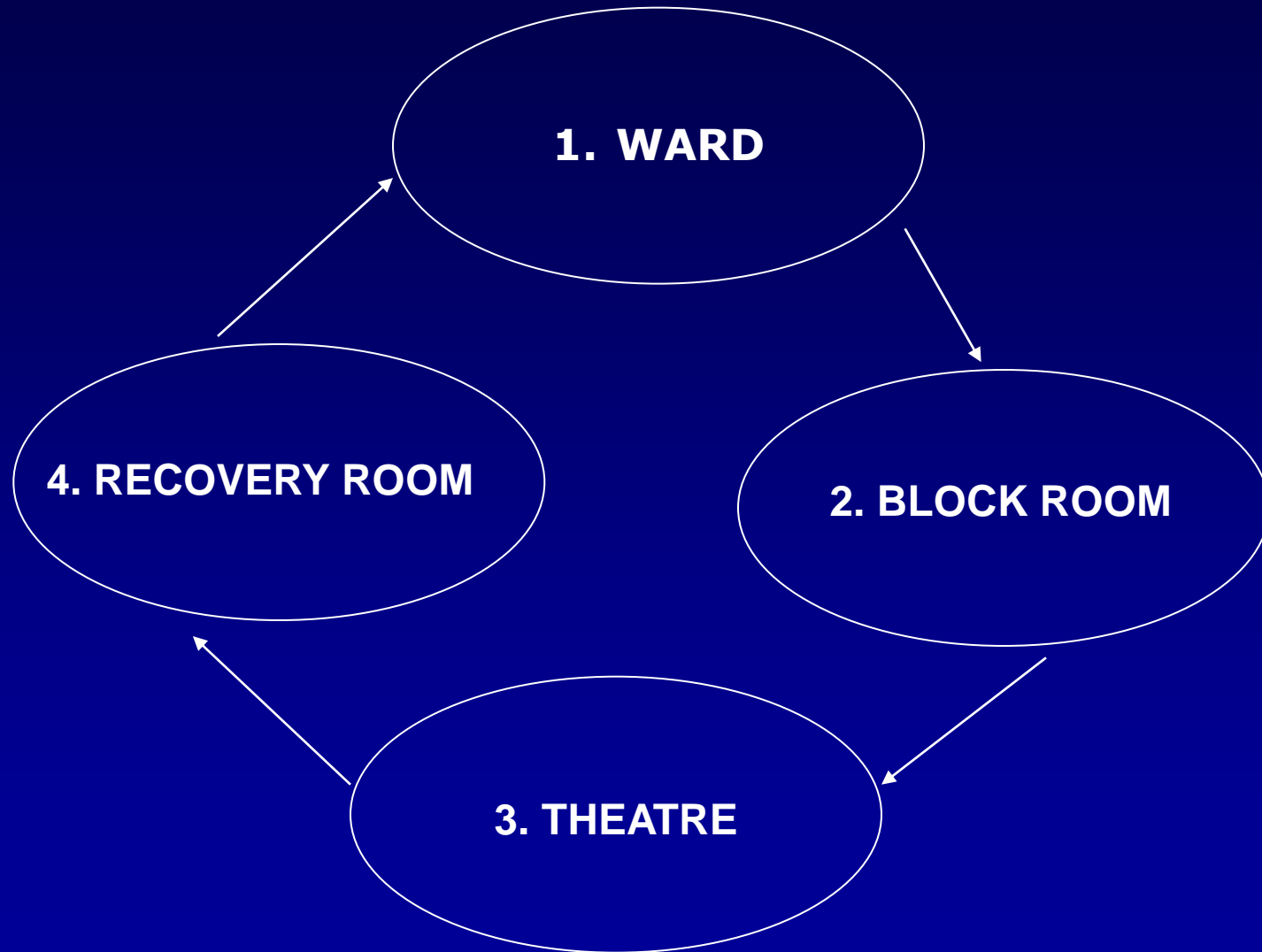


Guidelines for Ideal Layout for an Operating Theater Complex

**Dr.R.D.Ravindran
Aravind Eye Hospital
Madurai**

Patient Flow



Transfer area

This is an area, usually a corridor, where the patient is transferred from an outside trolley to an inside trolley.

A red line on the floor can demarcate the limit upto which the outside trolley could come from where the patient is shifted to the inside one.

General Considerations in OT Complex Planning

- **OT Location**
- **Understand OT layout / Zoning**
- **Ventilation system**
- **Water purification systems**
- **Central sterile supplies process**
- **Biomedical waste disposal**
- **Laundry**

Location

- The OR complex be segregated from high traffic areas
- Ideally it should be situated so that the patients & staff only pass through the passage, thus minimising the chances of infective organisms being carried inside.
 - In a separate wing
 - Top floor or ONE FROM TOP
(WATER PROOFING CONCERNS)

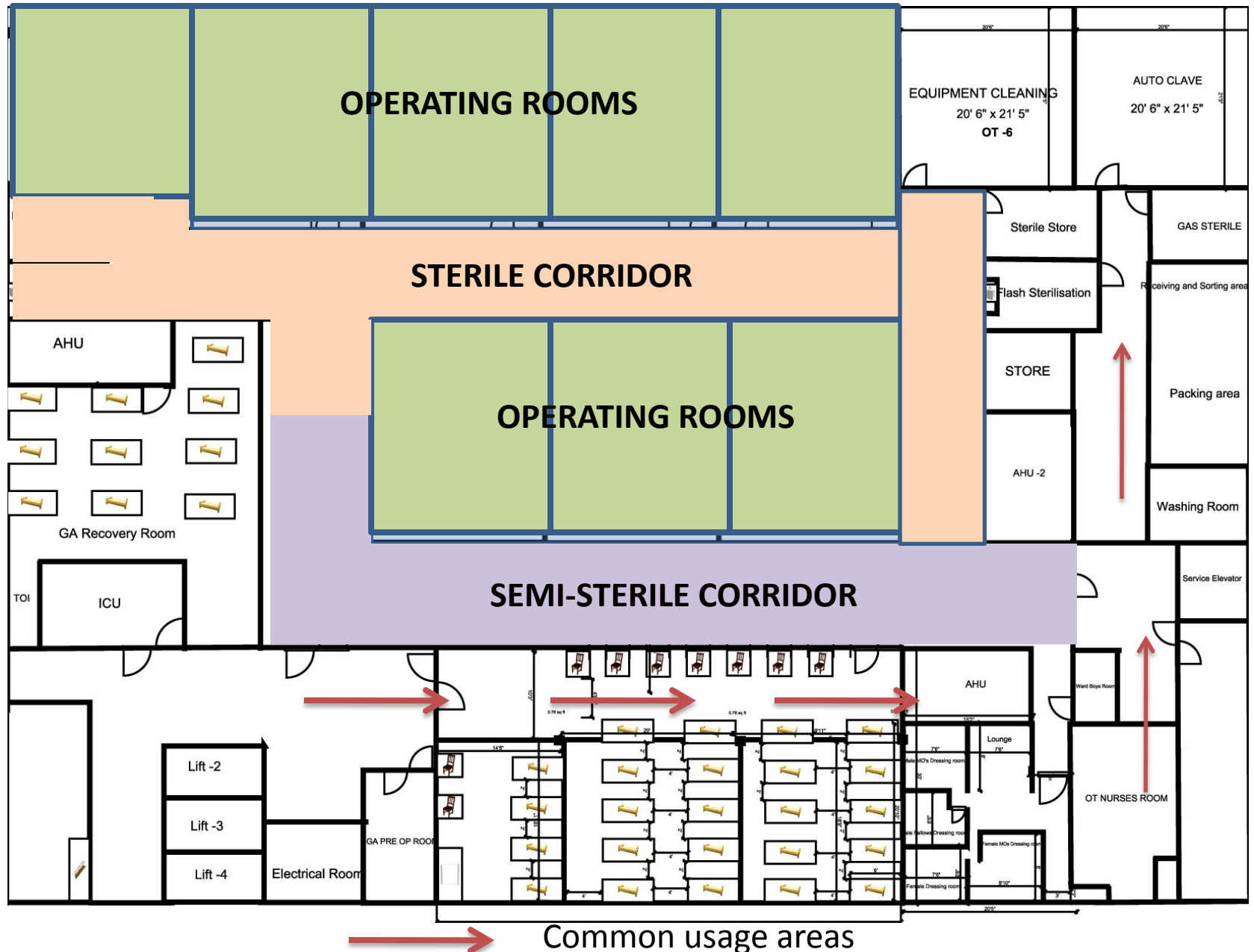
OT Layout

- Common usage areas
- Semi Sterile corridor / Areas
- Sterile corridor
- Operating Rooms
- CSSD / Sterile storage
- Surgical stores

OT Layout

- Common usage areas
 - Pre & Post op patient areas
 - Dress change room
 - Lounge for staff
- Street dress allowed
- No need to cover the hair

OT Layout



Ideal OT Layout

- *Separate Sterile From Non Sterile*

Traffic

- *Central corridor plan*
- *Peripheral corridor or race track plan*

Ideal Layout

Separate Sterile From Non Sterile Traffic

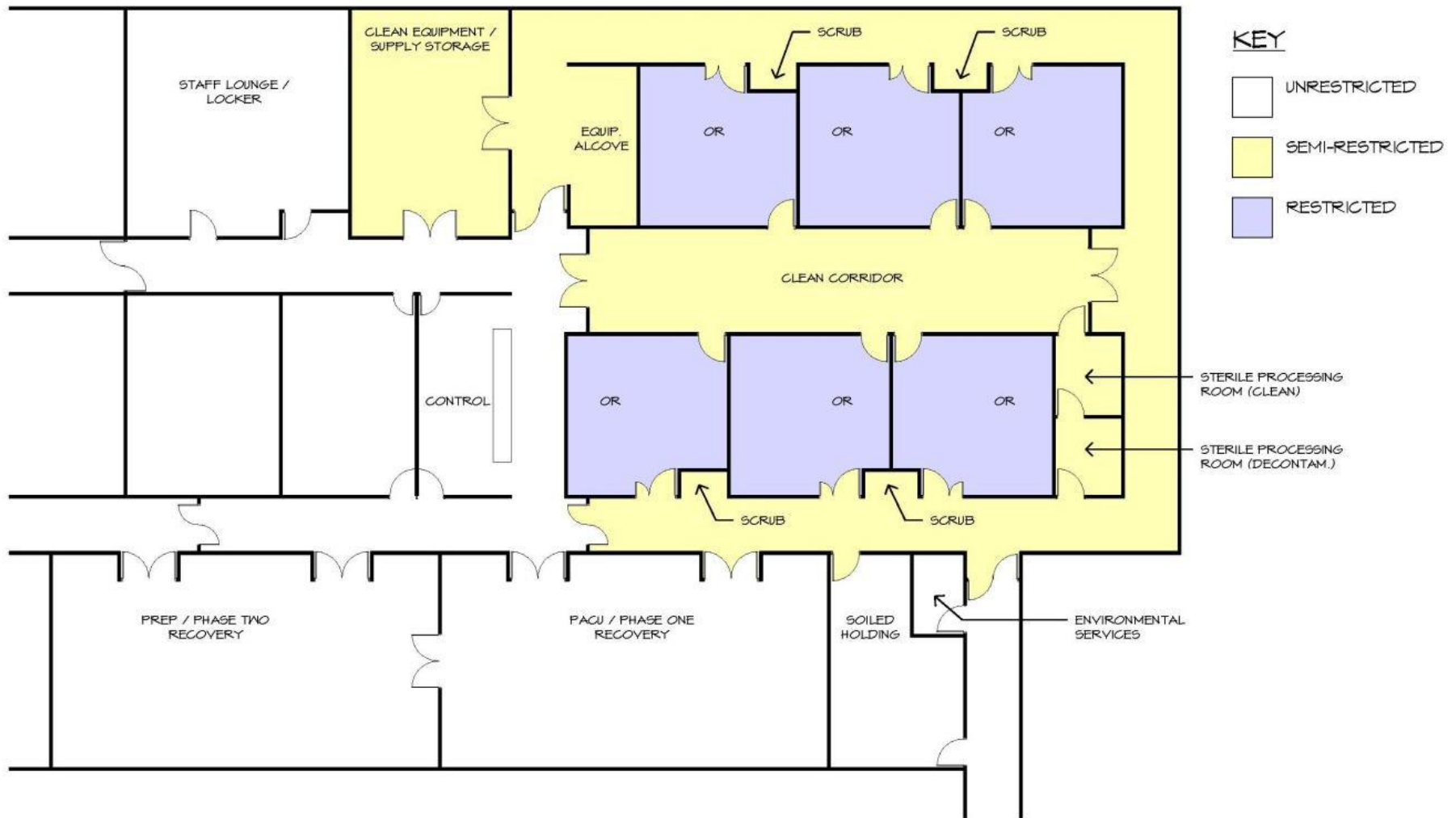
Central corridor plan

- The central core of the complex is the most clean portion.
- The sterilized items access the ORs from here
- Peripheral corridor for unsterile traffic

Peripheral corridor plan

- An encircling peripheral area is the cleanest area that connects the ORs.
- The dirty traffic accesses the OR from other (inner) side.

Ideal OT Layout



NABH Guidelines

- OT Size: Standard OT size of 20' x 20' x 10' (Ht. below the false ceiling level is considered).
- Occupancy: Standard occupancy of 5-8 persons at any given point of time inside the OT is considered.
- Equipment Load: Standard equipment load of 5-7 kW considered per OT.

OT Room Design

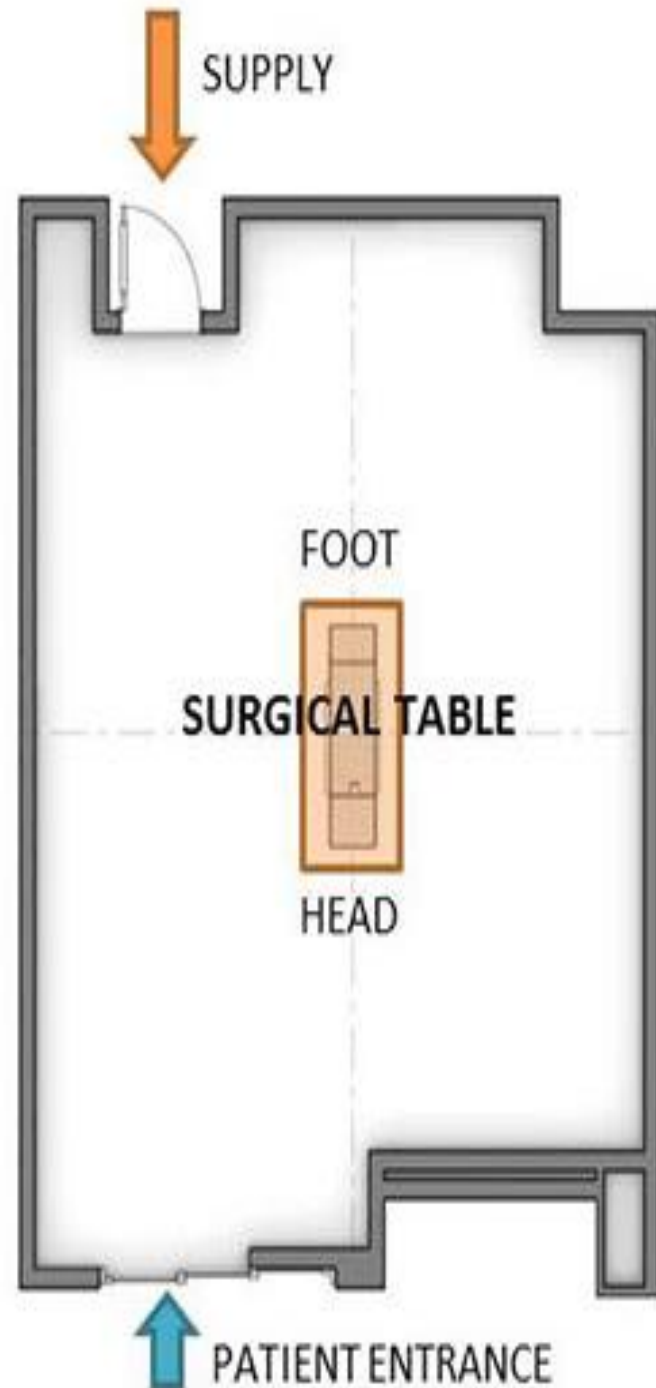
- Two doors

Front door

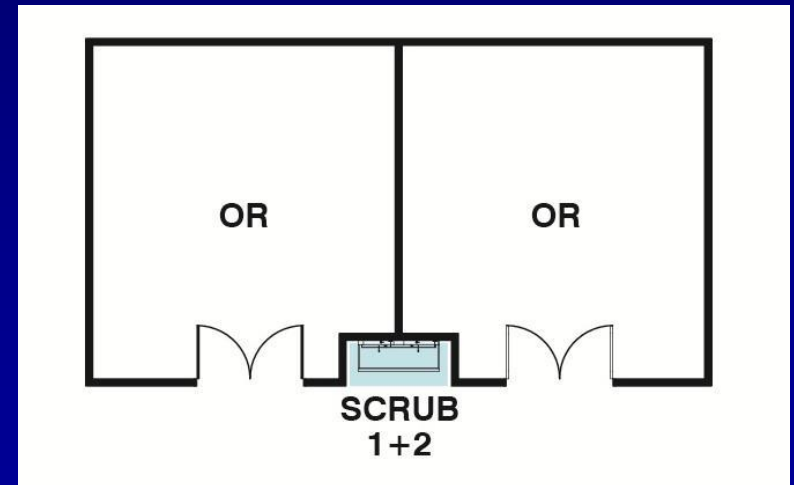
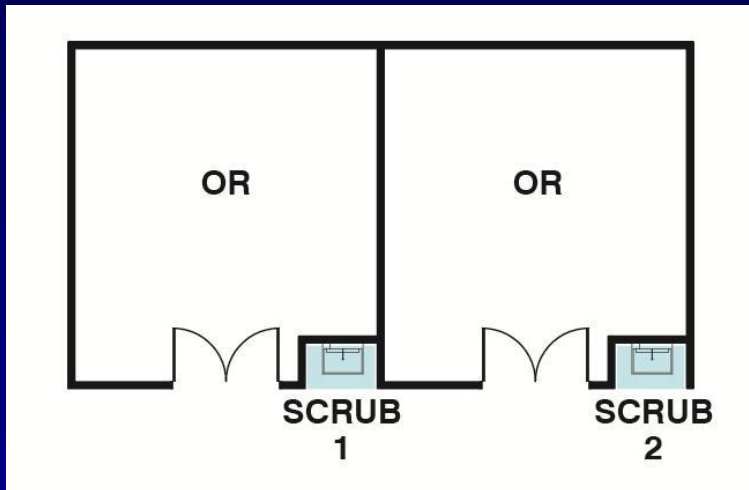
- Personnel entry
- Dirty instruments & Linen

Rear Door

- Sterile supply

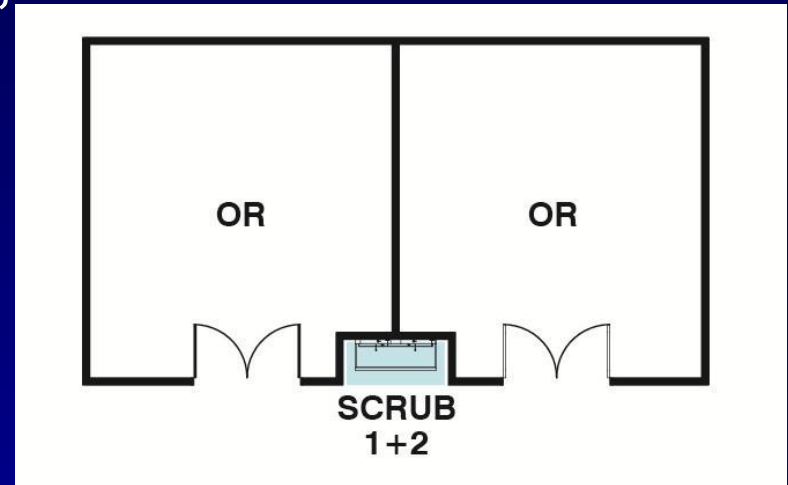


Location of Scrub Area



OT Layout

- No need for a “substerile” room between every two operating rooms
- No need for the door of the staff dress change room to open directly into the semi-restricted area of the surgical suite



Flooring & Walls

- The flooring, walls and ceiling should be non porous, smooth, seamless without corners and should be easily cleanable repeatedly.

Ventilation System

- Central air-conditioning of the operating room is ideal.
Positively Pressurized
- HEPA Filter (0.3 μM) - to minimize air borne contamination



Ventillation

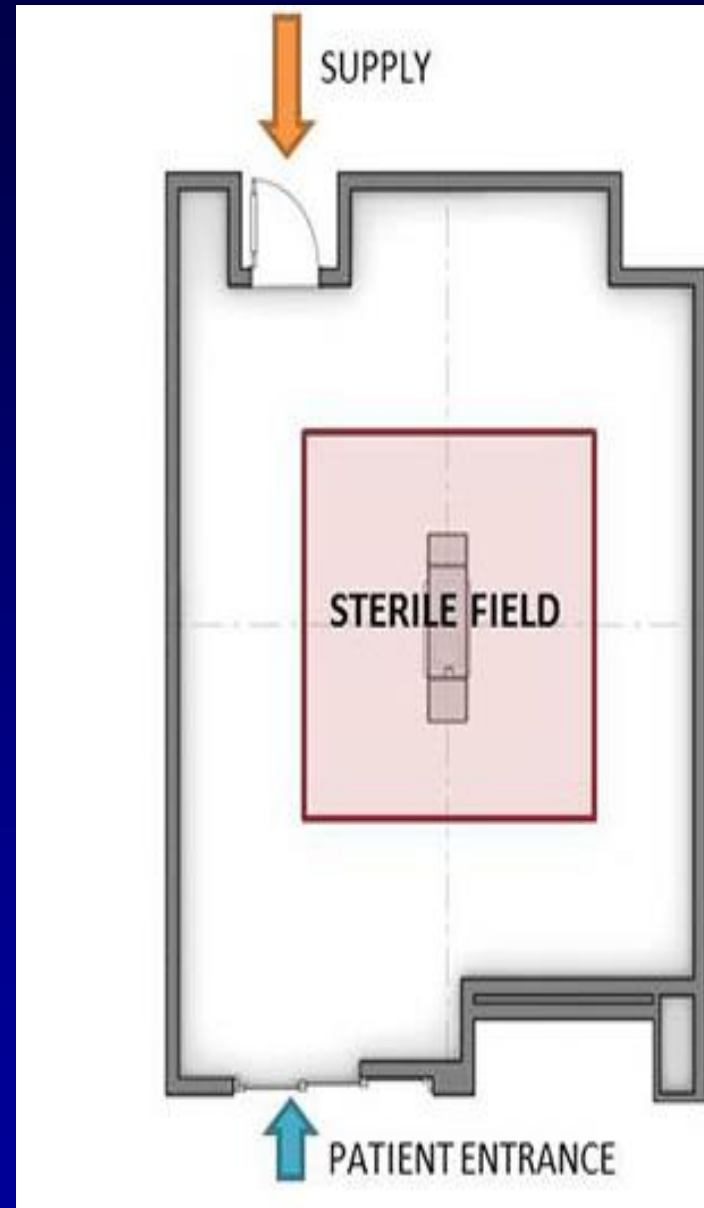
- **Air Change Per Hour:**
 - Minimum total air changes should be 25
 - Fresh air component of the air change to be minimum 4 air changes
- **Air Velocity:**
 - The vertical down flow of air coming out of the diffusers should be able to carry bacteria carrying particle load away from the operating table.
 - The airflow needs to be unidirectional and downwards on the OT table.

Ventillation

- Positive Pressure
 - Minimum positive pressure recommended is 15 Pascal (0.05 inches of water)
- Air is supplied through HEPA filters

Ventilation Design process

- Minimum size of the air supply area should be 6' x 4' to cover the entire OT table & surgical team
- Return air should be taken out through the exhaust grille located near the floor level (approx 6 inches above the floor level).



Temperature and Humidity

- The temperature should be maintained at 21 ± 3 Deg C
- Relative humidity between 40 to 60% though the ideal Rh is considered to be 55%.
- Appropriate devices to monitor and display these conditions inside the OT

Air Filtration

- AHU must be an air purification unit & air filtration unit.
- Two sets of washable flange type pre filters of capacity 10 microns & 5 microns with aluminum/ SS 304 frame within the AHU.
- HEPA filters of efficiency 99.97% down to 0.3 microns or higher efficiency may be provided in the AHU.

Ventillation

- The AHU of each OT should be dedicated one and should not be linked to air conditioning of any other area.
- During the non functional hours AHU blower will be operational round the clock (may be without temperature control).

Window & Split Airconditioner

- Window & split A/c should not be ideally used in any type of OT because they are pure re circulating units and have convenient pockets for microbial growth which cannot be sealed.

Periodical Validation

- Temperature and Humidity check
- Air particulate count
- Air Change Rate Calculation
- Air velocity at outlet of terminal filtration unit / filters
- Pressure Differential levels of the OT with ambient / adjoining areas
- Validation of HEPA Filters
- Preventive maintenance every 15 days

Water Purification System

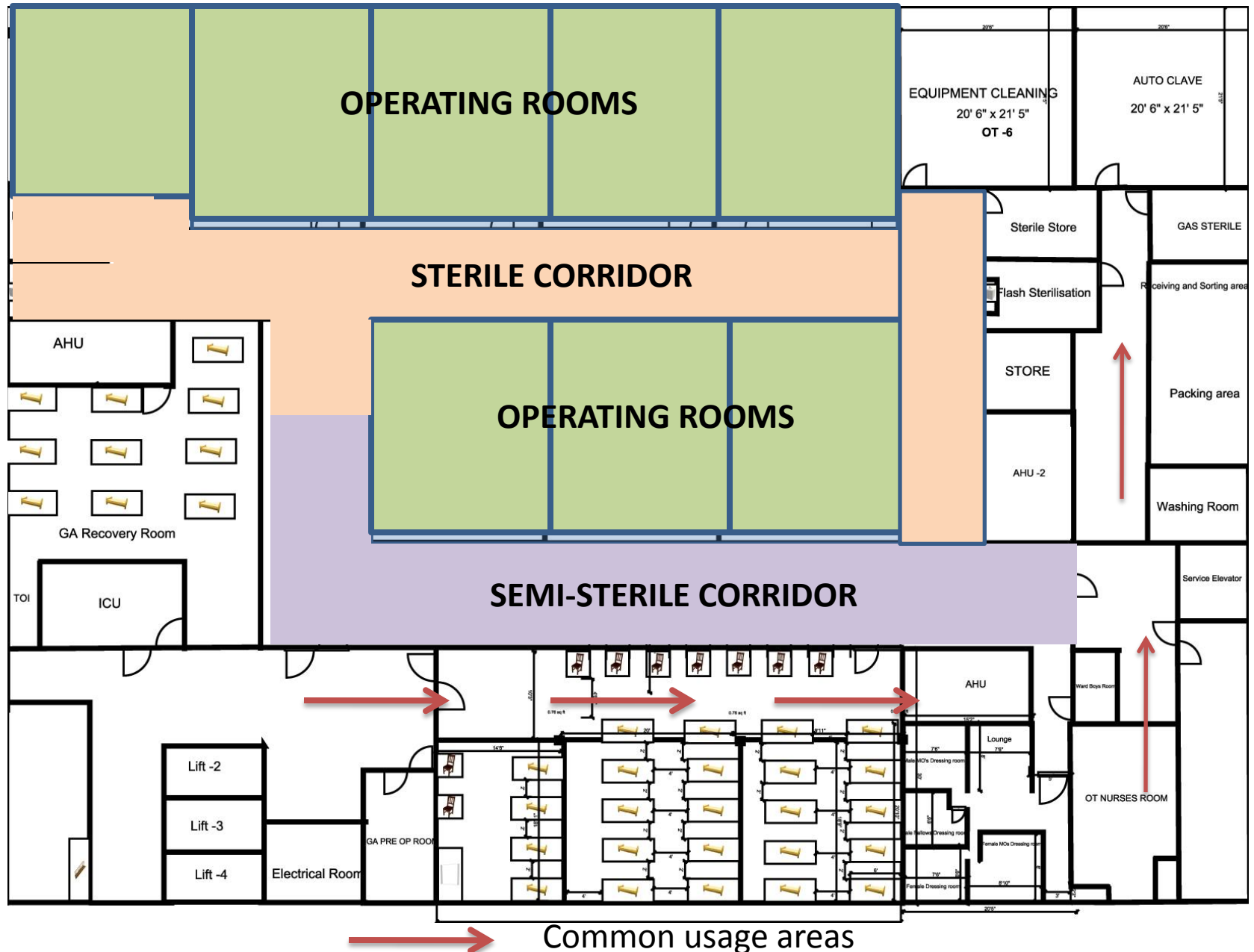
- **Water is an important reservoir of microorganisms like *Pseudomonas* & other gram –ve organisms.**
- **Dedicated water tank for OT**
- **Reverse Osmosis Water**
- **Effectively removes all types**
 - **Pyrogens**
 - **Microorganisms**
 - **Colloids & dissolved inorganics**

RO water Plant

- **Germicidal**
- **Multi grade Micron filter**
 - **To remove suspended solids**
- **Reverse osmosis**
 - **To remove total dissolved solids**
- **Ultra filtration ($< 0.02 \mu\text{m}$)**
 - **To remove microbes/
Endotoxin etc.,**



CSSD Layout



Autoclave Loading Area (Unsterile)



Loading of Bins



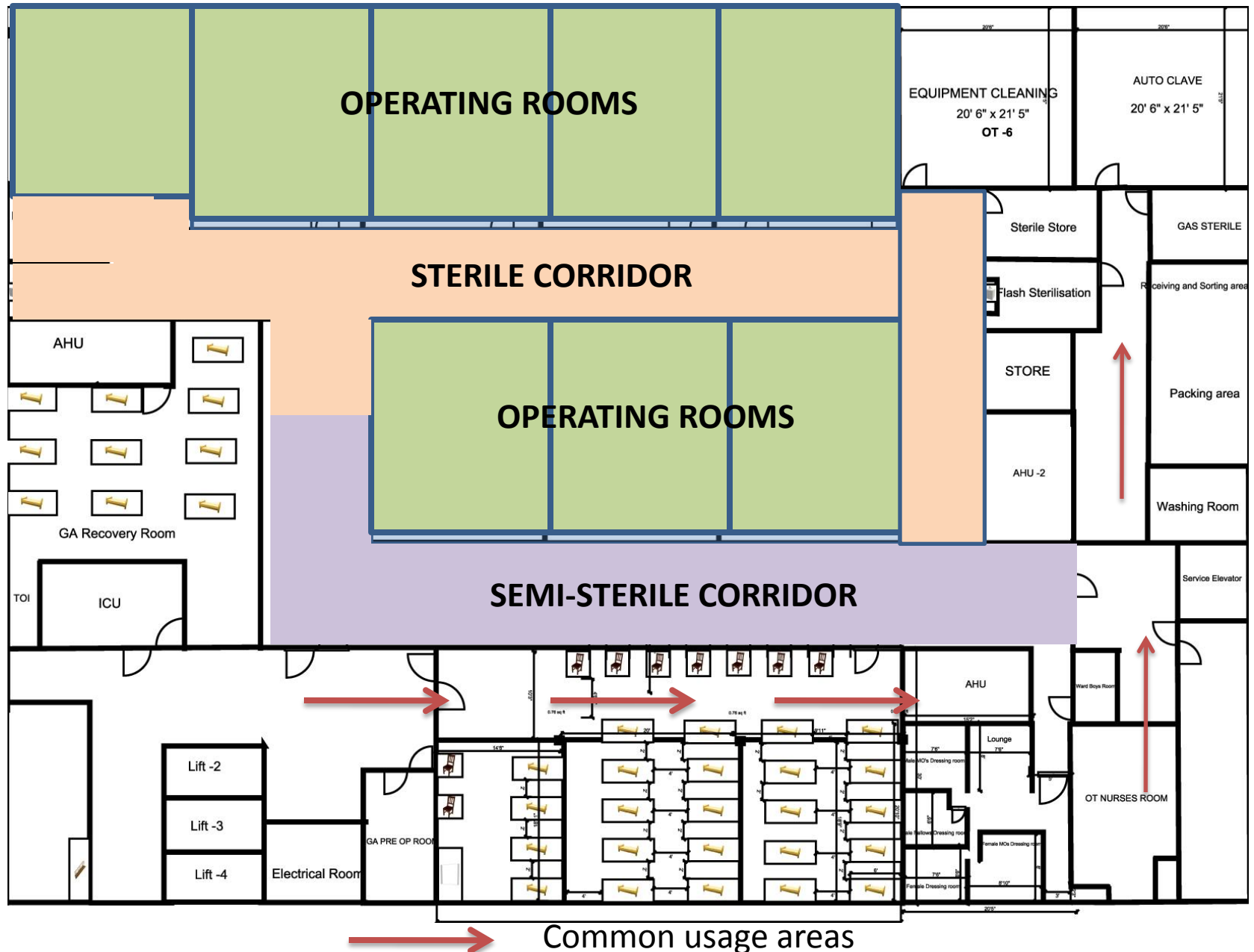
View of Unloading Sterile bins and Storage Area



Storage of Sterile bins in a rack



CSSD Layout



Surgical Supplies Store



Biomedical waste

- **Dedicated area for collection and storage**
- **Covered area**
- **Easily accessible**

THANK YOU