

## **A Study Done To Calculate the Required Capacity and the Capital Expenditure to Be Incurred In Establishing A Central Sterile Supply Department (CSSD) In A 1500 Bedded Tertiary Care Institute.**

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**ABSTRACT:-** CSSD is a critical part of a hospital setup and plays a vital role in infection control. For a 1500 bedded hospital with 200 critical care beds and an estimated 40 major procedures and 60 minor procedures per day, the total cost required to establish a state of the art central sterile supply department is Rs 2.3 crores. This was calculated after estimating the required CSSD load of 37000 ltrs per day

**Key words:-**CSSD, Capacity, Capital Expenditure

### **I. INTRODUCTION**

Health care-associated infections are among major threats to the safety of patient's care. It affects millions of people worldwide and acts as a rising problem<sup>4</sup> One of the major risks of these procedures is transmission of pathogens that can lead to infection not only to host barriers but also person-to-person transmission<sup>5</sup> Controlling this problem is a major criterion for hospital accreditation<sup>6</sup>. Both of central sterile supply department (CSSD) and nurses in office of surgical facilities are responsible for cleaning, decontamination, and sterilization of all reusable instruments and items<sup>7</sup>. Proper sterilization of instruments between patients is an essential action in removing all of microbes and prevention of catastrophic consequences<sup>8</sup> Central sterile supply departments (CSSD) is a service unit that processes, issues, and controls the sterile stores supply to all departments of the hospital<sup>1</sup>. The purpose of a CSSD is to provide all the departments of a hospital with guaranteed sterile equipment ready and available for immediate use in patient care – a step towards the prevention of hospital acquired infections<sup>2</sup>. Ideally, CSSD is an independent department with facilities to receive, clean, pack, disinfect, sterilizes, store and distribute instruments as per well-delineated protocols. CSSD team members and technicians should examine and establish if the CSSD can effectively service its customers with its current capacity and processing technologies<sup>3</sup>

### **II. OBJECTIVES**

1. To calculate the required capacity of CSSD for a 1500 bedded hospital
2. To calculate the cost required in establishing a CSSD as per the above calculated capacity.

### **III. METHODOLOGY**

- Literatures available on the latest trends in CSSD were studied.
- Requisite information regarding advances in CSSD was collected from a private company providing end to end solutions for CSSD and who are into outsourcing of CSSDs in private hospitals.
- The capacity was calculated based on the no of ward beds and critical care beds, average patient occupancy and average no of procedures done per day.
- Costing to establish a CSSD was done based on the average market costs.

### **IV. OBSERVATIONS AND RESULTS**

- Total number of beds - 1500
- Estimations based on averages for a 1500 bedded hospital:

- No. of Critical care beds - 200
- Major procedures per day - 40
- Minor procedures per day - 60

- No of OPD boxes - 60

**Basis for Calculation of Sterilizer Capacity**

- Each Major procedure will occupy 200ltr of steam sterilization capacity
- Each Minor procedure will occupy 100ltr of steam sterilization capacity
- Each Critical bed will occupy 24ltr of steam sterilization capacity
- Each normal bed will occupy 12ltr of steam sterilization capacity
- Each OPD box will occupy 6ltr of steam sterilization capacity
- 25% of steam sterilization capacity is the capacity of washer disinfector required.
- 10% of steam sterilizer is needed for low temperature sterilization option.
- As per the data given the capacity calculation is as follows:
- Major Procedures : 40 X 200 = 8000ltr per day
- Minor Procedures : 60 x 100 = 6000ltr per day
- Critical Beds: 200 x 24 = 4800ltr per day
- Normal Beds: 1000 x 12 = 12000ltr per day
- OPD 60 x 6 = 360ltr per day
- Total – 31160ltr per day
- Adding 20% margin which is equal 6232ltr
- Grand Total Requirement Daily is 37392ltr
- CSSD will run for three shifts, hence a total of 20 cycles of steam sterilization can be run daily.
- Hence the CSSD will require 37392/ 20 = 1870 (1900ltr of steam)
- From above, NIMS requires 3 sterilizers of 750ltr capacity. Washer Disinfector requirement is 30% of 1900ltr of steam requirement, hence 570ltr of washer or 2 washer disinfectors of 300ltr capacity.
- About 20% of steam sterilizer is the low temperature option needed per day. Hence the requirement is approx.400ltr. The hospital should plan for two options – Ethylene Oxide sterilizer and Plasma sterilizer. Plasma sterilizer can have about 2 loads daily while EO sterilizer can only have one cycle daily. Hence hospital will need an EO sterilizer of 400ltr and Plasma of 100ltr.

**Expenditure to be incurred for equipment:**

Equipment Details	Unit price	Tax @14%	Total (INR)	Qty	TOTAL (INR)
Steam Sterlizer 750 Lit, ( Approximate size)	2400000.00	336000.00	2736000.00	3	8208000.00
EO Sterilizer 400ltr	1400000.00	196000.00	1596000.00	1	1596000.00
Plasma sterilizer	4800000.00	672000.00	5472000.00	1	5472000.00
Washer Disinfector with accessories	1225000.00	171500.00	1396500.00	2	2793000.00
Ultrasonic Cleaner,	200000.00	28000.00	228000.00	1	228000.00
Rotary Sealer,	45000.00	6300.00	51300.00	1	51300.00
Hot Air Oven	200000.00	28000.00	228000.00	1	228000.00
DM Water Plant	75000.00	10500.00	85500.00	1	85500.00
Solar Panels for heating water	150000.00	21000.00	171000.00	2	342000.00
HVAC 44 TR	1176000.00	164640.00	1340640.00	1	1340640.00
Spray Gun Rinser,	15000.00	2100.00	17100.00	2	34200.00
Modular Sterilizing Basket 585 x 395 x 195mm	2000.00	280.00	2280.00	144	328320.00
Modular Sterilizing Basket 585 x 395 x 100mm	1850.00	259.00	2109.00	60	126540.00
Instrument Tray - appropriate size	3500.00	490.00	3990.00	144	574560.00
Control And Packing Table	75000.00	10500.00	85500.00	3	256500.00
Linen Inspection & Fold Table	65000.00	9100.00	74100.00	1	74100.00
SS Wet Work Table With Undershelf	28000.00	3920.00	31920.00	3	95760.00

<b>Front Open Storage Racks (Floor Mounted)</b>	45000.00	6300.00	51300.00	10	513000.00
<b>SS Dry Work Table with bottom shelves</b>	32000.00	4480.00	36480.00	3	109440.00
<b>SS Wash Station with 1 sink</b>	50000.00	7000.00	57000.00	1	57000.00
<b>SS Table Trolley</b>	19000.00	2660.00	21660.00	2	43320.00
<b>SS Basket Racks</b>	42000.00	5880.00	47880.00	6	287280.00
<b>SS Closed Transport Trolley</b>	65000.00	9100.00	74100.00	2	148200.00
<b>Washing Station with 2 sinks</b>	60000.00	8400.00	68400.00	2	136800.00
<b>Linen Distribution Trolley</b>	30000.00	4200.00	34200.00	1	34200.00
<b>Storewel Cupboard</b>	60000.00	8400.00	68400.00	1	68400.00
<b>Shoe Rack</b>	28000.00	3920.00	31920.00	1	31920.00
<b>BUS Transport/ Storage Trolley</b>	19000.00	2660.00	21660.00	3	64980.00
<b>Passbox</b>	52000.00	7280.00	59280.00	2	118560.00
<b>Revolving Stool</b>	12740	1783.60	14523.6	20	290472.00
<b>Working Chairs</b>	14700	2058.00	16758	3	50274.00
<b>Storage Rack for Packing Materials</b>	58800	8232.00	67032	1	67032.00
<b>TOTAL</b>					<b>2,38,55,298.00</b>

## V. DISCUSSION

For a 1500 bedded hospital with 200 critical care beds and an estimated 40 major procedures and 60 minor procedures per day, the total cost required to establish a state of the art central sterile supply department is Rs 2.3 crores. This was calculated after estimating the required CSSD load of 37000 ltrs per day. Establishing a CSSD requires heavy capital investment and the department does not generate direct revenue but it's a very important supporting department and is critical to the functions of the hospital.

## VI. CONCLUSION

CSSD is a critical part of a hospital setup and plays a vital role in infection control. Technologies available for CSSD functions are evolving and new technologies should be considered when renovating or rebuilding the CSSD.

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