



CSSD

Central Sterile Supply Department

The Central Sterile Supply Department (CSSD) comprises that service within a hospital which receives stores; processes, distributes and controls professional supplies and equipment, both sterile and non-sterile to and from all departments of the hospital for the care and safety of patients





Ideally, CSSD is an independent department with facilities to receive, clean, pack, disinfect, sterilizes, store and distribute instruments and supplies as per well-delineated protocols.

By custom diets, medicines, laundry, supply of blood and crystalloid are not included in activities of CSSD.



BACKGROUND



Objective and Functions

- a. To provide sterilized material.
- b. Contributing to a reduction in the incidence of hospital infection.
- c. To avoid duplication of costly equipment.
- d. To maintain record of effectiveness of cleaning, disinfection and sterilization process.



- e. To monitor and enforce controls necessary to prevent cross infection.
- f. To maintain an inventory of supplies and equipment.
- g. To stay updated regarding developments in the field.
- h. To provide a safe environment for the patients and staff.



Designing of a CSSD

- Size and location of CSSD varies
- 7 to 10 square feet per bed is recommended
- It should be located as close as possible to Operation theatres, Accidents and Emergency department and wards
- The CSSD layout should be designed for a unidirectional flow



CSSD should have four zones for a smooth work flow:

- a. The unclean and washing area
- b. The assembly and packing area
- c. The sterilization area
- d. The sterile area



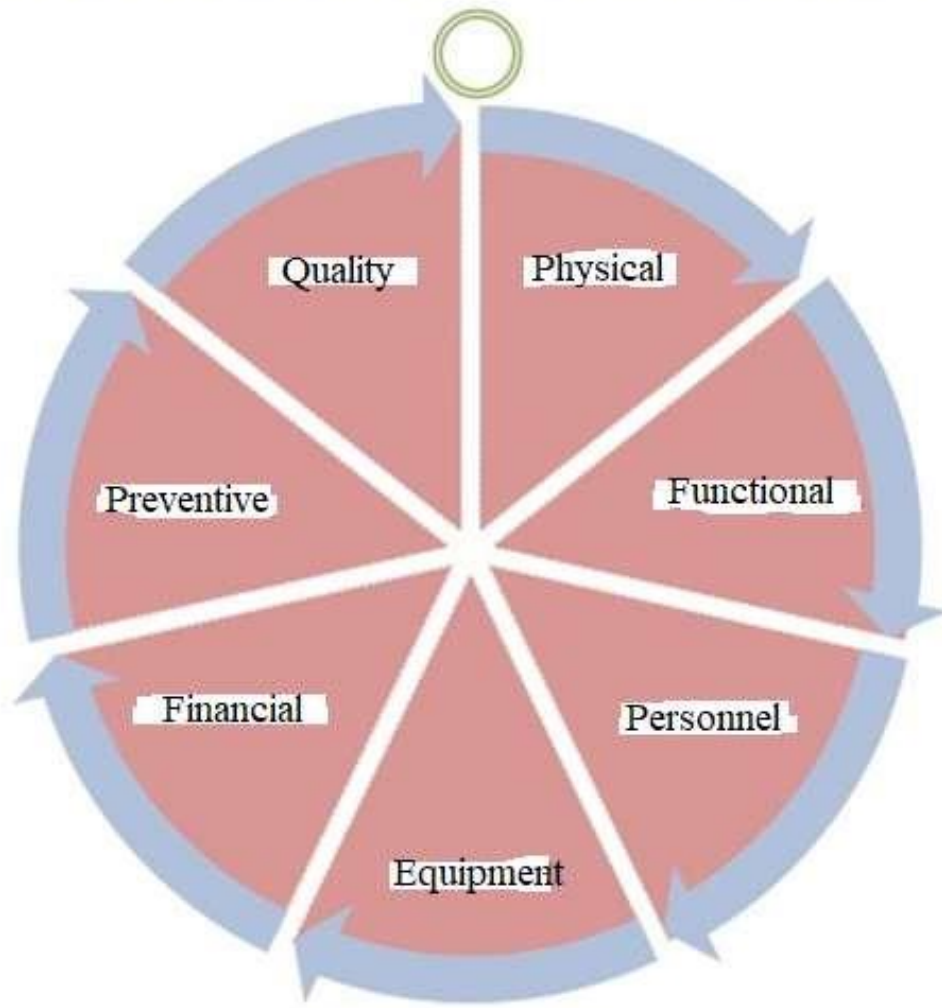
GENERAL CSSD DESIGN CONCEPT



- Physical separation between soiled, clean and sterile zone
- The risk of cross-infection spread by staff is minimized



PLANNING OF CSSD DEPT



PLANNING of CSSD

- The materials/ items from contaminated and sterile areas should not get mixed.
- There should be physical barrier between clean and dirty areas.
- The floor should be smooth, impervious, non skid and robust.
- Relative humidity should be maintained at 45 ± 5 %



- The clean area should be maintained at positive pressures.
- The minimum ventilation rate should be 6-10 air changes / hour.
- The work area should be made of marble / granite / stainless steel.
- The sterilization must be planned for autoclaving by steam as well as by gas.



Location

- The CSSD should be close to the casualty, Operation Theatre and wards which are the largest consumer of the sterilized material.
- In multistoried buildings, CSSD may be planned in the lower floor right under the Operation Theatre, where vertical movement will be the quickest possible movement of the material.



Floor Space

Serial	Beds available	Floor space required for CSSD
1	75-99	10 sq feet per bed
2	100-149	9 sq feet per bed
3	150-199	8.5 sq feet per bed
4	200-249	8 sq feet per bed
5	250-299	7.5 sq feet per bed
6	300 or More	7 sq feet per bed

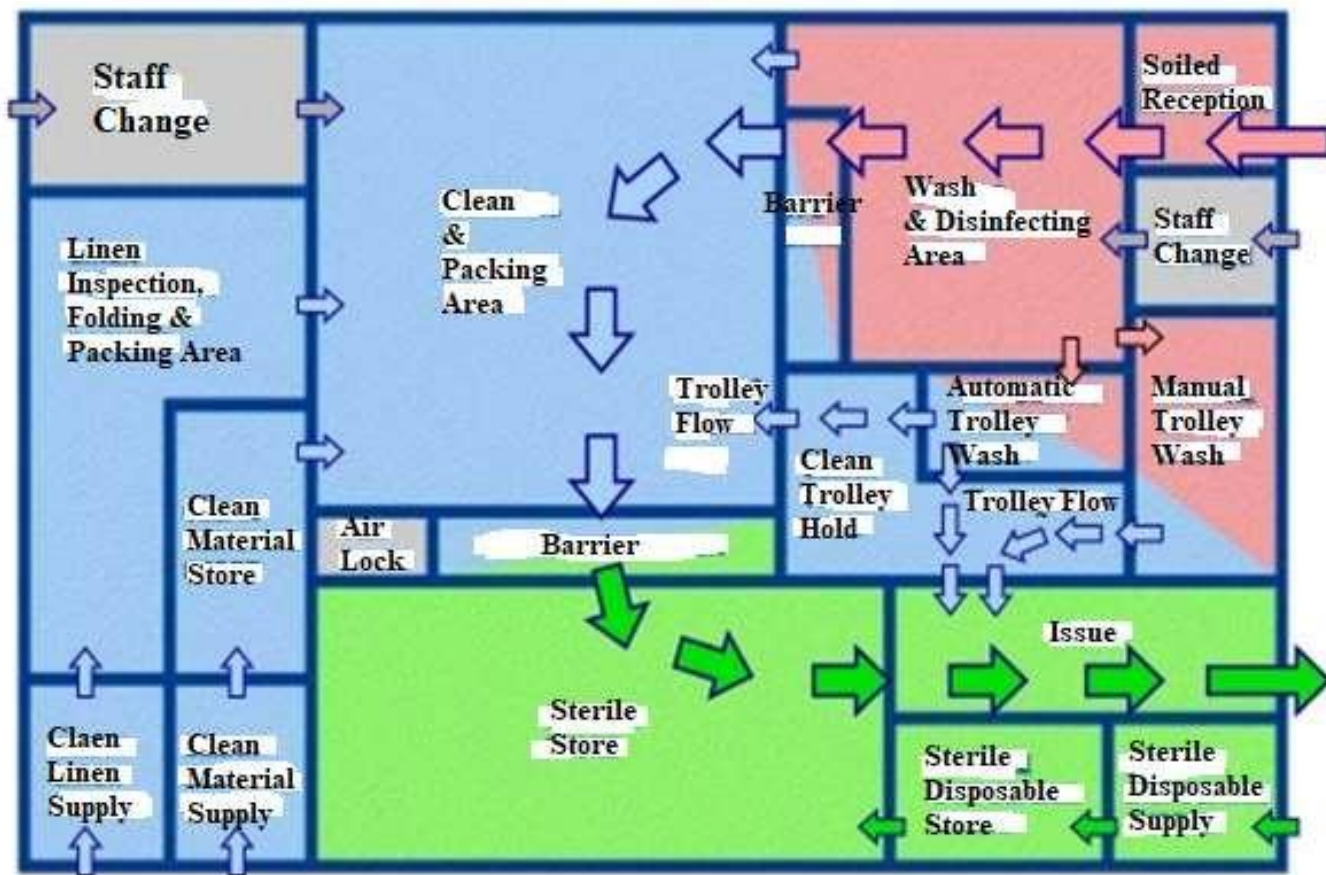


LAYOUT OF CSSD

- Red** - denotes contaminated zone
- Blue** - denotes clean zone
- Green** - denotes sterile zone

- By creating an U-shape workflow you often can solve the CSSD design

Goods flow



LAY OUT DESIGNING PRINCIPLE

- There is no back tracking of sterile goods.
- One way movement from receiving counter to issue counter.
- Sterile area should be prior to sterile storage and issue.
- The receiving counter must be away from the issue counter.
- Separate receiving and issuing counter

There should minimum six basic division in CSSD



Physical Facility and Equipment Availability at CSSD

Ser	Rooms in the CSSD	Nature of the work	Provision of the Space (%)
1.	Wash Rooms	Dirty	10
2.	Work Room (Packing Room)	Clean	26
3.	Syringe & Needle Processing	Clean	9
4.	Unsterile Pack Store	Clean	4
5.	Bulk Store	Clean	11
6.	Sterile Store	Sterile	16
7.	Miscellaneous (a)Gloves room (b)Office room (c)Rest room	Clean	19
8.	Autoclaves	Clean	5

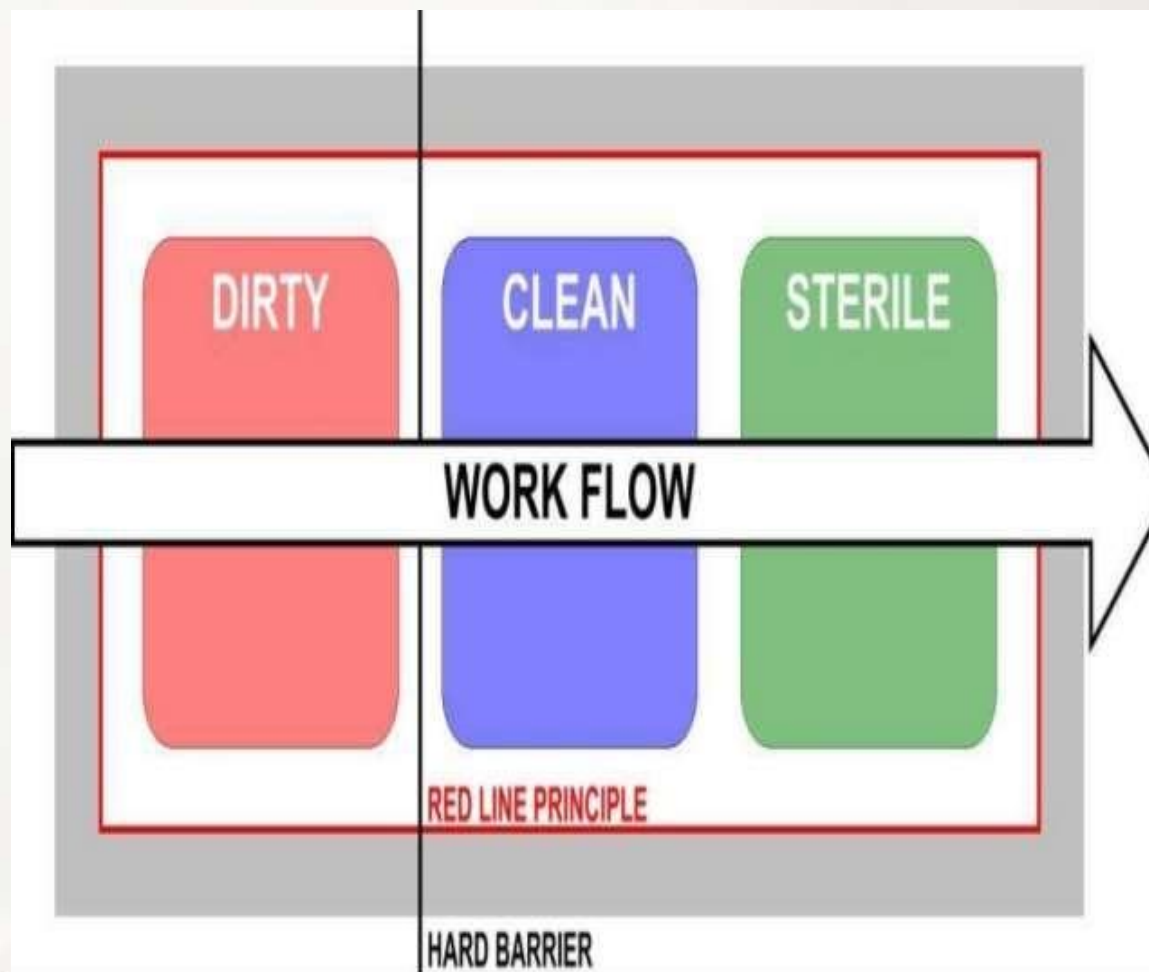
WORK FLOW

- **MAJOR ACTIVITIES IN A CSSD:**
- ❖ **RECEIVING THE USED ITEMS FROM USER DEPARTMENTS**
- ❖ **CLEANING**
- ❖ **PACKING**
- ❖ **STERILIZING**
- ❖ **STORING (TEMPORARY)**
- ❖ **DISTRIBUTING TO USER DEPARTMENTS**





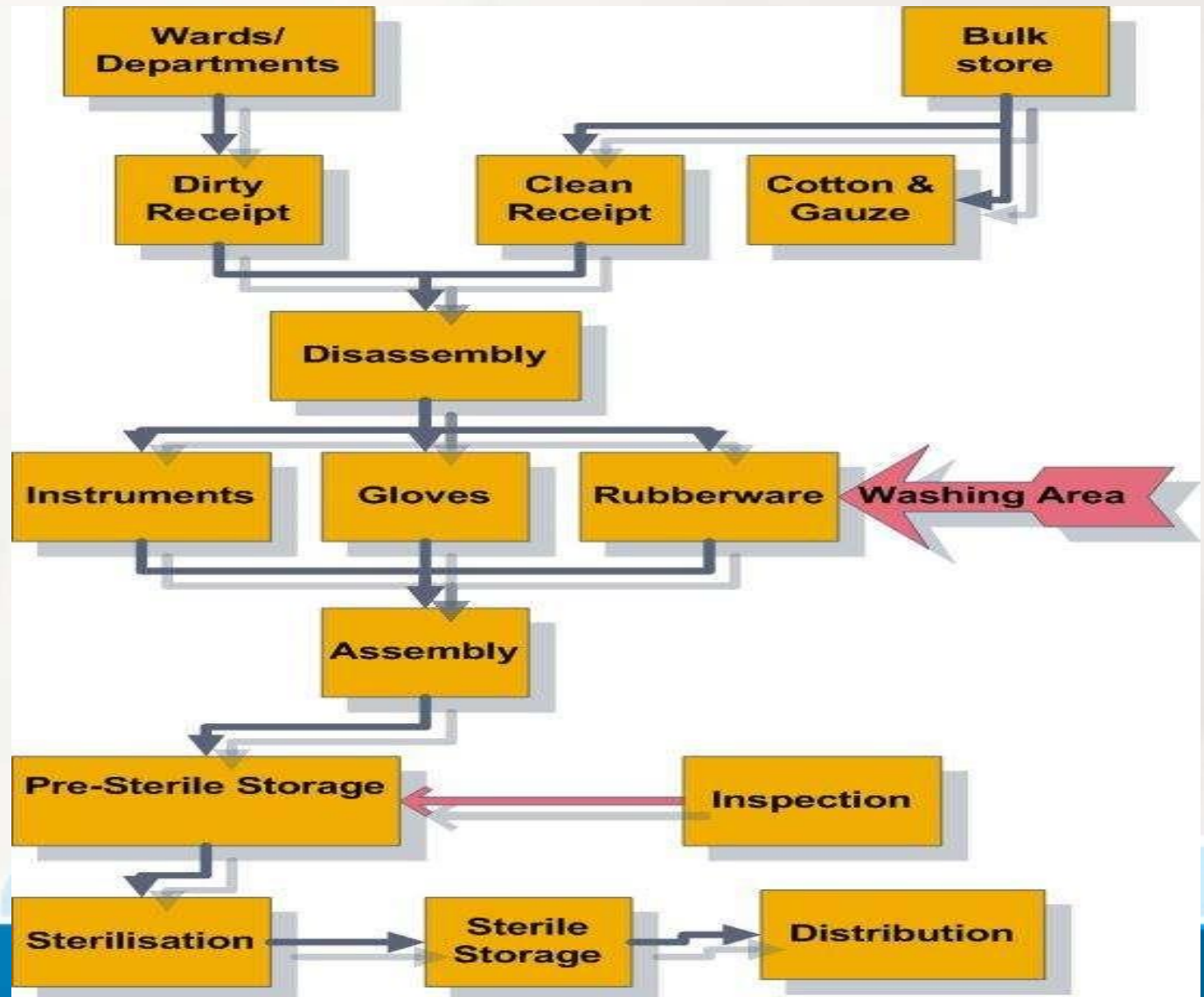
WORK FLOW OF CSSD





CSSD- Work Flow

FLOW PROCESS OF CSSD



RECEIVING AREA

- Used item from various departments of the hospital are shifted to CSSD for cleaning and sterilization.
- Ideally, the items that get soiled with blood or body fluid should be decontaminated with Sodium Hypochloride solution in the user department itself before sending to CSSD.



- The Receiving Area of CSSD should have access to outside through a window with a counter.
- The items (Specially for instruments in trays) are counted and Received.
- Thereafter, the instruments are inspected and blunt/unsuitable Instruments are segregated/discarded.
- Necessary entries are made for records.
- Thereafter, the items are shifted to Cleaning area.



CLEANING AREA

- HERE THE INSTRUMENTS ARE WASHED EITHER MANUALLY OR IN MACHINES.
- FOR MANUAL WASHING, SINKS WITH WATER SUPPLY AND WORKING COUNTERS ARE ORGANIZED. DETERGENTS AND BRUSHES OF VARIOUS SIZES AND SHAPES ARE REQUIRED IN THIS AREA.
- ULTRASONIC WASHER IS A MACHINE USED FOR CLEANING SURGICAL INSTRUMENTS. IT CONVERTS HIGH FREQUENCY SOUND WAVES INTO MECHANICAL VIBRATION THAT PRODUCES SMALL BUBBLES THAT BURST ON THE INTERNAL SURFACES OF INSTRUMENTS AND DISLODGE THE WASTE PARTICLES.



- 'TUNNEL WASHER' IS HIGHLY SOPHISTICATED AND EXPENSIVE MACHINE THAT ALLOWS TOTALLY HAND-OFF PROCESSING. INSTRUMENTS IN PERFORATE OR MESH BOTTOM TRAYS COMING FROM OPERATING ROOM OR OTHER DEPARTMENTS ARE PLACED INTO THE TUNNEL WASHER WITHOUT ANY FURTHER HANDLING. THE INSTRUMENTS ARE SUBJECTED TO CYCLES OF WASHING, RINSING, ULTRASONIC CLEANING AND DRYING.

- AFTER THE INSTRUMENTS ARE WASHED, THEY ARE DRIED IN OVEN DRYER AND SHIFTED TO PACKING AREA.



PACKING AREA

- CLEAN AND DRY INSTRUMENTS ARE PACKED BEFORE STERILIZATION, SO THAT THEY ARE NOT CONTAMINATED WHILE HANDLING AFTER THEY ARE STERILIZED. MOST OF THE INSTRUMENTS ARE PACKED IN TRAYS (TRAY ASSEMBLY) THAT ARE WRAPPED WITH DOUBLE LAYER OF COTTON CLOTH. PAPER ENVELOPES ARE ALSO AVAILABLE FOR PACKING THE INSTRUMENTS. THESE ARE EQUALLY EFFECTIVE BUT EXPANSIVE. PLASTIC BAGS (ETO BAGS) ARE USED FOR PACKING THE ITEMS FOR ETO STERILIZATION. THE PACKS ARE LABELED INDICATING DATE OF STERILIZATION AND DATE OF EXPIRY (WHEREVER POSSIBLE).

- SEALING MACHINE IS USED FOR THE SEALING THE PLASTIC BAGS IN WHICH INSTRUMENTS ARE PACKED. AFTER PACKING AND SEALING, THE INSTRUMENTS ARE SHIFTED FOR STERILIZATION.



STERILIZATION IS DONE BY EITHER OF THE TWO METHODS IN CSSD:

❖ STEAM STERILIZATION BY AUTOCLAVES

❖ GAS STERILIZATION BY ETO (ETHYLENE OXIDE) MACHINES

❑ *AUTOCLAVE*: STEAM UNDER PRESSURE IS THE MOST COST-EFFECTIVE METHOD OF STERILIZATION, “AUTOCLAVE” GENERATES STEAM AT A TEMPERATURE OF 121 DEGREE CENTIGRADE UNDER 15 POUNDS OF PRESSURE. AN EXPOSURE OF 20 MINUTES IS REQUIRED FOR STERILIZATION.

❑ *FLASH STERILIZER*: THIS IS A SPECIAL TYPE OF AUTOCLAVE THAT HAS A VERY SHORT STERILIZATION CYCLE OF ABOUT 3 - 5 MINUTES BECAUSE OF ITS ABILITY TO RAISE THE TEMPERATURE TO 132 DEGREE CENTIGRADE.



STERILIZING AREA

- ❑ ***ETO STERILIZER:*** THE ITEMS LIKE CARDIAC CATHETERS ARE THERMO SENSITIVE AND THEREFORE CANNOT BE STERILIZED BY STEAM. SUCH ITEMS ARE STERILIZED BY ETHYLENE OXIDE (ETO) GAS STERILIZATION. THE ETO IS AN EXPANSIVE AND TOXIC GAS. IT IS ABSOLUTELY NECESSARY TO ENSURE THAT THESE ITEMS ARE MADE FREE OF GAS MOLECULES BEFORE USING THEM ON A PATIENT. THIS IS ACHIEVED BY SUBJECTING THE ITEMS TO FORCED VENTILATION. THE ENTIRE CYCLE MAY TAKE ABOUT 8- 12 HRS.



STORE

AFTER STERILIZATION, THE ITEMS ARE TEMPORARILY STORED IN A CLEAN STORE (ON RACKS) FROM WHERE THEY ARE DISTRIBUTED TO USER DEPARTMENTS



DISTRIBUTION AREA

-IT SHOULD BE AWAY FROM THE RECEIVING AREA AND MAY COMPRISE OF A WINDOW WITH COUNTER.

-IN MODERN HOSPITALS, THERE MAY BE A SEPARATE LIFT FOR TRANSPORTING THE STERILE MATERIALS TO USER DEPARTMENTS.





Staffing of CSSD

- ❖ **Staffing should be planned based on following factors:-**
 - 1. Three shift working**
 - 2. Messenger service**
 - 3. Maintenance service.**
 - 4. Staff for 6 areas. (Or minimum for 3 areas)**
 - 5. Leave and off duty**



STAFF

- **CSSD IS USUALLY MANNED BY FOLLOWING STAFFS:**
 - **CSSD IN CHARGE/ MANAGER: SUPERVISES ACTIVITIES OF CSSD.**
 - CSSD TECHNICIANS: OPERATE THE AUTOCLAVE AND ETO MACHINES.**
 - **CSSD ASSISTANTS: PERFORM THE CLEANING AND PACKING, GAUGE CUTTING AND COTTON BALL MAKING.**
 - CLERK OR STOREKEEPER: TO MANAGE THE INVENTORY AND STERILE STORES.**
 - **HOUSEKEEPING STAFF.**

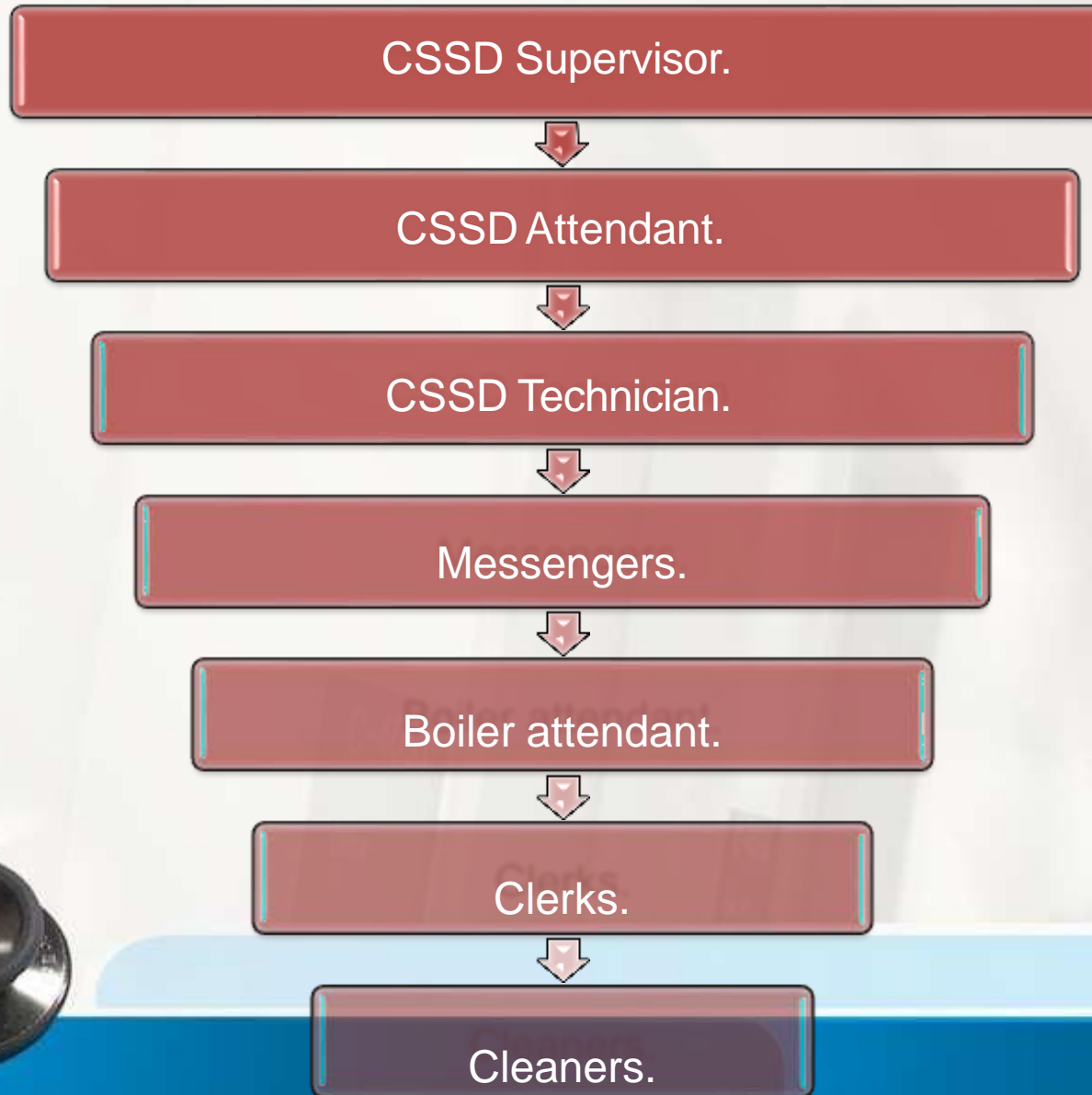


Staffing should be planned based on the following factors:-

- Average 02 technicians for 100 beds and one technical supervisors.**
- One clerk for keeping records, accounting and supply per shift.**
- Average 04 attendants per 100 beds in all shifts.**
- Adequate number of cleaning attendants and transporters.**
- One technician and two attendants should be stationed at each zone.**



ORGANOGRAM



Quality Assurance

- Mechanical Indicators:

MONITORING RECORD TIME, TEMPERATURE, HUMIDITY AND PRESSURE DURING THE STERILIZATION CYCLE.

- Chemical Indicators:

DEVICES WITH A SENSITIVE CHEMICAL OR DYE TO MONITOR ONE OR MORE PARAMETERS OF A STERILIZATION CYCLE.

- Biological Indicators:

EMPLOY THE PRINCIPLE OF INHIBITION OF GROWTH OF MICROORGANISM OF HIGH RESISTANCE.



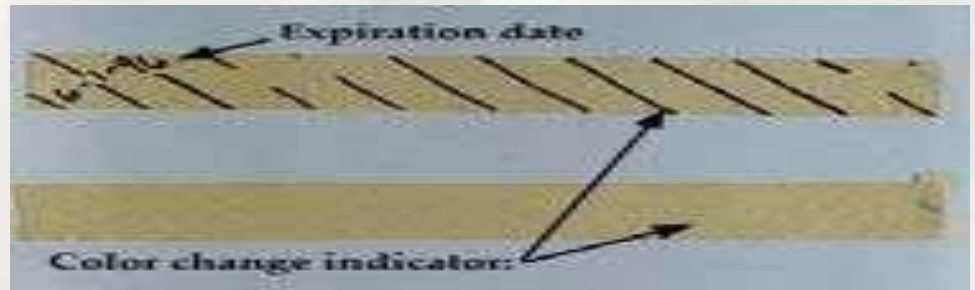
Mechanical:



Biological:



Chemical:



QUALITY ASSURANCE

- IN ORDER TO ENSURE THE QUALITY OF STERILIZATION THE FOLLOWING MEASURES ARE TAKEN:

- ENSURE THE EQUIPMENT IS FIT I.E. IN AUTOCLAVE THE TEMPERATURE IS MAINTAINED AT 121 DEGREES CENTIGRADE, 15-POUND PRESSURE AND HOLDING TIME IS MINIMUM 20 MINUTES. MODERN MACHINES ASSURE THAT AND ARE FITTED WITH GOOD QUALITY MONITORS. THEY PROVIDE PRINT OUTS OF READINGS. THE DOORS OF THE AUTOCLAVE DO NOT OPEN UNLESS THE CYCLE IS COMPLETE.

- BOWIE DICK'S TAPES ARE FIXED WITH EVERY PACK OF ITEMS TO BE STERILIZED. THIS TAPS CHANGES THE COLOR WHENEVER THE REQUIRED TEMPERATURE IS ATTAINED. AFTER A CYCLE, THE TAPES ARE CHECKED FOR CHANGE OF COLOR. HOWEVER, THE CHANGE IN COLOR ONLY INDICATES THAT THE SPECIFIC TEMPERATURE HAS BEEN ACHIEVED DURING THE CYCLE BUT CANNOT GUARANTEE THAT THE ITEMS ARE STERILIZED. INDICATORS ARE ALSO AVAILABLE FOR CHECKING THE QUALITY OF ETO STERILIZATION.



- **PERIODICALLY BACTERIOLOGICAL TESTS ARE TO BE DONE. A CAPSULE CONTAINING BACILLUS STEREOTHERMOPHILUS (FOR AUTOCLAVE) AND BACILLUS SUBTILIS (FOR ETO) ARE PUT ALONG WITH THE LOAD. THESE BACTERIA ARE CONSIDERED MOST RESISTANT TO STEAM OR GAS RESPECTIVELY. AFTER THE CYCLE IS OVER THESE CAPSULES ARE TESTED IN MICROBIOLOGY LAB FOR PRESENCE OF LIVE ORGANISMS. IF THERE ARE NO LIVE ORGANISMS IN THE CAPSULES, IT INDICATES THE STERILIZATION PROCESS WAS EFFECTIVE.**
- **THE STAFFS WHO WORK ESPECIALLY IN STERILIZATION AREA, STERILE STORE AND DISTRIBUTION AREA SHOULD CHANGE SLIPPERS AND THEIR DRESS, AND WASH THEIR HANDS BEFORE RESUMING WORK.**



ROLE OF CSSD MANAGER

- MAINTENANCE AND REPAIR OF EQUIPMENT
- INVENTORY MANAGEMENT OF SUPPLIES AND CONSUMABLE
- ENSURE QUALITY OF STERILIZATION
- ENSURE PROPER DISTRIBUTION AND TRANSPORT
- COST CONTROL MEASURE, TO ANALYZE AND REDUCE THE NUMBER OF CYCLE
- RECORD KEEPING AND DATA ANALYSIS
- OPTIMAL UTILIZATION OF MANPOWER AND EQUIPMENT
- MOTIVATION OF STAFF AND TRAINING
- INTER DEPARTMENTAL COORDINATION



Conclusion

In most healthcare facilities, the Central Sterile Supply Department (CSSD) plays a key role in providing the items required to deliver quality patient care. A well planned, well managed and well staffed CSSD can ensure an infection free environment of hospital and save valuable life and money.



THANK YOU

