DoD Space Planning Criteria

Chapter 540: Radiology, Nuclear Medicine and Radiation Oncology
July 1, 2017

Originating Component: Defense Health Agency Facilities Division

Effective: July 1, 2017

Releasability: No Restrictions

Purpose: This issuance: To provide space planning criteria guidance in support of planning, programming and budgeting for DoD Military Health System (MHS) facilities.

SUMMARY of CHANGE

This revision, dated July 1, 2017 includes the following:

- On page 12, section 3.1. INPUT DATA STATEMENTS number 11, changed the term Conscious Sedation to read “Moderate Sedation” to reflect the current terminology referenced by The Joint Commission. Changed every occurrence where this term is used in the chapter. Provided a definition for moderate sedation in the Glossary.

- On page 17, section 4.3. FA3: COMPUTED TOMOGRAPHY (CT) PATIENT AREA room 11, Scanning Room, Computed Tomography (CT) (XCTS1), changed stated net area size to read “360 NSF”.

- On page 23, section 4.7. FA7: RADIOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING added room 2 “Office, Tech Training Program Coordinator (OFDR1) at 120 NSF”; added criteria statement to read “Provide one if a Radiology Technology Training Program is authorized.”

- On page 23, section 4.7. FA7: RADIOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING added room 3 “Cubicle, Tech Student (OFA03) at 60 NSF”; added criteria statement to read “Provide one for each Radiology Technology Training student position authorized.”

- On page 23, section 4.7. FA7: RADIOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING room 3, changed name and room code to read “Classroom / Conference Room (CRR01)”.

- On page 29, section 6.4. FA4: NUCLEAR MEDICINE SUPPORT corrected this section’s room numbering to begin with “1”.

- On page 31, section 6.6. FA6: NUCLEAR MEDICINE GRADUATE MEDICAL EDUCATION (GME) / TRAINING added room 2 “Office, Tech Training Coordinator (OFDR1) at 120 NSF”; added the criteria statement “Provide one if a Nuclear Medicine GME program is authorized.”

- On page 31, section 6.6. FA6: NUCLEAR MEDICINE GRADUATE MEDICAL EDUCATION (GME) / TRAINING added room 3 “Cubicle, Tech Student (OFA03) at 60 NSF”; added the criteria statement “Provide one for each Nuclear Medicine Technology student position authorized.”

- On page 31, section 6.6. FA6: NUCLEAR MEDICINE GRADUATE MEDICAL EDUCATION (GME) / TRAINING room 5, changed name and room code to read "Classroom / Conference Room (CRR01)".

- On page 32, changed section 8.1. FA8 title to read "RADIATION ONCOLOGY RECEPTION".

- On page 33, section 8.1. FA8: RADIATION ONCOLOGY RECEPTION added room 5 "Alcove, Wheelchair (SRLW1) at 30 NSF".

- On page 34, section 8.2. FA2: RADIATION ONCOLOGY BEAM PATIENT AREA, corrected room numbering sequence for room numbers 14 – 17.

- On page 38, section 8.6. FA6: RADIATION ONCOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING added room 2 "Office, Tech Training Coordinator (OFDR1) at 120 NSF"; added the criteria statement "Provide one if a Radiation Therapy Technology Training program is authorized". Renumbered existing room order.

- On page 38, 8.6. FA6: RADIATION ONCOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING room 5, changed name and room code to read "Classroom / Conference Room (CRR01)".

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SECTION 1: PURPOSE AND SCOPE

1.1. PURPOSE AND SCOPE This chapter outlines space planning criteria for services and programs provided in Radiology (Imaging), Nuclear Medicine, and Radiation Oncology units within the Military Health System (MHS). Though there is little patient crossover between these units at many facilities, the increasing proliferation of hybrid equipment and integrated care will make the coordination of these programs increasingly important over time. Additionally, these three departments are addressed in a common chapter due to the additional levels of complexity associated with the effective planning for imaging and therapy equipment.

Throughout this chapter the exam / treatment rooms are defined with the minimum recommended area and equipment. This is based on lower-acuity patients, non-interventional use, and an absence of special use equipment, unless otherwise noted. As these factors change (e.g. use of general anesthesia or emergent / trauma imaging), the area associated with these services may need to be increased from the provided values. Due to the lifecycle of capital-intensive imaging and therapy facilities, it is highly recommended that facility space planning anticipate changes in functional or clinical use that may be likely within a five-year period following beneficial occupancy.

Interventional radiology (imaging services directly in support of concurrent therapeutic care, such as angioplasty or cardiac stenting) is not specifically addressed in this chapter. While many of the areas defined herein chapter 540 can be modified to support minimally-invasive interventional or image-guided procedures (such as image-guided biopsy), information on traditional interventional radiology space planning criteria can be found in DoD Chapter 316: Cardiology / Pulmonary Services, and DoD Chapter 440: Surgery: Inpatient and Ambulatory.

Imaging resources may be distributed throughout the MTF; therefore, imaging resources are covered in other Space Planning Criteria chapters. For example, the Emergency Department (Chapter 350) provides CT and General Radiology rooms, while Women's Health (Chapter 360) provides Mammography, Fluoroscopy, Ultrasound, DEXA and Stereotactic Biopsy rooms. Care must be taken to avoid duplicate programming of equipment based spaces on the same workload count, and special attention should also be given to assuring that the resources (to include staffing) necessary to provide all services programmed are available and fully supported by the command. It is recommended that siting considerations for imaging resources located in other clinical or functional areas of the MTF be coordinated with this chapter.

The space planning criteria in this chapter apply to all Military Treatment Facilities (MTFs) and are based on current DoD policies and directives, established and/or anticipated best practices, industry guidelines and standards, and input from DoD Subject Matter Experts (SME) and Defense Health Agency (DHA) Service contacts. As directed by the DHA, these space criteria are primarily workload driven; additional drivers are staffing and mission. Room Codes (RCs) in this document are based on the latest version of DoD's UFC 4-510-01, Appendix B.

SECTION 2: OPERATING RATIONALE AND BASIS OF CRITERIA

2.1. OPERATING RATIONALE AND BASIS OF CRITERIA.

A. Workload projections and planned services / modalities for a specific MHS facility project shall be sought by the planner in order to develop a project based on these Criteria. Healthcare and clinical planners working on military hospitals, medical centers and clinics shall utilize and apply the workload based criteria set forth herein for identified services and modalities to determine space requirements for the project.

B. Space planning criteria have been developed on the basis of an understanding of the activities involved in the functional areas required for Radiology, Nuclear Medicine and Radiation Oncology and their relationship with other services of a medical facility. These criteria are predicated on established and/or anticipated best practice standards, as adapted to provide environments supporting the highest quality health care for Service Members and their dependents.

C. These criteria are based on established and anticipated standards, which are subject to modification relative to development in equipment, medical practice, vendor requirements, and healthcare planning and design developments. The final selection of the size and type of medical equipment is determined during the design process.

D. Calculation of the number and -in some cases- the area (NSF) of rooms is performed in one of the following methods:

1. Directly workload-driven
2. Indirectly workload-driven
3. Mission or Staffing-driven

The directly workload-driven rooms are based on workload projections entered in response to the Workload Input Data Statements (IDSs) included in Section 3. The directly workload driven rooms in this chapter are the General Radiology Room, Radiography / Fluoroscopy (R/F) Room, Mammography Room, Mammography (Stereotactic) Room, DEXA Scan Room, Ultrasound Room, Computed Tomography (CT) Scanning Room, MRI Scanning Room, Nuclear / Gamma Camera Scanning Room, SPECT / CT Scanning Room, PET / CT Scanning Room, and Linear Accelerator (Single-Axis) Vault.

The indirectly workload-driven rooms are derived from the preceding group. They are typically in the Reception and Support Functional Areas. Examples are Waiting, or the number of clean or soiled utility rooms.

The mission / staffing-driven rooms are created based on Boolean 'yes/no' or numeric responses to the Mission and Staffing Input Data Statements (IDSs).

E. The Net Square Feet (NSF) and Room Code (RC) for each room in Section 4: Space Planning Criteria of this chapter was provided by or approved by the Defense Health Agency (DHA) Template Board.

F. Section 3: Input Data Statements and Section 4: Space Planning Criteria have been implemented and tested in the Space and Equipment Planning System (SEPS). To gain access to SEPS planner should contact a Defense Health Agency (DHA) representative; access to SEPS is provided via a 16-hour hands-on training session.

G. Calculation of each of the directly workload-driven room types is implemented in SEPS based on the following formulae:

Formula 1: Annual Room Workload Capacity

$$\frac{(\text{Operating Days per year})(\text{Hours of Operation per Day})}{\text{Average Length of Encounter (ALOE) in Minutes } \div 60}$$

Refer to the Table below for the values used for each modality.

TABLE 1: WORKLOAD CAPACITY PARAMETERS

RADIOLOGY, NUCLEAR MEDICINE AND RADIATION ONCOLOGY			
MODALITY	**OPERATING DAYS PER YEAR**	**HOURS OF OPERATION PER DAY**	**AVERAGE LENGTH OF ENCOUNTER (ALOE) in minutes**
General Radiology	240	10	20
Radiology / Fluoroscopy (R/F)	240	8	45
Mammography	240	11	30
Mammography (Stereotactic)	240	8	90
Densitometry	240	8	20
Ultrasound	240	11 (Range: 8 to 16)	50
CT Scanning	350	12 (Range: 8 to 16)	30
MRI Scanning	350	12 (Range: 8 to 16)	45
Nuclear / Gamma Camera Scanning	240	8 (Range: 8 to 16)	60
SPECT / CT Scanning Room	240	8 (Range: 8 to 16)	60
PET / CT Scanning	240	8 (Range: 8 to 16)	45
Single-Axis Linear Accelerator	240	8 (Range: 8 to 16)	30

Formula 2: Project-based Annual Room Workload Capacity

$$(\text{Annual Room Workload Capacity})(\text{Utilization Factor})$$

Where:

1. Utilization Factor is a fixed: 0.80 (80%) SEPS default: 0.80 (80%)

Typically, a workload value 20% above the Project-based Annual Room Workload Capacity generates an additional Room.

Formula 3: Number of directly workload-driven rooms

$$\frac{\text{Number of projected annual encounters}}{\text{Project-based Annual Room Workload Capacity}}$$

Example: Calculation the number of Scanning Rooms based on the following parameters:

1. Operating Days per Year: 240
2. Hours of Operation per Day: 8
3. Average Length of Encounter: 45 minutes
4. Utilization Factor: 80%
5. Projected workload: 14,250 annual encounters

Step 1: Scanning Room Workload Capacity calculation:

$$\frac{(240)(8)}{\frac{45}{60}} = 2{,}560 \text{ encounters}$$

Step 2: Project-based Scanning Room Workload Capacity calculation:

$$(2{,}560)(0.80) = 2{,}048 \text{ encounters}$$

Step 3: Number of Scanning Rooms:

$$\frac{14{,}250}{2{,}048} = 7 \text{ Scanning Rooms}$$

TABLE 2: WORKLOAD PARAMETER CALCULATION

RADIOLOGY, NUCLEAR MEDICINE AND RADIATION ONCOLOGY				
IMAGING ENCOUNTERS	**AVERAGE LENGTH OF ENCOUNTER (minutes)**	**UTILIZATION RATE**	**ANNUAL WORKLOAD PER EXAM / DIAGNOSTIC ROOM (*)**	**MINIMUM ANNUAL WORKLOAD TO GENERATE ONE ROOM (20%)**
General Radiology	20	80%	5,760	1,152
Radiology / Fluoroscopy (R/F)	45	80%	2,048	410
Mammography	30	80%	4,224	845
Mammography (Stereotactic)	90	80%	1,024	205
Densitometry	20	80%	4,608	922
Ultrasound	50	80%	2,534	507
CT Scanning	30	80%	6,720	1,344
MRI Scanning	45	80%	4,480	896
Nuclear / Gamma Camera Scanning	60	80%	1,536	307
SPECT / CT Scanning Room	60	80%	1,536	307
PET / CT Scanning	45	80%	2,048	410
Single-Axis Linear Accelerator	30	80%	3,072	614

SECTION 3: PROGRAM DATA REQUIRED: RADIOLOGY

3.1. INPUT DATA STATEMENTS. Input Data Statements are based on questions about Workload (W), Mission (M), Staffing (S) and Miscellaneous (Misc) information.

1. Is Radiology authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
2. How many annual General Radiology encounters are projected? (W)
3. How many annual Radiography / Fluoroscopy (R/F) encounters are projected? (W)
4. How many annual Mammography encounters are projected? (W)
5. Is a Mammography (Stereotactic) Room authorized? (M)
6. How many annual Mammography (Stereotactic) encounters are projected? (W)
7. How many Densitometry encounters are projected? (W)
8. How many annual Ultrasound encounters are projected? (W)
    a. How many hours a day is the Ultrasound Room authorized to operate? (Range 8 to 16 hrs; SEPS default: 11 hrs.) (Misc)
9. How many annual Computed Tomography (CT) encounters are projected? (W)
    a. How many hours a day is the Computed Tomography (CT) Scanning Room authorized to operate? (Range 8 to 16 hrs. SEPS default: 12 hrs.) (Misc)
10. Is Computed Tomography (CT) authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
11. Is Moderate Sedation authorized? (M)
12. Is Uninterrupted Power Supply (UPS) for the CT System Component Room authorized? (M)
13. Is a Computed Tomography (CT) Simulator authorized? (M)
14. Is an Uninterrupted Power Supply (UPS) for the CT Simulator System Component Room authorized? (M)
15. How many annual MRI encounters are projected? (W)
    a. How many hours a day is the MRI Scanning Room authorized to operate? (Range 8 to 16 hrs. SEPS default: 12 hrs.) (Misc)
16. Is Magnetic Resonance Imaging (MRI) authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
17. Is Uninterrupted Power Supply (UPS) for the MRI System Component Room authorized? (M)
18. Is Sub-Waiting in the Radiology Staff and Administrative Area authorized? (Misc)
19. Is a Department / Clinic Chief FTE position for Radiology authorized? (Misc)
20. Is an NCOIC / LCPO / LPO FTE position for Radiology authorized? (Misc)
21. How many Radiology FTE positions are authorized? (S)
    a. How many Radiologist FTE positions are authorized to have a private office? (Misc)
    b. How many Radiology FTE positions, other than the Radiologist, are authorized to have a private office? (Misc)
    c. How many Radiology FTE positions are authorized to have a shared office? (Misc)
    d. How many Radiology FTE positions are authorized to have a cubicle? (Misc)

22. How many Radiology FTEs will work on peak shift? (Misc)
23. Is an On-Call Room for Radiology authorized? (Misc)
24. Is a Picture Archiving and Communication System (PACS) Viewing Room in the Radiology Staff and Administration authorized? (Misc)
25. Is a Radiology Graduate Medical Education (GME) program authorized? (M)
    a. How many Radiology Resident / Fellow FTE positions are authorized? (S)
26. Is a Radiology Technology Training program authorized? (M)
    a. How many Radiology Technology student positions are authorized? (S)

SECTION 4: SPACE PLANNING CRITERIA: RADIOLOGY

4.1. FA1: RADIOLOGY RECEPTION.

1. **Waiting (WRC01)** **120 NSF**
   Minimum NSF; provide an additional 60 NSF per four General Radiology, Radiology / Fluoroscopy (R/F), Mammography, Mammography (Stereotactic), DEXA Scan, Ultrasound, Computed Tomography (CT) and MRI Scanning Rooms greater than four.

2. **Playroom (PLAY1)** **120 NSF**
   Provide one for Radiology.

   This space is provided to accommodate children's play activities, may be an open or an enclosed area and should be included within or adjacent to Waiting.

3. **Reception (RECP1)** **120 NSF**
   Provide one for Radiology.

   Allocated NSF accommodates two FTEs.

4. **Kiosk, Patient Check-in (CLSC1)** **30 NSF**
   Provide one for Radiology.

4.2. FA2: RADIOLOGY PATIENT AREA.

1. **Sub-Waiting (WRC03)** **60 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two General Radiology, Radiology / Fluoroscopy (R/F), Mammography, Mammography (Stereotactic), DEXA Scan, and Ultrasound Rooms greater than two.

2. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one for the Radiology Patient Area if it is serving a Hospital or Medical Center (Inpatient Care).

3. **Screening / Patient Prep (EXRG4)** **120 NSF**
   Provide one for the Radiology Patient Area.

   Dedicated to Point of Care blood testing and IV preparation, patient consult, venipuncture.

4. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Minimum one; provide an additional one for every increment of two General Radiology, Radiology / Fluoroscopy (R/F), DEXA Scan, Ultrasound, Mammography and Mammography (Stereotactic) rooms greater than two.

5. **Lockers, Personal Property (LR001)** **30 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of four General Radiology, Radiology / Fluoroscopy, Mammography, Mammography (Stereotactic), DEXA Scan, and Ultrasound Rooms greater than four.

6. **Alcove, Wheelchair (SRLW1)** **30 NSF**
   Provide one for the Radiology Patient Area.

7. **Alcove, Stretcher (SRLW2)** **60 NSF**
   Provide one for the Radiology Patient Area if it is serving a Hospital or Medical Center (Inpatient Care).

8. **General Radiology Room (XDR01)** **300 NSF**
   Minimum one if the projected number of annual General Radiology encounters is between 1,152 and 5,760; provide an additional one for every increment of 5,760 encounters greater than 5,760; the minimum workload to generate an additional General Purpose Radiology Room is 1,152. (Refer to Table 2)

9. **Radiography / Fluoroscopy (R/F) Room (XDRF1)** **300 NSF**
   Minimum one if the projected number of annual Radiology / Fluoroscopy (R/F) encounters is between 410 and 2,048; provide an additional one for every increment of 2,048 encounters greater than 2,048; the minimum workload to generate an additional R/F Room is 410. (Refer to Table 2)

10. **Toilet, Radiography / Fluoroscopy (R/F) Patient (TLTU1)** **60 NSF**
    Provide one per each Radiology / Fluoroscopic (R/F) Room.

    Dedicated R/F Toilet accessed directly from the R/F Room.

11. **Mammography Room (XDM01)** **150 NSF**
    Minimum one if the projected number of annual Mammography encounters is between 845 and 4,224; provide an additional one for every increment of 4,224 encounters greater than 4,224; the minimum workload to generate an additional Mammography Exam Room is 845. (Refer to Table 2)

Mammography may be separately provided in Women's Health if in clinic Concept of Operations, please refer to DoD Space Planning Criteria Chapter 360: Women's Health Clinic.

12. **Mammography (Stereotactic) Room (XDM02) 210 NSF**
Minimum one if authorized and if the projected number of annual Mammography (Stereotactic) encounters is between 205 and 1,024; provide an additional one for every increment of 1,024 encounters greater than 1,024; the minimum workload to generate an additional Mammography (Stereotactic) Exam Room is 205. (Refer to Table 2)

    Mammography may be separately provided in Women's Health if in clinic Concept of Operations, please refer to DoD Space Planning Criteria Chapter 360: Women's Health Clinic. While used frequently for breast exams for women, Mammography may also be used for screening male patients for breast cancer. Consideration should be paid to the location of Mammography services based on the beneficiary population being served.

13. **DEXA Scan Room (XDBD1) 150 NSF**
Minimum one if the projected number of Densitometry encounters is between 922 and 4,608; provide an additional one for every increment of 4,608 encounters greater than 4,608; the minimum workload to generate an additional Densitometry Exam Room is 922. (Refer to Table 2)

    Allocated NSF provides space for performing bone densitometry. This room may be separately provided in Nuclear Medicine if in clinic Concept of Operations.

14. **Toilet, Patient (TLTU1) 60 NSF**
Minimum one, provide an additional one for every increment of eight General Radiology, Mammography, Mammography (Stereotactic), and DEXA Scan Rooms greater than eight.

15. **Ultrasound Room (XDUS1) 180 NSF**
Minimum one if the projected number of annual Ultrasound encounters is between 507 and 2,534; provide an additional one for every increment of 2,534 encounters greater than 2,534; the minimum workload to generate an additional Ultrasound Room is 507. (Refer to Table 2)

16. **Toilet, Ultrasound Patient (TLTU1) 60 NSF**
Provide one per each Ultrasound Room.

17. **Cleaning Room, Transducer (USCL1) 120 NSF**
Provide one if the projected number of annual Ultrasound encounters is equal to or greater than 507.

4.3. FA3: COMPUTED TOMOGRAPHY (CT) PATIENT AREA.

1. **Sub-Waiting (WRC03)** **60 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two Computed Tomography (CT) Scanning Rooms greater than two.

   Area dedicated to prepared patient waiting proximal to Computed Tomography (CT) Scanning Rooms (may be combined with Radiology / X-ray).

2. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one for the Computed Tomography (CT) Area if it is serving a Hospital or Medical Center (Inpatient Care).

3. **Screening / Patient Prep (EXRG4)** **120 NSF**
   Provide one for the Computed Tomography (CT) Patient Area.

   Dedicated to Point of Care blood testing and IV preparation, patient consult and venipuncture.

4. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Provide one per each Computed Tomography (CT) Scanning Room.

5. **Lockers, Personal Property (LR001)** **30 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of four Computed Tomography (CT) Scanning Rooms greater than four.

   Allocated NSF may be provided in the Patient Dressing Cubicles or located adjacent to them during project development.

6. **Toilet, Computed Tomography (CT) Patient (TLTU1)** **60 NSF**
   Provide one for the Computed Tomography (CT) Patient Area.

7. **Medication Room (MEDP1)** **120 NSF**
   Provide one for the Computed Tomography (CT) Patient Area if moderate sedation is authorized.

   Allocated NSF is provided for medication in support of moderate sedation / general anesthesia exams.

8. **Prep / Recovery Room, Moderate Sedation (RROP1)** **240 NSF**
   Provide one for the Computed Tomography (CT) Patient Area if moderate sedation is authorized.

   Allocated NSF may be combined with Inpatient Holding.

9. **Nurse Station (NSTA3)** **60 NSF**
   Provide one for the Computed Tomography (CT) Patient Area if moderate sedation is authorized.

10. **Alcove, Blanket Warmer (RCA04)** **30 NSF**
    Provide one for the Computed Tomography (CT) Patient Area.

11. **Scanning Room, Computed Tomography (CT) (XCTS1)** **360 NSF**
    Minimum one if the projected number of annual Computed Tomography (CT) Scanning encounters is between 1,344 and 6,720; provide an additional one for every increment of 6,720 encounters greater than 6,720; the minimum workload to generate an additional Computed Tomography (CT) Scanning Room is 1,344. (Refer to Table 2)

    Due to specific functional and service clearances around the CT Scanner, room length, width, and height should be closely coordinated with siting requirements for CT scanner equipment. Coordinate siting considerations / magnetic field conflicts if located immediately adjacent to an MRI scanner.

12. **Control Room, Computed Tomography (CT) (XCTC1)** **120 NSF**
    Minimum one; provide an additional one for every increment of two Computed Tomography (CT) Scanning Rooms greater than two.

13. **System Component Room, Computed Tomography (CT) (XCTC2)** **90 NSF**
    Minimum NSF; provide an additional 60 NSF if Uninterrupted Power Supply (UPS) for the CT System Component Room is authorized; provide one per each Computed Tomography (CT) Scanning Room.

14. **Alcove, Clean Linen (LCCL3)** **30 NSF**
    Provide one for the Computed Tomography (CT) Patient Area.

15. **Alcove, Soiled Linen (LCSL3)** **30 NSF**
    Provide one for the Computed Tomography (CT) Patient Area.

16. **Alcove, Crash Cart (RCA01)** **30 NSF**
    Provide one for the Computed Tomography (CT) Patient Area.

    Locate this space in close proximity to CT Scanning Room.

17. **Alcove, Wheelchair (SRLW1)** **30 NSF**
    Provide one for the Computed Tomography (CT) Patient Area.

4.4. FA4: MAGNETIC RESONANCE IMAGING (MRI) PATIENT AREA. The Magnetic Resonance Imaging (MRI) Patient Area is zoned based on patient screening and access to MRI services. The Zones used in this document are Zone II, Zone III or Zone IV.

1. **Sub-Waiting (WRC03)** **60 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two MRI Scanning Rooms greater than two.

   Patient waiting, holding, changing / gowning, and screening functions (areas in which a patient may interact with other persons who have not been successfully screened for MRI contraindications) are all Zone II functions within the Four Zone principle.

2. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one for the Magnetic Resonance Imaging (MRI) Patient Area if it is serving a Hospital or Medical Center (Inpatient Care).

   This space is located in Zone II.

3. **Screening / Patient Prep (EXRG4)** **120 NSF**
   Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

   Dedicated to Point of Care blood testing, IV preparation, patient consult and venipuncture. This space is located in Zone II.

4. **Toilet, MRI Patient (TLTU1)** **60 NSF**
   Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

   This space is located in Zone II.

5. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Provide one per each Magnetic Resonance Imaging (MRI) Scanning Room.

   This space is located in Zone II.

6. **Lockers, Personal Property (LR001)** **30 NSF**
   Minimum NSF, provide an additional 30 NSF for every increment of four Magnetic Resonance Imaging (MRI) Scanning Rooms greater than four.

   Allocated NSF may be provided in the Patient Dressing Cubicles or located adjacent to them during project development. This space is located in Zone II.

7. **Alcove, Wheelchair (SRLW1)** **30 NSF**
   Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

   This space is located in Zone II.

8. **Alcove, Stretcher (SRLW2)** **60 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

This space is located in Zone II.

9. **Medication Room (MEDP1)** **120 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area if moderate sedation is authorized.

Depending on the location within the MRI suite, where – operationally – screenings are conducted, location of secured access points, and access control protocols, the Medication Room, Moderate Sedation Prep / Recovery, Nurse Station, and Blanket Warmer Alcove could be located within either Zone II or Zone III.

10. **Prep / Recovery Room, Moderate Sedation (RROP2)** **240 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area if moderate sedation is authorized.

Allocated NSF may be combined with Inpatient Holding. This space is located in Zone II.

11. **Nurse Station (NSTA3)** **60 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area if moderate sedation is authorized.

This space is located in Zone II.

12. **Alcove, Blanket Warmer (RCA04)** **30 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

This space is located in Zone II.

13. **Ferromagnetic Detection Area (XMRF1)** **30 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

This space is located in Zone III. Patients shall access the MRI Scanning Room(s) having first passed through this area.

14. **Scanning Room, MRI (XMRS1)** **480 NSF**
Minimum one if the projected number of annual MRI Scanning encounters is between 896 and 4,480; provide an additional one for every increment of 4,480 encounters greater than 4,480; the minimum workload to generate an additional MRI Scanning Room is 896. (Refer to Table 2)

Due to specific functional and service clearances around the MRI scanner, room length, width, and height should be closely coordinated with siting requirements for

MRI scanner equipment. It is preferable to increase the NSF of the MRI Scanning Room(s) if it eliminates the need for passive magnetic shielding in exam room walls. The MRI Scanning Room is, by definition, a Zone IV area (area in which the physical hazards are greatest).

15. **Control Room, MRI (XMRC1)** **150 NSF**
Minimum one; provide an additional one for every increment of two MRI Scanning Rooms greater than two.

    This space can also be used as secured access vestibule for MRI Scanning Room. This space is located in Zone III.

16. **System Component Room, MRI (XMRC2)** **180 NSF**
Minimum NSF; provide an additional 60 NSF if Uninterrupted Power Supply (UPS) for the MRI System Component Room is authorized; provide one per each MRI Scanning Room.

    Depending on access pathway and magnetic field hazards, an MRI System Component Room may be a Zone II space.

17. **Storage, MRI (SRS01)** **90 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

    Dedicated storage for MRI consumables, equipment and coils. This space is located in Zone II.

18. **Alcove, Clean Linen (LCCL3)** **30 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

    This space is located in Zone III.

19. **Alcove, Soiled Linen (LCSL3)** **30 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

    This space is located in Zone III.

20. **Alcove, Crash Cart (RCA01)** **30 NSF**
Provide one for the Magnetic Resonance Imaging (MRI) Patient Area.

    Locate in close proximity to MRI Scanning room / Inpatient Holding / Moderate Sedation Prep / Recovery Room. This space is located in Zone III.

4.5. FA5: RADIOLOGY SUPPORT.

1. **Utility Room, Clean (UCCL1)** **120 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two General Radiology, Radiology / Fluoroscopy (R/F), Mammography, Mammography (Stereotactic), Densitometry, and Ultrasound Rooms greater than sixteen.

   Allocated NSF may be subdivided for distributed storage of linens / supplies throughout Radiology / X-ray service area.

2. **Utility Room, Soiled (USCL1)** **90 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two General Radiology, Radiology / Fluoroscopy (R/F), Mammography, Mammography (Stereotactic), Densitometry, and Ultrasound Rooms greater than sixteen.

3. **Storage, Equipment (SRE01)** **120 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of two General Radiology, Radiology / Fluoroscopy (R/F), Mammography, Mammography (Stereotactic), Densitometry, and Ultrasound Rooms greater than sixteen.

4. **Alcove, Blanket Warmer (RCA04)** **30 NSF**
   Provide one for Radiology.

5. **Alcove, Crash Cart (RCA01)** **30 NSF**
   Provide one for Radiology.

4.6. FA6: STAFF AND ADMINISTRATION.

1. **Office, Department / Clinic Chief (OFDR1)** **120 NSF**
   Provide one if a Department / Clinic Chief FTE position for Radiology is authorized.

2. **Sub-Waiting (WRC03)** **60 NSF**
   Provide one if Sub-Waiting in the Radiology Staff and Administration is authorized.

3. **Office, NCOIC / LCPO/ LPO (OFA04)** **120 NSF**
   Provide one if an NCOIC / LCPO / LPO FTE position for Radiology is authorized.

4. **Office, Radiologist (OFDR1)** **120 NSF**
   Provide one per each Radiologist FTE position authorized to have a private office.

5. **Office, Private (OFA04)** **120 NSF**
   Provide one per each Radiology FTE position, other than the Radiologist, authorized to have a private office.

6. **Office, Shared (OFA05)** **120 NSF**
   Provide one for every increment of two Radiology FTE positions authorized to have a shared office.

7. **Cubicle (OFA03)** **60 NSF**
   Provide one per each Radiology FTE position authorized to have a cubicle.

   These cubicles may be collocated in a shared space or dispersed as required.

8. **Conference Room (CRR01)** **240 NSF**
   Provide one for Radiology.

   Planner must determine adequacy and availability of existing Conference Room space and the ability to optimize resources by sharing Conference Room space with other departments.

9. **Copy / Office Supply (RPR01)** **120 NSF**
   Provide one for Radiology.

10. **Lounge, Staff (SL001)** **120 NSF**
    Minimum NSF if the number of Radiologist FTEs working on peak shift is ten; provide an additional 60 NSF for every increment of five Radiology

    FTEs working on peak shift greater than ten; maximum 360 NSF.

11. **Lockers, Personal Property (LR001)** **30 NSF**
    Minimum NSF; provide an additional 30 NSF for every increment of four FTE positions not assigned a private office, shared office or cubicle greater than eight.

12. **Toilet, Staff (TLTU1)** **60 NSF**
    Minimum one; provide an additional one for every increment of fifteen FTEs working on peak shift greater than fifteen.

13. **On-Call Room (DUTY1)** **120 NSF**
    Provide one if an On-Call Room for Radiology is authorized.

14. **Toilet / Shower, On-Call Room (TLTS1)** **60 NSF**
    Provide one per each On-Call Room.

15. **Viewing Room, Picture Archiving and Communication System (PACS) (XVC01)** **120 NSF**
    Provide one if a Picture Archiving and Communication System (PACS) Viewing Room for Radiology is authorized.

4.7. FA7: RADIOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING.

1. **Office, Residency Program Director (OFDR1)** **120 NSF**
   Provide one if a Radiology GME program is authorized.

2. **Office, Tech Training Program Coordinator (OFDR1)** **120 NSF**
   Provide one if a Radiology Technology Training Program is authorized.

3. **Cubicle, Tech Student (OFA03)** **60 NSF**
   Provide one for each Radiology Technology Training student position authorized.

4. **Resident Collaboration Room (WKTM1)** **240 NSF**
   Minimum NSF if a Radiology GME program is authorized; provide an additional 60 NSF per each Radiology Resident / Fellow FTE position authorized greater than two.

   Minimum NSF accommodates two residents, and a collaboration / reference area.

5. **Classroom / Conference Room (CRR01)** **240 NSF**
   Provide one if a Radiology GME program is authorized and if the total number of Radiology Resident / Fellow FTE positions authorized is greater than five.

SECTION 5: PROGRAM DATA REQUIRED: NUCLEAR MEDICINE

5.1. INPUT DATA STATEMENTS. Input Data Statements are based on questions about Workload (W), Mission (M), Staffing (S) and Miscellaneous (Misc) information.

1. Is Nuclear Medicine authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
2. How many annual Nuclear / Gamma Camera encounters are projected? (W)
    a. How many hours a day is the Nuclear / Gamma Camera Scanning Room authorized to operate? (Range 8 to 16 hrs. SEPS default: 8 hrs.) (Misc)
3. Is a Testing / Treadmill Room per each Nuclear / Gamma Camera Scanning Room authorized? (M)
4. Is Dose Storage / Calibration authorized to be performed within the Hot Lab / Radiopharmacy? (M)
5. Is a Radiopharmaceutical Injection Room in the Nuclear Medicine Patient Area authorized? (M)
6. Is Uninterrupted Power Supply (UPS) in the SPECT / CT System Component Room authorized? (M)
7. Is Uninterrupted Power Supply (UPS) in the PET / CT System Component Room authorized? (M)
8. Is a Non-Sterile Compounding Room authorized for Nuclear Medicine? (M)
9. Is a Hot Lab / Radiopharmacy in the Nuclear Medicine Radiopharmacy Area authorized? (M)
10. How many Nuclear Medicine FTE positions are authorized? (S)
    a. How many Nuclear Medicine Physician FTE positions are authorized to have a private office? (Misc)
    b. How many Nuclear Medicine FTE positions, other than the Nuclear Medicine Physician, are authorized to have a private office? (Misc)
    c. How many Nuclear Medicine FTE positions are authorized to have a shared office? (Misc)
    d. How many Nuclear Medicine FTE positions are authorized to have a cubicle? (Misc)
11. How many Nuclear Medicine Male FTEs will work on peak shift? (Misc)
12. How many Nuclear Medicine Female FTEs will work on peak shift? (Misc)
13. Is Sub-Waiting in the Nuclear Medicine Staff and Administrative Area authorized? (Misc)
14. Is an On-Call Room for Nuclear Medicine authorized? (Misc)
15. Is a Nuclear Medicine Graduate Medical Education (GME) program authorized? (M)
    a. How many Nuclear Medicine Resident / Fellow FTE positions are authorized? (S)
16. Is a Nuclear Medicine Technology Training program authorized? (M)
    a. How many Nuclear Medicine Technology student positions are authorized? (S)

SECTION 6: SPACE PLANNING CRITERIA: NUCLEAR MEDICINE

6.1. FA1: NUCLEAR MEDICINE RECEPTION.

1. **Waiting (WRC01)** **120 NSF**
   Minimum NSF; provide an additional 60 NSF for every increment of four Nuclear / Gamma Camera, SPECT / CT, and PET / CT Scanning Rooms greater than four.

2. **Playroom (PLAY1)** **120 NSF**
   Provide one for Nuclear Medicine.

   This space is provided to accommodate children's play activities, may be an open or an enclosed area and should be included within or adjacent to Waiting.

3. **Reception (RECP1)** **120 NSF**
   Provide one for Nuclear Medicine.

   Allocated NSF accommodates two FTES.

4. **Kiosk, Patient Check-in (CLSC1)** **30 NSF**
   Provide one for Nuclear Medicine.

6.2. FA2: NUCLEAR MEDICINE PATIENT AREA.

1. **Sub-Waiting (WRC03)** **60 NSF**
   Provide one for the Nuclear Medicine Patient Area.

2. **Toilet, Patient (TLTU1)** **60 NSF**
   Provide one for the Nuclear Medicine Patient Area.

3. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one for the Nuclear Medicine Patient Area if it is serving a Hospital or Medical Center (Inpatient Care).

4. **Exam / Consult (EXR10)** **120 NSF**
   Provide one for the Nuclear Medicine Patient Area.

5. **Lockers, Personal Property (LR001)** **30 NSF**
   Minimum NSF; provide an additional 30 NSF for every increment of four Nuclear / Gamma Camera, SPECT / CT, and PET / CT Scanning Rooms greater than four.

   Allocated NSF may be provided in the Patient Dressing Cubicles or located adjacent to them during project development.

6. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Provide one per each Nuclear / Gamma Camera, SPECT / CT, and PET / CT Scanning Room.

7. **Alcove, Wheelchair (SRLW1)** **30 NSF**
   Provide one for the Nuclear Medicine Patient Area.

8. **Alcove, Stretcher (SRLW2)** **60 NSF**
   Provide one for the Nuclear Medicine Patient Area.

9. **Scanning Room, Nuclear / Gamma Camera (NMGS1)** **380 NSF**
   Minimum one if the projected number of annual Nuclear / Gamma Camera encounters is between 307 and 1,536; provide an additional one for every increment of 1,536 encounters greater than 1,536; the minimum workload to generate an additional Nuclear / Gamma Camera Scanning Room is 307. (Refer to Table 2)

   Due to specific functional and service clearances around the Nuclear / Gamma Camera, room length, width, and height should be closely coordinated with siting requirements for Nuclear / Gamma Camera equipment.

10. **Testing / Treadmill Room (OPTM1)** **300 NSF**
    Provide one per each Nuclear / Gamma Camera Scanning Room if a Testing / Treadmill Room is authorized.

    Collocate directly adjacent / proximal to SPECT / CT or Nuclear / Gamma Camera Scanning Room.

11. **Radiopharmaceutical Injection Room (NMIR1)** **150 NSF**
    Provide one if a Radiopharmaceutical Injection Room for the Nuclear Medicine Patient Area is authorized.

12. **Dose Storage / Calibration (NMDC1)** **120 NSF**
    Provide one for the Nuclear Medicine Patient Area if Dose Storage / Calibration is not authorized to be performed within the Hot Lab / Radiopharmacy.

13. **Scanning Room, SPECT / CT (XCTS1)** **360 NSF**
    Minimum one if the projected number of annual SPECT / CT encounters is between 307 and 1,536; provide an additional one for every increment of 1,536 encounters greater than 1,536; the minimum workload to generate an additional SPECT / CT Scanning Room is 307. (Refer to Table 2)

    Due to specific functional and service clearances around the SPECT / CT scanner, room length, width, and height should be closely coordinated with siting requirements for SPECT / CT scanner. This NSF is based on non-interventional use of the room; interventional or high acuity uses may need additional NSF.

14. **Control Room, SPECT / CT (XPCC1)** **120 NSF**
Provide one per each SPECT / CT Scanning Room.

15. **System Component Room, SPECT / CT (XPCC2)** **90 NSF**
Minimum NSF; provide an additional 60 NSF if Uninterrupted Power Supply (UPS) for the SPECT / CT System Component Room is authorized; provide one per each SPECT / CT Scanning Room.

Size, capacity, thermal load, and hazard issues with UPS may necessitate separate / larger area than indicated. Coordinate with design requirements.

16. **Injection / Uptake Room, PET / CT (NMIR1)** **120 NSF**
Provide three per each PET / CT Scanning Room.

Three per PET / CT Scanning Room (requires greater shielding from the SPECT CT). Patient spends about 45 minutes here prior to the exam. May also be additional equipment storage in this room.

17. **Scanning Room, PET / CT (XCTS1)** **360 NSF**
Minimum one if the projected number of annual PET / CT scanning encounters is between 410 and 2,048; provide an additional one for every increment of 2,048 encounters greater than 2,048; the minimum workload to generate an additional PET / CT Scanning Room is 410. (Refer to Table 2)

Due to specific functional and service clearances around the PET / CT scanner, room length, width, and height should be closely coordinated with siting requirements for PET / CT scanner.

18. **Control Room, PET / CT (XPCC1)** **120 NSF**
Provide one per each PET / CT Scanning Room.

19. **System Component Room, PET / CT (XPCC2)** **90 NSF**
Minimum NSF; provide an additional 60 NSF if Uninterrupted Power Supply (UPS) for the PET / CT System Component Room is authorized; provide one per each PET / CT Scanning Room.

Size, capacity, thermal load, and hazard issues with UPS may necessitate separate / larger area than indicated. Coordinate with design requirements.

20. **Thyroid Probe Uptake Room (NMUR1)** **120 NSF**
Provide one for the Nuclear Medicine Patient Area.

21. **Sub-Waiting, Hot / Cool Down (NMWR1)** **120 NSF**
Minimum one; provide an additional one for every increment of three Nuclear / Gamma Camera Scanning Rooms greater than three.

22. **Toilet, Hot (TLTU1)** **60 NSF**
Provide one if at least one PET / CT Scanning Room is generated; provide an additional one if at least one SPECT / CT or Nuclear / Gamma Camera Scanning Room is generated.

6.3. FA3: NUCLEAR MEDICINE RADIOPHARMACY AREA.

1. **Vestibule, Radiopharmacy (NMVC1)** **90 NSF**
Provide one for Nuclear Medicine.

Air lock, sally-port mechanism. Access form the Vestibule shall be provided to each of the following rooms: Non-Sterile Compounding Room, Hot Lab / Radiopharmacy Anteroom, Receiving / Storage Radiopharmacy, and Decay Storage. Please refer to each room for additional comments.

2. **Non-Sterile Compounding Room (NMPC1)** **90 NSF**
Provide one if a Non-Sterile Compounding Room is authorized for Nuclear Medicine.

Space provided for Pharmaceutical Compounding Non-Sterile Preparations per USP 795.

3. **Anteroom, Hot Lab / Radiopharmacy (NMLA1)** **120 NSF**
Provide one per each Hot Lab / Radiopharmacy.

ISO Class 8 (or better) area for hand hygiene, garbing procedures, order entry, labeling of compounded sterile products and perform other high-particulate generating activities. Anteroom provides access to Hot Lab / Radiopharmacy.

4. **Receiving / Decay Storage Radiopharmacy (NMDS1)** **120 NSF**
Minimum NSF; provide an additional 30 NSF for every increment of two Nuclear / Gamma Camera, SPECT / CT, and PET / CT Scanning Rooms greater than four.

This room requires Ionizing Radiation shielding.

5. **Hot Lab / Radiopharmacy (NMRP1)** **240 NSF**
Minimum NSF if a Hot Lab / Radiopharmacy is authorized; provide an additional 90 NSF if Dose Storage / Calibration is authorized to be performed within the Hot Lab / Radiopharmacy.

6. **Blood Product Compounding Room (NMBP1)** **90 NSF**
Provide one for Nuclear Medicine.

For blood cell tagging; per ISO 7 and USP 797 requirement. This space shall be accessed exclusively from Hot Lab / Radiopharmacy.

6.4. FA4: NUCLEAR MEDICINE SUPPORT.

1. **Storage, Equipment (SRE01)** **120 NSF**
   Minimum NSF; provide an additional 30 NSF per each Nuclear / Gamma Camera, SPECT / CT, and PET / CT Scanning Rooms greater than one; maximum 210 NSF.

2. **Alcove, Clean Linen (LCCL3)** **30 NSF**
   Provide one for Nuclear Medicine.

3. **Alcove, Soiled Linen (LCSL3)** **30 NSF**
   Provide one for Nuclear Medicine.

4. **Alcove, Crash Cart (RCA01)** **30 NSF**
   Provide one for Nuclear Medicine.

5. **Alcove, Blanket Warmer (RCA04)** **30 NSF**
   Provide one for Nuclear Medicine.

6. **Group Viewing / Reading (XVC01)** **120 NSF**
   Minimum NSF; provide an additional 120 NSF if the total number of Nuclear / Gamma Camera, and SPECT / CT Scanning Rooms is greater than three.

   This space shall be shared by all Nuclear Medicine services except PET / CT.

7. **PET / CT Viewing / Reading (XVC01)** **120 NSF**
   Provide one if the total number of PET / CT Scanning Room is equal to or greater than one.

6.5. FA5: NUCLEAR MEDICINE STAFF AND ADMINISTRATION.

1. **Office, Department / Clinic Chief (OFDR1)** **120 NSF**
   Provide one for Nuclear Medicine.

2. **Sub-Waiting (WRC03)** **60 NSF**
   Provide one if Sub-Waiting in the Nuclear Medicine Staff and Administrative Area is authorized.

3. **Office, NCOIC / LCPO / LPO (OFA04)** **120 NSF**
   Provide one for Nuclear Medicine.

4. **Office, Nuclear Medicine Physician (OFDR1)** **120 NSF**
   Provide one per each Nuclear Medicine Physician FTE position authorized to have a private office.

5. **Office, Private (OFA04)** **120 NSF**
   Provide one per each Nuclear Medicine FTE position, other than the Nuclear Medicine Physician, authorized to have a private office.

6. **Office, Shared (OFA05)** **120 NSF**
   Provide one for every increment of two Nuclear Medicine FTE positions authorized to have a shared office.

7. **Cubicle (OFA03)** **60 NSF**
   Provide one per each Nuclear Medicine FTE position authorized to have a cubicle.

   These cubicles may be collocated in a shared space or dispersed as required.

8. **Conference Room (CRA01)** **240 NSF**
   Provide one for Nuclear Medicine.

   Planner must determine adequacy and availability of existing Conference Room space and the ability to optimize resources by sharing Conference Room space with other departments.

9. **Copy / Office Supply (RPR01)** **120 NSF**
   Provide one for Nuclear Medicine.

10. **Lounge, Staff (SL001)** **120 NSF**
    Minimum NSF if the total number of Nuclear Medicine FTEs working on peak shift is ten, provide an additional 60 NSF for every increment of five Nuclear Medicine FTEs working on peak shift greater than ten; maximum 360 NSF.

11. **Toilet, Staff (TLTU1)** **60 NSF**
    Minimum one; provide an additional one for every increment of fifteen Nuclear Medicine FTE positions working on peak shift greater than fifteen.

12. **Locker / Changing Room, Male Staff (LR002)** **120 NSF**
    Minimum NSF; provide an additional 10 NSF for every increment of two Nuclear Medicine Male FTE positions on peak shift greater than twelve.

13. **Locker / Changing Room, Female Staff (LR002)** **120 NSF**
    Minimum NSF; provide an additional 10 NSF for every increment of two Nuclear Medicine Female FTE positions on peak shift greater than twelve.

14. **Toilet / Shower, Staff (TLTS1)** **60 NSF**
    Provide two for Nuclear Medicine.

15. **On-Call Room (DUTY1)** **120 NSF**
    Provide one if an On-Call Room for Nuclear Medicine is authorized.

16. **Toilet / Shower, On-Call Room (TLTS1)** **60 NSF**
    Provide one if an On-Call Room for Nuclear Medicine is authorized.

6.6. FA6: NUCLEAR MEDICINE GRADUATE MEDICAL EDUCATION (GME) / TRAINING.

1. **Office, Residency Program Director (OFDR1)** **120 NSF**
   Provide one if a Nuclear Medicine GME program is authorized.

2. **Office, Tech Training Program Coordinator (OFDR1)** **120 NSF**
   Provide one if a Nuclear Medicine GME program is authorized.

3. **Cubicle, Tech Student (OFA03)** **60 NSF**
   Provide one for each Nuclear Medicine Technology student position authorized.

4. **Resident Collaboration Room (WKTM1)** **240 NSF**
   Minimum NSF if a Nuclear Medicine GME program is authorized; provide an additional 60 NSF per each Nuclear Medicine Resident / Fellow FTE position authorized greater than two.

   Minimum NSF accommodates two residents, and a collaboration / reference area.

5. **Classroom / Conference Room (CRR01)** **240 NSF**
   Provide one if a Nuclear Medicine GME program is authorized and if the total number of Nuclear Medicine Resident / Fellow FTE positions authorized is greater than five.

SECTION 7: PROGRAM DATA REQUIRED: RADIATION ONCOLOGY

7.1. INPUT DATA STATEMENTS. Input Data Statements are based on questions about Workload (W), Mission (M), Staffing (S) and Miscellaneous (Misc) information.

1. Is Radiation Oncology Beam Patient Area authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
2. Is a Block Preparation / Storage in the Radiation Oncology Beam Patient Area authorized? (M)
3. Is a Radiation Oncology Isotope Patient Area authorized? (M)
4. Is Radiation Oncology Isotope authorized to serve a Hospital or Medical Center (Inpatient Care)? (M)
5. Is Sub-Waiting in the Radiation Oncology Isotope Patient Area authorized? (Misc)
6. How many annual SPECT / CT encounters are projected? (W)
    a. How many hours a day is the SPECT / CT Scanning Room authorized to operate? (Range 8 to 16 hrs. SEPS default: 8 hrs.) (Misc)

7. How many annual PET / CT encounters are projected? (W)
    a. How many hours a day is the PET / CT Scanning Room authorized to operate? (Range 8 to 16 hrs. SEPS default: 8 hrs.) (Misc)
8. How many annual Linear Accelerator (Single-Axis) encounters are projected? (W)
    a. How many hours a day is the (Single-Axis) Linear Accelerator Vault authorized to operate? (Range 8 to 16 hrs.; SEPS default: 8 hrs.) (Misc)
9. Is Sub-Waiting in the Radiation Oncology Staff and Administrative Area authorized? (Misc)
10. How many Radiation Oncology FTE positions are authorized? (S)
    a. How many Radiation Oncologist FTE positions are authorized to have a private office? (Misc)
    b. How many Radiation Oncology FTE positions, other than the Radiation Oncologist, are authorized to have a private office? (Misc)
    c. How many Radiation Oncology FTE positions are authorized to have a shared office? (Misc)
    d. How many Radiation Oncology FTE positions are authorized to have a cubicle? (Misc)
11. How many Radiation Oncology Male FTEs will work on peak shift? (Misc)
12. How many Radiation Oncology Female FTEs will work on peak shift? (Misc)
13. Are Staff Toilet / Showers for Radiation Oncology authorized? (Misc)
14. Is a Radiation Oncology Graduate Medical Education (GME) program authorized? (M)
    a. How many Radiation Oncology Resident / Fellow FTE positions are authorized? (S)
15. Is a Radiation Therapy Technology Training program authorized? (M)
    a. How many Radiation Therapy Technology student positions are authorized? (S)

SECTION 8: SPACE PLANNING CRITERIA: RADIATION ONCOLOGY

8.1. FA1: RADIATION ONCOLOGY RECEPTION.

1. **Waiting (WRC01)** **240 NSF**
   Minimum NSF; provide an additional 240 NSF for every increment of two (Single-Axis) Linear Accelerator Vaults greater than two.

2. **Playroom (PLAY1)** **120 NSF**
   Provide one for Radiation Oncology.

   This space is provided to accommodate children's play activities, may be an open or an enclosed area and should be included within or adjacent to Waiting.

3. **Reception (RECP1)** **120 NSF**
   Provide one for Radiation Oncology.

Allocated NSF accommodates two FTEs.

4. **Kiosk, Patient Check-in (CLSC1)** **30 NSF**
   Provide one for Radiation Oncology.

5. **Alcove, Wheelchair (SRLW1)** **30 NSF**
   Provide one for Radiation Oncology.

8.2. FA2: RADIATION ONCOLOGY BEAM PATIENT AREA.

1. **Sub-Waiting (WRC03)** **90 NSF**
   Minimum NSF; provide an additional 30 NSF per each (Single-Axis) Linear Accelerator Vault greater than two.

   Area dedicated to prepared patient waiting in close proximity to Beam Therapy rooms.

2. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one for the Radiation Oncology Beam Patient Area if it is serving a Hospital or Medical Center (Inpatient Care).

3. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Minimum one; provide an additional one per each (Single-Axis) Linear Accelerator Vault greater than two.

4. **Lockers, Personal Property (LR001)** **30 NSF**
   Minimum NSF, provide an additional 30 NSF per every increment of four (Single-Axis) Linear Accelerator Vault greater than four.

   Lockers may be provided in the Patient Dressing Cubicles or dispersed adjacent to them.

5. **Alcove, Stretcher (SRLW2)** **60 NSF**
   Provide one for the Radiation Oncology Beam Patient Area.

6. **Exam Room (EXRG1)** **120 NSF**
   Provide one for the Radiation Oncology Beam Patient Area.

7. **Consult Room (OFDC2)** **120 NSF**
   Provide one for the Radiation Oncology Beam Patient Area.

8. **Linear Accelerator (Single-Axis) Vault (XTLA1)** **1,200 NSF**
   Minimum one if the projected number of annual Single-Axis Linear Accelerator encounters is between 614 and 3,072; provide an additional one for every increment of 3,072 encounters greater than 3,072; the minimum workload to generate an additional Single-Axis Linear Accelerator Vault is 614. (Refer to Table 2)

Allocated NSF includes NSF for the Maze Entrance and may need to be increased if vault is to serve High Dose Rate (HDR) brachytherapy procedures. Coordinate functional program requirements and includes maze entrance. Refer to vendor siting requirements. Anticipate future equipment replacements / upgrades when sizing maze entrance clear widths.

9. **Control Room, Linear Accelerator (XTLC1) 120 NSF**
   Provide one per each Linear Accelerator (Single-Axis) Vault.

10. **System Component Room, Linear Accelerator (XTLE1) 90 NSF**
    Provide one per each Linear Accelerator (Single-Axis) Vault.

11. **Immobilizer Preparation / Storage (XTMF1) 120 NSF**
    Provide one for the Radiation Oncology Beam Patient Area.

    Space to create anatomy specific immobilizers for the patient.

12. **Block Preparation / Storage (XTMF1) 120 NSF**
    Provide one if a Block Preparation / Storage is authorized for the Radiation Oncology Beam Patient Area.

    Space for machining metal blocks for beam therapy and associated storage.

13. **Storage, Beam Therapy (SRE01) 120 NSF**
    Minimum NSF; provide an additional 30 NSF for every increment of two (Single-Axis) Linear Accelerator Vault greater than two.

14. **Scanning Room, Computed Tomography (CT) Simulator (XTSG1) 360 NSF**
    Provide one if a Computed Tomography (CT) Simulator is authorized.

    May be co-located in Nuclear Medicine or Radiology.

15. **Control Room, Computed Tomography (CT) Simulator (XTSC1) 200 NSF**
    Provide one if a Computed Tomography (CT) Simulator is authorized.

16. **System Component Room, Computed Tomography (CT) Simulator (XTSC2) 90 NSF**
    Minimum NSF if a Computed Tomography (CT) Simulator is authorized; provide an additional 60 NSF if Uninterrupted Power Supply (UPS) for the CT Simulator System Component Room is authorized.

17. **Team Collaboration Room (WRCH1) 120 NSF**
    Provide one for the Radiation Oncology Beam Patient Area.

8.3. FA3: RADIATION ONCOLOGY ISOTOPE PATIENT AREA.

1. **Sub-Waiting (NMWR1)** **60 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized and if Sub-Waiting in the Radiation Oncology Isotope Patient Area is authorized.

   Area dedicated to prepared patient waiting in close proximity to Beam Therapy rooms.

2. **Inpatient Holding (WRL01)** **90 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized and facility is serving a Hospital or Medical Center (Inpatient Care).

3. **Screening / Patient Prep (EXRG4)** **120 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized.

   Dedicated to Point of Care blood testing and IV preparation, patient consult, venipuncture.

4. **Lockers, Personal Property (LR001)** **30 NSF**
   Provide one per each HDR Brachytherapy Procedure Room if a Radiation Oncology Isotope Patient Area is authorized.

   Area outside dressing booth for secure storage of Personal Property.

5. **Cubicle, Patient Dressing (DR001)** **60 NSF**
   Provide one per each HDR Brachytherapy Procedure Room if a Radiation Oncology Isotope Patient Area is authorized.

6. **Alcove, Stretcher (SRLW2)** **60 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized.

7. **Exam Room (EXRG1)** **120 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized.

   Exam Rooms are used for evaluations of patients on initial consultations, examination during treatment and after completion of therapy.

8. **Consult Room (OFDC2)** **120 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized.

9. **Procedure Room, HDR Brachytherapy (XTBT1)** **180 NSF**
   Provide one if a Radiation Oncology Isotope Patient Area is authorized.

10. **Control Room, Brachytherapy (XTBC1)** **120 NSF**
    Provide one if a Radiation Oncology Isotope Patient Area is authorized.

11. **Storage, Isotope / HDR (NMDC1)** **150 NSF**
Provide one if an HDR Brachytherapy Procedure Room is authorized and a Radiation Oncology Isotope Patient Area is authorized.

    Allocated NSF accommodates the secure HDR unit storage, non-HDR radioactive isotope storage and decay storage.

12. **Toilet, Patient (TLTU1)** **60 NSF**
Provide one if a Radiation Oncology Isotope Patient Area is authorized.

8.4. FA4: RADIATION ONCOLOGY SUPPORT.

1. **Utility Room, Clean (UCCL1)** **120 NSF**
Provide one for Radiation Oncology.

2. **Utility Room, Soiled (USCL1)** **90 NSF**
Provide one for Radiation Oncology.

3. **Storage, Equipment (SRE01)** **120 NSF**
Provide one for Radiation Oncology.

4. **Work Area, Dosimetry / Treatment Planning (XTTP1)** **240 NSF**
Provide one for Radiation Oncology.

    This space is a collaborative work area for treatment planning.

5. **Alcove, Wheelchair (SRLW1)** **30 NSF**
Provide one for the Radiation Oncology Patient Areas.

6. **Workroom, Physics (XTLB1)** **240 NSF**
Provide one for Radiation Oncology.

    This room provides additional space for radiation physicists to perform special planning and calibration work for Linear Accelerators and Brachytherapy cases.

8.5. FA5: RADIATION ONCOLOGY STAFF AND ADMINISTRATION.

1. **Office, Department / Clinic Chief (OFDR1)** **120 NSF**
Provide one for Radiation Oncology.

2. **Sub-Waiting (WRC03)** **60 NSF**
Provide one if a Sub-Waiting for Radiation Oncology is authorized.

    Allocated NSF provides space for two seats plus circulation.

3. **Office, NCOIC / LCPO / LPO (OFA04)** **120 NSF**
   Provide one for Radiation Oncology.

4. **Office, Radiation Oncologist (OFDR1)** **120 NSF**
   Provide one per each Radiation Oncologist FTE position authorized.

5. **Office, Private (OFA04)** **120 NSF**
   Provide one per each Radiation Oncology position, other than the Radiation Oncologist, authorized to have a private office.

6. **Office, Shared (OFA05)** **120 NSF**
   Provide one for every increment of two Radiation Oncology FTE positions authorized to have a shared office.

7. **Cubicle (OFA03)** **60 NSF**
   Provide one per each Radiation Oncology FTE position authorized to have a cubicle.

   These cubicles may be collocated in a shared space or dispersed as required.

8. **Conference Room (CRA01)** **240 NSF**
   Provide one for Radiation Oncology.

   Planner must determine adequacy and availability of existing Conference Room space and the ability to optimize resources by sharing Conference Room space with other departments.

9. **Copy / Office Supply (RPR01)** **120 NSF**
   Provide one for Radiation Oncology.

10. **Lounge, Staff (SL001)** **120 NSF**
    Minimum NSF if the total number of Radiation Oncology FTEs working on peak shift is ten, provide an additional 60 NSF for every increment of five Radiation Oncology FTEs working on peak shift greater than ten; maximum 360 NSF.

11. **Toilet, Staff (TLTU1)** **60 NSF**
    Minimum one; provide an additional one for every increment of fifteen total Radiation Oncology FTE positions working on peak shift greater than fifteen.

12. **Locker / Changing Room, Male Staff (LR002)** **120 NSF**
    Minimum NSF; provide an additional 10 NSF for every increment of two Radiation Oncology Male FTE positions authorized greater than twelve.

13. **Locker / Changing Room, Female Staff (LR002)** **120 NSF**

    Minimum NSF; provide an additional 10 NSF for every increment of two Radiation Oncology Female FTE positions authorized greater than twelve.

14. **Toilet / Shower, Staff (TLTS1)** **60 NSF**
    Provide two if authorized for Radiation Oncology.

8.6. FA6: RADIATION ONCOLOGY GRADUATE MEDICAL EDUCATION (GME) / TRAINING.

1. **Office, Residency Program Director (OFDR1)** **120 NSF**
   Provide one if a Radiation Oncology GME program is authorized.

2. **Office, Tech Training Coordinator (OFDR1)** **120 NSF**
   Provide one if a Radiation Therapy Technology Training program is authorized.

3. **Cubicle, Student (OFA03)** **60 NSF**
   Provide one per each Radiation Therapy Technology student position authorized.

4. **Resident Collaboration Room (WKTM1)** **240 NSF**
   Minimum NSF if a Radiation Oncology GME program is authorized; provide an additional 60 NSF per each Radiation Oncology Resident / Fellow FTE position authorized greater than two.

   Minimum NSF accommodates two residents, and a collaboration / reference area.

5. **Classroom / Conference Room (CRR01)** **240 NSF**
   Provide one if a Radiation Oncology GME program is authorized and if the total number of Radiation Oncology Resident / Fellow FTE positions authorized is greater than five.

SECTION 9: PLANNING AND DESIGN CONSIDERATIONS

The following design considerations are intended to provide planners and designers with guidance on how to follow world-class and evidence-based design strategies for new and renovation of existing healthcare facilities. For a more comprehensive list, refer to the World Class Checklist (https://facilities.health.mil/home/). Also refer to Part 3: Outpatient Facilities of the FGI Guidelines for Design and Construction of Hospitals and Outpatient Facilities by the Facility Guidelines Institute (FGI Guidelines) for additional information.

9.1. NET-TO-DEPARTMENT GROSS FACTOR. Net-to-department gross factor (NTDG) for Radiology, Nuclear Medicine and Radiation Oncology is 1.50. This number, when multiplied by the programmed net square foot (NSF) area, determines the departmental gross square feet. This factor accounts for the space occupied by internal department circulation and interior partitions as well as other construction elements not defined by the net square foot area. Refer to UFC 4-510-01, Section 2-3.4.2.2 and DoD Space Planning Criteria Chapter 130: Net to Gross Conversion Factors.

9.2. GENERAL DESIGN CONSIDERATIONS.

1. Reception Area

    a. Consideration should be given to special needs of specific patient groups in a shared / general waiting area. For example, adolescent and geriatric patients may require different seating options and environments. Consider the needs of bariatric patients.

    b. The playroom (or play area) for children shall be constructed of surfaces and materials that are easy to clean and durable (nonporous and smooth).

2. Patient Area

    a. Provide acoustic privacy by controlling sound transmission between rooms and wherever else patient information is exchanged.

3. Support Area

    a. In all equipment storage rooms, assure adequate power is provided for all equipment housed within these rooms.

    b. The medication preparation room should be enclosed to minimize distractions. A glass wall or window may be provided to permit observation of patients and department activities.

4. Staff and Administrative Area

a. Team collaboration rooms and staff areas should be located so staff members may have conversations regarding patients and clinical matters without being heard by patients or visitors.

5. Other

a. Many diagnostic and therapeutic services within this chapter make use of ionizing radiation (including X-ray, CT scanner, Mammography, Nuclear Camera, PET / CT, and Linear Accelerator). In each room in which an ionizing radiation emission source is located, stored, prepared, generated, calibrated, used, or disposed of, the design team will consult with a medical physicist to determine the necessary shielding quantities / materials to be used in construction.

9.3. MODALITY PLANNING CONSIDERATIONS.

1. Radiology Reception Area

a. Radiology should have a clearly identified Reception Area. If the radiology area shares reception / waiting functions with other clinical services (e.g. women's health or nuclear medicine), these co-located services should be clearly identified as sharing Reception / Waiting.

b. Patient check-in kiosk should be positioned to be clearly visible to patients and visitors entering the reception area, and should be in the line-of-sight from the reception counter.

2. Radiology Patient Area

a. Sub-waiting areas should be combined for imaging modalities which share common patient populations and preparations.

b. Inpatient holding areas should provide area for radiology exam preparations around a patient Stretcher.

c. Inpatient holding areas should allow direct patient observation if a patient's condition warrants.

d. Additional Patient Dressing Cubicles may be subdivided provided that accessibility requirements are achieved.

e. Radiographic rooms include exposure control alcoves.

f. Adjustable lighting levels are essential in radiology exam areas. Provide dimmable lighting when possible.

g. For ultrasound rooms which may serve abdominal exams, it is recommended that the corresponding ultrasound toilet be directly accessed from the Ultrasound Room.

3. Computed Tomography (CT) Patient Area

    a. Sub-waiting, Inpatient Holding, Screening / Patient Prep, Patient Dressing Cubicle, and Personal Property Locker for CT may be combined with Radiology if services are proximal and there are no functional contraindications.

    b. Due to temperature regulation considerations, it is recommended that a CT System Component Room be provided and utilized even if the CT manufacturer permits the CT system components to be located within the Exam Room or the Control Room.

    c. If Moderate Sedation is authorized, Prep / Recovery Room should be positioned with direct line of sight from Nurse Station.

    d. The Control Room and CT Scanning Room should be configured to allow the technologist at the control console to have a view of the patient in the CT gantry.

    e. Anticipate additional space needs in CT Scanning Room based on changes in patient acuity and interventional clinical uses.

    f. Carefully coordinate siting requirements / restrictions when CT Scanning Room is planned to be adjacent to MRI Scanning Room.

    g. Due to temperature regulation considerations, it is recommended that a CT System Component Room be provided and utilized even if the CT manufacturer permits the CT system components to be located within the Exam Room or the Control Room.

4. Magnetic Resonance Imaging (MRI) Patient Area

    a. MRI patient area layout should adhere to the safety and security principles of the ACR 4-Zone model as identified in the most current edition of the ACR Guidance Document on MR Safe Practices, including the appendix ‘MR Facility Safety Design Guidelines’. Refer to the most recent- ACR Guidance Document on MR Safe Practices (JMRI37-5-01-530).

    b. In principle, the four-zone model requires greater levels of screening, access control, and supervision as untrained persons approach the MRI Scanning Room.

    c. Zone I: Areas with no direct relationship to an MRI service, and no associated physical hazards. The entire world outside of MRI providers’ facilities would be Zone I.

d. Zone II: Areas within an MRI provider's imaging suite where persons self-select to enter the MRI area, and where both physical and clinical screenings of persons who will be proceeding further are conducted. There are to be no physical hazards associated with MRI (static magnetic field) in Zone II areas.

e. Zone III: Areas in proximity to the MRI scanner that meet one or both of the following criteria must be treated as Zone III areas: Areas in which a person may access static magnetic fields in excess of 5 Gauss, or areas from which a person can directly access the MRI Scanning Room. Zone III areas must be physically restricted from Zone II areas. Independent access is to be provided only to facility-designated personnel who have demonstrated competence in MRI safety. Persons should only be permitted to enter Zone III following successful completion of physical and clinical screening for MRI contraindications, as appropriate. Patients or other non-MRI personnel within Zone III must always be under the direct supervision of facility-designated personnel who have demonstrated competence in MRI safety.

f. Zone IV: The MRI Scanning Room, itself. It is within this room that the physical hazards related to MRI are the greatest.

g. The Control Room and MRI Scanning Room should be configured to allow the technologist at the control console to have a view of the patient in the MRI gantry.

h. Due to the unique risks associated with MRI scanning equipment, patient support spaces for MRI shall not be shared / combined with those of other imaging modalities.

i. Inpatient holding areas should provide area for MRI Scanning preparations around a patient Stretcher.

j. Inpatient holding areas should allow direct patient observation if a patient's condition warrants.

k. If Moderate Sedation is authorized, Prep / Recovery Room should be positioned with direct line of sight from Nurse Station.

l. Inpatient Holding may be integrated with Moderate Sedation.

m. Additional Patient Dressing Cubicles may be subdivided provided that accessibility requirements are achieved.

n. Ferromagnetic Detection Alcove may be located immediately prior to the MRI Scanning Room Entrance, or near the entrance to the MRI Control Room. It is preferable to locate the Ferromagnetic Detection systems such that doors do not swing into / through the detection zone.

o. In many situations it is preferable to increase the size of the MRI Scanning Room above the programmed NSF if doing so can eliminate a need for passive magnetic shielding.

p. MRI scanners are highly sensitive to vibration. It is recommended that the locations of MRI suites be planned to avoid proximity to fans, motors, pumps, drives, elevators, and loading docks and other such equipment.

q. MRI scanners may be highly sensitive to ferromagnetic materials used in construction, particularly in the floor assembly. Seek to minimize / eliminate ferrous materials in the floor structure beneath the MRI Scanning Room.

r. It is generally preferable to place MRI Scanning Rooms on slab-on-grade construction to minimize potential conflicts with structure-borne vibration and ferrous content in structured floors.

s. MRI scanners can produce damaging levels of sound pressure during the image acquisition process. Enclosing walls, floor, and deck construction should be selected to control acoustic transmission to other areas. Similarly, HVAC ductwork which communicates with other areas should be provided with acoustic treatment. Finish materials within the MRI Scanning Room should be selected with consideration of their acoustic properties.

t. Due to temperature regulation considerations, it is recommended that a MRI System Component Room be provided and utilized even if the MRI manufacturer permits the MRI system components to be located within the Exam Room or the Control Room.

5. Radiology Support Area

    a. Clean and Soiled Utility areas may be subdivided and distributed to be convenient to each of the imaging areas, as dictated by need.

    b. Equipment Storage is identified for only storage needed within the Radiology Department. Storage outside of the department for items such as portable X-ray or other radiology resources must be determined independently.

    c. Radiology services will require a PACS server room. These may be located within the Radiology department, or remote. Space planning criteria are included in DoD Space Planning Criteria Chapter 240 Information Management (IM) “Server Room”.

6. Radiology Staff and Administrative Area

    a. In any room / office with PACS viewing capability, dimmable lighting should be provided.

b. If windows are provided into any room / office with PACS viewing capability, blackout curtains should be provided.

c. Radiologist Offices and Viewing Rooms should be provided with acoustic treatments to prevent patient information dictations from being overheard in adjacent spaces.

7. Nuclear Medicine Reception Area

a. Nuclear Medicine should have a clearly identified Reception Area. If the Nuclear Medicine area shares reception / waiting functions with other clinical services (e.g. women's health or radiology), these co-located services should be clearly identified as sharing reception / waiting.

b. Patient check-in kiosk should be positioned to be clearly visible to those entering the reception area, and should be in the line-of-sight from the reception counter.

8. Nuclear Medicine Patient Area

a. Inpatient holding areas should provide area for Nuclear Medicine exam preparations around a patient Stretcher.

b. Inpatient holding areas should allow direct patient observation if a patient's condition warrants.

c. Additional Patient Dressing Cubicles may be subdivided provided that accessibility requirements are achieved.

d. Nuclear / Gamma Camera Scanning Room, SPECT / CT Scanning Room, and PET / CT Scanning Room, should each be located / positioned such that the scanner's detectors are not oriented towards another Nuclear / Gamma Camera Scanning Room, Testing / Treadmill Room, Dose Storage / Calibration, Hot Lab, Decay Storage, Radiopharmaceutical Injection Room, PET / CT Injection / Uptake Room, other nuclear medicine scanning room, or other radiological sources.

e. Patient flow should be carefully considered to segregate patients injected with higher-energy radiopharmaceuticals (typically used for PET imaging) from other persons.

f. Workflow in support of PET imaging services should minimize the travel distance and crossing circulation routes of 'hot' patients with other persons.

g. If gaseous or aerosolized radiopharmaceuticals are to be used, additional HVAC systems should be designed accordingly. Closely coordinate the clinical / research intentions with the facility design.

h. Coordinate storage security requirements for radioisotopes with Radioactive Materials (RAM) license requirements.

i. Coordinate shielding design requirements with an appropriately credentialed medical physicist.

9. Nuclear Medicine Support Area

a. It is recommended to locate Decay Storage and Hot Lab facilities off-axis from the line of detection of Nuclear / Gamma Camera Scanning Room, SPECT / CT Scanning Room, or hybrid PET imaging device scanning room.

b. Hot Lab / Radiopharmacy design program requirements depend extensively upon nuclear medicine scanning equipment, utilized radiopharmaceuticals, and clinical applications. Coordinate closely with end-user(s) to develop appropriate program and space needs.

c. Radioisotope generator, if utilized, may require significant room shielding; however storing them in shielded cabinets is the preferred method. Carefully coordinate the selection of generator equipment with siting and shielding requirements. Coordinate shielding design requirements with an appropriately credentialed medical physicist.

10. Nuclear Medicine Staff and Administrative Area

a. In any room / office with PACS viewing capability, dimmable lighting should be provided.

b. If windows are provided into any room / office with PACS viewing capability, blackout curtains should be provided.

c. Nuclear Medicine Physician Offices and Viewing Rooms should be provided with acoustic treatments to prevent patient information dictations from being overheard in adjacent spaces.

11. Radiation Oncology Reception Area

a. Radiation Oncology should have a clearly identified Reception Area. If the Radiation Oncology area shares reception / waiting functions with other clinical services (e.g. nuclear medicine), these co-located services should be clearly identified as sharing Reception / Waiting.

b. Patient check-in kiosk should be positioned to be clearly visible to those entering the reception area, and should be in the line-of-sight from the reception counter.

12. Radiation Oncology Beam Patient Area

a. Sub-waiting areas may be combined for therapy modalities which share common patient populations and preparations.

b. Inpatient holding areas should provide area for beam therapy preparations around a patient Stretcher.

c. Inpatient holding areas should allow direct patient observation if a patient's condition warrants.

d. Additional Patient Dressing Cubicles may be subdivided provided that accessibility requirements are achieved.

e. Adjustable lighting levels are essential in beam therapy exam areas. Provide dimmable lighting when possible.

f. If beam therapy vault(s) are provided to support HDR procedures (see FAs 15 & 16 notes), coordinate the layout and infrastructural supports (e.g. procedure lighting and medical gasses) to accommodate these procedures. For multi-purpose vaults, allocated NSF may need to be increased.

g. Imaging simulators may be dedicated to Radiation Oncology. At lower patient volumes, scanners located in Radiology or Nuclear Medicine may be outfitted with simulation hardware and software to support simulation activities for Radiation Oncology patients.

h. Due to extreme thicknesses of vault wall construction and their disproportionate and concentrated effect on net-to-gross floor area, NSF area associated with the thickness of each vault wall assembly may need to be factored independently from standard departmental grossing factors. Vault wall thickness (and resulting NSF) will depend upon specific properties of the beam therapy equipment and vault design.

i. In addition to the imaging and therapy devices defined in the earlier sections of this chapter, a number of newer / novel imaging and therapy devices are also available. Due to the low probability that any of these are likely to be broadly used at DoD facilities within an estimated five years from initial publication of this chapter update, specific space planning criteria are not provided. Because of their availability, however, the authors believe it appropriate to minimally identify them:

    i. Multi-Axis Robotic Beam Therapy (e.g. "Cyber-knife")

    ii. Proton Beam Therapy

    iii. Stereotactic Radiosurgery

    iv. Tomotherapy Room

v. PET / CT

vi. PET / MRI

vii. MRI / Beam Therapy

j. Each of the above devices will have specific programmatic needs beyond the immediate scanning room. Should one of these advanced devices be identified for a project, the planning and design teams are advised to carefully coordinate siting and space needs requirements with the equipment manufacturer / vendor. Additionally, it is strongly recommended to enlist expert radiology / therapy architects as early in the process as possible.

13. Radiation Oncology Isotope Patient Area

a. Sub-waiting areas may be combined for therapy modalities which share common patient populations and preparations.

b. Inpatient holding areas should provide area for isotope therapy preparations around a patient Stretcher.

c. Inpatient holding areas should allow direct patient observation if a patient's condition warrants.

d. Additional Patient Dressing Cubicles may be subdivided provided that accessibility requirements are achieved.

e. Low Dose Rate (LDR) Brachytherapy may be performed in a procedure room that has been provided with appropriate shielding. Coordinate shielding design requirements with an appropriately credentialed medical physicist.

f. High Dose Rate (HDR) Brachytherapy may require vault-style assembly to achieve necessary shield attenuation. For lower volume HDR services, it may be possible to utilize beam therapy vault enclosure(s) for HDR procedures. Coordinate functional and space requirements (see FA15 notes, above). Coordinate shielding design requirements with an appropriately credentialed medical physicist. Bulk seed storage and decay storage for HDR and LDR brachytherapy is recommended to be centrally provided in FA10: Nuclear Medicine Radiopharmacy Area.

14. Radiation Oncology Support Area

a. Where feasible (and if provided independently), Radiation Oncology's Hot Lab / Radiopharmacy may be co-located with Nuclear Medicine's Hot Lab / Radiopharmacy.

b. Where feasible, Radiation Oncology's Decay Storage may be co-located with Nuclear Medicine's Decay Storage.

15. Radiation Oncology Staff and Administrative Area

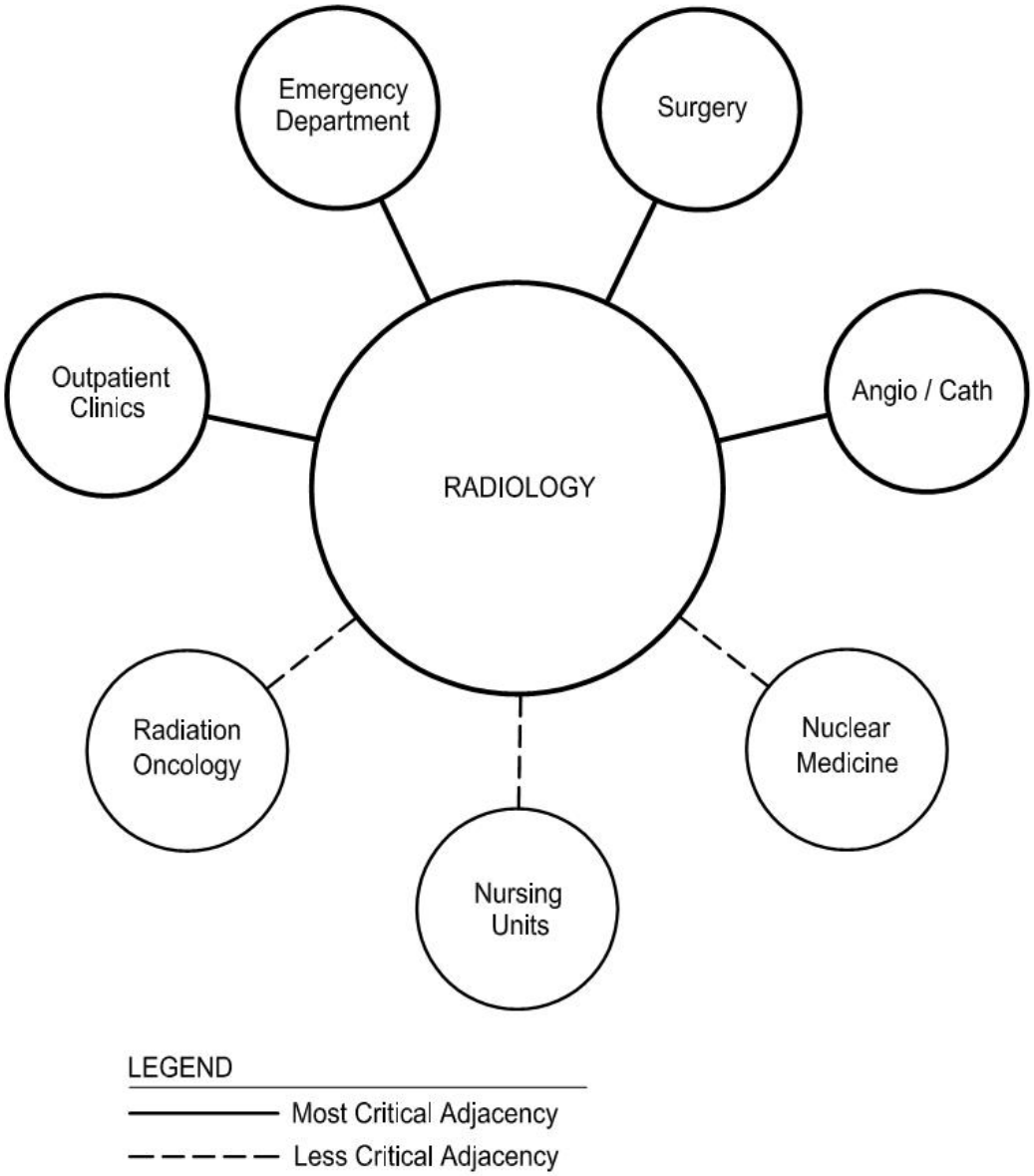
a. In any room / office with PACS viewing capability, dimmable lighting should be provided.

b. If windows are provided into any room / office with PACS viewing capability, blackout curtains should be provided.

c. Radiation Oncology Physician Offices and Viewing Rooms should be provided with acoustic treatments to prevent patient information dictations from being overheard in adjacent spaces.

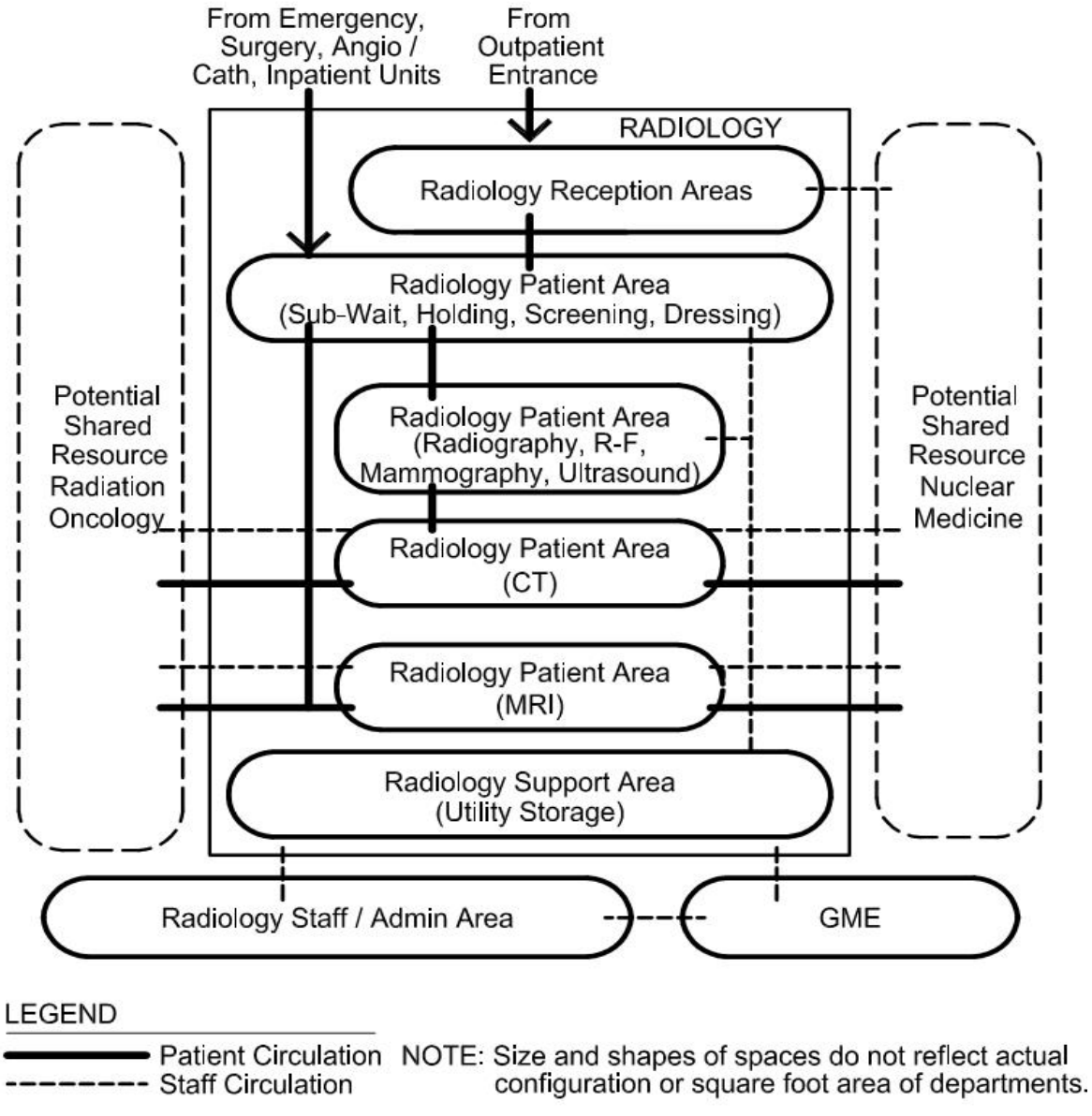
SECTION 10: FUNCTIONAL RELATIONSHIP (INTERDEPARTMENTAL): RADIOLOGY

10.1. FUNCTIONAL RELATIONSHIP: RADIOLOGY. Radiology will rely on a number of other services in a Military Treatment Facility (MTF) for patient care and support functions. The diagram below represents desirable relationships based on efficiency and functional considerations.



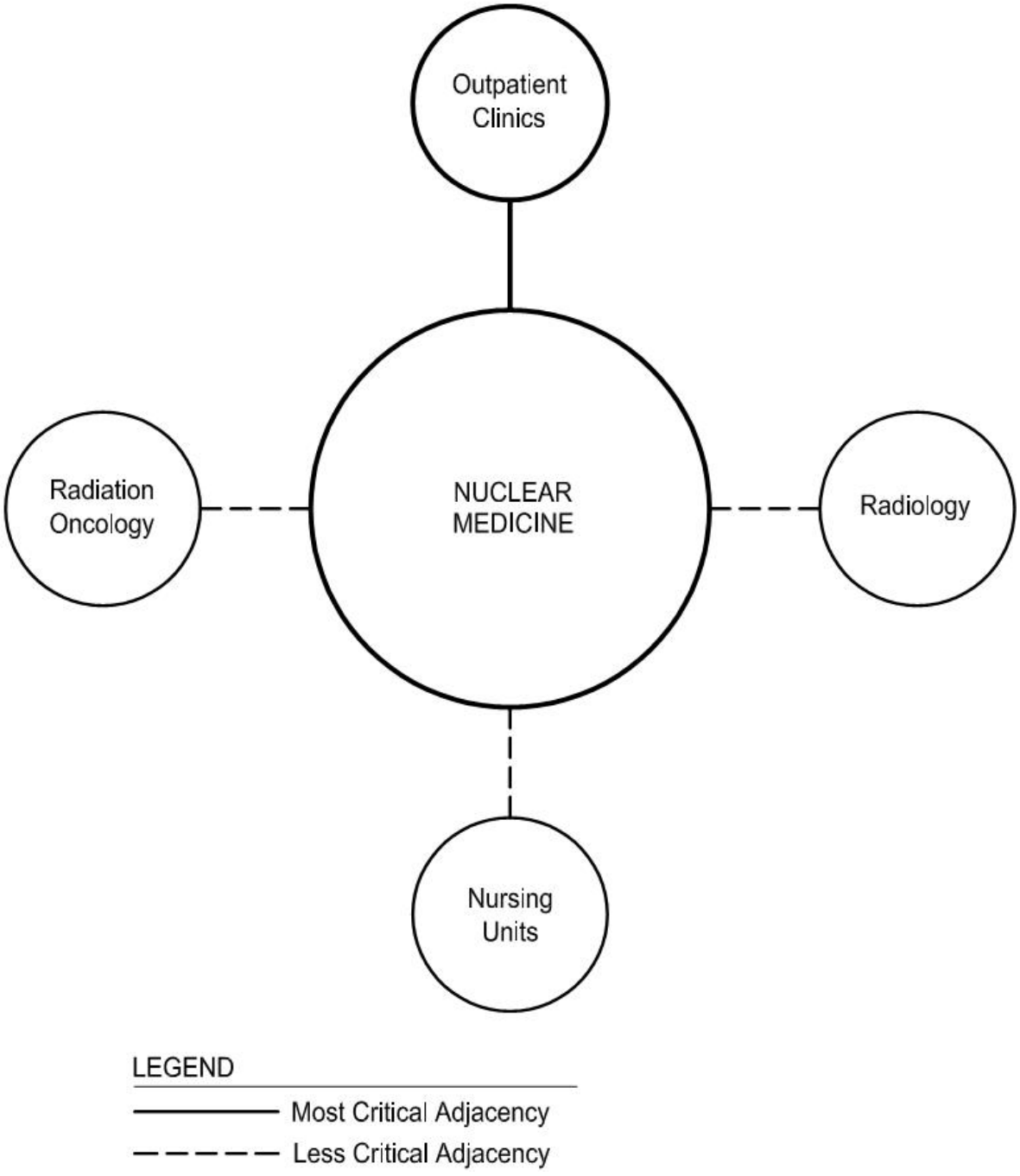
SECTION 11: FUNCTIONAL DIAGRAM (INTRADEPARTMENTAL): RADIOLOGY

11.1. FUNCTIONAL DIAGRAM: RADIOLOGY. The diagram below illustrates intradepartmental relationships among key areas / spaces within Radiology. The diagram is necessarily generic. The planner shall use this as a basis for design only and shall consider project-specific requirements for each Military Treatment Facility.



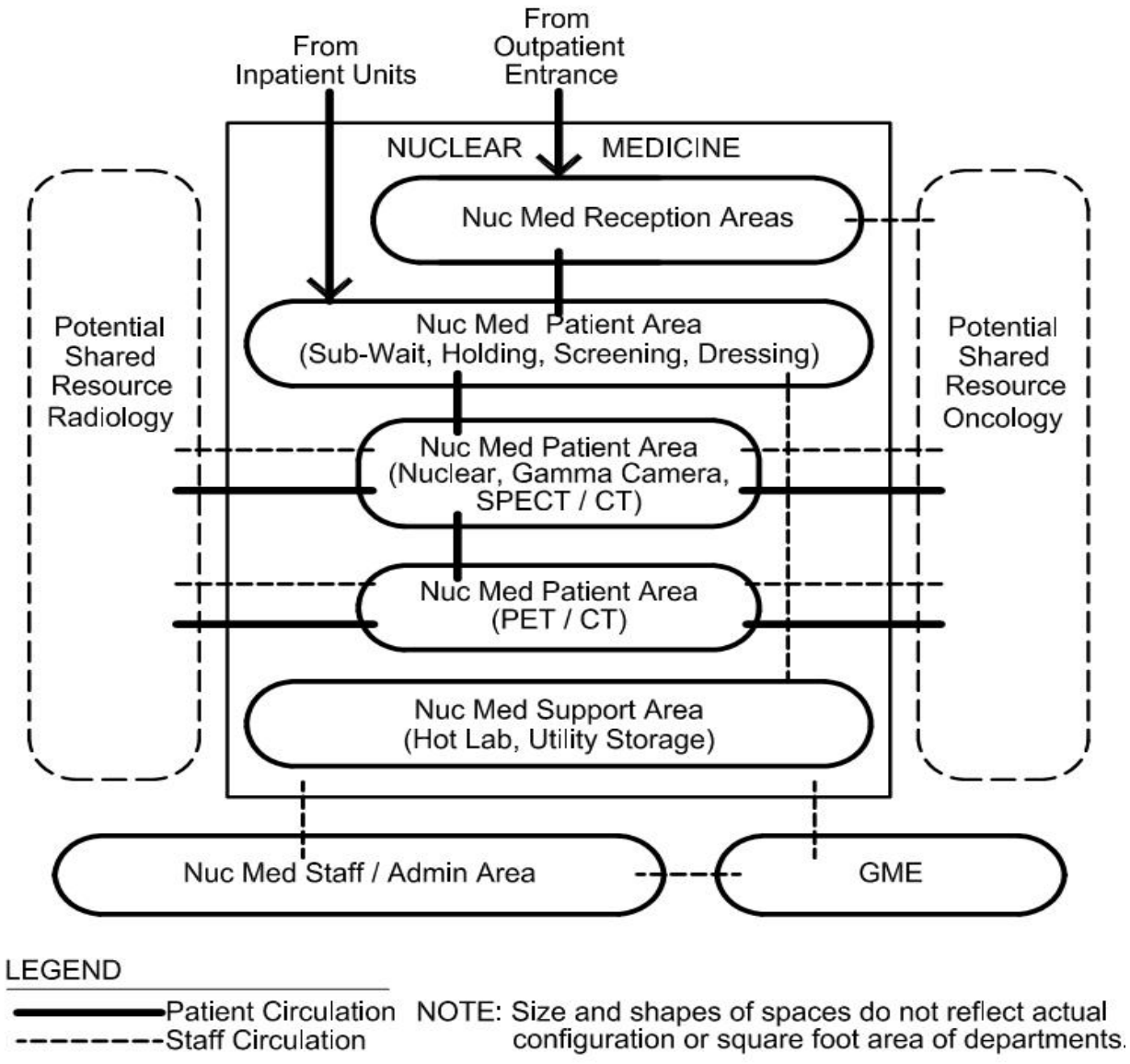
SECTION 12: FUNCTIONAL RELATIONSHIP (INTERDEPARTMENTAL): NUCLEAR MEDICINE

12.1. FUNCTIONAL RELATIONSHIP: NUCLEAR MEDICINE. Nuclear Medicine will rely on a number of other services in a Military Treatment Facility (MTF) for patient care and support functions. The diagram below represents desirable relationships based on efficiency and functional considerations.



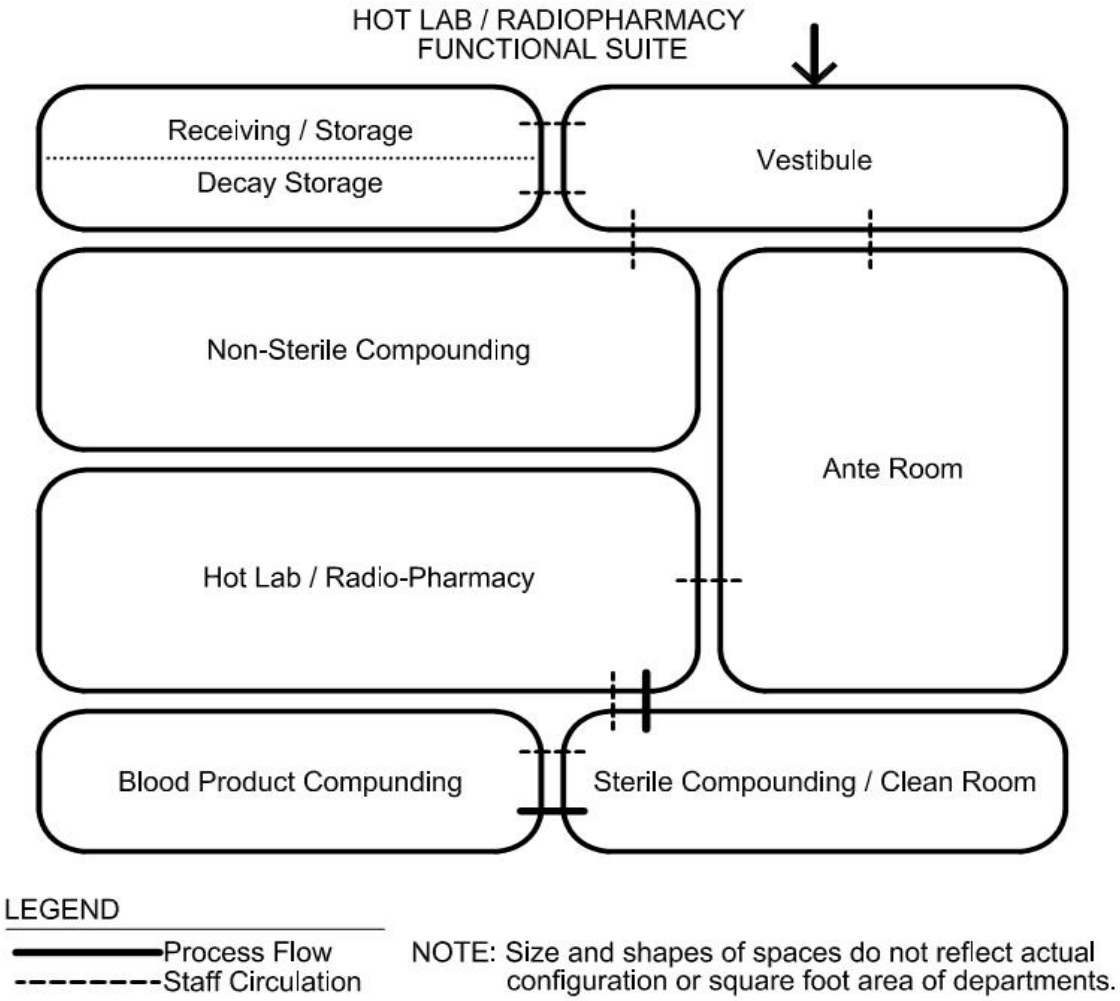
SECTION 13: FUNCTIONAL DIAGRAM (INTRADEPARTMENTAL): NUCLEAR MEDICINE

12.1. FUNCTIONAL DIAGRAM: NUCLEAR MEDICINE. The diagram below illustrates intradepartmental relationships among key areas / spaces within Nuclear Medicine. The diagram is necessarily generic. The planner shall use this as a basis for design only and shall consider project-specific requirements for a Military Treatment Facility.



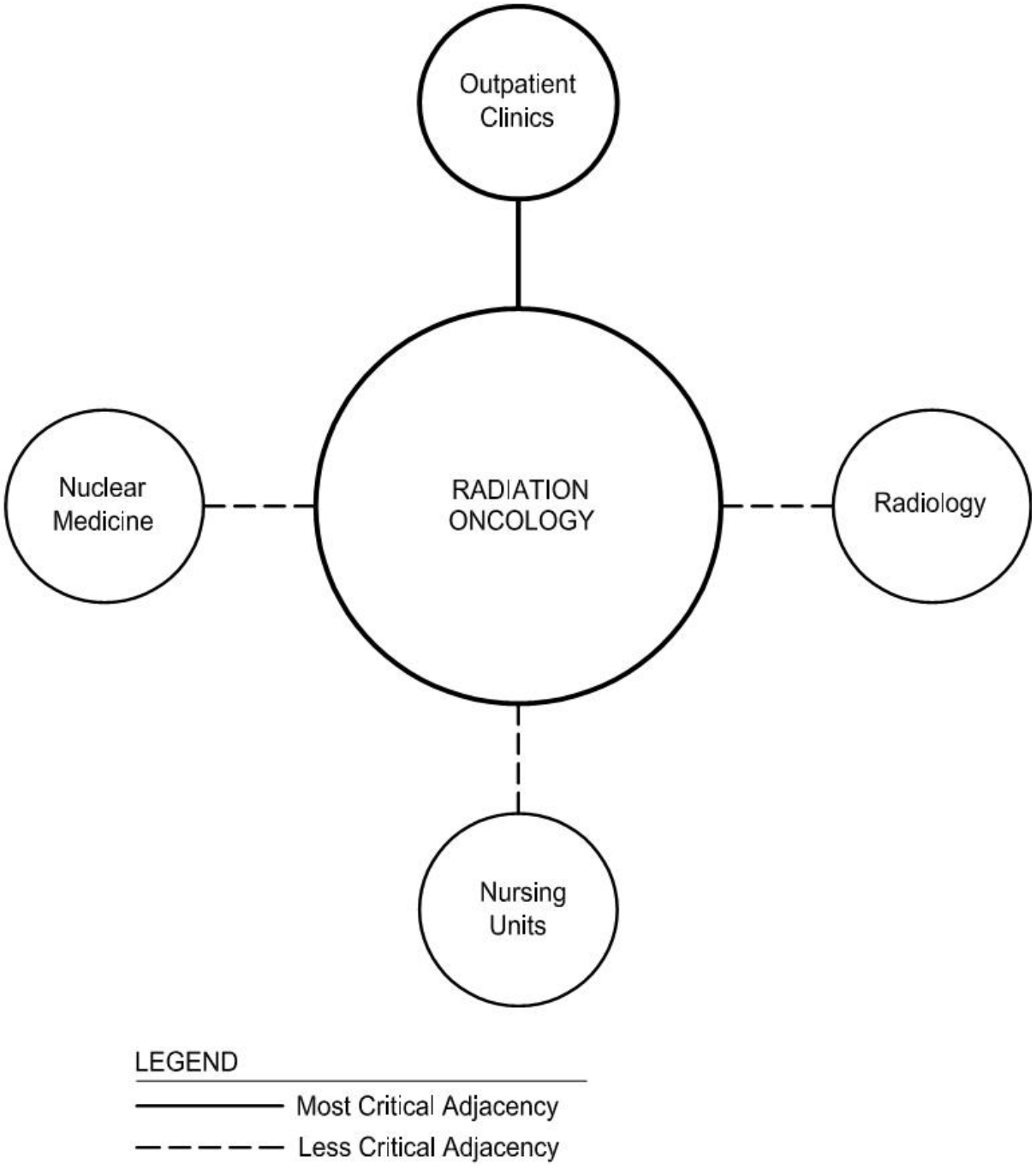
SECTION 14: FUNCTIONAL DIAGRAM (INTRADEPARTMENTAL): HOT LAB SUITE

14.1. FUNCTIONAL DIAGRAM: HOT LAB SUITE. The diagram below illustrates intradepartmental relationships among key areas / spaces within a Hot Lab / Radiopharmacy. The diagram is necessarily generic. The planner shall use this as a basis for design only and shall consider project-specific requirements for a Military Treatment Facility.



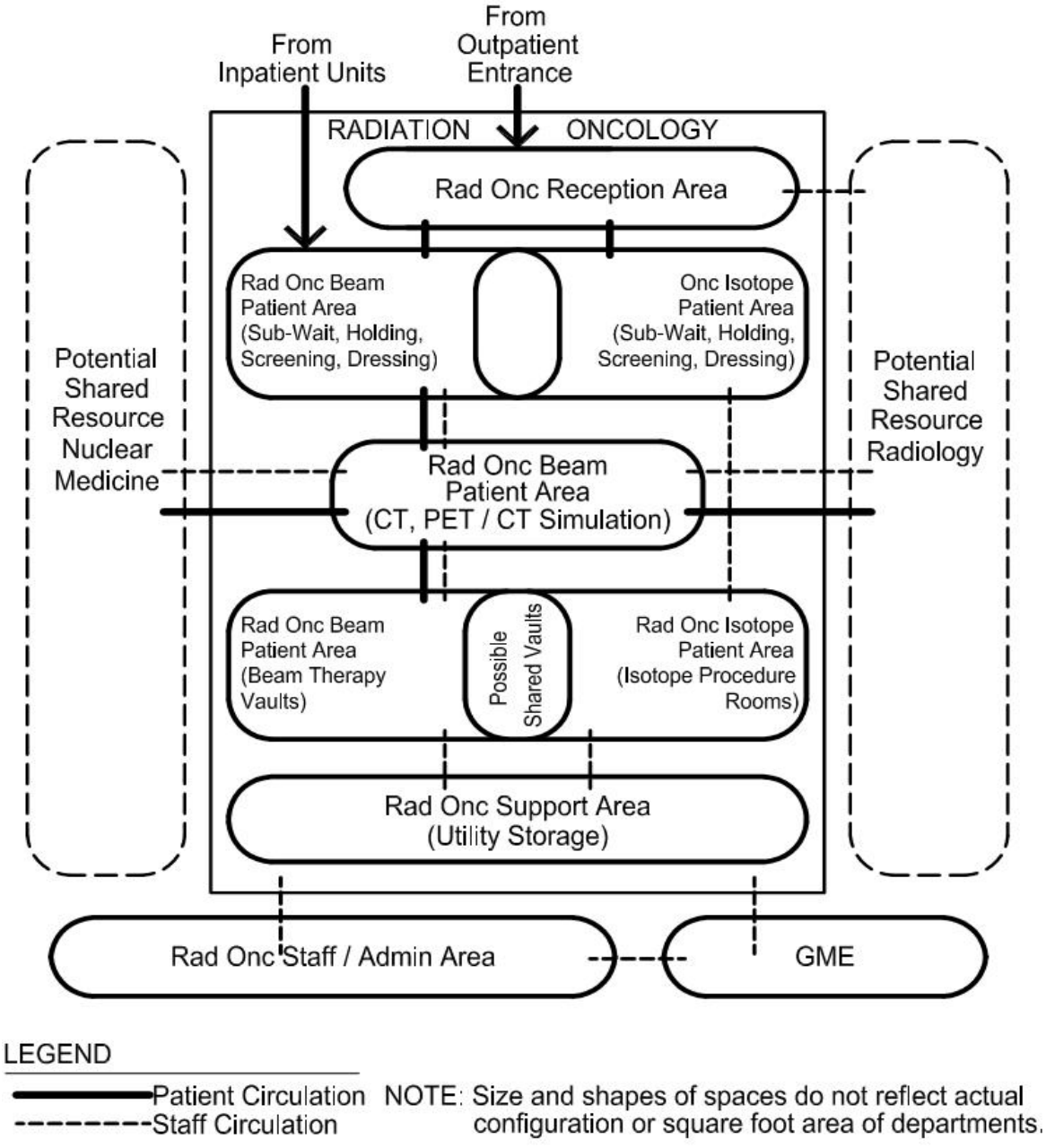
SECTION 15: FUNCTIONAL RELATIONSHIP (INTERDEPARTMENTAL): RADIATION ONCOLOGY

15.1. FUNCTIONAL RELATIONSHIP: RADIATION ONCOLOGY. Radiation Oncology will rely on a number of other services in a Military Treatment Facility (MTF) for patient care and support functions. The diagram below represents desirable relationships based on efficiency and functional considerations.



SECTION 16: FUNCTIONAL DIAGRAM (INTRADEPARTMENTAL): RADIATION ONCOLOGY

16.1. FUNCTIONAL DIAGRAM: RADIATION ONCOLOGY. The diagram below illustrates intradepartmental relationships among key areas / spaces within Radiation Oncology. The diagram is necessarily generic. The planner shall use this as a basis for design only and shall consider project-specific requirements for a Military Treatment Facility.



GLOSSARY

G.1. DEFINITIONS.

Authorized: This document uses the term "authorized" to indicate that, during a project's space plan development, a planner shall seek approval from the appropriate official in the chain of command to activate certain spaces or certain groups of spaces. Typical components that may require authorization are certain programs or services that activate Functional Areas (e.g., GME); office spaces (e.g., FTE position); specialized rooms (e.g., Hybrid OR) or other spaces (e.g., On-Call Room). Typically, Mission, Staffing and Miscellaneous Input Data Statements require authorization, while directly and indirectly workload driven rooms / spaces do not.

Average Length of Encounter (ALOE): In these space criteria, an encounter is defined as a face-to-face professional contact between a patient and a provider vested with responsibility for diagnosing, evaluating, and treating the patient's condition. The Length of Encounter is the time between set-up and clean-up of the Scanning Rooms. The Average Length of Encounter is used to capture variations in length of encounter among similar clinical encounters that will take place in a Scanning Room.

Beam Therapy: A class of radiation therapy which deposit high-energy beams or particles into the subject from a device external to the subject.

Blood Product Compounding: The creation of a particular pharmaceutical product within a sterile environment to fit the unique needs of a patient.

Brachytherapy: A radiation therapy procedure in which a radioactive object is placed within a diseased structure inside the patient's body. The radiation emitted by the object (seed) damages the diseased tissues.

Clean Room: An area / room designed to very specific tolerances for particulate matter in the air.

"Cold": A term used to describe areas (typically within nuclear medicine or radiation therapy departments) that have not been exposed to radioactive materials and are intended to be kept free of exposure to radioactive materials.

Computed Radiology (CR): A technology by which conventional film images are precisely scanned to create a digital image for electronic viewing / storage. Legacy imaging equipment may be CR, but new systems should all be Digital Radiography (DR).

Computed Tomography (CT): A technique to produce derived cross sectional images from a series of multi-dimensional X-ray images. The series of sectional, planar images may be manipulated to produce different planar or volumetric view of the areas of interest. CT is used for diagnostic imaging, interventional radiology, and therapy planning.

Control Room: The separate room from which a technologist operates a radiologic / nuclear medicine device, such as a CT scanner, MRI scanner, or PET scanner.

Cubicle: A cubicle is a partially enclosed workspace, separated from neighboring workspaces by partitions. Managers and other staff with no supervisory responsibilities as well as part-time, seasonal, and job-sharing staff may qualify for a cubicle.

DEXA: Dual-Energy X-ray Absorptiometry (DEXA) is a technology through which bone density can be measured through the absorption of X-rays which pass through the body originating from a calibrated source.

Diagnostic Radiology: The medical specialty that utilizes imaging examinations to inform diagnosis.

Digital Radiography (DR): The direct capture of radiographic images in a digital format.

Encounter: A contact between an eligible beneficiary and a credentialed provider. An encounter may consist of examination, diagnosis, treatment, evaluation, consultation or counseling or a combination of the above. The encounter may take place in a clinic, by telephone, computer, or in other treatment or observation areas. Encounter volume used to generate exam room requirements should not include telephone encounters.

Ferromagnetic Detection: Equipment used to assist in the screening of subjects and equipment for MRI. Unlike conventional 'airport style' metal detectors, these specialized detectors detect only ferromagnetic (magnetizeable) materials.

Four-Zone Principle: A concept of planning MRI suites which ties access privileges to areas of increasing hazard to access controls and direct supervision by safety-trained MRI Staff.

Fluoroscopy: The technique of capturing real-time cinematic X-ray images showing motion.

Full-Time Equivalent (FTE): A staffing parameter equal to the amount of time assigned to one full time employee. It may be composed of several part-time employees whose total time commitment equals that of a full-time employee. One FTE equals a 40-hour per week workload. The FTE measure may also be used for specific workload staffing parameters such as a clinical FTE; the amount of time assigned to an employee providing clinical care. For example, a 0.5 clinical FTE for a healthcare worker would indicate that the healthcare worker provides clinical care half of the time per 40-hour work week.

Functional Area (FA): The grouping of rooms and spaces based on their function within a clinical service. Typical Functional Areas are Reception Area, Patient Area, Support Area, Staff and Administrative Area, and Education Area.

General Radiology Room: A room in which direct radiography is performed.

Graduate Medical Education (GME): All internship and residency years fall under the umbrella of GME. After a physician completes 4 years of medical school, he/she must then

complete an internship (also called PGY-1 or Post Graduate Year 1) and then a post-internship residency (termed PGY-2, PGY-3, etc.). An internship typically lasts one year, and a residency may last from two to seven years depending on the specialty.

High Dose Rate / Low Dose Rate (HDR / LDR): Different forms of brachytherapy in which a small radioactive object is placed within the body of the patient to damage diseased tissues. For HDR brachytherapy, the object is placed for a short time (minutes) and removed. For LDR brachytherapy, the object is placed for months or even permanently left within the body of the patient.

"Hot": Term used to describe radioactive materials that are giving off ionizing radiation. Materials or areas that have been in contact with radioactive materials will also be considered "hot" for a period of time specific to the radioactive material in question.

Hot Lab / Radiopharmacy: An area dedicated to the safe storage and preparation of radiopharmaceuticals for use in nuclear medicine and/or radiation oncology areas.

Hours of Operation per Day: These are the hours of operation within a department. For example, a hospital nursing unit and an emergency department will operate 24 hours per day; whereas a clinic may be operational 8 hours or more, depending on the clinic.

Interventional Radiology (IR): The clinical subspecialty that uses radiology imaging modalities to guide minimally-invasive procedures. IR Procedures are complex, requiring a team of doctors and technicians. As such, they are often performed in the Surgical Suite, and scheduled in advance as they require special preparation. Refer to DoD Space Planning Criteria Chapter 440: Surgical / Interventional Services & ASC.

Input Data Statement: A set of questions designed to elicit information about the healthcare project in order to create a Program for Design (PFD) (see definition below); based on the space criteria parameters (refer to Section 4) set forth in this document. Input Data Statements are defined as Mission, Workload, Staffing or Miscellaneous.

Linear Accelerator (Single-Axis / Multi-Axis) / Linac: A beam therapy modality which propels high energy ionizing beams through a patient to damage diseased tissue. Total planned therapy is typically divided into multiple fractional doses, applied incrementally over periods of weeks or months. Traditional Linear Accelerators rotate around a single axis. Newer systems have the capability to robotically control the Linear Accelerator's orientation throughout multiple axes of movement.

Magnetic Resonance (MR) / Magnetic Resonance Imaging (MRI): A modality which uses magnetic fields and radiofrequency energy to generate tomographic and three dimensional images of a patient. MR can also produce non-image diagnostic data, such as spectrographic analyses.

Mammography: A modality utilizing ionizing X-ray imaging for breast examinations.

Mammography, Stereotactic: Imaging of the breast from two slightly angled directions from which a three dimensional model of the breast can be computer generated.

Moderate Sedation: Also referred to as "Conscious Sedation", is a drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

Net Square Feet (NSF): The area of a room or space derived by multiplying measurements of the room or space taken from the inside surface of one wall to the inside surface of the opposite wall.

Net-to-Department Gross Factor (NTDG): A parameter used to calculate the Department Gross Square Foot (DGSF) area based on the programmed Net Square Foot (NSF) area. Refer to DoD Chapter 130 for the NTDG factors for all Space Planning Criteria chapters.

Nuclear / Gamma Camera: A modality which measures the energy given off by low-energy radiopharmaceuticals, introduced within a patient to measure specific anatomic / metabolic functions.

Office, Private: A single occupancy office provided for confidential communication.

Office, Shared: An office that accommodates two workstations.

Operating Days per Year: The number of days per calendar year a facility is operational for patient care (refer to Section 2).

Personal Property Lockers: This is a small-sized locker, commonly called purse or cell phone locker, and is generally used to secure purses and smaller valuables. Staff members who do not have an office or cubicle space where they can safely store belongings will be assigned these lockers.

Picture Archiving and Communication System (PACS) Viewing Room: A digital radiology reading room that consists of workstations for interpretation.

Positron Emission Tomography (PET): A modality which measures and triangulates the energy given off by radiopharmaceuticals within a patient to measure specific anatomic / metabolic functions. Formerly a stand-alone modality, PET imaging is now integrated in hybrid scanners (PET/CT and PET/MRI).

Program for Design (PFD): A listing of all of the rooms / spaces generated based on answers to the Input Data Statements (see Section 3) and the space planning criteria outlined in this document (Section 4) in SEPS. The list is organized by Functional Area and includes the Room Quantity, Room Code, Room Name and generated Net Square Feet (NSF), Construction Phase and Construction Type.

Project Room Contents (PRC): A listing of the assigned contents (medical equipment, FF&E, etc.) for each room in a PFD generated by SEPS.

Radiography: A still X-ray image utilizing ionizing radiation.

Radiographic / Fluoroscopic (R/F) Room: A room containing a radiographic / fluoroscopic system that produces either still X-ray records or real-time images of internal body structures / functions.

Radiosurgery: High-intensity radio frequency (RF) beam therapy used to ablate / destroy diseased tissues within the body in a few therapy visits.

Resident Collaboration Room: This room is provided for the Residents. It will contain one cubicle per Resident, a table with chairs for collaboration space and bookcases.

Space and Equipment Planning System (SEPS): A digital tool developed by the Department of Defense (DoD) and the Department of Veterans Affairs to generate a Program for Design (PFD) and a Project Room Contents list (PRC) for a DoD healthcare project based on approved Space Planning Criteria, the chapter and specific project-related Mission, Workload and Staffing information entered in response to the Program Data Required - Input Data Statements (IDSs).

Soiled Utility Room: This space provides an area for cleanup of medical equipment and instruments, and for disposal of medical waste material. It provides temporary holding for material that will be picked up by Sterile Processing or similar service. It should be accessible from the main corridor.

Scanning Room: For large-gantry imaging modalities (CT, MRI, PET), this is the room in which the patient is imaged within the scanner.

Simulation Room: An imaging room used to simulate the positioning of a patient for radiation therapy. The imaging modality may be CT, MRI, or hybrid modalities with PET.

SPECT / CT: A modality which combines the functional capabilities of a Nuclear / Gamma Camera with those of a CT scanner.

Sub-Waiting: An area for patient waiting dedicated to an individual modality (or multiple modalities with common screening / patient preparation procedures).

System Component Room: For many pieces of imaging / therapy equipment it is necessary (or minimally recommended) to place the supporting electronic componentry in a dedicated room.

Tomography: Imaging modalities which are capable of generating a ‘slice’ view. CT, MRI, and PET imaging are examples of tomographic imaging modalities.

Ultrasound: High frequency sound waves are utilized to view soft tissue and determine the size and shape of internal organs based on the differential rates of reflection. Images can be observed in real time to reveal motion, and can include coloration of directional blood flow.

Utilization Factor: Also known as capacity utilization rate, this factor provides flexibility in the utilization of a room to account for patient delays, scheduling conflicts and equipment maintenance. A room with an 80% utilization factor provides a buffer to assume that this room would be available 20% of the time beyond the planned operational practices for this room.

Vault: While shielding for most radiology and nuclear medicine modalities can be readily incorporated in conventional construction methods, shielding for many radiation therapy systems must be much more robust. Linear accelerators, for example, may have high-density reinforced concrete shield assemblies around the therapy device of one meter (or more) in thickness. HDR brachytherapy procedures may also require vault enclosures.

Workload: Space Planning Criteria per DHA Policy shall be workload driven. Workload projections divided by the throughput determined in this document for each workload driven room determines the quantity of rooms needed to satisfy the projected workload demand.