

**EXPANDED COMPETENCIES FOR THE  
NUCLEAR MEDICINE ADVANCED ASSOCIATE (NMAA)**

**INTRODUCTION**

The SNMITS (formerly the Society of Nuclear Medicine Technologist Section) published the first draft of expected competencies for the Nuclear Medicine Advanced Practitioner (NMAA) in March 2007 (1). These competencies were based on existing scopes of practice, knowledge base, and the clinical skills expected of other lateral middle-level providers, primarily Physician Assistants (PA), Radiologist Assistants (RA), and Nurse Practitioners (NP). Results from the 2005 SNMITS physician survey (2) were also used to guide the development of practice areas for the NMAA (3-5).

The first document focused on the desired clinical and administrative skill sets. It was assumed that because these programs would be offered at the graduate level, course work in research methods, ethical and professional issues, and health care systems issues would be included in an institution's curriculum and so were purposefully omitted from the document. Upon further consideration, the Advanced Practice Task Force decided to expand the original competency list and explicitly outline all the knowledge, skills, and attitudes that should be demonstrated by an advanced practice professional. This decision was prompted by an extensive literature search on curriculum development for graduate level education in the health professions with the intention to more fully align the NMAA competencies with complementary actions and perspectives of other participants in the medical field.

The general concepts included in the competency domains outlined in this document have been embraced by a broad spectrum of health and medical education programs throughout the US and Europe. They are similar to education models promoted by the Accreditation Council of Graduate Medical Education (ACGME)'s "Outcomes Project" (6). This project resulted in the establishment of baseline standards and competencies for medical residents to meet the needs of the modern healthcare system, far surpassing the more traditional roles of dispensing patient care and medical knowledge. Additionally, Project Professionalism, published by the American Board of Internal Medicine, serves as a guide for altruistic and communication characteristics that are also important for instruction and assessment in medical education (7). Accordingly, the Advanced Practice Task Force has added competencies in Interpersonal and Communication, Practice-Based Decision Making, and Professionalism. The section on Administrative Competencies has been renamed Systems-Based Practice. Competencies pertaining to patient care as found in the original General Core Competencies have been outlined and expanded upon in a new competency domain, Patient Care. The remaining competencies in the General Core plus those in the Cardiology, Oncology and Therapy, and Elective Competencies have been combined into a new domain, Clinical Nuclear Medicine.

It is anticipated that NMAAs will be required to demonstrate a high level of autonomy, technical sophistication, advanced clinical knowledge and strong critical thinking and decision-making skills. They will be highly capable and motivated professionals, comfortable with the sciences, seeking increased clinical responsibilities and education at an advanced degree level. The new competencies will more clearly delineate for the profession and the public what can be expected of the practicing NMAA.

NMAAs are projected to work in general nuclear medicine settings as well as in specialty settings, such as oncology and cardiology. The scope of practice for the NMAA is anticipated to subsume many of the patient care and managerial functions currently provided by a wide array of ancillary personnel and will also include advanced knowledge and skills of the practicing nuclear medicine technologist. Additionally, the NMAA could assume certain physician tasks under the discretion of the overseeing radiologist or attending physician. Candidates for NMAA programs would be credentialed by Nuclear Medicine Technology Certification Board (NMTCB) or the American Registry of Radiologic Technologists (ARRT-N) and have clinical practice experience deemed appropriate by institutional admissions committees. The NMTCB and the ARRT have agreed to collaborate for the development of a certification examination for the credentialing of advanced imaging practitioners.

### **COMPETENCY DOMAINS**

The core competencies outlined in this document are intended to serve as a guide in the development of the curriculum for NMAA programs, which will be offered at the master's degree level. These competencies primarily reflect the clinical tasks of an NMAA but NMAAs may take on additional responsibilities at the discretion of the supervising physician. They were compiled in consideration of tasks required to work with general as well as specific patient populations in diagnostic and therapeutic settings.

These core competencies drive the professional curriculum in terms of content and most importantly, in terms of assessment. The professional curriculum is expected to utilize a competency-based model where responsibilities and functions are defined by clinical competencies integrated with physician interaction and supervision. Education programs will be outcomes based and must provide learning opportunities in each competency domain. Assessment of student achievement in each of the domains should be undertaken at multiple intervals using multiple assessment methods.

The six competency domains are Patient Care, Clinical Nuclear Medicine, Interpersonal and Communication Skills, Practice-based Decision Making, Professionalism, and Systems-Based Practice. Patient Care Competencies are described for general nuclear medicine procedures in all settings. Clinical Nuclear Medicine competencies incorporate general nuclear medicine procedures with specialty competences outlined for cardiology, therapy, and elective competencies for those skills in which some NMAAs may choose to become proficient depending on their practice setting and the evolution of the profession. Interpersonal Communication focuses on the ability to work effectively with others as a member or leader of a health care team or other professional group with an emphasis on demonstrating team communication skills and leadership skills. Practice-based decision making is the ability to analyze practice experience and perform practice-based improvement activities using a systematic methodology and may involve such activities as quality improvement programs, patient safety programs, or grand round conferences. Professionalism encompasses the adherence to ethical principles such as the provision of care, confidentiality, informed consent, autonomy as well as accountability to patients, society, and the profession. Systems-based Practice, formerly known as Administrative Competencies, encompasses many of the quality assurance, accreditation, and coding and billing duties required to those assuming administrative tasks.

## PATIENT CARE

1. Communicate effectively and demonstrate caring, respectful and ethical behaviors when interacting with patients, their families, physicians and other health care professionals. [see Interpersonal and Communication Skills competency domain)
2. Counsel and educate patients and their families.
  - a. Obtain patient informed consent for required procedures according to state law and institutional policy.
  - b. Educate patients on pre-procedural preparation and post-procedural care.
3. Make informed decisions about diagnostic and therapeutic procedures based on patient information and preferences, up-to-date scientific evidence, and clinical judgment.
  - a. Gather and evaluate essential information including correlative studies about patients.
  - b. Perform history and physical examinations
  - c. Evaluate findings for contraindications to testing and for indicators of additional patient pathology.
  - d. Consult with physician as needed.
  - e. Counsel patient and family as indicated.
4. Determine and implement a plan of care
  - a. Use professional judgment to recommend or adapt protocols for procedures to improve diagnostic quality and outcome.
  - b. Consult with the physician or appropriate health care provider to determine a modified action plan when necessary.
  - c. Report findings to referring physicians and patients per protocol.
5. Order, administer and monitor patients who are receiving sedating pharmaceuticals as indicated by patient profile and diagnostic or therapeutic procedure as allowable by state and federal statutes.
6. Implement additional requirements for patient care for diagnostic or therapeutic procedures.
  - a. Perform patient bladder catheterizations.
  - b. Implement additional routes of radiopharmaceutical administration other than IV injection or oral
  - c. Monitor vital signs and physiological parameters.
  - d. Evaluate the need for contrast media.
7. Provide indicated intervention per patient emergency event.
  - a. Provide supportive medical management
  - b. Basic life support
  - c. Advanced life support
  - d. Facilitate transfer to definitive care environment.

## CLINICAL NUCLEAR MEDICINE

### General Core Competencies

1. Review requests and physician directives for nuclear medicine procedures.
  - a. Review request for imaging procedures per protocol.
  - b. Ensure the appropriate diagnostic study has been requested for the clinical presentation.
  - c. Evaluate collaborative laboratory for indications/contraindications.
  - d. Order or facilitate adjunctive pharmaceuticals for the imaging procedure.
  - e. Review request for therapy procedures per protocol.
  - f. Evaluate clinical criteria for therapy, including expected biodistribution of radiotherapeutic pharmaceutical.
  - g. Order or facilitate adjunctive pharmaceuticals for radiotherapy
  - h. Ensure appropriate laboratory work has been completed prior to treatment
  - i. Order appropriate radiotherapeutic pharmaceutical per physician direction including patient specific dosage.
2. Competently perform clinical nuclear medicine procedures considered essential in the area of practice.
  - a. Perform routine nuclear medicine procedures
  - b. Perform sentinel node imaging and lymphatic mapping
  - c. Prepare patients and ancillary equipment for radiation therapy planning using positron and multimodality imaging systems
3. Prescribe and administer pharmacologic and nonpharmacologic interventions as indicated by patient profile and diagnostic procedure as allowable by state and federal statutes.
4. Analyze results of the procedure and prepare a comprehensive report for the physician.
  - a. Assess image quality and other associated data.
  - b. Make a preliminary interpretation.
  - c. Document initial observations of imaging procedures according to protocol.
  - d. Communicate initial observations as per supervising physician discretion.
  - e. Report findings to referring physicians and patients per protocol.

### Cardiology Competencies

1. Successfully complete Advanced Cardiac Life Support credentialing.
  - a. Assess normal ECG to determine patient safety for stress testing.
  - b. Assess abnormal ECG conduction in preparation for stress testing.
2. Develop procedural policies and standards for pre-cardiac arrest emergencies that might occur within the department as directed by institutional policy and practice standards.
  - a. Identify the signs and symptoms of symptomatic bradycardia and symptomatic tachycardia.
  - b. Follow a step-by-step course of action for patients who develop asymptomatic bradycardia or tachycardia while in office (before, during or after stress test).

- c. Follow a step-by-step course of action for patients who develop signs and symptoms of bradycardia or tachycardia while in office (before, during or after stress test).
  - d. Identify the proper medications and dosages for stable cardiac rhythms.
  - e. List contraindications and precautions of common cardiac medications:
  - f. Follow a step-by-step approach to handling an ST elevated myocardial infarction (STEMI).
  - g. Follow a step-by-step approach to handling a stroke situation.
  - h. Identify and delegate personnel to perform various tasks in preparation for cardiac emergencies.
  - i. Incorporate the appropriate federal, state, and institutional guidelines into departmental policies and procedures.
3. Provide indicated intervention for a cardiac emergency event.
    - a. Establish IV access.
    - b. Identify and administer the appropriate medications for commonly occurring cardiac arrhythmias.
    - c. Perform cardiac compression or defibrillate patient if required.
    - d. Facilitate the ordering of labs or other tests as needed for a cardiac arrest event.
    - e. Facilitate admission of patient to hospital if necessary.
  4. Provide indicated intervention for non-cardiac emergency events.
  5. Manage crash cart for compliance.
    - a. Follow the appropriate guidelines in implementing regulation for managing the department's crash cart.
    - b. Inventory crash cart components according to institutional policy.
    - c. Assure that drugs are those recommended by the current AHA standards.
    - d. Properly dispose of expired drugs.
    - e. Replace expired drugs.
    - f. Perform quality assurance testing on defibrillator and document results.
  6. Take comprehensive patient history and evaluate for patient pathology.
    - a. Interview patient and document on department form a complete past and current cardiac history.
    - b. Establish NPO compliance.
    - c. Evaluate ambulatory ability.
    - d. Review non-cardiac history for prevalence to study requested.
    - e. Perform physical assessment.
  7. Evaluate patient laboratory biochemical markers relevant to cardiac pathology.
    - a. Review most recent laboratory test results relevant to cardiovascular diseases.
    - b. If applicable, review recent blood tests for elevated cardiac markers.
    - c. Order relevant blood tests if necessary (including pregnancy testing).
  8. Evaluate patient medications for contraindications to stress testing.
    - a. Understand contraindications to each type of stress test and evaluate for each.
    - b. Review patient medications for contraindications to exercise stress testing.
    - c. Conduct preoperative evaluation for orthopedic surgery, COPD, LBBB, Pacemaker/AICD.

9. Obtain patient informed consent as required for nuclear cardiology procedures according to state law and hospital policy.
  - a. Determine need for informed consent.
  - b. Understand the ethical and legal underpinnings of informed consent.
  - c. Determine capability of patient to give informed consent.
  - d. Explain procedure to the patient, including all components of a valid informed consent.
  - e. Obtain the patient's or guardian's signature.
  
10. Conduct treadmill testing per all protocol options.
  - a. Prepare patient for exercise protocol.
  - b. Determine type of exercise stress test.
  - c. Monitor ECG tracings and blood pressure for specific pathology and cardiac events during stress testing.
  - d. Use the appropriate termination protocols.
  - e. Calculate the Duke Treadmill Score.
  
11. Prescribe and administer interventional drugs for pharmacological stress.
  - a. Explain the indications and contraindications for each pharmacologic stress agent.
  - b. Identify the physiological action of each pharmacologic agent as it relates to stress-testing.
  - c. Calculate total dose, volume, and dose rate for each of the most common pharmacological stress agents.
  - d. Prepare pharmacologic agents for administration utilizing sterile technique.
  - e. Administer pharmacologic agents.
  - f. Monitor the patient's response to pharmacologic agents and treat patients appropriately in the event of an adverse effect.
  
12. Analyze results of the stress test and imaging portion of the examination and prepare a comprehensive report for the physician.
  - a. Create a comprehensive report detailing the results of the stress portion of the test.
  - b. Examine rotating raw data from both stress and resting image acquisitions and evaluate image quality.
  - c. Review data for incidental finding outside of the heart.
  - d. Compare and contrast stress vs. resting processed images for perfusion defects.
  - e. Determine if the heart-to-lung ratio and TID are abnormal.
  - f. Evaluate the wall motion of stress and resting images for ejection fraction and kinetic abnormalities.
  - g. Review and evaluate bull's eye polar maps and summed stress scores.
  - h. Create a comprehensive report detailing the results of the imaging portion of the test.
  
13. Facilitate or recommend patient-specific cardiac related procedures based on nuclear cardiology examination results (outcomes management).
  - a. Order or facilitate scheduling of complimentary diagnostic procedures as indicated.
  - b. Identify the clinical pathways as outlined by the AMA/ACC for cardiac disease.

### **Therapy Competencies**

1. Analyze the indications, contraindications, complications for therapeutic interventions
  - a. Interpret epidemiological data, research and trends related to incidence and prevalence of cancer.
  - b. Identify risk factors for cancer.
  - c. Conduct imaging protocols; evaluate images and laboratory values for presence of disease and metastasis.
  - d. Determine appropriate candidacy for therapy.
2. Counsel and educate the patients and their families regarding the proposed therapeutic intervention.
  - a. Obtain translator/interpreter services as necessary.
  - b. Obtain patient informed consent for required procedures according to state law and
  - c. Educate patients on pre-procedural and post procedural care.
3. Calculate and administer appropriate therapeutic dosage based upon imaging and laboratory results, according to protocol.
4. Report procedure to referring physicians according to protocol.
5. In conjunction with referring physician, monitor patient and provide post therapy intervention as needed for adverse side effects.

### **Elective Competencies**

These procedures consist of those tasks that are infrequently performed in most practice settings but might be particularly useful to some NMAAs in some settings.

1. Administer radiopharmaceuticals for radionuclide cisternography, cerebrospinal fluid shunt evaluations, cerebrospinal fluid leaks or for intraperitoneal procedures using aseptic technique and radiation safety standards at the discretion of the supervising physician
  - a. Explain complete procedure to patient/ family
  - b. Ensure scheduled imaging timeline compliance.
  - c. Prepare injection site adhering to predetermined aseptic/ sterile technique.
  - d. Conduct a Joint Commission recommended "time out" procedure.
  - e. Monitor room, contents and personnel as per institutional radiation safety guidelines.
2. Participate in image guided biopsy at the discretion of the supervising physician.
  - a. Prepare sterile field and biopsy area using aseptic/sterile technique.
  - b. Obtain informed consent for biopsy.
  - c. Evaluate for complications prohibiting safe biopsy.
  - d. Identify appropriate instruments and use according to recommended standards of practice.
  - e. Prepare biopsied tissue for pathological examination according to guidelines for specific tissue type, include appropriate transport media slide preparation and documentation.
  - f. Close and dress wound according to recommended standards of practice.
  - g. Order appropriate follow-up imaging studies appropriate to biopsy site and procedure.

February 2008

- h. Appropriately intervene for complications.
  - i. Advise patient of needed follow-up care.
3. Manage pain and sedation for patients receiving diagnostic testing or therapeutic treatment.
- a. Prescribe pharmacologic and nonpharmacologic interventions as allowable by state and federal statutes.
  - b. Monitor patient response to sedation and provide intervention according to accepted standards of practice.

### **INTERPERSONAL AND COMMUNICATION SKILLS**

1. Demonstrate team communication and leadership skills to work effectively with others as a member or leader of a health care team or other professional group.
  - c. Demonstrate leadership skills by leading a group project to successful completion.
  - d. Communicate with referring physician to assure appropriate examination selection, including actions to be taken if the requested procedure appears to be inappropriate.
  - e. Collaborate with other health care team members to improve service delivery.
2. Protect and preserve personal and confidential information of others to which access is provided.
  - a. Adhere to privacy and regulatory standards and requirements regarding the accountability and protection of patient information.
  - b. Identify potential abuses of confidential patient information.
  - c. Describe the challenges associated with maintaining the confidentiality of patient information stored in computer systems and transmitted via networks.
3. Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills.
  - a. Listen to the "patient's story," extract important details from the history taking, and provide information to their patients in an understandable way.
  - b. Demonstrate effective interviewing skills for patient assessment.
  - c. Demonstrate effective communication skills with and provide psychosocial support to specific groups of people, such as the terminally ill, physically or emotionally impaired, culturally diverse patient, families, and colleagues.
  - d. Demonstrate effective age-specific and gender-specific communications.
  - e. Be receptive to the clinical significance of the patient's personal beliefs and values for adaptation of an exam protocol or departmental policies.
4. Demonstrate emotional resilience and stability, adaptability, flexibility and tolerance of ambiguity and anxiety.
  - a. Maintain composure in all situations.
  - b. Refrain from negative conversations
  - c. Demonstrate self-awareness of personality traits.
5. Follow appropriate protocol in resolution of conflict, exhibiting proper restraint when presented with potentially volatile situations.

February 2008

6. Maintain comprehensive, timely, and legible records for medical, legal, quality improvement and financial purposes.
7. Maintain appropriate protocol, courtesy, tact, and confidentiality in business communication, both written and oral.
8. Demonstrate an appropriate level of communication skills when orally presenting professional or scholarly work.
9. Demonstrate technical writing ability in a variety of venue, including scholarly writing and business communications.
  - a. Write an abstract according to published standards.
  - b. Prepare a poster for presentation at a professional conference.
  - c. Write scholarly articles.
  - d. Develop patient procedure protocols.
  - e. Develop department policies.
  - f. Write business correspondence such as business letters, memos, or internal reports.
  - g. Prepare reports, such as a needs assessment or progress report.
  - h. Develop action plans for quality improvement projects.
  - i. Develop patient education materials.
10. Apply concepts of teaching and learning theories in design, implementation and evaluation in the education of patient, family, colleagues and the community.

### **PRACTICE-BASED DECISION MAKING**

1. Track and analyze processes, procedures and outcomes using appropriate statistical and/or qualitative techniques.
  - a. Use the evidence-based medicine (EBM) process of asking, acquiring, appraising, applying, and assessing to improve clinical practice.
  - b. Analyze practice organization and management and perform practice based improvement activities.
  - c. Develop a personal program of self-study and professional growth.
2. Use benchmarking analysis and adjust processes, procedures and operations for comparison with published standards of care.
  - a. Follow a systematic process for identifying and implementing best or better practices.
  - b. Follow professional standards of practice and work within the NMAA scope of practice to improve patient care and safety and protect the public.
3. Critically evaluate current literature and extant research to assess the effectiveness of diagnostic and therapeutic procedures.
  - a. Identify credible sources of information.
  - b. Determine applicability of information; clarifying patients' questions and misunderstandings about procedures, conditions, or treatment options based on what they may have read.
  - c. Use findings from literature and benchmarks to design and initiate appropriate research to investigate a given clinical situation in order to arrive at an optimal solution.
  - d. Apply knowledge of research design and statistical methods to appraise the literature.

February 2008

4. Use feedback and observations to verify that changes were implemented to optimize patient care delivery and outcomes were effective
5. Use information technology to effectively access, collect, analyze and disseminate data.
  - a. Use current information technology and other sources to efficiently locate and retrieve relevant information from credible sources.
  - b. Follow ethical principles in using information that may be sensitive.
  - c. Be aware of appropriate regulations or legislation involving information sharing, storing, protecting, or deleting sensitive information.
6. Provide discipline-specific education to patients, students, colleagues, and the public.
  - a. Use opportunities to teach and learn as facets of professional practice.
  - b. Develop learning relationships with clients, patients, students and colleagues.
  - c. Assess what needs to be learned and demonstrate effective teaching techniques in settings that may be spontaneous or by design
  - d. Select appropriate resources and activities to support teaching.
  - e. Use evaluation and feedback to measure and enhance teaching effectiveness.
  - f. Facilitate the transfer of learning.

### **PROFESSIONALISM**

1. Demonstrate calm, compassionate, helpful demeanor toward those in need.
2. Treat others with dignity and respect, demonstrating sensitivity and responsiveness to culture, age, gender, and disability.
  - a. Discuss how diversity issues, health literacy or disparity issues might impact patient care and adherence to treatment.
3. Consistently strive for excellence in professional activities.
  - a. Be meticulous and careful in conducting professional tasks.
  - b. Work systematically and complete assignments in a timely manner.
  - c. Take responsibility for continuity of care.
  - d. Recognize how NMAA patient care and professional practices might affect other health care professionals and the health care organization.
  - e. Demonstrate ability to reflect on methods of improving professional behavior.
4. Act with integrity and understand personal limitations.
  - a. Refrain from performing tasks beyond personal capabilities or outside of professional scope of practice.
  - b. Accept responsibility for mistakes and report mistakes as appropriate.
  - c. Accept criticism and make an effort to improve.
  - d. Reflect on difficult encounters and analyze how values, skills, and knowledge are affecting care of patients with challenging and/or terminal illnesses.
  - e. Recognize and appropriately respond to impairment of self or colleagues.

5. Demonstrate the professional attitudes that must be considered by the NMAA.
  - a. Uphold the goals of the profession by supporting professional organizations, keeping professional confidences, maintaining competency, and exhibiting a professional image.
  - b. Exhibit exemplary professional appearance and personal hygiene.
  - c. Adhere to the scope of practice and standards of practice, including the role of state and federal regulations.
  - d. Demonstrate conscientiousness and organization in addressing all professional obligations.
6. Foster professional relationships with members of the health care team.
  - a. Mentor students, technologists, and other members of the health care team.
  - b. Enhance the professional relationship by keeping the patient as the main focus.
  - c. Manage conflict among health professionals in a constructive manner.
7. Demonstrate accountability to the health care organization and society by adhering to ethical business principles.
  - a. Outline the nature of the special fiduciary relationship between the practitioner and the patient.
8. Demonstrate a commitment to medico-legal and ethical principles.
  - a. Apply the ethical principles of autonomy, non-maleficence, beneficence, justice, paternalism, fidelity, veracity, altruism, integrity, respect, and compassion.
  - b. Practice patient-centered care that encompasses confidentiality, respect, and autonomy via appropriate informed consent and shared decision making.

### **SYSTEMS-BASED PRACTICE**

1. Describe the structure, governance, financing and operation of the health care system and its facilities and how this influences patient care, research and educational activities at a local, state, regional and national level.
  - a. Understand the structure and function of health care delivery systems and medical practices.
  - b. Describe the various third-party payer systems, covered health benefits, formularies, preauthorization, appeals, disease management and quality improvement.
  - c. Define and describe a patient population.
2. Practice cost effective healthcare and resource allocation that do not compromise quality of care.
  - a. Review and adjust coding practices and procedures to assure optimal and legal reimbursement.
  - b. Analyze departmental budget, cost/revenue for optimal efficiency.
  - c. Provide documented analysis and data for resource acquisition.
  - d. Follow filing and documentation practices for practitioner reimbursement as directed by CMS policies and procedures, state, and federal law.

3. Ensure compliance for all local, state, regional, and federal requirements for laboratory operations and personnel training and credentialing.
  - a. Comply with current federal, regional and local regulations governing the laboratory.
  - b. Conduct procedures and provide documentation for laboratory accreditation.
  - c. Implement Joint Commission standards.
4. Partner with health care managers and health care providers to assess, coordinate, and improve health care.
  - a. Structure department staffing for quality care delivery and employee satisfaction.
  - b. Conduct process for departmental strategic planning per institutional mission.
  - c. Advocate for quality patient care and assist patients in dealing with system complexities.
5. Understand the reciprocal impact of personal professional practice, health care teams, and the health care organization on the community and society.
  - a. Identify ways in which an NMAA may interact with health-care professionals, health administrators, and community groups to positively impact the health and well being of one's community.
  - b. Gather information (e.g. demographics and socio-cultural beliefs) about the community in which one works and practices that affect health and disease.
  - c. Participate in interdisciplinary team discussions, demonstrating the ability to accept, consider and respect the opinions of the other team members, while contributing an appropriate level of expertise to patient care.
6. Describe the major legal mechanisms for oversight and regulation of medical practice, including those related to licensure and discipline, negligence, malpractice, risk management, doctor-patient relationships, confidentiality, and patient's rights.
  - a. Compare civil and criminal law.
  - b. Explain civil procedures.
  - c. Follow the proscribed standard of care for NMAA
  - d. Distinguish between the different types of consent.
  - e. Understand and comply with the patient's directives in regard to medical care.
  - f. Comply with employer and employee legal obligations.

Reference Section

1. Owen MA, Pickett MW, Christian PE, Dillehay GL, Fulk LA, Gordon LL, Henkin RE, Smith M, Hubble WL, Thompson K, Keech FK, Nielsen, Stachowiak A. Nuclear medicine practitioner competencies. *J Nucl Med Technol.* 2007; 35(1):39-41.
2. Pickett MW, Keech FK, Owen MA, Stachowiak A, Fulk LA, Murphy KH, Christian PE, Hunter K, Hubble WL, Gordon LL, Dillehay GL, Henkin RE. Position paper on the development of a middle level provider in nuclear medicine: The nuclear medicine practitioner. *J Nucl Med Technol.* 2006; 34(4):236-243.
3. Competencies for the physician assistant profession. Journal of the American Academy of Physician Assistants. VOL 18. NO. 7. July 2005. pp. 16-18. Accessed Online 8/24/05  
[<http://www.nccpa.net/pdfs/Definition%20of%20PA%20Competencies%203.5%20for%20Publication.pdf>]
4. National Commission on Certification of Physician Assistants. Physician Assistant Knowledge and Skill Areas. Accessed Online 8/24/05.  
[[http://www.nccpa.net/EX\\_knowledge.aspx?r=pance](http://www.nccpa.net/EX_knowledge.aspx?r=pance)]
5. American Association of Colleges of Nursing. Curriculum Standards. Acute Care Nursing Practitioner. Accessed Online 8/21/05.  
[<http://www.aacn.nche.edu/Education/curriculum.htm>]
6. Accreditation Council of Graduate Medical Education. Outcome Project. Accessed Online 8/8/07 [URL: <http://www.acgme.org/outcome/comp/compFull.asp> ]
7. American Board of Internal Medicine. Project Professionalism. Accessed Online 8/5/07 [URL: <http://www.abim.org/pdf/profess.pdf>]
8. Nuclear Medicine Certification Board. Cardiology Examination: Detailed Content Outline. Accessed Online 8/24/05 [<http://www.nmtcb.org/Content1.shtml>]
9. Washington Manual of Therapeutics, 29th Edition, Editors: Charles F Carey, Hans H Lee and Keith F Woeltje, 1998. Pages: 91-98.
10. Oncology Nursing Exam Prep Guide. Accessed Online 8/30/05. [[http://www.cna-nurses.ca/cna/documents/pdf/publications/CERT\\_Oncology\\_e.pdf](http://www.cna-nurses.ca/cna/documents/pdf/publications/CERT_Oncology_e.pdf)]
11. Oncology Nursing Society. Position on Oncology Services in the Ambulatory Setting. Accessed Online 8/30/05.  
[<http://www.ons.org/publications/positions/AmbulatoryPractice.shtml>]
12. Nuclear Medicine Certification Board. Positron Imaging Examination: Exam Content Specifications. Accessed Online 9/01/05  
[<http://www.nmtcb.org/PET%20Content%20Outline.htm>]
13. American Society of Radiological Technologists, Society of Nuclear Medicine. 2004. PET/CT Curriculum. Accessed Online 9/13/05 [<http://www.crcpd.org/PET->

February 2008

CT\_Fusion\_Imaging/PETCT%20Curriculum%20Accepted%20021704.pd.pdf]

14. Merriam SB, Simpson E L. (1995). A Guide to research for educators and trainers of adults. Malabar, FL: Krieger Publishing Company
15. Meltzoff J. (1999). Critical thinking about research: Psychology and related fields. Washington, DC: American Psychological Association.
16. AACE/AAES medical/surgical guidelines for clinical practice: management of thyroid carcinoma. U.S. Department of Health and Human Services. Agency for Healthcare Research and Quality. Accessed Online 5/25/06. [URL: [http://www.guideline.gov/summary/summary.aspx?ss=15&doc\\_id=2848&nbr=2074&string=](http://www.guideline.gov/summary/summary.aspx?ss=15&doc_id=2848&nbr=2074&string=) ]
17. Competencies and Goals for Radiology Residents. University of Rochester, Department of Imaging Science. Accessed 05/25/06. [URL: <http://www.urmc.rochester.edu/smd/Rad/ResidentGoals.pdf> ]