NMED-2950: NUCLEAR MEDICINE FIELD EXPERIENCE II

Cuyahoga Community College

Viewing: NMED-2950 : Nuclear Medicine Field Experience II

Board of Trustees:
June 2022

Academic Term:
Fall 2022

Subject Code
NMED - Nuclear Medicine Technology

Course Number:
2950

Title:
Nuclear Medicine Field Experience II

Catalog Description:
Supervised sessions in nuclear medicine department with specific assignments and case studies to include math problems and instrumentation. Clinical rotations through variety of specialty areas including nuclear medicine studies of various patient age groups (pediatrics/geriatric) and pathologies.

Credit Hour(s):
4

Lecture Hour(s):
1

Other Hour(s):
640

Other Hour Details:
Field Experience: 640 hours of experience at a clinical site per semester (average of 40 hours per week)

Requisites

Prerequisite and Corequisite
NMED-2940 Nuclear Medicine Field Experience I or departmental approval.

Outcomes

Course Outcome(s):
Follow compliance with hospital policies and procedures for the successful completion of clinical training and professional preparedness.

Objective(s):
1. Demonstrate professional ethical behavior at all times with patients, hospital personnel, college staff and visitors.
2. Perform department charting of patient medical care with demonstrated efficiency.
3. Route patients to and from their destination within the hospital.

Course Outcome(s):
Apply health care and related services with respect for the patient's dignity and age-specific needs without bias based upon personal attributes, nature of the disease, sex, race, creed, religion or socio-economic status by meeting standards of a nuclear medicine technologist.

Objective(s):

1. Recognize emergency patient conditions and initiate first aid and basic life support procedures.
2. Exhibit respect for patient confidentiality, understanding patient's rights, and compliance with all HIPAA regulations.
3. Explain and discuss the appropriate use of restraints when patient condition or age necessitates.

Course Outcome(s):

Adhere to professional standards for a nuclear medicine technologist.

Objective(s):

1. Apply effective communication skills as expected of a health care professional.
2. Practice and discuss effective patient care during nuclear medicine procedures.
3. Show proficiency by successfully completing examinations during clinical experiences from the following categories: imaging procedures, non-imaging procedures, radiopharmacy procedures, quality control procedures, and patient care.
4. Adequately complete patient history and evaluate for appropriateness of testing ordered.
5. Contact ordering physician or nuclear medicine staff if questionable before proceeding to injecting and scanning.
6. Explain patient/public education related to nuclear medicine procedures and radiation safety.
7. Identify and interpret nuclear medicine requisitions and/or prescriptions.

Course Outcome(s):

Use safe operation of imaging and ancillary equipment under the supervision of a registered nuclear medicine technologist and/or physician.

Objective(s):

1. Explain how to prepare the room and equipment prior to beginning each nuclear medicine procedure.
2. Demonstrate proficiency in operating nuclear medicine equipment.
3. Recognize variance in patient's body habitus and/or patient's pathological conditions and demonstrate the proper imaging adjustments to accommodate anticipated imaging expectations.

Course Outcome(s):

Practice proper radiation protection and safety techniques at all times and comply with ALARA (As Low As Reasonably Achievable) standards.

Objective(s):

1. Demonstrate ability to perform quality control of nuclear medicine equipment, explain the safe limits of operation, and report malfunctions to the proper authority.
2. Describe the roles the nuclear medicine technologist, radiologist and physicist roles have within the nuclear medicine department.
3. Explain and differentiate radiation safety limits for both patients and a radiation safety worker.
4. Determine proper biohazard signage of areas that handle radiation and/or bodily fluids.

Course Outcome(s):

Produce quality images of all nuclear procedure(s) with the use of technique guides, positioning skills, computers, nuclear medicine instrumentation, and ancillary devices.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Demonstrate competency in quality control procedures.
2. Describe how to produce quality images using correct imaging equipment parameters.
3. Evaluate and critique nuclear medicine images/results as to their quality and demonstrate ability to correct for miscalculations/ positioning accuracy.
4. Correctly administer radiopharmaceuticals via proper route of administration to the patient.

Course Outcome(s):

Use a team approach in assisting the radiologist or nuclear medicine technologist in the handling, selection, dosage and quality control in preparation, administration and disposal of radiopharmaceuticals.

Objective(s):

1. Properly select, prepare and determine if a radiopharmaceutical meets quality control measures prior to administration to the patient.
2. Demonstrate and record the steps to dispose of and store radioactive materials.
3. Demonstrate and record the steps to dispose of and store biohazard materials.

Course Outcome(s):

Review case studies of a variety of nuclear medicine procedures.

Objective(s):

1. Discuss clinical and practical application of the procedures in nuclear medicine.
2. Perform accurately procedures required of a nuclear medicine technologist, including the computer analysis.
3. Determine if the reported result is the proper conclusion given the information that is presented.

Course Outcome(s):

Use a team approach in assisting the Radiologist or CT Technologist in the patient preparation, quality control, positioning, imaging and processing of CAT scan studies in preparation of the Nuclear Medicine Technology Certification Board (NMTCB) national registry.

Objective(s):

1. Accurately prepare the CT patient in regards to contrast administration, contraindications of study, medicinal contraindications, proper pregnancy precautions and renal impairment identification.
2. Participate in the quality control processes necessary within a working CT department, under the direct guidance of a registered CT technologist.
3. Position patients accurately for a basic CT scan under direct supervision of a CT technologist.
4. Perform accurately and under direct supervision of a registered CT technologist any basic CT scan.
5. Process accurately and under the direct supervision of a registered CT technologist any basic CT scan.
6. Observe any biopsies and special procedures performed by a registered CT technologist.
7. Correctly identify major structures, label and process images, describe and analyze any basic CT scan they participated in acquiring.

Methods of Evaluation:

1. Site supervisor evaluation
2. Written tests
3. Competency performance evaluations
4. Professional/ethical evaluations
5. Basic technical evaluations
6. Completion of all clinical requirements
7. Case studies

Course Content Outline:

1. Hospital protocols and departmental policies
    a. Clinical site handbook
    b. Radiology information system
    c. Film library
2. Effective communication skills
    a. Patient communication
        i. Identify and assess patient condition
        ii. Verify and explain procedure
        iii. Safety
        iv. Comfort and cooperation
    b. Patient clinical history
    c. Communication with radiologists, nuclear medicine technologists and staff
3. Nursing procedures for nuclear medicine

a. Standard (universal) precautions for patients and self
b. Monitor, observe and respond to patients
c. Provide general patient care as needed
    i. CPR
    ii. Vital signs (BP, pulse, respiration, temperature)
    iii. Venipuncture
    iv. O2 administration

4. Clinical rotations (pediatric, geriatric, adult):
    a. Respiratory
        i. Perfusion
        ii. Ventilation or aerosol
        iii. Quantitative
    b. Skeletal system
        i. Planar - static
        ii. Planar - whole body
        iii. SPECT
        iv. Three-phase
    c. Cardiovascular
        i. Cardiac first pass
        ii. Gated blood pool studies
        iii. Myocardial perfusion - stress/rest or rest/stress SPECT and/or planar
        iv. Myocardial perfusion gated with SPECT
        v. Positron emission tomography
    d. Abscess and infection
        i. Gallium
        ii. Tagged leukocytes
        iii. Positron emission tomography
    e. Central nervous system
        i. Brain - planar
        ii. Brain - SPECT
        iii. Brain - dynamic
        iv. Cisternography - routine
        v. Cisternography - CSF leak
        vi. Positron emission tomography
    f. Endocrine/exocrine
        i. Thyroid - scan
        ii. Thyroid - metastatic survey
        iii. Parathyroid
    g. Gastrointestinal
        i. Biliary function
        ii. Gastroesophageal reflux
        iii. Gastric emptying
        iv. GI bleeding
        v. Meckel's diverticulum
    h. Liver/spleen
        i. Planar
        ii. SPECT
        iii. Hemangioma
    i. Genitourinary
        i. Renal - dynamic perfusion
        ii. Renal - sequential imaging
        iii. Testicular
        iv. Cystography
    j. Tumor/antibody
        i. Gallium
        ii. Monoclonal antibodies
        iii. Breast
        iv. Lymphoscintigraphy
        v. Positron emission tomography

   k. Shunt studies
   l. Non-imaging procedures
      i. Thyroid uptake
      ii. Schilling's test
      iii. Therapeutic - palliative bone
      iv. Therapeutic - thyroid (excluding dose administration)
      v. Emerging nuclear medicine therapies
   m. Fusion imaging
      i. SPECT/CT
      ii. SPECT/MR
      iii. PET/CT
      iv. PET/MR
5. Equipment operation
   a. Radiation safety and protection for self, patient and others
   b. Room preparation
   c. Equipment preparation and configuration
   d. Process images
      i. Daylight
      ii. Computed imaging
   e. Image quality and evaluation
   f. Medical informatics
6. Radiopharmaceutical protocols
   a. Radiation safety
      i. Major spills
      ii. Minor spills
   b. Preparation and handling
      i. Selection
      ii. Dosage
      iii. Quality review
   c. Administration and recording
7. Quality control
   a. Gamma camera
   b. Dose calibrators
   c. Well counters/uptake probes
   d. Survey meter
8. Case studies of nuclear medicine procedure

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Resources

Early, Paul J. and D. Bruce Sodee, eds. *Principles and Practices of Nuclear Medicine.* 2nd ed. St. Louis, MO: Mosby, 1995.

Saha, Gopal B., ed. *Fundamentals of Nuclear Pharmacy*. 7th ed. New York, NY: Springer-Verlag, 2018.

Adler, Patricia and Richard Carlton, eds. *Introduction to Radiologic Sciences and Patient Care*. 7th ed. St. Louis, MO: Elsevier, 2020.

Cherry, Simon R., James A. Sorenson and Michael E. Phelps. *Physics in Nuclear Medicine.* 4th ed. Philadelphia, PA: Saudners/Elsevier, 2013.

Mettler, Fred Jr. and Milton Guiberteau, eds. *Essentials of Nuclear Medicine Imaging*. 7th ed. Philadelphia, PA: W.B. Saunders, 2018.

Goldfarb, C. Richard and Stevens R. Parmett, Lionel S. Zuckier, Fukaiat Ongseng, Maroun Karam, and Jeffrey A. Cooper, eds. *Nuclear Medicine Board Review: Questions and Answers for Self-Assessment*. 4th ed. New York, NY: Thieme Medical Publishing, 2018.

Ramer, Karen and Abass Alavi, MD, eds. *Nuclear Medicine Technology: Review Questions for the Board Exams*. 3rd ed. New York: NY: Springer, 2008.

American Registry of Radiologic Technologists (ARRT). "Competency Requirements for Nuclear Medicine Technology" 2017.

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