



Department of
Veterans Affairs

Office of Construction & Facilities Management

1. Narrative



SPINAL CORD INJURY/ DISORDERS CENTER

1. NARRATIVE

1.1 General Description, Function and Concepts

1.1.1 The Spinal Cord Injury/Disorder Patient

A patient with a Spinal Cord Injury or Disorder (SCI/D) is one who has sustained a lesion or disease of the spinal cord or cauda equina resulting in either paraplegia or tetraplegia. Paraplegia involves the loss of nerve control from about the waist down. Tetraplegia involves nerve control loss from the neck or shoulders down. Most patients are without control of the legs, lower torso, bowel and bladder. Most patients with tetraplegia are also without upper torso, arm, and hand control; and intrinsic hand articulation. There may be respiratory control problems as well. The Intensive Rehab and Sustaining Care populations have about an equal number of patients with paraplegia as tetraplegia while the Long Term population has a majority of patients with tetraplegia.

It can be assumed that each SCI/D patient will require an assistive device for mobility. Patients with Paraplegia may be expected to use manual wheelchairs while those with tetraplegia are more likely to use power wheelchairs. Lack of mobility, coupled with the loss of sensation can lead to pressure ulcer (pressure sore). Treatment for sores can temporarily confine a patient to a gurney.

Due to the nature of their injuries and to the length of rehabilitation that is required, SCI/D patients tend to have relatively long hospital stays. After

rehabilitation, SCI/D patients often require readmissions for preventative and curative purposes, and outpatient visits. There will always be an ongoing relationship between the SCI/D patient and the SCI/D Center.

1.1.2 The Spinal Cord Injury /Disorders Treatment Team and Staff Levels

Treatment of SCI/D patients requires a coordinated team effort that includes the following minimal staff for only some of the critical disciplines:

1. *Medical Center Director* - The Director is responsible for ensuring that SCI/D Center staff levels adhere to policy directives set by the Veterans Health Affairs (VHA).
2. *SCI/D Physician Staff* - The SCI/D Physician Staff levels are set at one physician for every ten-staffed (operating) beds. An additional 0.5 FTE physician is to be allocated for the administrative responsibilities of the full-time SCI/D Chief.
3. *Nursing Staff* - The Nursing Staff levels are set at a minimum of 71 FTE's per 50 beds or 1.42 FTE per staffed bed. Staffing levels are adjusted when acuity levels of the patient population exceed the national VA average.
4. *SCI/D Social Workers* - The SCI/D Social Workers are provided at a ratio of 1 per 20 staffed beds. Social workers also provide on-site services to SCI/D outpatients.
5. *SCI/D Psychologists* - The SCI/D Psychologists are provided at a ratio of 1 per 20 staffed beds. Psychologists

also provide services to SCI/D outpatients.

6. *Therapists* - The Therapist staffing levels are set at one rehabilitation therapist (from a mix of physical therapists, occupational therapists, kinesiotherapists, and certified therapeutic recreational specialists) per five staffed beds.
7. *Other staff* - Other staffing needs are determined locally to provide for such SCI/D Center programs as SCI/D Home Care, SCI/D Care Coordination, SCI/D Outpatient Clinic, and SCI/D Telemedicine programs in addition to the preceding defined minimal staffing needs.

1.1.3 The Spinal Cord Injury/Disorders Center

A Spinal Cord Injury/Disorders Center (SCI/DC) is a specialized medical facility designed to provide a full range of care for patients who have sustained a lesion of the spinal cord and/or cauda equina resulting in either paraplegia or tetraplegia. Each patient assigned to this unit uses a manual or electric powered wheelchair, or occasionally a gurney.

The purpose of the SCI/D Center is to provide care and treatment for the Spinal Cord Injury/Disorder patients and to ensure that they receive maximum benefit from trained staff in a specialized, mission-oriented facility.

Spinal Cord Injury/Disorders Care is divided into three phases and SCI/D Center designs must provide for their differing needs.

1. *Acute (Intensive Rehabilitation)* -Acute care involves medical stabilization immediately after injury and is usually provided at the nearest trauma center, with later transfer to an SCI/D Center as soon as possible.

In an Intensive Rehab Unit, a multidisciplinary medical team focuses on bringing the patient to the highest functional level possible. The goal is to enable the patient to return to independent living. Specialized care in the acute setting includes at least the following activities:

- Prevention and/or treatment of medical and surgical problems associated with the spinal cord injury.
- Diagnostic and surgical care of the urinary tract system.
- Providing proper nursing care to prevent the formation of pressure ulcers.
- Training patients to perform their own self care, this includes such activities as getting dressed, getting into and out of bed, bathing, performing toilet activities (bowel and bladder care), etc.
- Training in optimal mobility whether learning to walk again or effective use of a wheelchair.
- Providing patients with and teaching them to use any special assistive devices they may need to achieve independence.
- Diagnostic and surgical care of the urinary tract system.
- Providing patients and family with social, psychological and vocational support to deal with the consequences of the injury.
- Providing proper nursing care to optimize outcomes and to prevent complications such as the formation of pressure ulcers.

- Restoration and/or maintenance of nutritional status.
 - Providing education to empower the patient and for subsequent training of a personal care assistant, if needed.
2. *Sustaining Care* - provides medical, surgical, rehabilitative, and SCI/D home care services for needs that arise subsequent to initial rehabilitation. Primary and specialty care are delivered on an inpatient and outpatient basis.
 3. *Long Term Care* - serves patients with complex medical needs in either SCI/D long term care centers or to stable patients in VA Nursing Home Care Units. Patients residing in Long Term Care Centers are of varying ages. Long term care SCI units will follow these design criteria with modifications.

1.1.4 The SCI/D Center Components

The key elements of a Spinal Cord Injury/Disorders Center include but are not limited to:

- Reception Areas
- Acute Care Patient Care Units
- Long Term Care Patient Care Units
- Administrative and Support Areas
- Patient Care Unit: Common Support
- SCI/D Patient Clinics
- SCI/D Patient Therapy
- SCI/D Home Care
- SCI/D Administration
- Staff Lockers, Lounge, and Toilets
- Residency Program

For a complete listing of the SCI/D spatial requirements, please refer to the Chapter 104 of the VA Space Planning Criteria.

1. *Reception Areas* – consist of general waiting areas, reception, toilet rooms, and consultation rooms that are planned to help orient the SCI/D Patient and persons accompanying the patient to the SCI/D Center.

This is the first impression of the SCI/D Center and should be designed to provide a pleasant and welcoming environment. The reception area is particularly important to provide information and directions if needed.

The reception area also notifies the staff that the patient has arrived; beginning the patient check-in process. The reception counter should be designed to accommodate persons using wheelchairs and gurneys.

2. *Acute Care Patient Care Units* - consist of the functions needed to provide living accommodations and deliver health care to Spinal Cord Injury/Disorders (SCI/D) patients. An SCI/D Center may include acute, sustaining, or long term care nursing units.

Most frequently, Acute and Sustaining Care beds are managed together on the same patient care units while Long Term Care beds are located separately. The Patient Care Units, as described in this Design Guide, consist of the various types of inpatient rooms and adjoining toilet/shower rooms.

3. *Long Term Care Patient Care Units* – Discussion of Long Term Care units have been assigned a separate section of this Design Guide (See Chapter 4).

4. *Administrative and Support Areas* – consist of various spaces such as unit storage, soiled and clean utility, and the nurse station. These areas directly support the individual patient unit and are provided for each unit.
5. *Patient Care Unit: Common Support* - consists of the functions needed for inpatient treatment and patient care. Included are areas to support patient activities and care, staff functions for clinical affairs, and logistical and environmental services.
6. *SCI/D Patient Clinics* - consist of the functions that provide SCI/D outpatient health care services, as well as those functions shared by SCI/D inpatients. These functional areas include exam rooms, Uro-dynamics Lab, and other treatment areas.
7. *SCI/D Patient Therapy* – consist of space allocated to physical and occupational therapy, activities of daily living, therapeutic pool, and other spaces designed to help the SCI/D patient achieve the highest level of mobility and independence.
8. *SCI/D Home Care* – consist of space to provide for the SCI/D Home Care program. This outreach program provides services to SCI/D patients at their homes and supplements services offered to SCI/D patients at the SCI/D Center.
9. *SCI/D Administration* - consists of staff offices and support spaces responsible for the management of the SCI/D Center. These functional areas also include the lobby/information/reception space, clerical work spaces, and conference/educational spaces. (See Figure 1.1 Functional Diagram).
10. *Staff Lockers, Lounge, and Toilets* – consist of space allocated for staff members at the SCI/D Center.
11. *Residency Program* – consist of space allocated for the Residency Program at VA medical facilities that are affiliated with other medical programs

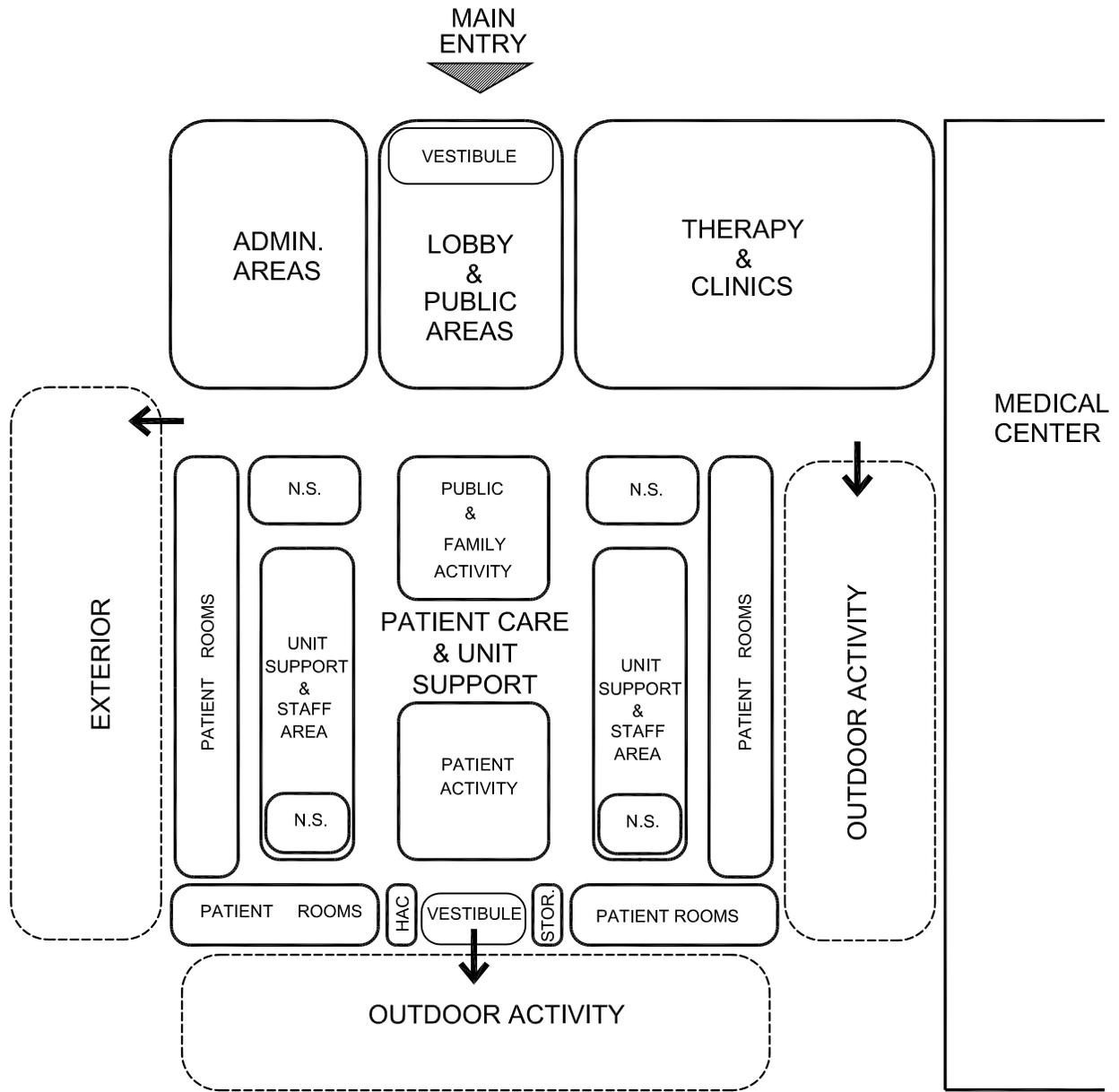


Figure 1.1
Spinal Cord Injury/Disorders Center
Functional Diagram
 NTS

LEGEND:

-  MAIN ENTRY
-  ACCESS
-  CIRCULATION

1.2 Planning Criteria

1.2.1 General Design Goals

When planning an SCI/DC facility, several primary goals should be considered including; Infection Control, Single Patient Bedrooms, Quieter Hospitals, Views of Nature/Day Lighting, Ventilation and Unit Design.

- **Infection Control**
Reduce patient infections with single-bed rooms. Provide numerous hand washing sinks and hand-cleaner dispensers. Provide a separate Patient Litter Bathroom for each patient bed.
- **Single Patient Bedrooms**
Provide single-bed rooms per VA space planning criteria. Adaptable-acuity single-bed rooms should be widely adopted.

Single rooms have been shown to lower hospital-induced nosocomial infections, reduce room transfers and associated medical errors, greatly lessen noise, improve patient confidentiality and privacy, facilitate social support by families, improve staff communication to patients, and increase patients' overall satisfaction with health care.

- **Quieter Hospitals**
New hospitals should be quieter to reduce stress and improve sleep and other outcomes.

Noise levels will be substantially lowered by the following combination of environmental interventions: providing single-bed rooms, installing high-performance sound-absorbing ceilings, and eliminating noise

sources (for example, using noiseless paging).

- **Views of Nature/Day Lighting**
Provide patients with stress reducing views of nature and other positive distractions. Improve artificial light sources with full-spectrum lighting. Reduce depression through light, both natural and artificial.
- **Ventilation**
Improve ventilation with improved filters, attention to appropriate pressurization, and special attention to detail during construction.
- **Unit Design**
Design unit layouts and nurses stations to reduce staff walking and fatigue, increase patient care time and support staff activities such as medication supplies, communication, charting, and respite from stress (See Figure 1.2).

Develop way-finding systems that allow users, and particularly outpatients and visitors, to find their way efficiently and with little stress.



Figure 1.2
Patient Charting Area
SCI/D Center
VAMC Cleveland

1.2.2 Location

In new medical facility construction the SCI/D Center is required to be located on grade with access to the main Medical Center elevators. In existing hospitals, every effort must be made to locate the SCI/D Center on the ground level.

Alternate locations must be approved by the Chief Consultant SCI/D. In all cases, SCI/D patients must have direct, level and enclosed access to all major medical facilities related to SCI/C care.

The SCI/DC should have close proximity to Rehabilitation Medicine, Prosthetics Service, Dietetics Service, Supply Service and Building Management Service. There should be no proximity between the SCI/D Center and Psychiatric patients.

1.2.3 Unit Layout

Patient care units are to be planned to maximize staff efficiency. Patient unit layouts should minimize walking distances for staff to allow more Staff time in direct patient care.

The layout needs to encourage patient interaction through social spaces and areas for shared activities. Further, the facility layout should provide patient access to the outdoors for active and passive therapeutic activities.

Key design features include:

- Doorways to rooms should be 48" (1219 mm) wide or wider to accommodate patient beds, electric wheelchairs and other personal mobility devices.
- Maneuvering space shall be of 66" (1676 mm) diameter in all patient rooms, toilet/showers in all patient areas (Note: This has been adopted as a VA standard.)
- Patient rooms for SCI/D patients need to be larger than typical patient rooms to sustain/provide adequate circulation space and space for patient lifting and transfer. (See Figure 1.3 and Guide Plates No.1 and No.3).
- Patient toilet/showers (Private Litter Baths) are larger to allow staff and other caregivers to assist patient with toileting and showering, as needed (See Guide Plate No.4).
- Circulation space in common areas, such as dining rooms need to be generous to allow two wheel chairs or other power/electric mobility devices to pass each other (See Guide Plate No. 12).
- Physical therapy departments should be designed so that therapists can reach all four sides of patients on PT mats or other similar equipment (See Guide Plates No. 29,30,and 31).

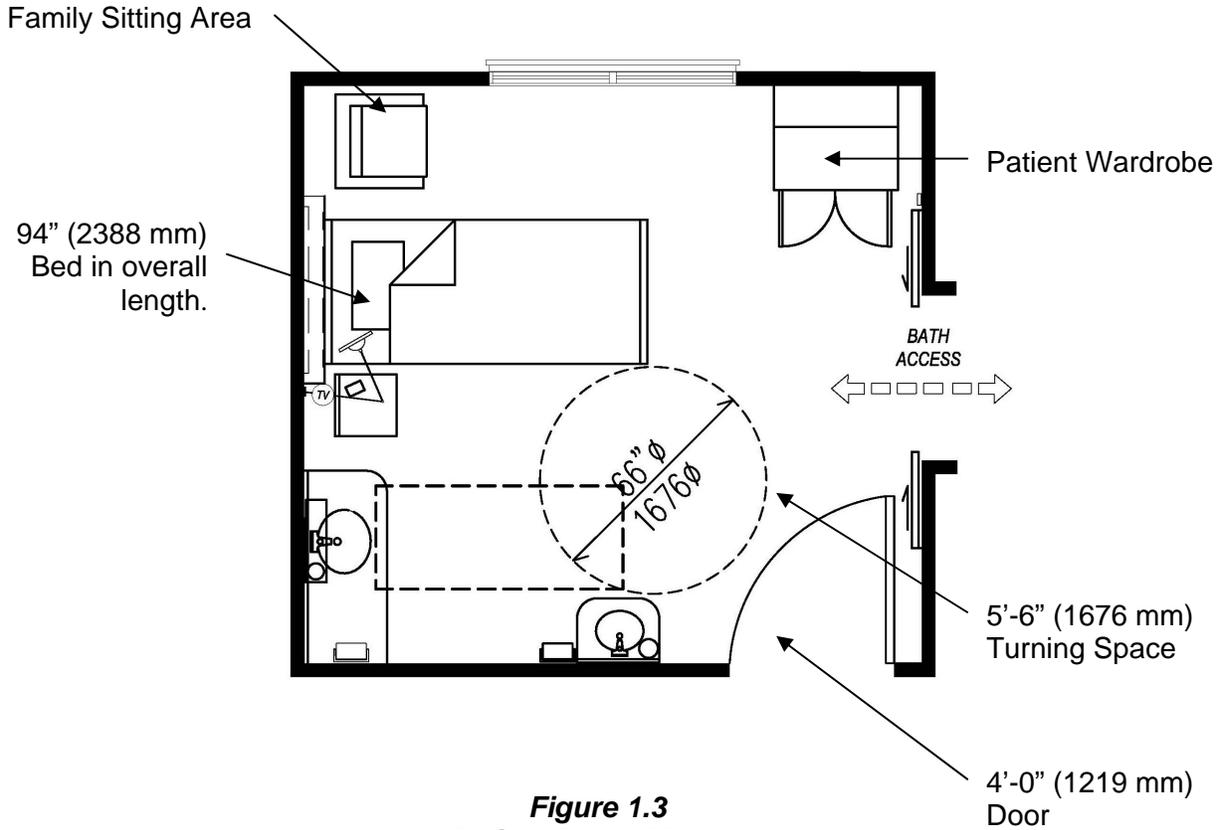


Figure 1.3
Patient Room Module
NTS

1.2.4 Space Program Requirements

1. *Patient Care Unit* - Patient Care Unit size is expressed by the number of beds per unit. The size of the patient unit depends on a number of factors, including the overall number and type of approved beds. However, it is recommended that 30 beds be the minimum unit size.
2. *1-Bed Patient Room* - 1-bed patient rooms are provided for better infection control, increased patient privacy, and more effective patient treatment. 73% of each unit's beds should be in 1-bed

rooms, including isolation rooms. The balance should be 2-bed rooms. SCI/D patient rooms must be larger than medical / surgical patient rooms. This additional square footage allows for wheelchair turning space as well as adequate space for patient transfer on / off lift devices. Ceiling height should be sufficient to accommodate requirements for lift / transfer devices. (See Guide Plate No. 1)

- 3. **2-Bed Patient Room** - The 2-bed patient room, when part of the program of care, may be effective for sustaining care SCI/D patients in terms of interaction between patients sharing the room. (See Figures 1.4 and 1.5).



Figure 1.4
Two-Bed Patient Room
SCI/D Center
VAMC Hines Center

Ceiling height should be sufficient to accommodate requirements. (See Guide Plate No. 3.)

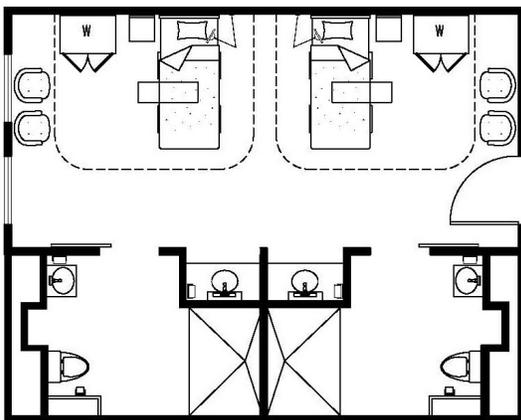


Figure 1.5
Two-bed Patient Room w/ Separate Toilets
Concept for Separate Bathrooms in
Semi-Private Rooms.

- 4. **Private Litter Bath** - To accommodate assistance in the toileting and showering for SCI/D patients, the private litter baths must be substantially larger than standard bathrooms. (See Figure 1.6).



Figure 1.6
Wide Opening to Private Litter Bath
SCI/D Center
VAMC Hines, Illinois

Separate bathrooms for semi-private rooms are provided for infection control. (See Figure 1.5).

The ceiling lift system used in the patient bedroom is extended to the private litter bath to provide mobility for patient with staff assistance (See Figure 1.7 and Guide Plate No. 4).



Figure 1.7
Ceiling Lift Transition to Private Litter Bath
SCI/D Center
VAMC Hines, Illinois

5. *Patient Care Unit Support* - Patients are expected to spend a considerable amount of time outside the individual patient room engaged in therapies and other activities that assist in the care process. (See Figure 1.8).



Figure 1.8
Casual Outdoor Seating Space
 SCI/D Center
 VAMC, Hines, IL

From a Programming and Planning standpoint, the patient care unit support areas include square footages for patient activities as well as work space for SCI/D Center staff. (See Figure 1.9).



Figure 1.9
On-Unit Staff Work Area
 SCI/D Center
 VAMC Cleveland, OH

6. *Staff or Nurse Station* - The nurse's station is at the center of the patient care unit. There should be ample space for every staff person that needs to be accommodated at any one time.



Figure 1.10
Staff or Nurse Station
 SCI/D Clinic
 VAMC Augusta, GA

For an example of a nurses' station, (See Guide Plate No.6).

7. *Nourishment Kitchen* - The nourishment kitchen is accessed directly by patients and by staff and caregivers for patient needs. Typical equipment and layout are shown in Guide Plate No.7.
8. *Dayroom* - The dayroom serves an important socialization function in SCI/D patient care. Here patients visit with family and other patients and engage in unsupervised activities. (See Guide Plate No.11).
9. *Dining Room/Serving*- This room includes space for dining and a service line for meal selection and serving. Patients eat lunch and dinner here while breakfast is typically consumed in the patient room. The room must include adequate space needed for circulation between tables. (See Guide Plate No.12).

10. *Multipurpose Room* - This room accommodates a wide variety of recreational activities including adaptive games, traditional table games, as well as suitable arts and crafts. Working with recreation therapists, patients learn to use adaptive equipment to develop/maintain manual dexterity. (See Guide Plate No.13).

The room is used also by patients for self-directed activities. Ceiling mounted tables may be raised to permit other large group activities or sports requiring open floor space. (See Figure 1.11).



Figure 1.11
Suspended Tables in Recreation Room
VA Hines SCI/DC
Chicago, IL

11. *Physical/Occupational Therapy* - Physical therapy concentrates on gross neuromuscular and skeletal activity. Physical therapy components are treatment areas and a gymnasium configured to accommodate portable equipment. This may include mats, platforms, gait training, parallel bars, and weights, as well as other resistive equipment and orthotic and prosthetic training services (See Figure 1.12).



Figure 1.12
Physical Therapy Room
SCI/D Center
Hines, IL

Occupational therapy focuses on strengthening and optimizing a patient's independence while concentrating on finer physical movement. Driver's training for example is an important OT element.

Both simulated and actual training are to be included. Additional activities may also include vocational training with special adaptive equipment such as computers and telephones. (See Guide Plate 33).

12. *Kinesiotherapy* - SCI/D Centers may choose to include a separate space for kinesiotherapy or it may be combined with PT/OT. Kinesiotherapy combines exercise and education to motivate and assist patients in maintaining physical skills. Previously called Corrective Therapy, kinesiology focuses on large motor exercises and activities. (See Guide Plate No. 32).

13. *Aquatic Therapy* - A therapeutic/exercise pool is important part of the initial therapy for acute SCI/D patients.

Therapy pools allow patients to move and exercise while suspended in water, thus reducing the impact of body weight during therapy. Self-contained aquatic therapy pools should allow adequate space for several patients with trained staff. (See Guide Plate No.16).

The SCI patient requires 92°F - 93°F water temperature, while the MS patient requires 83°F - 84°F water temperature. The pool equipment should be designed to accommodate quick water temperature change, where both patient types can use the same pool on a given day based on schedule.

14. *Activities of Daily Living (ADL)* - These are activities that individuals need to master order to live independently.

The activities include bathing, physical ambulation, grooming, dressing, eating, and toileting. ADL facilities provide a mock kitchen and bathroom arrangement. (See Figure 1.13).

This space may be combined with PT/OT area. (See Guide Plate No.15).



Figure 1.13
Activities of Daily Living
SCI/D Center
VAMC Hines, IL

15. *Storage* - Adequate storage is a very important concept for the SCI/D Center. Substantial amounts of space, in strategic locations are needed to allow staff access to the bulky items of patient equipment, and medical supplies.

16. *Clinics* - Spinal Cord Injury/Disorders Centers include outpatient clinic facilities for detection and treatment of genitourinary problems and conditions, Spinal Cord Injury/Disorders Centers include outpatient clinic facilities for detection and treatment of genitourinary problems and other conditions, as well as yearly patient evaluations. These facilities are used by inpatients also. Other specialized facilities are located here, while additional specialized outpatient needs of SCI/D patients are met in the Medical Center Specialty Clinics.

17. *Exam/Treatment Room* - Exam rooms for SCI/D patients must accommodate patients on a gurney, which requires a larger space than the normal exam/treatment room. These rooms should also include ceiling lifts. (See Figure 1.14 and Guide Plate No.22).

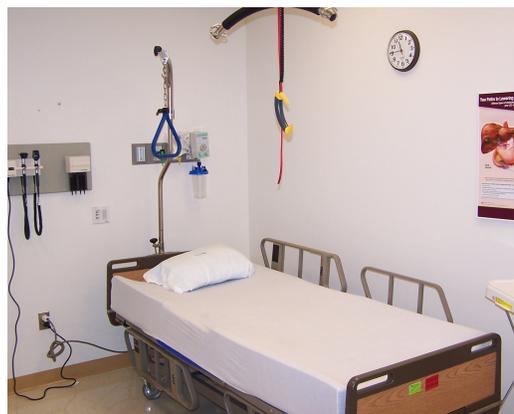


Figure 1.14
Exam/Treatment Room
SCI/D Center
VAMC Hines, IL

18. *Urodynamics Lab* - Urodynamics Labs are used for cystoscopy exams and procedures and optionally, for lithotripsy. Portable/mobile equipment may assist in allowing space to be used for several purposes, provided adjacent storage space is available to park equipment when not in use. (See Guide Plate No.23a and 23b).



Figure 1.15
Urodynamics Lab
VAMC SCI/D Center
Tampa, FL

19. *Home Environmental Learning* – The purpose of this suite of rooms is to teach and promote independence for the SCI/D patient who is transitioning from the Center setting to the home environment.



Figure 1.16
Home Environment Learning-Bathroom
SCI/D Center
VAMC Tampa, FL

Prior to discharge, the patient, and oftentimes a caregiver, will spend a pre-ordained amount of time in the apartment, in order to assess the patient's attainment of sufficient skills to live in the home environment. (See Figure 1.16 and 1.17; See Guide Plate 28).



Figure 1.17
Home Environment Learning-Kitchen
SCI/D Center
VAMC Tampa, FL

1.3 Relationship and Flow Diagrams

The SCI/D Center is always located within or adjacent to a Medical Center and is integrally related. (See Figure 1.18).

Medical care delivery and emergency support require close proximity. Service traffic from Medical Center departments enables the SCI/D Center to be supplied for meals, linen, and medical supplies, as well as to remove trash, hazardous waste, and soiled materials. (See Figure 1.19).

The flow of SCI/D inpatients to areas outside the patient unit is substantial and encouraged by staff. It is important to provide patients in the SCI/D Center a secure environment with controlled access from the medical center to prevent persons not associated with the SCI/D unit from entering the area.

Also, patient traffic is required to allow SCI/D patients access to diagnostic services and other Medical Center functions. (See Figure 1.20).

Outpatients, seen in the SCI/D Center, typically arrive by private transport and also may access Medical Center services and specialty clinics. (See Figure 1.21)

1.4 Therapy Relationship Concept Diagram

One concept for arranging elements of therapy is to organize them centrally around staff charting. (See figure 1.22). Co- treatment of patients is supported by shared space.

1.5 Anthropometrics

SCI/D patient using wheelchairs have special requirements to enable independence (See Figures 1.23, 1.24 and 1.25).

SCI/D patients who use prone gurneys have special requirements to enable independence (See Figures 1.26 and 1.27).

SCI/D patients in wheelchairs use specialized techniques for toilet transfer. One option is portrayed. (See Figures 1.28, 1.29 and 1.30).

1.3 Relationship and Flow Diagrams

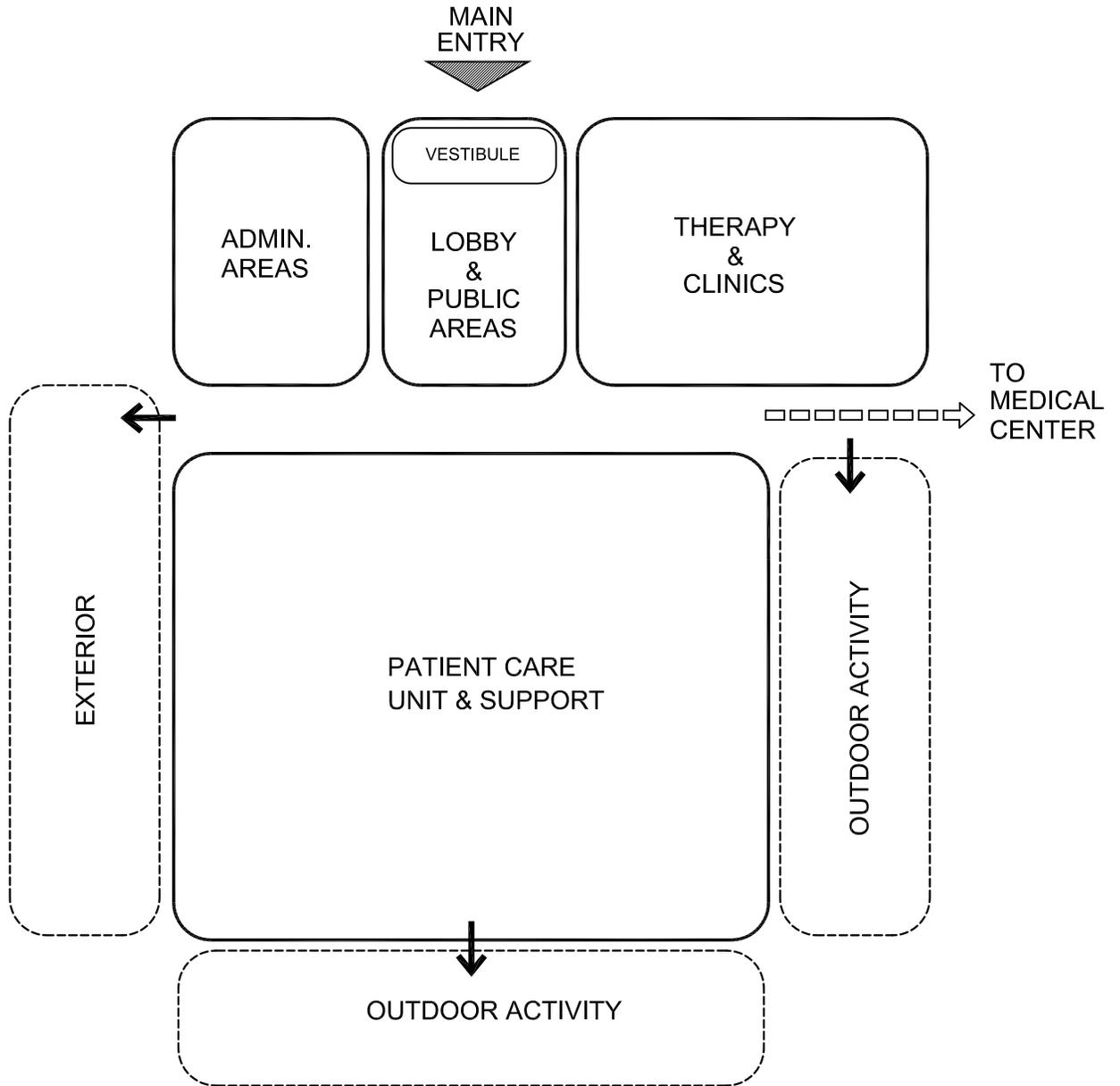
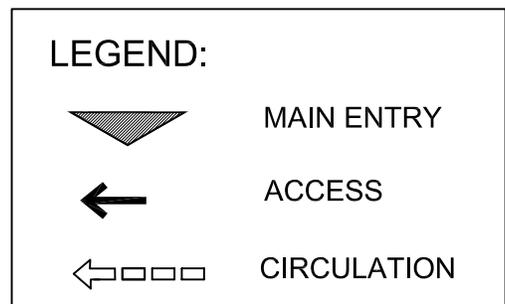


Figure 1.18
Spinal Cord Injury/Disorders Center
Relationship Diagram
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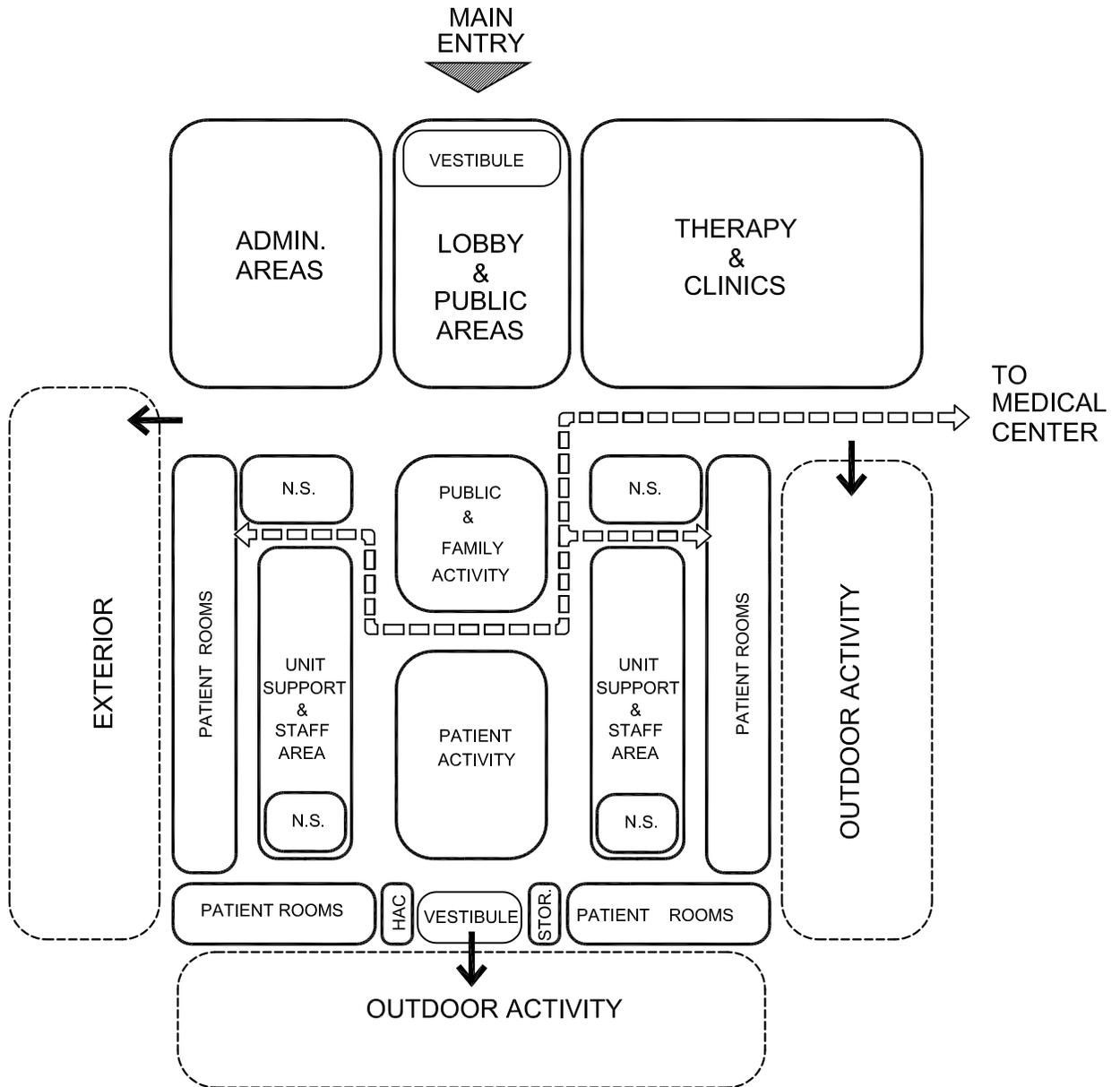


Figure 1.19
Spinal Cord Injury/Disorders Center
Service Traffic Flow Diagram
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LEGEND:

-  MAIN ENTRY
-  ACCESS
-  CIRCULATION

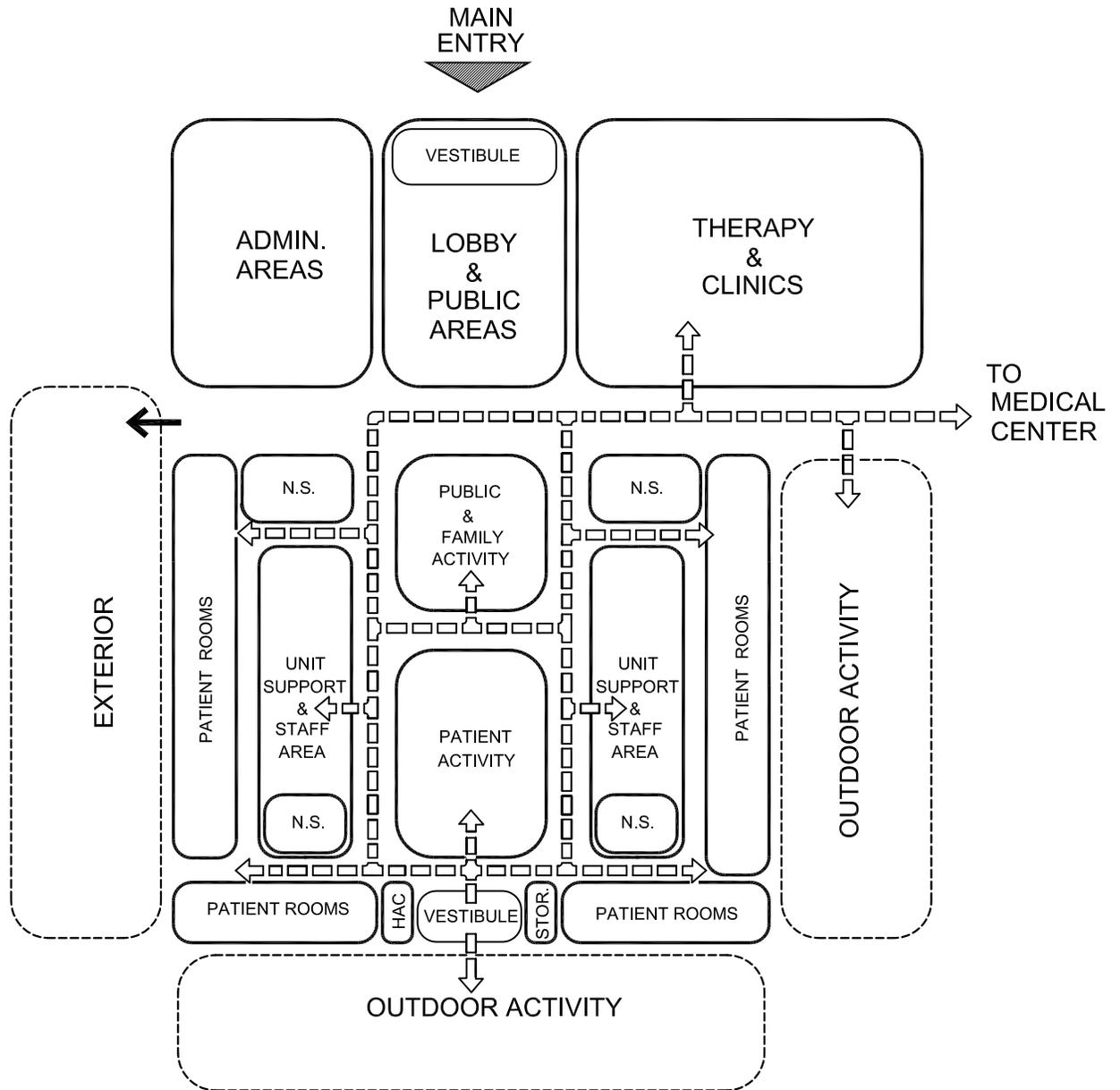


Figure 1.20
Spinal Cord Injury/Disorders Center
Inpatient Traffic Flow Diagram
 NTS

LEGEND:

-  MAIN ENTRY
-  ACCESS
-  CIRCULATION

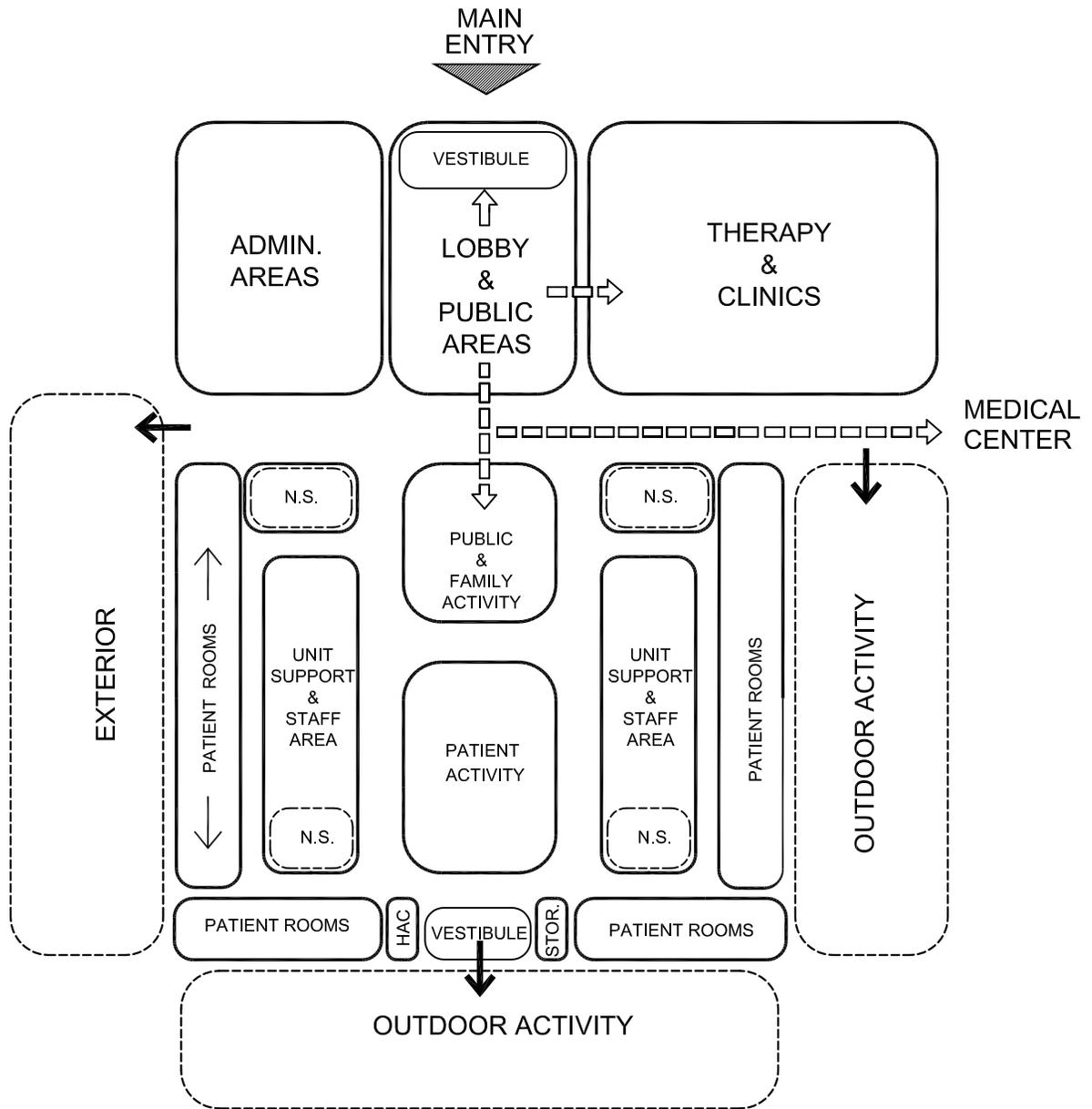
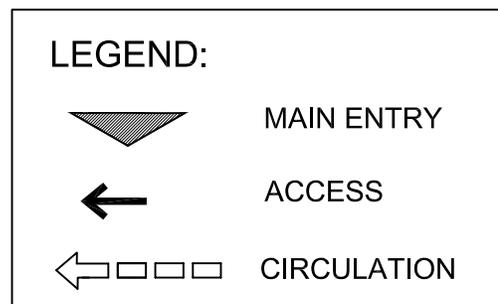
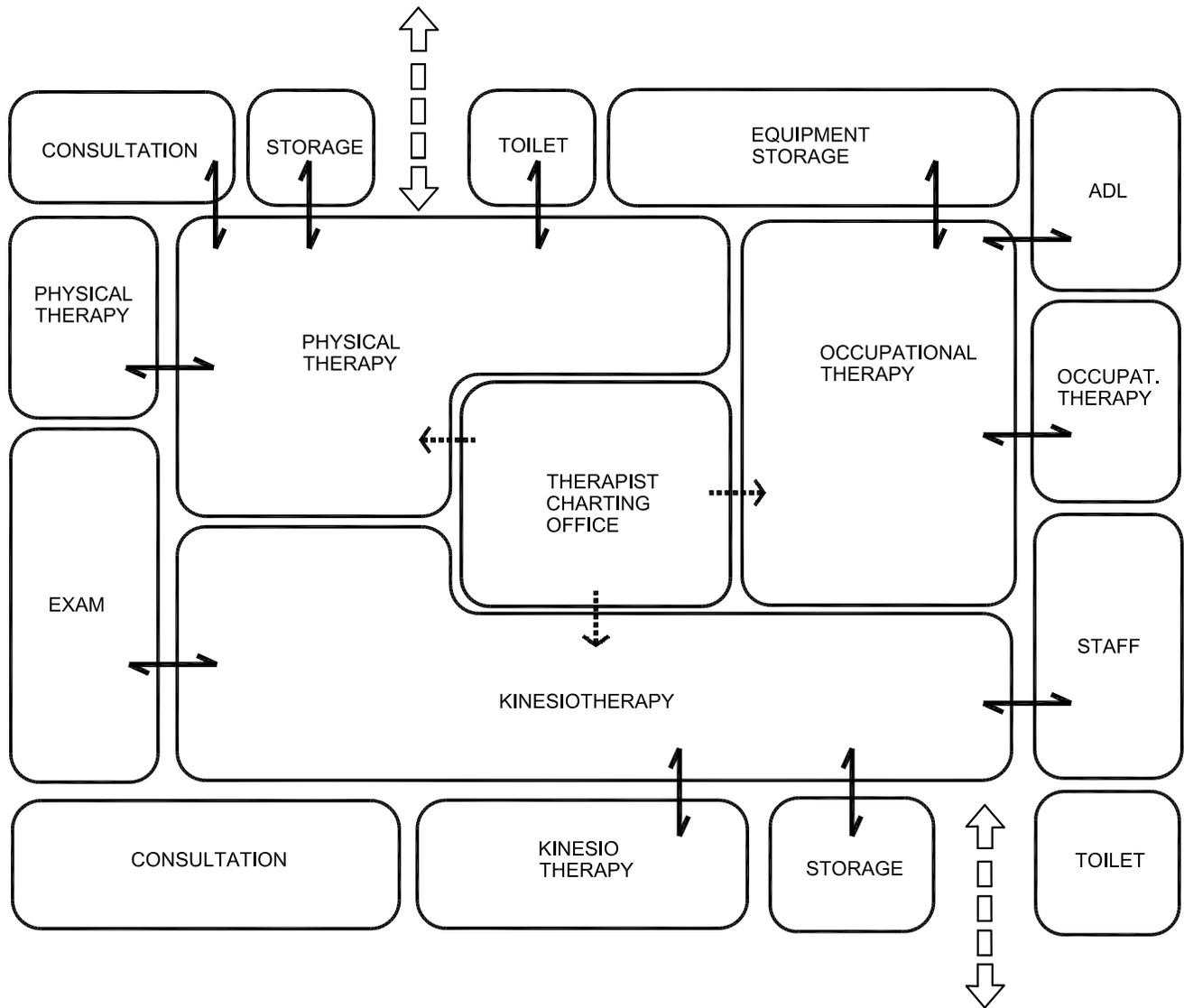


Figure 1.21
 Spinal Cord Injury/Disorders Center
 Outpatient Traffic Flow Diagram
 NTS



1.4 Therapy Relationship Concept Diagram



LEGEND:

- ROOM ACCESS
- FACILITY ENTRY
- VIEW

Figure 1.22
Spinal Cord Injury/Disorders Center
Therapy Relationship Concept Plan
 NTS

1.5 Anthropometrics

Typical Wheelchair & Reach Dimensions

Figure 1.23

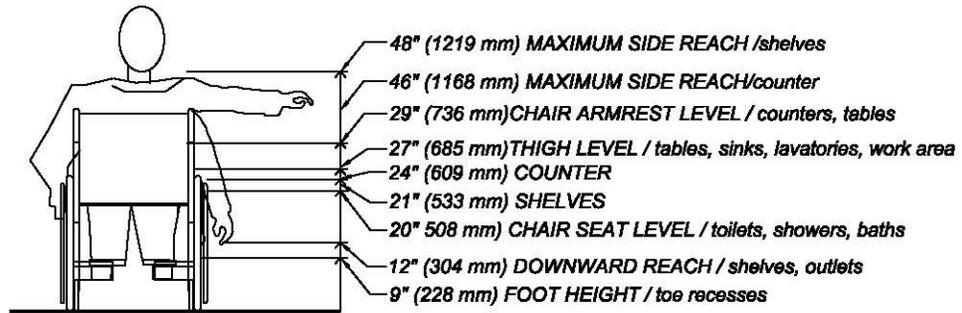


Figure 1.24

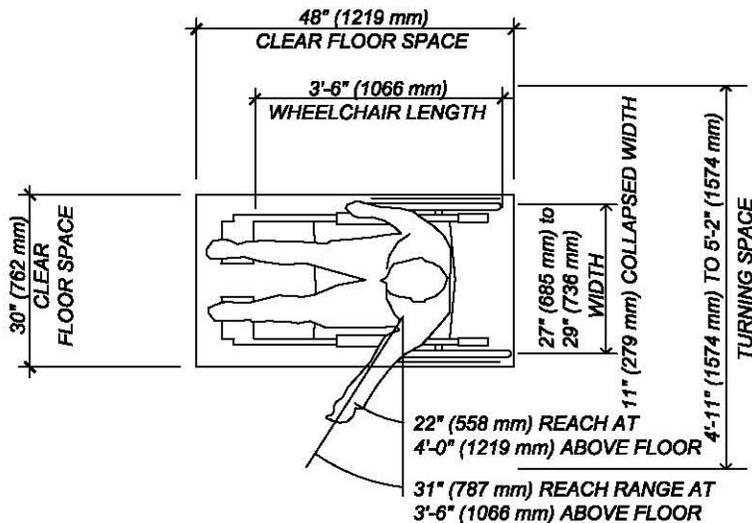
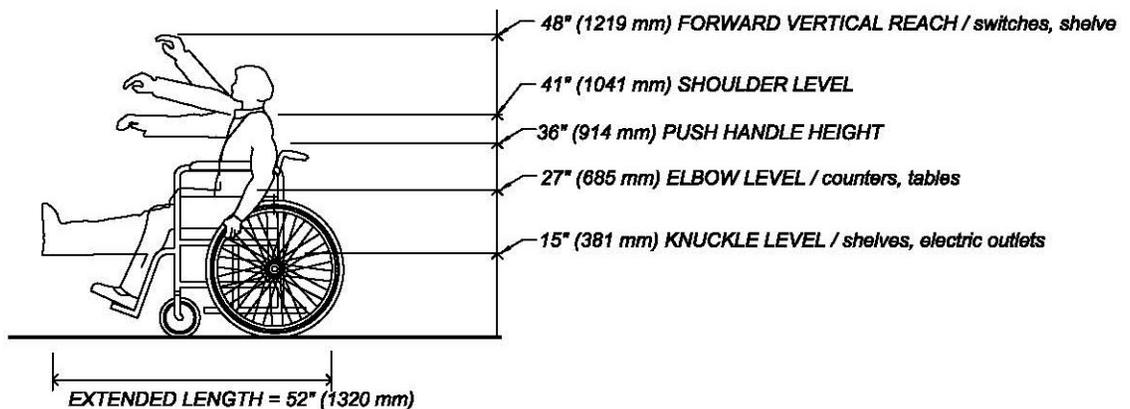


Figure 1.25



Typical Prone Gurney/Self-Propelled Litter & Reach Dimensions

Figure 1.26

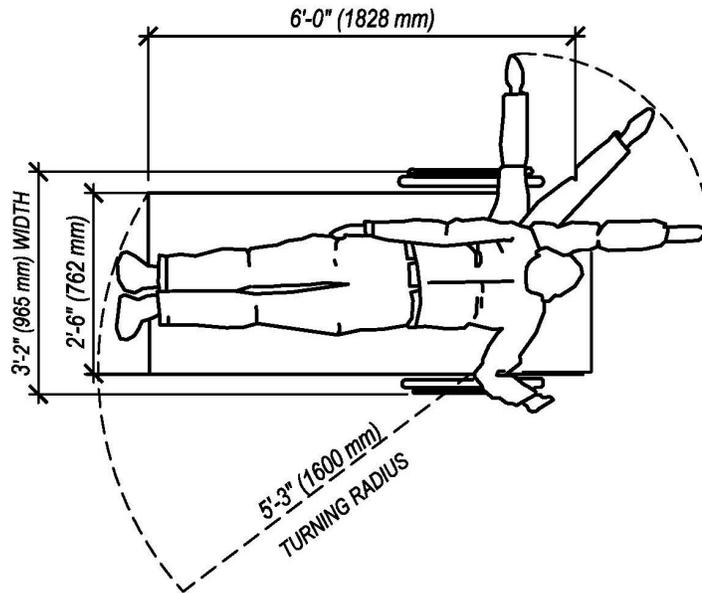
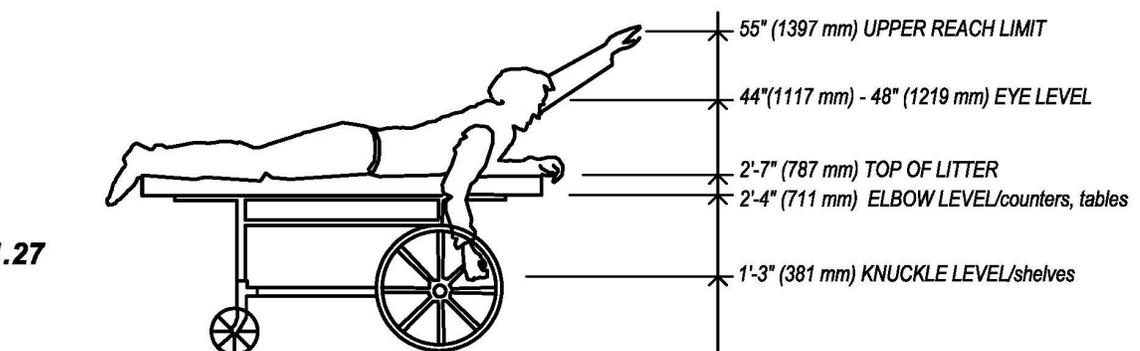
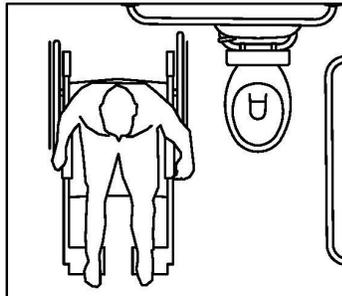


Figure 1.27



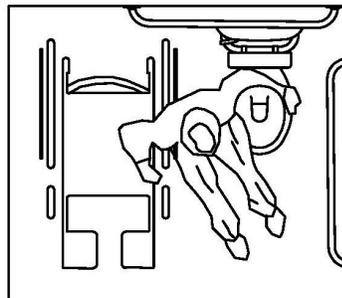
Toilet Transfer Techniques

Figure 1.28



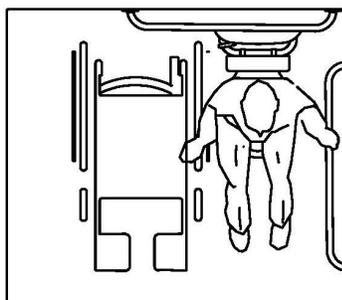
**Takes Transfer Position
Remove Armrest, Sets Brakes**

Figure 1.29



Transfers

Figure 1.30



Position on Toilet