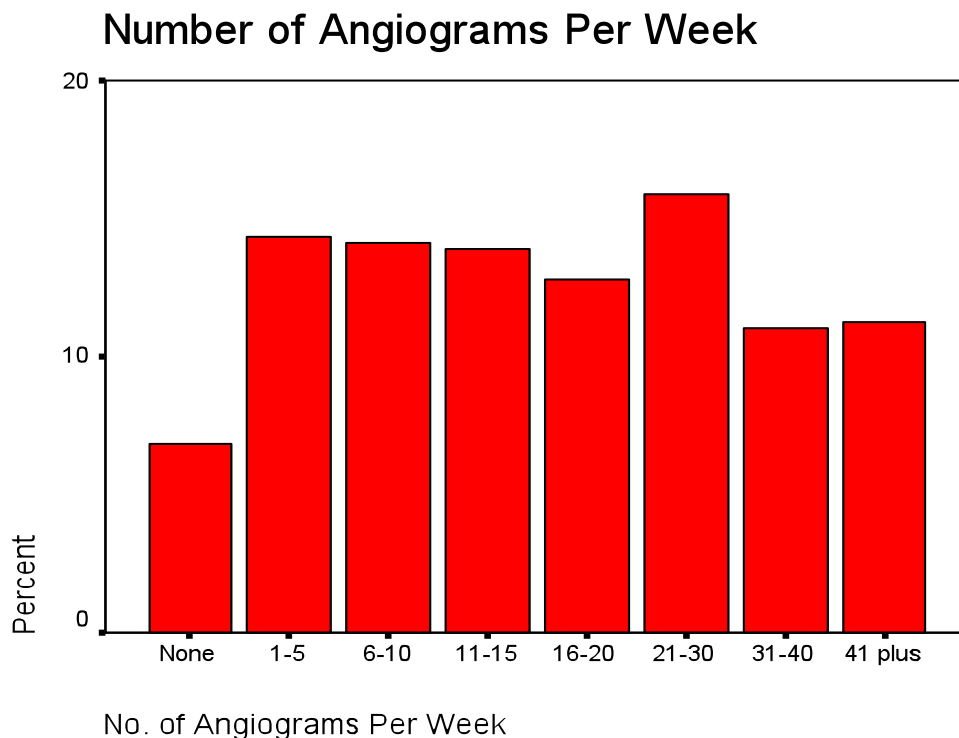


Table 5. Number of Angiograms performed each week – frequency distribution



Years of Experience

To better understand the level of ophthalmic photography experience of the respondents, the survey asked the question below. Of the 459 respondents 6 failed to respond to this question. While 7 responses were offered, the data was best analyzed by combining the groupings as indicated in Figure 5. There was an even distribution between the respondents having 0-10 years experience, and those having more than 20 years (35% and 36% respectively), with 26% falling in between these two groups. This indicates a well-represented respondent group, one that drew from not only the highly experienced professionals (who traditionally are more likely to participate in a survey of this kind) but from those professionals who are newer to the field. Tables 6 and 7 describe the frequency distribution as combined and collected.

Describe your years of professional experience in the field of ophthalmic photography.

- 01 = LESS THAN 2 YEARS
- 02 = 2 - 3 YEARS
- 03 = 4 - 6 YEARS
- 04 = 7 - 10 YEARS
- 05 = 11 - 15 YEARS
- 06 = 16 - 20 YEARS
- 07 = MORE THAN 20 YEARS

Figure 5. Years of professional experience

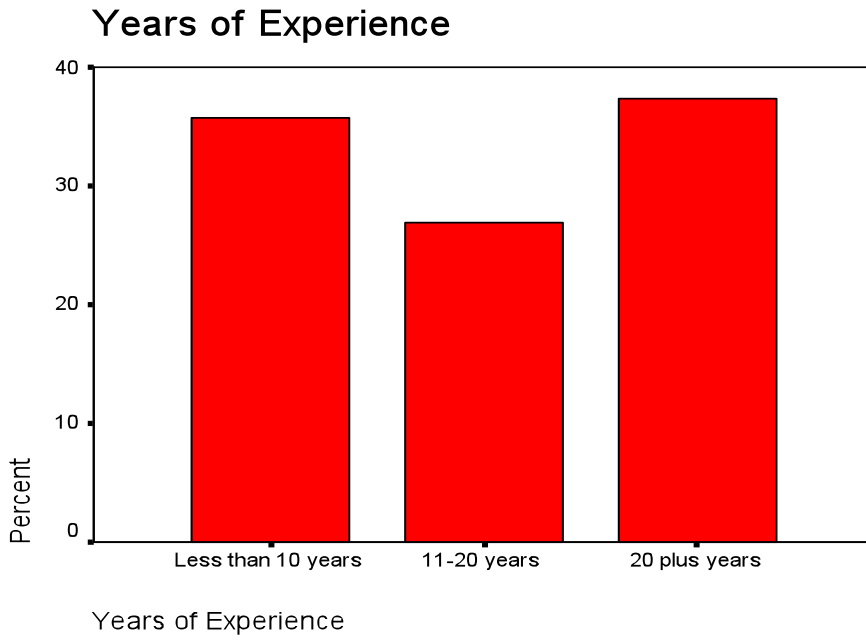


Table 6. Years of professional experience (combined)



Table 7. Years of professional experience (full frequency distribution)



Practice Setting

To evaluate how well the sample represented the range of professional practice settings, the survey asked the question below. Of the 459 respondents, 4 failed to respond. Over 31% (146) of the population worked in a private practice with a retina specialty, 24% reported working in a University/Hospital setting. By combining University Hospital Setting respondents with respondents indicating they worked in a Hospital/Medical Facility, the data indicated that 38% of respondents practiced in a Medical Facility settings. Figure 6 presents a graph of the data, and Table 8 describes the frequency distribution of the responses. Table 9 describes the detail provided by the 62 respondents indicating they practiced in an “Other” setting: similar or identical responses were combined, as indicated in the far right-hand column which indicates the number of respondents. Based upon the response frequency it can be assumed that a number of respondents chose a practice setting from the 01-05 choices and then went on to provide information in the “other” drop down text box, as the total number of responses was 517 (455 responses in categories 01-05, 62 “Other” responses).

Which of the following best describes your primary professional practice setting?

- 01 = HOSPITAL/ MEDICAL FACILITY
- 02 = UNIVERSITY HOSPITAL/MEDICAL FACILITY
- 03 = PRIVATE PRACTICE (GENERAL/MULTI-SPECIALTY)
- 04 = PRIVATE PRACTICE (RETINA ONLY)
- 05 = INDEPENDENT CONTRACTOR
- 06 = OTHER (DESCRIBE IN TEXT BOX)

Figure 6. Primary practice setting



Table 8. Primary practice setting – frequency distribution



Table 9. Other practice settings (self-described)

<u>Other Professional Practice</u>	<u># of responses</u>
Vendor	8
Vendor Trainer	1
Imaging Specialist for manufacture	1
Multiple facilities and practices	6
Hospital and Private Practice	2
Hospital	1
Eye Hospital	1
VA HOSPITAL	2
University based Medical School/Teaching Hospital	4
Teaching Hospital attached to the Galway University Ireland	1
Department of Ophthalmology at a University of California	1
pediatric teaching hospital	1
Stanford Hospital and Clinics	1
Yale Eye Center, Yale U. Sch. of Medicine	1
Bert M Glasear National Retina Institute	1
I am currently an inpatient RN in the Labor and Delivery unit	1
I am a Registered Nurse hired specifically to perform FFA. I work in med/surg at a local hospital and at the eye center 2 days a week.	1
Diagnostic Ophthalmic Service department	1
Diabetes Care	1
private practice within a larger hospital/institute	2
private ocular oncology practice within an eye institute	2
General Ophthalmology and Retinal Practice	1
Single Physician Retina Specialist	3
Multiple Physician Retina Specialist	8
vitreo-retinal surgical practice (retina, cataracts, plastics, Lasik)	3

<u>Other Professional Practice</u>	<u># of responses</u>
Independent contractor for private practice Ophthalmologist	2
Retired	2
Ophthalmic Photographic Educator/Consultant	1
Research retina only/Govt. Research Facility	2
Total Number of Other Respondents	62

Age Range

To evaluate how well the sample represented the population of professionals, the survey asked the respondents to indicate their age range. Of the 459 respondents, 7 failed to provide a response to this question. Approximately 40% of respondents were between the ages of 45 and 54, with approximately 18.5% falling below the age of 34, and 19% age 55 or older. Figure 7 provides the breakdown of responses, and Table 10 indicates the frequency distribution of this data.

Please describe your age range:

- 01 = UNDER 25
- 02 = 26 - 34
- 03 = 35 - 44
- 04 = 45 - 54
- 05 = 55 - 64
- 06 = 65 OR OLDER

Figure 7. Respondent age range



Table 10. Respondent age range – frequency distribution



Geographic Region

To better understand where the respondents worked, the survey asked the question below about geographic regional setting. Of the 459 respondents, 10 did not answer this question. The Northeast region was the most regularly indicated with 26% of the sample; combining the Pacific Northwest, West and Southwest indicated a relatively even distribution across the traditional four sectors of the U.S. as presented in Figure 8. Table 11 represents the frequency distribution of the combined categories (Appendix B contains the full frequency distributions for all demographic data points) and Table 12 represents the data from respondents who indicated their location as “Other.”

Which of the following best describes the North American geographic region in which you practice?

- 01 = PACIFIC NORTHWEST
- 02 = WEST
- 03 = SOUTH WEST
- 04 = GREAT LAKES/MIDWEST
- 05 = SOUTHEAST
- 06 = NORTH EAST
- 07 = US ISLANDS OR TERRITORIES
- 08 = OTHER (DESCRIBE)

Figure 8. Geographic Region



Table 11. Geographic Region (areas combined)



Table 12. Geographic Representation – Other (self-described)

<u>Other Geographic Region</u>	
Country	Response Frequency
USA / Canada / Latin America	1
Switzerland	2
Sweden	2
South Central. Memphis TN. /Mid South	2
South Australia	1
Singapore	1
Saudi Arabia	3
Canada	5
military hospital in Europe	1
Middle East (Saudi Arabia)	1
Ireland	2
Hawaii	1
Entire Country	1
East	1
Australia	6
ASIA	1
Global Practice	1
Alaska	1

Certifications and Professional Degrees

To profile the respondents’ professional credentials, the survey asked the question below regarding certification and degrees achieved. Respondents were asked to identify all credentials and/or professional degrees held; the percentage value indicates the percentage of respondents (of the 459 respondents) who indicated that they held a given certificate. Table 13. *Certifications and/or Degrees Held* below presents this data. Among the respondents, 231 indicated holding the CRA credential (representing 50% of the respondents), and 104 respondents indicated that they held the Certified Ophthalmic Assistant (COA) credential. Notable, was the 28 respondents holding the newly-launched OPS BOC Credential, the OCT-C, which represented 99% of the entire population of OCT-C certificants.

Table 14 represents the data provided by respondents indicating a certification of “*Other.*” This question was not designed to capture educational experience, but degrees related specifically to the profession: demographic question 10 queries the respondents’ highest level of education. However, many respondents indicated educational degrees using the “*Other*” text box as indicated in Table 14.

Note: a number of the “other” certifications listed were also included in the body of this question, indicating that some respondents may not have understood that multiple certifications could be indicated.

Which of the following Certification Credentials and/or degrees do you hold? (Check all that apply.)

- | | |
|----------|----------------------------|
| 1. CRA | 8. RN |
| 2. OCT-C | 9. ROUB |
| 3. COA | 10. LDO |
| 4. COT | 11. ABO/NCLC |
| 5. COMT | 12. DO |
| 6. RBP | 13. MD |
| 7. LPN | 14. OTHER (Please Specify) |

Table 13. Certifications and/or Degrees Held

Certification/Degree	Frequency	Percent
CRA	231	50.3 %
OCT-C	28	6.1 %
COA	104	22.7 %
COT	72	15.7 %
COMT	8	1.7 %
RBP	2	0.4 %
LPN	3	0.7 %
RN	9	2.0 %
ROUB	6	1.3 %
LDO	1	0.2 %
ABO/NCLC	6	1.3 %
OD	1	0.2 %
DO	0	0.0 %
MD	0	0.0 %

Table 14. Other Certification and/or Degrees Held (self-described)

Other Credential/Diploma	Response Frequency
3 year commercial photography with 22 years medical photography	1
AA AAT CPT	1
AAS	3
Associate Science Photography +	1
B App. Sci	1
B.A. and B.F.A.	1

<u>Other Credential/Diploma</u>	Response Frequency
B.S., M.Ed	1
BA	12
BA History /Education minor	1
BA, Illustrative Photography	1
BA, MS	1
BA/BS	2
Bachelor in Fine Arts in photography	1
Bachelor of Applied Arts, Ophthalmic Assistant (Canada)	1
Bachelor's/Accounting; Certified Paralegal; Commercial Photography	1
BAS in Photography (RMIT Australia)	1
BFA	4
BFA, MA	1
BHK	1
BS	9
BS biomedical communications	1
BS in Biomedical Photography	3
BS in Biomedical photography, MA in publication design	1
BS w/photography degree track	1
BS, expired CRA	1
BS, MAH, MFA	1
CBP - Cert. Bio-Med. Photog.	1
CCRC- CERTIFIED CLINICAL RESEARCH COORDINATOR	1
Certified Applied and Industrial Photography	1
Certified in Ultrasonography	1
Certified Orthoptist	1
Certified Phlebotomy Technician (CPT)	1
Clinical research trial certification with reading US centres	3
CLP	1
CMA	2
CMA AAMA	1
CMSRN (certified medical surgical registered nurse)	1
CNMA	1
COSA	1
CPO	1
CPT	1
CRA portfolio approved / CRA Soon	2
CRA Lapsed	

<u>Other Credential/Diploma</u>	Response Frequency
CST (Certified Surgical Technologist)	3
DEC,OA	1
Diagnostic Radiography -Angio	1
DRCR	1
EMT-P	1
eyebank tech	1
F.O.P.S.	1
Graphic Arts \ Photography	1
Honorary Optics and Visual Sciences and Engineering	1
Licensed Health Care Assistant (for injections)	1
licensed optician	1
MBA-Health Care Management	1
medical assistant AAS	2
Military certifications	1
MPH	1
MS MLA	1
MSc.	1
MSN	1
NCPT EMT	1
nurse/tech	1
OHTS Certified	1
Ophthalmic Educational Instructor.	1
P-emt, Reg. Resp. Therapist,	1
Phlebotomist	1
photoschool	1
previously: COA, ABO, NCLE	1
RDMS in ophthalmology	2
Registered Diagnostic Medical Sonographer(ophth)	1
ROUB	1
RTR Radiologic Technologist (Inactive)	1
Surgical Asst	1
Total "Other Responses	108

Gender

The next demographic question asked respondents to indicate their gender. Of the 459 respondents, 15 failed to answer this question. Approximately 53% (163) of the respondents indicated that they were male. Figure 9 presents this data, and Table 15 indicates the frequency distribution.

Gender (select one)

01 = MALE

02 = FEMALE

Figure 9. Gender



Table 15. Gender

|||||

Formal Education

To better understand the educational background of the respondents, the question listed below was asked concerning formal education. Of the 459 respondents, 5 failed to respond to this question. Figure 10 represents this data; Table 16 indicates the frequency distribution and Table 17 represents the data from 54 respondents indicating their educational background as “*Other*.” The number and nature of the responses in Table 17 *Other* indicate that respondents used the text box to either register the fact that beyond their highest level of education they held other degrees and diplomas – as a number of the self-described educational achievements mirror those in the body of the demographic question – or that they wished to provide additional information about the diploma that they held. For example, four respondents used the “Other” text box to indicate that they held a Bachelors Degree in Fine Arts, Photography.

There were 185 respondents (40%) indicating that they held a 4-year College diploma, and 16% indicating they held a 2-year degree. Over 61% of respondents indicated holding a 2-year degree or higher, reflecting the high level of education of this respondent group.

Which of the following describes your highest level of formal education?

- 01 = DID NOT COMPLETE HS
- 02 = HS GRADUATE OR EQUIVALENT
- 03 = SOME COLLEGE
- 04 = VOCATIONAL TECHNICAL CERTIFICATE
- 05 = COLLEGE DEGREE (2-YEAR)
- 06 = COLLEGE DEGREE (4-YEAR)
- 07 = MASTER'S DEGREE
- 08 = DOCTORATE (DESCRIBE SUBJECT)
- 09 = OTHER (DESCRIBE)

Figure 10. Highest Level of Formal Education



Table 16. Highest Level of Formal Education (frequency distribution)



Table 17. Highest Level of Education – Other (self described)

<u>Other Education</u>	<u>Frequency</u>
(2) 4yr degrees	2
2 yrs at USC and 2 yrs at Art Center College of Design	1
3 years of university studies	2
5 years of college total	1
American School of Photogrammetry	1
Architectural Technician / Photographer	1
Associate's Degree	1
Associates in Business Administration	1
associates in human services	1
Assoc of Arts Degree & JCAHPO Tech Program	1
Associate Degree Photography/Visual Communications	1
Associate Science Photography + 6 months Medical Photography course	1
Associates Degree in Biomedical Communications with concentration in Ophthalmic Photography RIT. Also, Associates Degree in Graphic Design	1
Assistant professor of Ophthalmology	1
B.A. Photography/Cinema /BAS	4
BA Exercise Science	1
Bachelor Degree – 3 year	1
Bachelor's of Fine Art	2
bachelors' of science in biomedical photography	1
BS Biomedical Photographic Communications from RIT	1

<u>Other Education</u>	<u>Frequency</u>
BS in ophthalmic technology	1
BS Medical Photographer Univ of Texas Southwestern Medical School	1
business college certificate, some university, and ophthalmic assistant program	1
college → 3 years out of a 4 year degree	1
few credits shy of 4 yr degree	1
seeking bachelors currently	1
currently enrolled in a Master's program	1
BS photojournalism + some masters work	1
Fellowship in Medical Photography	1
Georgetown Ophthalmic Medical Assistant Program	1
GRADUATING 2008	1
half semester junior college	1
LABS	1
Licensed Practical Nurse	1
Lots of College Art Classes	1
Masters of Public Health	1
MS – Biology	1
Nurses aide	1
Ophthalmic Technologist Program at Univ of Fla.	1
Optometry	1
Photography and Geography degrees	1
RIT	1
trained in Europe as professional photographer	1
University degree – Bachelor of Applied Science (Orthoptics)	1
US Navy Hosp Corps “A” school and Ocular Tech. “C” school	1
USAF trained ophthalmic tech, surg tech, angiographer	1
Military certifications and Associates’ degrees	1
military classification 8444	1
Total number of “Other Education” Respondents	54

Ethnicity

To better understand how well the survey represented the ethnicity of the population, the following question was included. Of the 459 respondents, 6 did not answer this question. Approximately 82% of the respondents indicated Caucasian ethnicity. The data results show a greater ethnic diversity among respondents when compared to the previous analysis (2004) when more than 89% of respondents were self-reported Caucasians. Figure 11 presents this data. Table 18 reflects the frequency distribution of this question, and Table 19 indicates the self-described “*Other*” responses.

Please describe your racial/ethnic background:

- 01 = ABORIGINAL/FIRST NATIONS
- 02 = AFRICAN/BLACK
- 03 = CARIBBEAN
- 04 = CAUCASIAN/WHITE
- 05 = EUROPEAN
- 06 = HISPANIC
- 07 = EAST ASIAN
- 08 = SOUTH ASIAN
- 09 = WEST ASIAN
- 10 = OTHER (DESCRIBE)

Figure 11. Ethnicity 

Table 18. Ethnicity (Frequency distribution)



Table 19. Ethnicity “Other” (self-described)

<u>Other Ethnic/Racial Background</u>	<u>Respondent Frequency</u>
American	1
Asian	1
Asian Hong Kong	1
British, Irish, Scottish ancestry	1
Caribbean/Hispanic/middle eastern	1
Central American Black Hispanic	1
Hispanic	1
Hungarian	1
Mexican-American	1
Middle Eastern/Arab	2
Pacific Islander	1
Puerto Rican	1
South west Asian	1
Southeast Asian	2
Total “Other” respondents	17

Additional Tasks Not Identified on the Survey

Respondents were given the opportunity to comment on the survey and identify any tasks that they felt may have been inadvertently excluded from the survey by completing a text box entry response to the query below. These 36 comments and identified tasks were reviewed and evaluated by the Committee. Consensus was established that one of the respondent-identified tasks (Electronic Medical Records EMR): The task was added to the text of tasks T147-T147 in the final outline (see Appendix K). The rest of the tasks were reviewed and found not to warrant inclusion in the outline due to the fact that they were already covered in the task listing, related to technology that was not specific to the role of the retinal angiographer, or were outside the scope of practice of the Retinal Angiographer. Table 20 outlines a synopsis of the responses, and the Advisory Committee responses.

Please list any additional tasks that you felt should have been included on the survey.

(Text Box drop-down menu).

Table 20 – Tasks Left off of the Survey

<u>Respondent Number</u>	<u>Please list any additional tasks that you felt should have been included on the survey.</u>	<u>SME Advisory Committee Response</u>
1	You did a fantastic job on covering all areas.	Comment, not a task: No action
2	Visual Field Testing/Microperimetry	Outside of Scope/Not Performed by an RA
3	visual field	Outside of Scope
4	Visante OCT	Included (covered under T219)
5	The only other tasks I perform would be the patient booking and billing for the angiograms. I'm not sure that is done in other practices.	Not Certification
6	Some basic knowledge of primates for research Recognition of major refractive trends from pt's glasses Problems during I.V. injections	Outside of scope (more general knowledge covered under T168, T184-185, and T245)
7	Retinal angiography and related imaging is what I was hired to do. I also perform (hopefully with adequacy) other related technical duties with training I've received on the job. They include such activities typical for COT's, maintaining cryo, b-scan and laser equipment. In addition I organize the patient traffic flow in the clinic and order/maintain adequate medical supplies. While some or none of these duties may ever directly find their way to issues of certification, they are a considerable portion of my work day.	Comment/outside of scope
8	researching new equipment reading ophthalmic articles using Photoshop keep an update knowledge of digital cameras, scanners, and printers	Tasks addressed under CRA recertification requirements -no action

<u>Respondent Number</u>	<u>Please list any additional tasks that you felt should have been included on the survey.</u>	<u>SME Advisory Committee Response</u>
9	Printer "calibration" v. profiling or at least a question about understanding the properties of color inkjet, laser and dye-sub printers.	General task covered under T134 – refined language of task T-124 to address more fully
10	Preparing materials for presentation (for lectures and publication)	Not Entry-Level
11	Photographers should be required to document peripheral lesions. I am not sure if there was a question relating to it.	Section 2/Portfolio Req.
12	phlebotomy	Outside of Scope
13	Personality traits such as being able to converse with patients to put them at ease.	Not Assessable
14	Open-Ended Response	Comment – not feasible testing mode.
15	OCB....IOL Master perhaps in addition to A and B-scanning	Outside of Scope
16	Nothing comes right to mind.	Comment
17	No mention of PDT mapping, which I still do on rare occasions.	T122
18	New technology awareness - moderately important	Not Assessable
19	My question is how much film/dk room knowledge is now needed for the ophthalmic photographer Coming from a film background I feel the understanding and skills gained from pre-digital work is of value even in the digital age but are these skills necessary for the new ophthalmic photographer?	Comment
20	more on patient handling ,knowledge of working up patients from history, vision, tension, pressures etc.	T-63, T57-58
21	More emphasis should be placed on information technology as it applies to ophthalmic imaging.	Tasks covered in Section 7
22	Many ophthalmic photographers are performing more OCT's than IVFA's on a daily basis. Should be more questions on that subject.	Comment
23	management of employees	Not Assessable
24	In the future duties of an OP may be to integrate images into an electronic medical records system. Consider adding this area to the next survey.	Comment
25	In our office I do a lot of procedure prep, for avastin injection. I also do traditional tech work.	Outside of Scope of Practice
26	In our department, we work also to create graphics documents for publications, presentations and congress tasks. We work although with audio-visual media, power point presentations congress organization.	Not Entry-Level
27	importance of documentation	Comment – not assessable

<u>Respondent Number</u>	<u>Please list any additional tasks that you felt should have been included on the survey.</u>	<u>SME Advisory Committee Response</u>
28	I might have miss it, but asking about being able to communicate with the patient, knowing that test can not be done for physical or mental reasons.	Covered under task T-58
29	I cannot think of one topic that was not covered	Comment
30	explanation to patient re FFA's did not ask if there is support staff in the room with photographer esp for FFA level of training prior to having to perform FFA's	Covered in Section 3
31	electronic medical records (EMR)	Added to T147-148
32	Effective communication skills with physicians, nurses, and co-workers	Not Assessable
33	Does the ophthalmic photographer perform other diagnostic test, i.e.: visual fields, biometry. Also must photographers assist physicians with papers and scanning documents, exporting data etc.	Not Assessable
34	basic interpretation	Covered General Subjects
35	Applanation Tonometry/ Pachymetry (esp. using the OCT).	Outside of Scope
36	Angiographer should always know state laws for medical coverage of performing test and physician responsibility	Not Assessable

Respondent Comments

Respondents were given the opportunity to provide general comments, questions or concerns related to the survey using a text box drop down field. Table 21 outlines the 63 comments posted by respondents. The Advisory Committee reviewed and considered all comments – no specific actions were warranted based upon this review.

Please use the space below to add any comments you may have.

(Text Box)

Table 21. Respondent Comments

<u>Respondent Comments</u>
would this survey be shown to physicians
We need to keep in mind that angiographers need not do anterior or external studies by simple definition. As well as most places are totally digital now not like when we started and film has gone by the way side.
We have a full time RN to do injections and monitor patients.
We completely stopped using film 6 months ago, although all 3 photographers in our practice can do so. I'm interested in addressing injection of dye. Connecticut does not allow a non-licensed person to inject. How many states allow a photographer/tech to do so?

<u>Respondent Comments</u>
We are unable to attend any conferences, due to budget restraints, would appreciate education, from basic to advanced, available via e-mail
usually patient dilated prior to seating with angiographer - hopefully contraindications to drops already assessed
Typo on Page 1 during explanation "i addition" should be in addition. Might add an active link to the OPS web site (open in new window) linking to the CRA requirements. Users cannot "choose" to follow or not follow DICOM standards - they can understand the concepts of DICOM and then either choose to purchase systems supporting DICOM and integrate with other DICOM systems. Ultimately the infrastructure of where they are will dictate the applicability of DICOM - maybe 2 questions. I think users need to know how to organize archives...but are there established and well-published state and federal regulations (perhaps 2 different questions).
tried to answer in the average day of what is done
To most of the questions discussing film Extremely Important applied. However, I have not used my experience and knowledge in so long the importance is gone
time to phase out film processing
This survey covers the tasks of the Ophthalmic Photographer/Imaging Specialist in great detail.
This is a fantastic idea. I'm studying hard to become a CRA. Anyway I can help or contribute makes me feel better.
The title of Certified Retinal Angiographer (CRA) has always been to narrow a title to adequately encompass what an ophthalmic photographer does. External, slit lamp and surgical photography all being left out. Now we have an OCT-C! Next it will be certifications for external photography - then slit lamp photography or perhaps an HRT-C, maybe a SD-OCT-C. There really is no certification for a true Ophthalmic Photographer. The way it is going - there never will be - just certifications for portions of the position.
The time of film is over. Very good in general but not easy to understand some of the questions that apply to US regulations. Many of the tasks are out of the photographers hands due to hospital and provincial regulations.
The survey was thorough almost to a fault. Very few ophthalmic photographers are exposed to the full range of instrumentation and procedures you described. In any clinical setting high competence in every procedure specific to that practice would be necessary.
The role of the ophthalmic photographer varies so widely from state to state, and practice to practice, it is problematic to imply any other entry skill other than capturing images of a retinal angiogram. For many offices, that is the sum total of the job. For others, there's an unlimited demand on any skill the photographer may possess, even carting boxes to satellite offices!
The rating system for this survey should be labeled differently. Although one may not perform or rarely performs the tasks stated the ratings make it appear that one does not understand or feel that they are important.
Thanks to all involved in providing this survey.
Thanks for the opportunity.
Thanks for doing this survey! Hey, why have the due date on the same date as taxes are due?? :-)
tasks completed by doctor orders only
Some questions seemed to only have 1 answer, i.e. following HIPPA stds, of course it is extremely important! Seemed some questions were, "leading" questions.
Since the title is Retinal Angiographer, I focused my answers to that point. Many Imagers work in a broader setting, go to OR, do video, gonio, slit lamp-are we then considered out of the title of "retinal angiographer"?

<u>Respondent Comments</u>
Seemed like the survey was slanted to what I think all angiographers do. I felt it should have been more about what I actually do.
Responsibilities can, and do, vary GREATLY depending upon circumstances.
Pretty much covers the entire spectrum. Even though some photographers do not typically perform some duties, they should still be aware of what they are and their role in those duties, should they be called upon to perform them in the future.
Photographer should have a clear understanding of the laws in his/her state covering whether or not they are allowed to dilate eyes and/or perform IV injections of dye.
Pentacam, GDx, Topps, SLO etc. proficiency necessary to do one's job naturally depends on whether your office had this technology and if you were the technician responsible for it,
Outstanding effort Beth Anne!!
Open-Ended Response
Need to put in salaries of above based on a minimum of geographic area, time in grade.
Many of the items listed are dependent on job context and difficult to apply universally
Many of the "does not perform" areas I checked were because I do not perform them (for instance, my office doesn't do ICG or slit lamp photography
less film info and more digital info ie computers hardware and software
Job tasks/requirements may vary with employer
It's a pity that the next generation of "photographers" will miss the darkroom experience.
In my practice I have never used film, ICG, or auto fluorescence.
I think the survey questions covered all the bases.
I think the questions about "film and developing might be a bit outdated...When I took my CRA exam all of that was on there and it was before digital, but I do not know any offices, at least in this area (CT) that use film, so how can they possibly become proficient or be examined with this past testing...
I think many of us know how to process and print film and can do all of the asked processes involving film but most are digital now and don't use these skills any more. Since we are totally digital I checked no to the film analog processes.
I think it is important to have basic film knowledge, even though most people, including myself, mostly use digital now. My backup to digital is film, and I have had to go back to that a couple of times. I hope the OPS keeps that part in the CRA test.
I hope I answered the questions adequately. I only perform fl.angiography, and only once per week. I do this in a hospital setting and because I am in Canada, an RN must do all patient workup and injecting and monitoring of the patient. However I do feel it is important to be aware of all of those things as a secondary person should the nurse leave the room temporarily. The more aware you are the better part of the team you will be.
I have worked in Retina for 12 years now. Used film about 10 years ago. Now all digital. Good info to know but I think the majority of physicians are digital. It should be covered but not required at this point. Maybe I am just spoiled. :)
I have been doing angiography for nearly ten years now and never used film.
I feel that there should be a certification that includes all aspects of ophthalmic photography (ie COPRA). CRA says to me angiography only. A problem with this survey is that it does not take into account the fact that many of us are not exposed to SLO and ICG. I was not sure how to respond to those questions.

<u>Respondent Comments</u>
I feel film knowledge and processing are still very important to the CRA designation. In a primary digital age computers do malfunction and the use of taking film and hand developing is a alternate way of saving the patient from having to come back or losing valuable information (this has happened in our clinic infrequently but patients are appreciative of the knowledge of knowing what to do when a crisis occurs). With the CRA designation an employer will feel confident knowing that a CRA can produce good results with old technology as well as advancing technology.
I based some of my answers on what equipment I have available at my present office however a general knowledge of all equipment used in the field is a plus for any ophthalmic photographer
I am Professional photographer, but now we didn't perform anymore film photography. We use only digital photography.
have only used film one time since 2001, but still could if the computers go down again...
Hard to assess some material as I thought it was important to the job itself (at least in knowing the principles) but not something I really thought a CRA always does.
Good survey
Given the advances in digital technologies, I would like to see certification available that does not require such extensive experience in film/developing. It would be difficult to access these supplies to qualify for current certification requirements.
Film is rarely used and I do not feel that it should be only a small part of the exam. Of those that use film still, many get the film developed elsewhere.
Excellent!!
Even tho I do not perform film photography/angiography I feel it is still important to have an understanding of how photography began. I do not feel it should have been omitted from the CRA performance exam
CRA and OCT-C should be ONE certification. The separate OCT-C is ridiculous, and implies OPS are trying to stay relevant, and in danger of losing the recognition and status of the CRA. The two need to be one title to maintain the true value of imagers. Imagers MUST be up an ALL imaging to retain our respect in the community. People who can only operate an OCT to NOT belong along side the CRA in status.
Coming from a private practice I have to be a jack of all trades. In a span of an hour I can do complete workups, OCTs, fundus photography, fluoresceins, book surgery, assist with intravitreal injections etc. So really depending on the workplace situation depends on what a competent retinal angiographer will do. I found it hard to separate what I do with some of the questions that were asked. Also having been involved with digital photography the last 6 years makes me realize what I have forgotten about film.
As an independent contractor for a small private practice Ophthalmologist I do not have access to OCT nor do we perform ICG angiography. I feel they are important procedures and the OPS should continue to offer excellent training and exposure to these areas in the field that new ones that are developing.
Although many techniques and procedures are important at an academic institution, they do not apply to most practices and the photographer would not have access or exposure and would be unrealistic to be mandatory for certification.
Although it may be useful for retinal angiographers to know and understand the aspects of film processing, developing, and enlarging, we simply do not perform these tasks any more. As we have made the switch to digital, our responsibilities have become increasingly predicated upon a knowledge and understanding of computers and electronic technology. Basic computer skills have become essential. Furthermore, as more clinical trials are accepting digital images, the photographers are required to have MORE than basic computer skills for image submission. For example, an understanding of different file formats is crucial to our everyday work experience.

Respondent Comments
All my answers were based on "competency of an entry level retinal angiographer". Some of the questions regarding other imaging modalities, imho, are/should be reserved for retinal angiographers who are more experienced than "entry level", such as B-scan, slit lamp and gonio photography.
.. No one processes film for angiography anymore. We can't expect folks to be tested on a dead art.

Decision Criteria for Task Exclusion

After consideration of respondent comments, tasks identified as potentially having been left off of the survey, and demographic information, the Advisory Committee was asked to consider the resulting survey listing of tasks, and the importance and frequency data associated with each task. In order to do this, summary data was calculated for each of the 253 tasks including performance frequency and mean importance data. Three additional analyses were calculated to evaluate demographic subgroup impact on tasks identified for exclusion from assessment. The analyses conducted were based upon the following variables:

1. Percentage of tasks identified as *not performed*;
2. Mean Importance calculations;
3. Subgroup Analysis of years experience;
4. Subgroup Analysis of practice setting;
5. Subgroup Analysis of geographic practice region.

Individual criteria analysis data for the five variables can be found in Appendices D, E, F, G, and H. A spreadsheet detailing the Advisory Committee decisions and actions on individual tasks may be found in Appendix I. *Content Outline Review – Task Exclusion/Edit Documentation*.

Rule 1. Percentage of tasks identified as *Not Performed*;

The first decision rule was made based on the percentage of respondents who indicated that they did not perform a task. To qualify for inclusion, the Advisory Committee decided that a task had to have at least 76% of the respondent population indicating that the task **was performed**. This decision threshold was the same as that adopted for the last full Job Analysis, completed in 2004. 49 tasks were eliminated based on this decision criterion as outlined in Table 22. Of those 49 tasks, one was also identified for elimination based upon the importance rating criterion as described in Rule 2, as highlighted on the table below. Appendix D presents a full listing of all of the survey tasks sorted in descending “Not Performed” percentage order.

Note – the tasks in Table 22 that are in italics are not necessarily removed from the outline, but are included as headings and sub-headings for tasks identified for exclusion, to provide context for interpretation of eliminated tasks. The complete text of each task, as it appeared on the survey, may be found in Appendix A. A Survey of the Role of Retinal Angiographers Practicing in North America.

Table 22. Tasks Identified as Not Performed

Certified Retinal Angiographer				
III. Patient Management				
		G.	<i>Administers prescribed drops:</i>	
OUT/Freq	T67		2	performs punctal occlusion
V. General Photography - Film				
OUT/Freq	T74	A.	Stocks and inventories the photographic suite supplies	
		C.	<i>Demonstrates the use of the following image output equipment and materials:</i>	
Out/Freq	T81		1	enlarger
Out/Freq	T82		2	contact printer
Out/Freq	T83		3	film processing equipment for black and white film
Out/Freq	T84		4	automatic processing equipment for black and white film
Out/Freq	T85		5	photographic papers
		D.	<i>Demonstrates the ability to process black and white film:</i>	
			1	<i>load reels and tanks to process film using:</i>
Out/Freq	T86		a.	manual processing equipment
Out/Freq	T87		b.	automatic processing equipment
Out/Freq	T88		2	select and use processing chemicals
Out/Freq	T89		3	coordinate chemical temperature, dilution and timing with film exposure
			4	<i>monitor processed film for:</i>
OUT/Freq	T90		a.	contrast
OUT/Freq	T91		b.	density
OUT/Freq	T92		c.	granularity
OUT/Freq	T93		5	prepare film for filing/viewing
		E.	<i>Demonstrates the ability to print black and white film:</i>	
OUT/Freq	T94		1	use appropriate safe-light conditions
			2	<i>generate a contact print with:</i>
Out/Freq	T95		a.	an enlarger
Out/Freq	T96		b.	a contact printer
			3	generate a contact print:
OUT/Freq	T97		a.	on paper
OUT/Freq	T98		b.	on film
OUT/Freq	T99		4	generate an enlargement on paper
OUT/Freq	T100	F.	Recognizes and corrects processing and printing artifacts	
XI.	Fundus Autofluorescence/using Scanning Laser Ophthalmoscope (SLO)/ Modified Fundus Cameras			
Out/Freq	T205	A.	Uses of excitation and barrier filters/wavelengths	<i>T205-T209 Moved/Out/single</i>
Out/Freq	T206	B.	Performs image acquisition - mean calculations	<i>new task below position T171</i>
Out/Freq	T207	C.	Understands noise effect and gain	
Out/Freq	T208	D.	Understands the causes of artifacts (e.g., retinal bleaching w/CSIO)	
Out/Freq	T209	E.	Uses disease specific applications (e.g., RPE changes/lipofuscin)	

TASKS Identified as Not Performed (continued)			
XII. Indocyanine Green (ICG) Angiography			
		C.	<i>Performs descriptive angiographic interpretation by recognizing:</i>
Out/Freq	T212		1 the phases of circulation
Out/Freq	T213		2 the mechanisms of “hyperfluorescence”
Out/Freq	T214		3 the mechanisms of “hypofluorescence”
Out/Freq	T215		4 the anatomical location of lesions
Out/Freq	T216	D.	Uses high speed video
XIII. Optical Coherence Tomography (OCT)			
		A.	<i>Performs OCT imaging:</i>
Out/Freq	T219		3 anterior segment
Out/Freq	T222	D.	Performs spectral-domain OCT
XIV. External Photographs			
Out/Freq	T223	A.	Performs motility photography
Out/Freq	T224	B.	Performs surgical photography
Out/Freq	T225	C.	Performs oculoplastics and/or external dermatological photography
XV. Slit Lamp			
Out/Freq	T226	A.	Applies lighting techniques and exposure settings
Out/Freq	T227	B.	Uses stains and dyes
Out/Freq	T228	C.	Performs gonio photography
Out/Freq	T229	D.	Determines magnification
XVI. Uses Other Imaging Technologies including:			
Out/Freq	T230	A.	Non-mydratic fundus cameras
Out/Freq	T231	C.	cSLO (Confocal Scanning Laser Ophthalmoscope)
Out/Freq/IMPT	T232	D.	3-D Ultrasonography
Out/Freq	T233	E.	B-Scan Ultrasonography
Out/Freq	T234	F.	Corneal Endothelial Imaging
Out/Freq	T235	G.	Corneal Topography (e.g., Pentacam and 3-D Wave)
Out/Freq	T236	H.	Hand-held Fundus Camera (e.g., Retcam, Genesis)
Out/Freq	T237	I.	Ultra Wide Field Fundus Imaging
Out/Freq	T238	J.	Other Ophthalmic Scanning Modalities (e.g., HRT, GDX, TOPPS)

Rule 2. Mean Importance Rating

The second decision rule established by the Advisory Committee was that the mean importance rating for an individual task must be greater than 3.00 to be included on the final Content Outlines. Relative to the rating scale used for the survey, this mean threshold can be interpreted as a task being assigned at minimum, an *average or medium importance* rating. This threshold was the same as that established for the 2004 Job Analysis Survey.

Only one task (*T-232 Uses Other Imaging Technologies: 3-D Ultrasonography*) was identified for elimination based on this decision criterion. This task was also identified for exclusion for not meeting the Rule 1—“*Not Performed*” criteria—as highlighted on the table below. Appendix E provides a complete listing of tasks sorted by mean importance ratings.

The survey results highlight an important characteristic of the role of the Retinal Angiographer in today's highly diverse marketplace. It was the intent of the Advisory Committee to create a survey that was truly inclusive of the range of tasks performed; these results indicate that this goal was accomplished. Large numbers of respondents did not perform all tasks, as evidenced by the elimination of 49 tasks based upon frequency decisions, but those indicating they did perform the 49 tasks assigned them high importance ratings (only one task was identified for exclusion based upon importance ratings); therefore we can assume that the respondents performing the tasks in question considered them critical to competent practice. These results provide the OPS BOC with helpful information concerning the role of the Angiographer, and the impact of new technologies in the field. The results provide research-based understanding that while new technologies are impacting what some Angiographers do on the job – the impact is not significant enough at this time to change the nature of the delineation of the role. This concept is further supported by the performance of sub-group analyses as outlined below, which indicated that there was no appreciable variability among the sub-group ratings of task importance.

Rule 3. Mean Importance in relation to Years of Experience

To evaluate whether the practice tasks were viewed differently by practitioners of varying levels of experience, the data was evaluated in relation to respondent years of professional experience. The evaluation results support the content validation model claim that that Retinal Angiography practice is consistent regardless of years of experience. Using the same criteria from Rule 2 (task inclusion requirement of a mean rating of 3.0 or greater), data analysis was performed on four individual age groups as follows:

Years of Professional Experience Groupings

Group 1:	0 to 10
Group 2:	11 to 20
Group 3:	20 and Over

It was established that two out of the four groups must assign a task a mean importance rating of 3.0 or higher (showing agreement among the age ranges) in order to qualify for inclusion in the final content outline. Applying this criterion, agreement was perfect among all three age groupings: There were **no tasks** that were identified as not critical to two of the three age groups that had not been previously identified by the *mean importance* and *not performed* exclusion thresholds. Appendix F presents this data.

Rule 4. Mean Importance by Practice Setting

To assure that the role of the Retinal Angiographer was not viewed differently based upon where respondents worked, responses were analyzed by practice settings. It was established that two of the five practice setting groups had to assign a mean importance rating of higher than 3.0 (showing agreement among practice settings) in order to qualify for inclusion in the final content outline.

Practice Setting Groupings:

- Group 1: Hospital/Medical Facility
- Group 2: University Hospital
- Group 3: Private Practice (general)
- Group 4: Private Practice (retina)
- Group 5: Independent Contractor (other)

Applying this criterion, agreement was again so high among the groups, that **no tasks** were identified for exclusion that had not been eliminated based upon the Rules 1 and 2 (not performed and criticality). This analysis provided additional support to the content validation model: The tasks identified as critical to competent practice were common among all work settings. Appendix G presents this data.

Rule 5. Mean Importance Rating in Relation to Geographic Practice Regions

To evaluate whether Retinal Angiographic practice differed across geographic regions, analysis of responses by region was conducted. The respondent groups were broken into five geographic areas as follows:

- Group 1: Pacific/Southwest/West
- Group 2: Great Lakes/Midwest
- Group 3: Southeast
- Group 4: Northeast
- Group 5: U.S. Islands/Other

Two of the five groups had to assign an importance rating of 3.0 or higher in order for a task to be included on the final content outline. Once again, there was no discernable difference among the responses from the three regional areas and **no tasks** were identified based upon this criterion that had not been previously identified by the *mean importance* and *not performed* exclusion thresholds. Appendix H presents this data.

Content Outlines

After applying the five exclusion rules above, 49 tasks were identified for removal from the task listing. Of the resulting 204 tasks, two tasks (T177-T178 represented in Table 23 below) were eliminated from the outline as they duplicated tasks T-146 and T-147 show in Table 24 below.

Table 23. Tasks eliminated due to duplication within the outline

X. Fluorescein Angiography			
	A.	Performs Fluorescein Angiography including:	
		make preparations for IV fluorescein	
T175	1	injection	
T176	2	Identify patient demographics	
	3	perform red free photography:	
Out - duplicates	T177	a.	non-stereoscopic images
T-172 sub a, b	T178	b.	stereoscopic images

Table 24. Tasks Restated – Fundus Photography

IX. Fundus Photography			
	13	uses monochromatic filters/ wavelength to produce:	
	a.	red free (green filter) images	
T146	1	non-stereoscopic images	
T147	2	stereoscopic images	
T148	b.	green free (red filter) images	
T149	c.	autofluorescence images	
T150	d.	fundus autofluorescence (FAF) images	

Tasks T149-T153 (shown in Table 25) had lower than average frequency values, and the Advisory Committee felt that the content area should be renamed from *Image Grading: The use of and coordination with Reading Centers* to the more general *Clinical Trials Imaging* which they believed would better describe the tasks as performed by most practitioners. The Committee also felt that Tasks T149-153 could be restated into the two more general tasks (labeled TXXX A. and TXXX B.) below. These tasks became Tasks T126-127 on the final outline, bringing the final task accounting to 199 tasks (204 tasks, minus two duplicate tasks removed, minus five Image Grading Tasks removed, plus two Clinical Trials Imaging tasks restated). The final content outline including all of the described edits may be found in Appendix K.

Table 25. Task Restating – Clinical Trials

VIII. Image Grading: The use of and coordination with Reading Centers (out restated below)				
VIII. Clinical Trials Imaging (new)				
New	TXXX	A.	Understands standard clinical trial processes, protocols and certification procedures	
New	TXXX	B.	Exports masked data and transfers images to reading centers	
Edited/out	T149	A.	Understands reading center certification	<i>(T149-153 reworked into Tasks TXXX A and TXXX B above)</i>
Edited/out	T150	B.	Understands reading center protocols	
Edited/out	T151	C.	Communicates with principal investigators and study coordinators	
Edited/out	T152	D.	Transfers images	
Edited/out	T153	E.	Masks patient data	

The Advisory Committee was then asked to determine how the remaining 199 critical tasks should be assigned to the two examination content outlines: the Multiple-Choice Examination and the Clinical/Performance Examination. Each of the remaining 199 tasks was evaluated against the following four decision criteria:

1. Should the task be assessed on the Multiple-Choice Examination only?
2. Should the task be assessed on the Performance Examination only?
3. Should the task be assessed on both the Multiple Choice and the Performance Examinations?
4. Should this task be eliminated from the outline because it can not be reliably observed or measured?

All tasks were identified as being readily observed or measurable, and a careful evaluation of the resulting task outline was conducted. The Committee discussed at length the goal of the certification program to provide the most cost-effective, reliable testing instrument. Discussion continued that psychometric research supports that while the Performance Examination was critical for capturing a small subset of skills related to competence, whenever feasible, tasks would be optimally tested via the written examination format. Subsequently, a shift can be noted between the divisions of tasks between the two examinations. The Multiple-Choice Examination now includes more tasks than was previously the case, as numerous tasks that were tested on the Performance Examination were identified for assessment on the Multiple-Choice Examination. It was also noted that the few tasks left on the outline associated with the use of film-based imaging could most reliably be tested on the written examination at this time. The Performance Examination was realigned to cover Fundus Photography and Fluorescein Angiography exclusively.

With this philosophy established, each task was evaluated for placement on the Written Examination, Performance Examination or both. From this list, 198 tasks were included on the final content outline (examination specifications) for the Multiple-Choice Examination; 22 of these tasks are also identified for assessment on the Performance Examination. The Performance

Examination includes those 22 tasks plus 2 additional tasks which are exclusive to the Performance Examination.

The Advisory Committee then discussed the length of the two examinations. The Committee reviewed the final Written Examination Content Outline and suggested that a four-option multiple choice examination made up of 150 items would adequately cover the content. A recommendation to change the examination from its current length of 175 questions to 150 questions was made. The length of the performance examination could not be assessed, since the scenarios to test the 23 tasks had yet to be created. The Advisory Committee felt confident that the Subject Matter Experts writing the Performance Examination Scenarios would create an examination of appropriate length.

Content Area Weighting

Once the final content outlines were established for the Written and Performance Examinations, the Committee was asked to set the weighting (emphasis) for each of the content areas. Variables such as the difficulty of tasks within content areas, the critical nature (deadly and dangerous) of content areas and the numbers of tasks identified were discussed. The content area weighting decisions are outlined in Appendix K.

Conclusion

The final approved task listings were then translated into complete Examination Content Outlines, which will serve as the blueprint used to develop the Multiple Choice and Performance Certification Examinations. Adoption of these Outlines and content area weightings thereby established the link between job performance of critical tasks, and successful examination performance.