Task Analysis: Foundation for a Valid Examination

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This paper discusses the concept of task analysis and its relationship to the validity of the Nuclear Medicine Technologist Certification Examination, which is administered by the Nuclear Medicine Technologist Certification Board (NMTCB). Components of the NMTCB Critical Task Survey and the survey procedure are presented. We suggest how survey results can be used to gain information about the current practice of nuclear medicine and describe how results will be translated into NMTCB examination content specifications. Interested nuclear medicine technologists are encouraged to participate in the task analysis process.

This fall, the NMTCB will begin the process of reviewing the NMTCB examination Task Analysis. This review process is a vital component of the NMTCB's efforts to ensure that the examination reflects the current, entry-level practice of nuclear medicine technologists nationwide. To accomplish this goal, some method for determining what constitutes current practice is necessary. The NMTCB has chosen to develop a "Critical Task Survey."

COMPONENTS OF THE CRITICAL TASK SURVEY

The Critical Task Survey, being developed by the NMTCB with the assistance of American College Testing (ACT), is comprised of three parts. The first part consists of several demographic questions. Demographic data is collected so that practice characteristics of subpopulations can be examined (e.g., rural versus urban, entry-level versus senior technologists). It is important to note, however, that survey respondents are only asked to provide routine demographic information. Respondents' names are not requested and only an identification number is used to monitor survey response.

The second section of the survey is a list of procedures commonly performed by nuclear medicine technologists and of equipment commonly found in nuclear medicine departments. Survey participants will be asked to indicate what equipment is found in their departments and which procedures they perform. Items appearing on the lists of procedures and equipment have been chosen by the NMTCB Board of Directors and refined by the NMTCB Task Analysis Committee. There will be space provided for technologists to add other commonly used equipment or procedures that do not appear on the lists.

The final section of the survey consists of several task statements. Each statement is a sentence describing an important task performed by nuclear medicine technologists. In this section, survey respondents will be asked to indicate how frequently they perform the task and to estimate the criticality of the task; that is, the seriousness of any medical or institutional consequences if the task is performed improperly. Also, respondents will be asked to indicate the level of practice at which a technologist would be expected to perform the task. For example, it will be useful to learn if successful performance of the task is generally expected at entry level, after six months on the job, or after one year.

CRITICAL ROLE OF SURVEY

For any ongoing testing program, validity is a primary concern. Validity is the extent to which a test measures what it is supposed to measure. Standards promulgated by courts (*1–3*), regulatory agencies (*4*), and the psychometric profession(*5–6*) all require that licensure and certification testing programs measure valid components of candidates' knowledge, skills, and abilities. Specifically, the kinds of knowledge, skills, and abilities that should be assessed are those that are job-related. Thus, in order for the NMTCB to remain a valid and useful certification examination, it must continue to measure current, important, job-related aspects of nuclear medicine technology practice.

It is important to note that this kind of rigorous validation procedure is not a one-time event. As the professional practice of nuclear medicine technology changes, members of the profession must be resurveyed to determine to what extent new diagnostic tools, radiopharmaceuticals, and specialized tasks are being performed and to what extent dated procedures and equipment are being abandoned. In rapidly changing professions, such as nuclear medicine technology, the revalidation of examination content may need to be performed frequently.

Indeed, the NMTCB has recognized the critical importance of continually revising and updating the task list, which forms

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the basis of the NMTCB examination. The NMTCB has also used the results of previous critical task surveys to disseminate information describing current practice to nuclear medicine technologists (*7–9*). A complete report on the latest task validation survey and a comprehensive list of the tasks approved for use on the current NMTCB examination appeared in the *Journal of Nuclear Medicine Technology* in 1988 (*10*).

DETERMINATION OF SURVEY PARTICIPANTS

Rather than survey all practicing professionals in the field of nuclear medicine technology, a sample of people has been selected. The sample is weighted to include a significant majority of practicing, certified nuclear medicine technologists. Also represented in the survey will be educators, program directors, nuclear physicians, radiopharmacists, and others knowledgeable about the practice of nuclear medicine technology. From these groups, a random sample of people will be selected, in order to achieve appropriate representation by geographic region, gender, ethnicity, age, and practice setting.

A notification will be mailed to all of those randomly selected to participate in the survey. Approximately two weeks after the selected participants receive their notification, the actual survey will arrive. It is, of course, vitally important that all of those who receive the survey complete it accurately and return it promptly. This year's survey has been designed to take one hour, at most, of respondents' time. This hour of professional service will provide participants with an important opportunity to influence the direction of their profession.

USE OF SURVEY RESULTS

Data collected from the survey will be analyzed with two goals in mind. The first and primary goal of the data analysis is to identify those elements of nuclear medicine technology practice that are current, important, and frequently performed. Tasks that are only rarely performed will be dropped from the list of task statements. Tasks that did not appear on a previous task list but, due to the survey results, now appear to be performed regularly will be added to the list of task statements. This process ensures that only relevant, widely performed tasks and the knowledge, skills, and abilities associated with those tasks, are assessed on the NMTCB examination.

Second, responses to the lists of equipment and procedures will be used to identify the equipment and procedures that are generally found in nuclear medicine departments. The finalized equipment and procedure lists will be used to assist in generating questions for the NMTCB examination. Based on the survey results, rarely used equipment or seldomly performed procedures will be removed from the lists, ensuring that only the most common equipment and procedures appear in examination questions.

CONCLUSION

The upcoming NMTCB Critical Task Survey represents a vital component in the development of the NMTCB examination. The survey helps ensure that current, important, job-related knowledge, skills, and abilities are tested. A properly conducted survey and accurate job analysis data form the foundation upon which a sound testing program rests. To achieve the most accurate results possible, diverse participation and a high response rate from survey participants are essential. Results of the survey will provide members of the nuclear medicine technology profession with an accurate picture of current practices and will influence professional certification in the future.

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