Section 2: Narrative

General Considerations

Overview

What is Radiology?

Radiology or radiography is a photographic process used to image anatomic structures. Instead of visible light, radiography utilizes X-ray energies which penetrate the body. These energies are absorbed at different rates by different tissue densities and are particularly effective for imaging bone and dense tissues. By varying the frequency and intensity of the X-ray energies different tissue structures can be imaged.

Many different applications of X-ray imaging technology have been developed over the years. In addition to the direct imaging technologies originally developed to print images on film, new computerized detectors have largely replaced film to produce electronic versions of the radiographic image.

By using X-ray images of a volume acquired from different angles, three-dimensional reconstructions of the object can be created. This is the technology used for Computed Tomography (CT) scanners which can create acutely detailed volumetric models of anatomy.

X-ray energies are a form of ionizing radiation that does have known health risks. However, the level of exposure from diagnostic imaging examinations, when appropriately proscribed, does not present significant health risks.

The VA Radiology service also includes ultrasound which uses non-ionizing sound waves instead of X-rays to produce images for diagnosis or to guide treatment. Design guidance for Magnetic Resonance Imaging (MRI), often co-located with radiology services, is addressed in a separate VA Design Guide.

Current Trends

The Radiology Department performs examinations and produces images from non-invasive or minimally invasive procedures performed on patients in specially equipped examination rooms. The imaging modalities associated with the Radiology Service include General Radiology, Fluoroscopy, Computer Tomography (CT), Interventional Radiology (IR), Ultrasound, and Mammography.

Diagnostic imaging procedures may be performed in several areas of the hospital or medical center, dependent upon the type or volume of examination required. Portable radiographic and fluoroscopic equipment may be used in selected instances for imaging of patients. Patient convenience and accessibility should be an integral part of the planning and design of the Radiology Department. A high percentage of the volume of this service will consist of outpatients. Flexibility and adaptability should be a main consideration when planning the facility in order to accommodate constant upgrades in equipment technology and treatment. Picture Archiving and Communication System (PACS) has become the VA standard for the capture, transfer and storage of diagnostic images. This system consists of workstations for image interpretation, a web server for distribution, printers for file records, image servers for information transfer and holding, and an archive for off-line information. PACS reading sta-

tions may be located centrally or remotely. For general viewing by physicians outside the Radiology Service, a typical flat screen monitor will suffice for the reading of images. A high-end monitor system should be provided in areas where physician viewing and diagnosis occur, either within the Radiology Service or remotely. Although some VA imaging facilities still employ conventional film technology, total conversion to PACS is anticipated and reflected in this design guide.

Future Trends

The science of Radiology has advanced greatly since its early beginnings in the late 1800's. Whereas before we were able to only image anatomy, we are now able to image function and anatomy, including the workings of organs, cells and molecules. In the near future, Radiology Departments will focus more and more on chemistry and molecular biology. This will enable earlier and more accurate detection of disease. Imaging modalities are not only emerging but also converging, and it is anticipated that merging of technologies will continue in the future.

Radiology facilities can expect that image-guidance for minimally-invasive procedures and other therapies will continue to grow. Additionally, we are likely to see increased use of hybrid modalities, such as PET/CT, which will combine anatomic and metabolic imaging management tools to create a single composite image from multiple imaging sources.

As technology advances, it is important that our imaging facilities be designed to accept whatever changes in equipment and treatment is developed. At the same time, the needs of the patient must not get lost in all this change. It is critical to provide an environment that not only addresses the requirements of technology but also addresses the needs of the patient.

Functional Considerations

Operations

Services

Radiology Imaging Services may be organized as one central department which serves emergency, outpatients, and inpatients, or as separate facilities for inpatients and outpatients.

Satellite facilities may be justified to serve the diagnostic needs of a special center of excellence, if this can be coordinated with associated and complimentary diagnostic services, to assure quality of patient care.

Imaging Processes

Diagnostic Imaging Procedures are performed on inpatients and outpatients on a regular and scheduled basis. Services are also performed on an unscheduled or STAT basis for emergency patients.

Radiographic Process

The process begins with patient arrival. Patients are checked-in and records initiated within the patient reception and scheduling area. The patient is directed or escorted to procedure rooms where imaging takes place.
The image is processed by digital electronic image processing. The electronic image is coded for patient identification and reviewed for image quality. After the quality assurance process has confirmed the quality of the image, the patient is released from Radiology Service. Radiologists and staff review the electronic images for interpretation. Diagnostic results are communicated to the ordering physician and entered into the patient records system. Image records are stored electronically and available for retrieval for consultation and follow up exam comparisons. This may be accomplished both in central viewing areas and remotely.

Patient Care Support

Providing convenient access to healthcare in a non-institutional, non-threatening environment is an objective of Radiology Services. Patient education and family consultation may be used to further reduce the stress sometimes associated with Radiology Procedures for patients who are not familiar with the Radiology process and equipment.

Space Planning

Location

Several factors should be considered when determining the location of Radiology Services within a facility. This service should be strategically located to maximize efficiency in usage. As technology is constantly changing and new methods of Imaging Services are being developed, consideration should also be given to the high probability that the area will require renovation, expansion and / or equipment replacement in the future. It is frequently more cost effective to expand an existing Imaging Service than to relocate the service completely. Thus, it is desirable to locate the service on the perimeter of a facility and where future expansion is possible. This location also provides for ease of service of existing equipment and equipment replacement as new technologies are developed. Soft space such as administrative offices and support space should be located adjacent to the high technology / diagnostic equipment areas to facilitate ease of expansion for the equipment areas.

Access

The main Radiology Service should be readily accessible to both inpatients and outpatients, and in proximity to the central vertical transportation system serving other areas of the medical facility. It should be located near Ambulatory Care, Nuclear Medicine, Outpatient Services, and the Emergency Department.

Planning Strategies

The design concept for the Radiology Service can be divided into two distinct planning strategies; the centralized work core concept and the cluster concept. The centralized work core concept is ideal for services containing twelve or less diagnostic rooms; for both general purpose and specialized procedures. This design is compact and minimizes the amount of travel required for both patients and staff. The cluster design is recommended for services contain-

ing greater than twelve diagnostic rooms. In this design, basic areas consisting of radiography, fluoroscopy, interventional procedures, and administration are clustered around two or more support areas. In both planning concepts, staff administration and support should be centralized to maximize staff and space efficiency.

General Space Planning

Patient waiting areas should be located near the main entrance to the service and provide direct access to diagnostic rooms and dressing rooms. Centralized patient check-in should be provided to simplify the patient visit for patients as well as provide for staff efficiency. Patient holding areas should be located near high volume modalities.

For those modalities which require patient preparation, thought should be given to the volume of patients requiring special preparation and whether it would be advantageous to provide dedicated preparation areas for activities such as starting IV medications or inducing anesthesia patients.

Radiology Procedure Rooms used for quick turn-a-round, high volume examinations such as chest, abdomen, and extremities should be located closest to the reception and patient waiting areas in order to decrease patient travel distance and improve patient way-finding. Rooms with longer procedure times such as Ultrasound and MRI (See Magnetic Resonance Imaging Design Guide) may be somewhat more removed. Rooms with long procedure times such as Special Procedures may be located further from the main reception and waiting areas.

All Radiology Procedure Rooms should be designed to accommodate patients with disabilities as well as space for the transfer of patients from a stretcher to the diagnostic equipment.

Radiology and Fluoroscopy may be grouped together as they utilize similar support facilities. In addition, the space and configuration of these areas are the same; allowing future interchange of Radiographic and Radiographic / Fluoroscopic rooms, as well as provisions for new technologies which may be developed in the future. CT areas should be co-located with PET / CT areas in Nuclear Medicine in order to facilitate the common use of both CT Technicians and Nuclear Medicine Technicians. Ultrasound and Mammography and their associated gowned waiting and patient toilet rooms are often co-located to satisfy patient privacy concerns.

PACS reading areas may be centrally located within the service, located remotely or both. General viewing by physicians outside the Radiology Service may be accomplished using flat-screen monitors. More detailed viewing is accomplished using a higher resolution monitors; both within the service and remotely.

All diagnostic rooms that require a ceiling support system should be designed in accordance with applicable Department of Veterans Affairs Standard CAD Details. Clear finished ceiling heights will be in accordance with the Department of Veterans Affairs Design and Construction Procedures PG-18-3. Specific ceiling supported system requirements should be closely coordinated with the equipment vendor specifications.

The Control Alcove or Control Room for each Radiology Room accommodates the controls and appropriate accessories and must provide required radiation protection for the Radiology Technician. The wall space for each control booth which faces the Radiology Room must accommodate an X-Ray shielded control window. Voice communication between the patient and the Radiology Technician should be provided. The Control Room must be positioned so

that the Technician can observe both the patient in the examination position and the controls simultaneously. The Control Area must also permit observations of the patient through the viewing window when the table is in 90 degree vertical position as well as when the table is horizontal. Whenever possible, the Control Room should be designed without a door to the Radiology Room and it must conform to NCRP standards. Local or remote specialized computer rooms or data center spaces will have additional rack-mounted PACS servers and network switching equipment. Greater floor space for equipment racks, terminations, and higher power densities with associated heat loads are anticipated for these rooms.

Technical Considerations

General

Seismic

Where required, install all components and equipment with seismic provisions as outlined in the various discipline specific VA Design manuals for healthcare projects. Refer to VA Construction Standard Handbook PG-18-03 (CD-54), “Natural Disaster Resistive Design Nonstructural” for additional information. Consult with equipment vendor for specifications for anchoring imaging equipment and appurtenances, including electronic cabinets, in seismic zones.

Mycobacterium Tuberculosis

Current Center for Disease Control (CDC) requirements for design of public areas within the building to accommodate Mycobacterium Tuberculosis patients must be addressed by architectural and mechanical disciplines. Check current requirements with the VA task force on transmission of Mycobacterium Tuberculosis, TB criteria in HVAC Design Manual for Hospital Projects, and the CDC Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Healthcare Settings, 2005.

Radiology Service Space Allocation

Radiology Service space requirements are outlined in the VA Space Planning Criteria: Chapter 276 Radiology Service.

Sustainability

In 2006, the Department of Veterans Affairs joined other Federal agencies who are participating in principles outlined in the Memorandum of Understanding for the Federal Leadership in High Performance and Sustainable Buildings. The purpose of these guidelines is to encourage the use of life cycle concepts, consensus-based standards, and performance measurement and verification methods that utilize good science and lead to sustainable buildings. The goals of the members of this initiative are to establish and follow a common set of sustainable Guiding Principles for integrated design, energy performance, water conservation, indoor environmental quality, and materials aimed at helping Federal agencies and organizations:

Reduce the total ownership cost of facilities.

Improve energy efficiency and water conservation

Provide safe, healthy, and productive built environments

Promote sustainable environmental stewardship

These principles should be addressed in the design of all VA facilities.

Architectural

Interior Materials and Finishes

Partitions

Interior partitions should be primarily painted gypsum wallboard on metal studs. Partitions enclosing physician offices, exam rooms, and treatment rooms should be provided with sound attenuation batts between the studs in accordance with H-18-03, VA construction standard CD 34-1, Noise Transmission Control.
Partitions, windows and doors enclosing Radiographic Rooms, CT Scanning Rooms, and Interventional Radiology rooms require radiation shielding, engineered by an appropriately certified Health Physicist. Refer to H-18-03 VA Construction Standard 64-1, X-Ray Radiation shielding and Special Control Room Requirements. Construction documents will require written certification by a registered Health Physicist.

Floors

Floors in offices, conference rooms and waiting areas should be carpet with a 4 inch high resilient base.

Floors in toilet rooms should be ceramic tile with a ceramic tile base.

Floors in Exam Rooms, Treatment Rooms, and most other spaces should be vinyl composition tile (VCT) with a 4 inch high resilient base.

Floors in Radiographic Rooms require a 4 inch deep depression to facilitate installation of the floor trench duct system.

Floors in Interventional Radiology Rooms or Radiographic Rooms intended to support image-guided or minimally-invasive procedures should be welded seam sheet flooring with an integral base.

Ceilings

Ceilings should be primarily of lay-in acoustic type. Coordinate the ceiling height requirements with the equipment manufacturer.

Wall Protection

Wall and corner guards should be used in corridors and all other areas where damage from cart and stretcher traffic is anticipated.

Interior Doors and Hardware

Interior doors should be 1 ¾ inch thick solid core flush panel wood doors or hollow metal doors in hollow metal frames.
Doorjambs, except in rooms with radiation shielding, should have hospital type sanitary stops that stop 8 inches from the floor to facilitate mopping. Hollow metal doors should be used where high impact is a concern and where fire rated doors are required. Kick / mop plates should generally be applied to both sides of the doors. Handicapped accessible hardware should be used throughout.

Refer to VA Handbook PG-18-14, Room Finishes, Door and Hardware Schedule, for additional information.

Structural

General

The size, weight and support requirements for radiology equipment vary greatly. Manufacturer data sheets should be obtained for each type of equipment under consideration. Configure framing systems to accommodate support and serviceability requirements established by the manufacturer.

Shielding

Radiation shielding is often necessary to protect adjacent occupancies. Give proper consideration to the weight of shielded partitions, doors, ceilings and floors. In some instances, structural building materials may provide adequate levels of radiation shielding in specific directions and may not require additional layers of supplemental shielding. Floor depressions and / or door jamb reinforcement are sometimes necessary.

Floor Trenching

Identify areas where floor trenching is required to receive equipment infrastructure.

Equipment

Imaging Systems

Imaging System requirements will vary for each facility and the technology may be deferred in selection / procurement.

Casework

Casework may be millwork or modular.

Casework systems should be chosen that provide flexibility for planning and utilization purposes.

Casework systems should incorporate components dimensioned for ease of multiple re-use installation applications.

Casework systems should provide for cable management and ergonomic placement of workstations and flat screen monitors.

Information Management Systems

Information Management Systems shall include elements of image retrieval, processing, storage, treatment planning, electronic patient records including patient registration, patient charges, physician order entry, and patient / staff movement.

These systems elements will require access to the main facility information system as well as the departmental local area network. A standardized structured cable system and pathway system are provided to facilitate current and future network access. All components should be planned for compatibility.

Radiology Service Space Allocation

Radiology Service space requirements are outlined in the VA Handbook 7610 Chapter 276 – Radiology Service.

Picture Archiving and Communications Systems

It is the goal of the VA to implement Picture Archiving and Communications Systems (PACS) in all VA healthcare facilities. As this conversion to PACS is implemented, some existing facilities are currently utilizing conventional film processing. It is anticipated that any significant renovation will include conversion to PACS as a basis for design.

HVAC

When HVAC services must penetrate a shielded enclosure, coordination is required between HVAC design and Health Physicist certifying the construction documents.

Operation

Air conditioning systems should be provided to heat, cool and ventilate the individual spaces, as required to satisfy the VA design criteria.

Provide a dedicated computer-type AC unit to cool the System Component room for Interventional Radiology rooms. Verify the AC requirements with equipment supplier.

Generally, lead lining in walls terminates at or below ceiling level. However, in special instances where lead linings extend higher and ducts penetrate the lining, refer to Lead Shielded Duct Requirements in the VA HVAC Design Manual.

Capacities

The number of people and the air conditioning load noted on the room design standard sheet is for the purpose of establishing the basis of design guide and its use in planning. Verify the actual number of people and the air conditioning load to agree with the project requirements.

Verify equipment AC loads based on the actual equipment furnished on the project.

Provide a minimum of two air changes/hour of outside ventilation air to all spaces.

Air Quality and Distribution

All equipment / exam rooms should have positive air pressure with respect to the adjoining areas. This is to help maintain a reduced dust environment for the electronic equipment

The transferred air should be no more than 150 cfm (71.0 liters/second) per undercut door.

Design of air distribution system shall be in accordance with criteria given in the HVAC Design Manual. Provide linear diffusers for the spaces qualified to receive linear diffusers.

Mycobacterium Tuberculosis

Refer to General Comments. Radiology waiting rooms to be minimum 12 air changes / hour supply air with all air exhausted to outdoors.

Seismic

Refer to General Comments

Noise Level

Select HVAC equipment, ductwork and air distribution devices to achieve noise levels listed in the VA HVAC Design Manual.

Plumbing

When plumbing and piping services must penetrate a shielded enclosure, coordination is required between plumbing design and Health Physicist certifying the construction documents.

Water and Waste Systems

The plumbing systems should be provided to satisfy the departmental plumbing needs.

The department's domestic cold water should be piped to all plumbing fixtures and equipment requiring this utility. A hot water return system should be provided to ensure the design temperature at the farthest outlet.

The department's plumbing fixtures and drains should be drained by gravity through soil, waste and vent stacks. In addition, the department's special waste should be drained through corrosion-resistant, flame retardant piping into either a local or centralized acid dilution tank.

When an emergency secondary water supply is required to serve as a backup for the equipment chilled water system, proper drainage and backflow prevention assemblies shall be provided.

Plumbing fixtures and equipment shall comply with the Uniform Federal Accessibility Standards (UFAS).

Medical Gas Systems

The department's medical gas outlets are shown to establish a base for the design guide and its use in planning. The engineers / designers shall verify the medical gas location and quantities for individual projects.

Fire Protection: See Life Safety

Electrical

Illumination

Illumination is typically provided utilizing recessed fluorescent luminaries with acrylic prismatic lenses. The fixtures typically use F32T8 lamps in compliance with the National Energy Policy Act of 1992, with subsequent revisions in 1998 and 2005. Lamps have a minimum color rendering index (CRI) of 85 and a color temperature of 4100 Kelvin (K), which is close to the "cool white" color temperature of 4150 K. Lighting intensities conform to the VA design criteria, the IES Lighting Handbook, and ANSI/IESNA RP-29-06, the recommended practice: Lighting For Hospitals and Healthcare Facilities. Evaluate the possibility of reducing the installed lighting levels to be in compliance with the latest edition of AS-HRAE 90.1.

Viewing Rooms will typically have indirect lighting systems for visual comfort, reduced glare, reading accuracy, and critical determinations. Dimmer switches are utilized for the variable illumination level.

Lighting is typically controlled by wall mounted switches located at the entrance to the room. Dimmer switches are utilized for variable lighting levels in control and exam areas. Larger spaces may utilize multiple switching by separate switches for lighting of individual zones or areas.

For special procedure and image-guided interventional rooms, fixed or mobile procedure lighting may also be required.

Power load densities for lighting are listed by use for the mechanical HVAC load calculation purposes. Load densities should be verified for the actual design, as they may vary depending on the room configuration, fixture types, lamps and ballasts used.

Power

Power and grounding of modern medical electronic equipment, computers, and displays requires careful consideration of power quality principles. The basic need for proper voltage and frequency is supplemented by other power quality concerns, including:

- Source and load compatibility;
- Distortion of voltage and current waveforms by harmonics present in the power systems;
- Sensitivity and susceptibility of electronic equipment loads to interruptions, surges, harmonic waveform distortions, and noise (RF, EMI, etc.).

Power systems and equipment characteristics need to be evaluated to determine effective solutions to reduce the potential sources of interference, reduce the susceptibility of the load

equipment, or to apply power conditioning equipment (IEEE Std. 1100-1999, the IEEE Recommended Practice for Powering and Grounding Electronic Equipment).

Radiology Service power requirements have to be specifically coordinated with the equipment manufacturer. Separate power feeds may be required for Radiology Service computer equipment, power conditioners, and air conditioning systems. General purpose duplex receptacles are typically provided on each wall of a room or space. Workstations with personal computers (PC's) are typically provided with quadraplex receptacles for the PC, monitor, printer, or PACS workstations.

Each hospital determines which specific Radiology Service equipment needs to function during a power outage to be connected to an emergency power system. Duplex receptacles on the critical branch of the emergency power system are provided for selected pieces of equipment (such as refrigerators and PC's) to allow for limited operation during a power outage. All receptacles essential to patient safety during specific procedures should be on a critical branch even when the selected Radiology equipment is on the equipment branch. If the modality is used for interventional or emergent imaging, provide emergency power / receptacles as required to support critical equipment and patient care.

Junction boxes are provided for equipment requiring a hardwire connection. Provide shielding behind all boxes and other penetrations in shielded scanning room surfaces. Certain modular casework units are provided with a utility access module with surface mounted electrical pre-manufactured raceways, which provides a chase for wiring. Conduits and junctions boxes are provided to connect to the utility access module for power wiring.

Power conditioning and uninterruptible power supplies equipment may be required for Radiology equipment, computers, or PACS workstations, where an interruption of power would not be acceptable during a specific procedure. Power conditioning and UPS equipment require physical space, working clearances, maintenance access, cooling / ventilation access, and coordination with casework.

Grounding and bonding of electrical systems in Radiology Service areas are essential to proper operation of equipment. Radiology equipment may require special configurations (e.g., "5-wire equipment connections") and a low impedance path to earth and building ground, per the equipment manufacturer's specifications.

Security and Access Control

Security and access control requirements may apply to selected areas of the Radiology Services suite. Specific Patient Privacy and HIPPA requirements may affect IT system components location, separation from non-secure components, and local staff screen or display orientation. PACS server rooms and other critical Radiology Service IT infrastructure areas may require access control systems.

Life Safety

Purpose

The life safety program should be developed to provide a reliable system to protect the building occupants, firefighting personnel, building contents, building structure, and building function. This can be accomplished by limiting the development and spread of a fire emergency to the area of origin and thereby reduce the need for total occupant evacuation.

The design aspects of the facility which relate to the fire and life safety include:

Structural fire resistance;

Building compartmentalization;

Fire detection, alarm and suppression;

Smoke control and exhaust;

Firefighter access and facilities;

Emergency power;

Emergency egress and exit lighting.

New hospital construction and renovated areas of existing facilities are required to be fully protected by an automatic fire suppression system.

The minimum width of corridors in areas used by Radiology Service inpatients is 8'-0". The minimum width of corridors and passageways is 5'-0" in areas used by staff only.

Provide handrails on both sides of the corridors in patient areas.

Nurse control areas are permitted to be open to the corridors.

Waiting areas are also permitted to be open to the corridors.

Refer to the latest editions of NFPA 101 "Life Safety Code", International Building Code and additional standards published by the National Fire Protection Association (NFPA).

Energy Conservation

The HVAC, Plumbing, Power and Lighting Systems should be designed for overall energy efficiency and lowest life-cycle cost. This should include the use of high efficiency equipment and fixtures and a programmable control system. The minimum energy standard shall be the latest edition of ASHRAE/IESNA Standard 90.1.

Communications

Telephone

Telephone outlets are typically provided at each workstation or in each room. Desk outlets are 18" AFF and wall phone outlets are 48" AFF. Desk outlets may be combined with modular data ports into a single-gang outlet. Infrastructure will be extended to local telecommunications room via available pathways utilizing cable tray, sleeves through fire / smoke partitions, and conduit stubs / backboxes to work area. Certain modular casework units are provided with a utility access module that houses communication outlets and provides a chase for cabling. Conduits and junction boxes are provided to connect to the utility access module for telephone service. Current technologies such as "voice over internet protocol", or VoIP, and IP wireless systems require coordination with the ADP/LAN telecommunications infrastructure.

Automatic Data Processing (ADP)

ADP, or computer outlets, are typically provided at each workstation with a personal computer (PC) and/or printer. ADP includes local area networks (LAN's), PACS applications, and wireless LAN's (WLAN). Desk outlets are 18" AFF. Multi-port telecommunications outlets are provided in accordance with BICSI and ANSI-EIA/TIA standards for telecommunications. Infrastructure will be extended to local telecommunications room via available pathways utilizing cable tray, sleeves through fire / smoke partitions, and conduit stubs / backboxes to work area. Certain modular casework units are provided with a utility access module that houses communication outlets and provides a chase for cabling. Conduits and junction boxes are provided to connect the utility access module for ADP service. Cable and jack identification and color coding are essential to proper administration of the ADP systems.

Public Address

The Radiology Service will not have an independent public address (PA) system. The department paging and public address will be included as part of the hospital-wide PA system. Speakers are typically located in corridors and public spaces. The actual system configuration will depend on the overall design layout and the functional requirements.

Miscellaneous Systems

A local sound system may be provided for selected Radiology procedure room to provide background music during the procedure. Nurse call and/or intercom systems may be provided for communications between the control room and the procedure room. A closed circuit TV systerm may be provided for direct observation of the patient during the procedure. Other systems, such as MATV, CATV, or local digital video monitoring may be provided.

Waste Management

Medical Waste

Medical waste is generated in exam and treatment spaces where it is bagged, collected and transported to the soiled utility rooms. Then it is held in separate containers pending transport to the medical waste handling facility.

General Waste

General waste is generated in all spaces and is held in containers for collection and sorting into carts or bagged and placed in a waste chute and transported to the waste handling facility.

Recycling

Methods for sorting, collecting, transporting and disposing of recyclable products must be specifically analyzed for each facility and location.

The optional use of disposable and reusable products should be considered.

Soiled Linen

Soiled reusable linens are generated in exam rooms, treatment spaces, and patient and staff gowning areas. They are collected in carts or hampers in the soiled utility room; or bagged and transported to (a) central collection area(s) via soiled linen chutes or carts.

Disposable linens are included with either general recyclable waste or medical waste as appropriate.

Utensils

Reusable utensils include bedpans, urinals, emesis basins and other stainless steel items, which are used in exam and treatment areas. They are transported to the soiled utility room where they are processed (if steam washers are available) or collected for reprocessing and transported to the Sterile Processing Department.

Space Requirements

Space requirements will vary with the selection of waste collection and recycling methods / systems. Space requirements need to be analyzed for each optional method or system considered for new and existing facilities.

Transportation

Patient

Gowning areas with lockers for inpatient and outpatient should be provided.

Outpatient

Convenient access from patient parking and primary care entrance should be considered.

Passenger elevator access to Radiology Service facilities should be located off main entrance levels.

Techniques like clear access routes, public spaces, landmarks and signage facilitate way finding.

Inpatient

Stretcher and wheelchair patients should be separated from ambulatory patients where possible.

Inpatients arrive at a control point common with outpatients. Separate waiting is provided for inpatients.

Inpatients access patient holding through a dedicated route, which is separated from outpatient waiting.

Staff

Staff access should be separated from patient waiting and holding areas.

Staff lounge and locker areas should be located away form inpatient and outpatient traffic and gantry rooms.

Records

Radiology Service utilizes digital imaging and retrieval techniques.

Viewing, interpretation and video image manipulation areas should have data communication access and PACS provisions at designated PACS workstations.

Pharmaceuticals

Pharmaceuticals, including narcotics, are transported by pharmacy personnel in locked carts or by a robotic system to the department.

Narcotics are delivered to a narcotics locker which is located in a clean supply or patient prep area and is remotely alarmed to the nearest nursing control station. Network access is provided at the Pharmacy dispensing location.

Materials

Clean supplies are transported by exchange carts which are stored in the Clean Supply Room.

Supplies are transported by Service Elevator and through hospital corridors separated from patient traffic where possible.

Deliveries are scheduled during hours when patient visits are not schedules.

Linen

Disposable linens are delivered as part of clean supplies.

Sterile Supplies

The use of sterile supplies is minimal as is accommodated by prepackaged or disposable items delivered with clean supplies.

Food

Meal and nourishment deliveries to Radiology Service are not required.

Waste

Waste is collected by housekeeping staff and transported to the Soiled Utility Room, from where it is disposed.