

Rationalization of Departmental Consumption at The Calcutta Medical Research Institute (CMRI)

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CMRI – 50 Glorious Years of Trust
The Calcutta Medical Research Institute (CMRI), the flagship brand of CK Birla Hospitals with 440 beds having a rich heritage spanning over 50 years, is recognized as the most trusted multi speciality tertiary care hospital of Eastern India & neighbouring countries.

Vision

- To be the leading multi-speciality healthcare and research institute in Eastern India, with world class standards in quality

Mission

- To offer the highest standards of medical treatment
- To treat patients with care, compassion & commitment
- To touch every section of society and offer them value for money

- ❑ Departmental Consumption is the calculation of overall resources that are utilized to run a department in any tertiary hospital.
- ❑ It is important to calculate if there is any over or underutilization of resources in order to increase the revenue and profit margin.
- ❑ It decreases the holding stock and therefore leads to proper utilization of resources by a particular department.
- ❑ Till February'19 the departmental consumption was 50% of the total consumption in CMRI.
- ❑ Controlling costs and consumption optimization will ultimately increase the savings and profit margin

- ❖ **Miguel Gómez-Chaparro & Justo García-Sanz-Calcedo & Luis Armenta Márquez, 2018. "Analytical Determination of Medical Gases Consumption and Their Impact on Hospital Sustainability," Sustainability, MDPI, Open Access Journal, vol. 10(8), pages 1-17, August** - The present work reports on a study performed between 2008 and 2016 in a target set of 12 Spanish hospitals with floor area and number of beds ranging 2314–23,300 m² and 20–194, respectively, for which the average annual consumption rates of oxygen, nitrogen, medicinal air, carbon dioxide and nitrogen protoxide were analysed. The annual consumption of medical gases in a hospital was proved to be correlated with the number of hospital discharges, the number of surgeries, the number of emergency interventions, the number of hospitalisations, the number of hospital beds, the useful floor area of the building and the number of workers. It is shown that healthcare activity appears as an adequate variable to quantify and to monitor medical gases consumption in hospitals, to assess the size of their facilities as well as to optimise maintenance management.
- ❖ **Shaleen Vasishta; Departmental Consumption Analysis and Scope for Improvement; IIHMR University Jaipur, 2016** - Overall departmental consumption was carried out from 15th march to 15 April, 2016. It included the overall consumption of human resources, electricity, water and material consumption which came out to be Rs. 923000, Rs. 203498, and Rs. 16500 respectively. Material consumption was calculated separately according to the 3 cases which came out to be Rs.893.47 for SLED, Rs.990.25 for acute and Rs.509.18 for regular.

- ❖ **Justo Garcia-Sanz-Calcedo & Fernando Lopez-Rodriguez & Talal Yusaf & Awf Al-Kassir, 2017. "Analysis of the Average Annual Consumption of Water in the Hospitals of Extremadura (Spain)," Energies, MDPI, Open Access Journal, vol. 10(4), pages 1-10, April** - The aim of this paper was to quantify the annual average consumption of water in 13 public hospitals in Extremadura (Spain). An analytical study in order to reduce water demand was conducted from 2010 to 2014 in the above-mentioned hospitals. The study concluded that, in order to determine the average annual water consumption, a fixed ratio is not the appropriate tool. A parametric type related to the built surface area and/or number of beds by hospital should be used instead.
- ❖ **S.C. Hu, J.D. Chen and Y.K. Chuah; ENERGY COST AND CONSUMPTION IN A LARGE ACUTE HOSPITAL; International Journal on Architectural Science, Volume 5, Number 1, p.11-19, 2004** - This paper presents the measured results of electricity consumption and cost in a large acute hospital in subtropical Taipei City of Taiwan ROC from August 2001 to July 2002. It was found that air-conditioning is the major electricity end use, accounting for more than 50% of the total building energy use. The highest EUI (Electrical Use Intensity) value found in the region of Operation Theater (OT), in which the EUI value is about three times higher than that in general place. Some approaches to shift peak load are proposed and discussed.

- ❑ To minimize the departmental consumption at CMRI from 50% to 30%.
- ❑ To increase the profit margin.
- ❑ Streamlining the inventory.

- ❑ **Study Design:** Secondary Research Study
- ❑ **Sampling Method:** Non-Probability Purposive Sampling
- ❑ **Sample Population:** Implants, Medical Consumables (MC), Non-Medical Consumables (NMC), Pharma
- ❑ **Sample Size:** 3688 Line Items
- ❑ **Sample Area:** The Calcutta Medical Research Institute (CMRI)
- ❑ **Time Period:** 4th February to 3rd May 2019
- ❑ **Data Analysis:** Data analysis was done using MS-Excel and interpreted.

- ☐ Conversion of present non-billable line items into billable items.
- ☐ To minimize the consumption at department level.

❖ Calculation based on ERP value

Total Line Items (3688)

1.24 Cr

No Scope for Reduction
(1617)

44%

0.70 Cr

Convertible Line Items
(2071)

56%

0.54 Cr

Medical Consumables
(231)

14%

0.17 Cr

Non-Medical
Consumables (985)

61%

0.32 Cr

Pharma (401)

25%

0.21 Cr

Immediate Conversion
(1708)

82%

0.37 Cr

Scope to be Evaluated
(363)

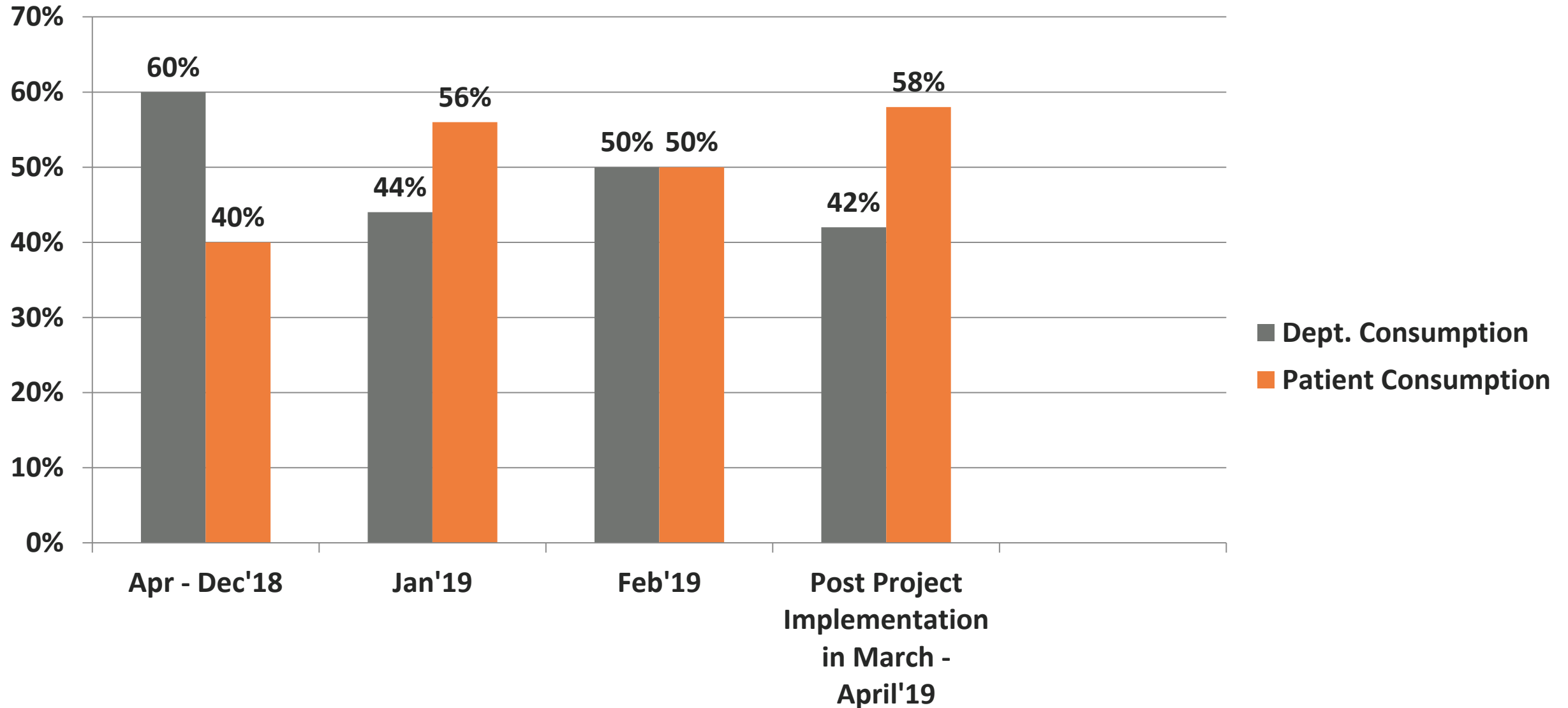
18%

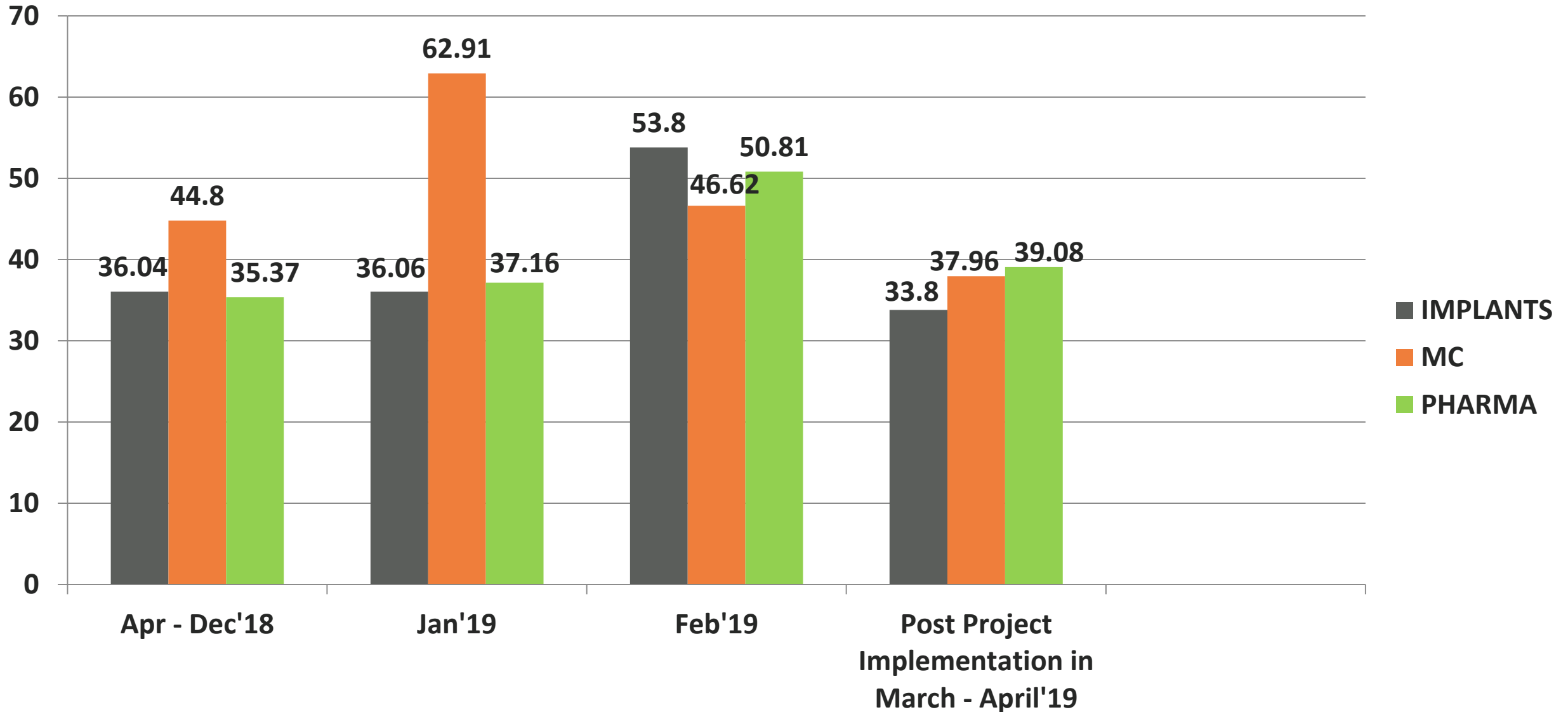
0.17 Cr

Implementation Pending

120 items finalized and
implemented

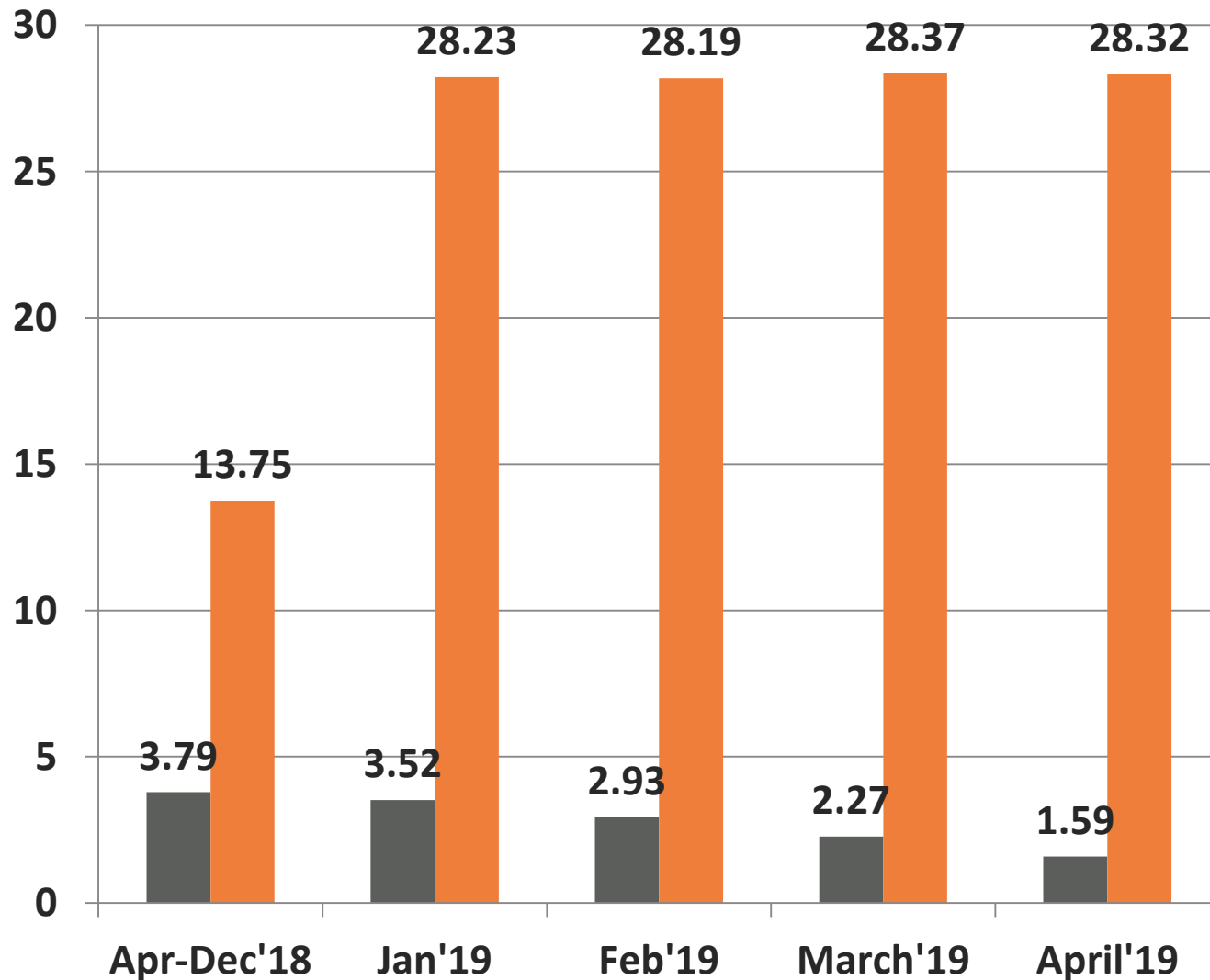
- ❑ Implants (1708 items) to be directly billed to patients.
- ❑ Scope of conversion of 363 items to be evaluated through user departments.
- ❑ Fixing the **MIN** (represents a stock level that triggers a reorder) and **MAX** (represents a new targeted stock level following the reorder) in **HIS** (a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services).





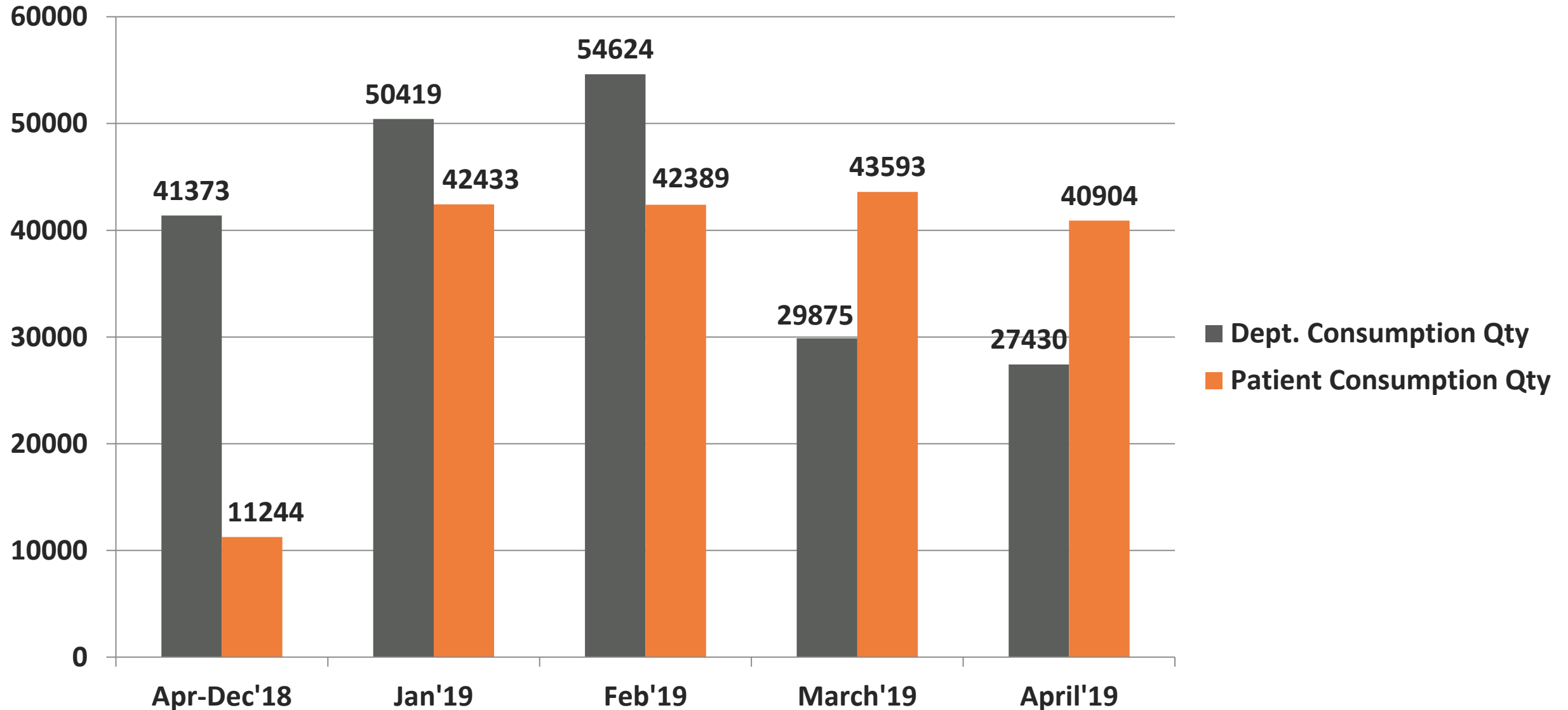
Material Code	Name of Item	Quantity	Value
M-N-SU-V016-000005	DISPOSABLE NITRILE NON STERILE GLOVES ME	4900.00	2205000
M-N-SU-D015-000006	GAUZE SWAB STERILE 7.5CMX7.5CM 8PLY DATT	12674.00	1115312
M-N-SU-S021-000008	DISPOSABLE GLOVES - LATEX STERILE/SURG	20753.22	1016908
M-N-SU-S021-000007	NITRILE GLOVES (SURGICARE SYNTHO)-M 30S	1364.44	610870
M-N-SU-D015-000010	IV DRESSING KIT VELFIX DATT MEDIPRODUCTS	3512.78	609093
M-N-PH-E048-000013	NORMAL SALINE 9 100ML(EUROHEAD)EUROLIFE	15322.00	544237
M-N-SU-A005-000006	YANKEURS SUCTION SET PLAIN TIP(AIRWAYS)	1138.56	479332
M-N-SU-V018-000006	PM LINE MF 200CM VINJOH	1302.00	358050
M-N-SU-V007-000006	P.M. LINE(VIGGO) 200CM	1431.11	343629
M-N-PH-LZZZ-000819	PROPOFOL LIPURO 1% 20ML	1235.11	334339
M-N-SU-P010-000060	ET TUBE SUCTION CUFF 8.5MM SACETT PORTEX	415.22	332178
M-N-PH-A069-000001	NORMAL SALINE 100ML POLY BT(STERIPORT)	7530.00	267466

Material Code	Name of Item	Quantity	Value
M-N-SU-D010-000042	CHEST ELECTRODE (DYNA)	10558.00	263950
M-N-PH-W004-000008	BETADINE SOLUTION 10% 100ML	2409.56	218134
M-N-SU-P008-000035	TRIPLE LUMEN CVC 7 FR X 15 POLYMED	47.00	194674
M-N-SU-V016-000004	DISPOSABLE APRON ASPIRE	4049.00	182205
M-N-SU-A016-000014	GLOVES SIZE 7.5 ENCORE MICROOPTIC ANSELL	1871.11	177756
M-N-PH-C002-000004	XYLOMIST 0.1% NASAL DROP 10 ML	388.67	158090
M-N-PH-S002-000060	ADRENOR INJ.	2788.22	150954
M-N-SU-S021-000004	GLOVES 7.0 STERILE SURGICARE	2304.89	149818
M-N-SU-V016-000001	STERILE EVA GLOVES-M(ASPIRE)/PAIR	6141.33	148433
M-N-SU-R012-000297	VACCUM SUCTION SET ROMSONS	398.00	144047
M-N-SU-LZZZ-000810	BEDPAN PLASTIC	1343.33	128960
M-N-SU-S023-000004	GLOVES STERILE SIZE 6.5 TRUSKIN SUTURE	2146.00	113738
M-N-SU-3001-000014	DURAPORE 3INCH 3M	79.56	111378



Dept. Consumption in Apr – Dec'18 = 3.79 lakhs
 Dept. Consumption in Apr'19 = 1.59 lakhs
 Savings in dept. consumption = 3.79-1.59 = 2.20 lakhs
Savings for 1 year = 2.20*12 = 26.40 lakhs

■ Dept. Consumption Value
 ■ Patient Consumption Value



- ❑ MIN and MAX of 2038 line items have been calculated based on last 6 months consumption.
- ❑ ..\Downloads\MIN_MAX CMRI.xlsx
- ❑ Shared with IT team for auto-population of line items in HIS

CK BIRLA HOSPITALS

The Calcutta Medical Research Institute

HOME

TASKS

QUICK LINKS

SETTINGS

DASHBOARD

Inventory

TimeOut : 26 minsCentral StoresRahul Roy

Stock Request

View All

Req. Store *

ICU - I

Issue Store *

GENERAL STORE

Request Type *

General

Requester Name *

Rahul Roy

Indent Type *

General

Valid Period

23/04/2019

Remarks

Line Items

Auto PopulateAdd Line Item

	Item Code	Item Name	Quantity	Remarks	CurrentStock	StkReq Pending Qty	Stklssue Pending Qty	Issue Store Stock	Current Rate	Current Value	Indent Value	Consumed Quantity	Issued Quantity	Action
☐	G-N-PR-LZZZ-000066	BROWN PAPER 29X44 40GSM	1.0 EACH		0.0 EACH	0.0 EACH	0.0 EACH	0.0 EACH	INR 5.04	INR 0.0000	5.04	--		
☐	G-N-OF-LZZZ-000335	COMPUTER LABEL (5x2CM) 24PCS IN A SHEET	250.0 EACH		0.0 EACH	210.0 EACH	0.0 EACH	0.0 EACH	INR 2.4	INR 0.0000	600.0	--		
☐	G-N-OF-LZZZ-000124	CONTINUATION SHEET FOR MEDICINE CHART 10	75.0 EACH		0.0 EACH	0.0 EACH	0.0 EACH	0.0 EACH	INR 1.65	INR 0.0000	123.75	--		
☐	G-N-LI-LZZZ-000784	DISP. SHOE COVER (NON-WOVEN IN PAIR)	1292.0 EACH		0.0 EACH	0.0 EACH	0.0 EACH	0.0 EACH	INR 2.47	INR 0.0000	3191.24	--		
☐	G-N-CR-LZZZ-000006	DISPOSABLE PAPER GLASS 150ML 195 GSM PRI	692.0 EACH		0.0 EACH	1003.0 EACH	0.0 EACH	0.0 EACH	INR 0.61	INR 0.0000	422.12	--		
☐	L-N-CL-B006-000008	E.D.T.A VIAL	117.0 EACH		0.0 EACH	125.0 EACH	700.0 EACH	0.0 EACH	INR 5.73	INR 0.0000	670.41	--		
☐	G-N-MI-	GREEN LIME AUTO												

Key Function	Operational Timings	Operational Days	Remark
Operation Theatre (OT)	24*7	All Days	Second Floor near Gastroenterology Dept.

Step No.	Activity Description	Activity Performed By
1	OT Coordinator comes to know about Surgeon booking OT for implant case.	OT Coordinator
2	Surgeon informed about OT booking confirmation.	OT Coordinator
3	Doctor informs vendor about requirement	Doctor
4	Vendor supplies Sterile Implant Kit to OT and Unsterile Implant and Kit will go to CSSD.	CSSD
5	At time of surgery, sister will receive from CSSD and keep ready for surgery.	Nursing
6	Post-surgery vendor will count for used implants and consumption sheet approved by surgeon.	Vendor
7	Sterile Implants Sticker will be pasted on Consumption sheet and Patient File.	Vendor
8	Damaged Implants is notified in consumption sheet	Vendor
9	Vendor raises invoice post checking consumption sheet	Vendor
10	Based on vendor invoice, billing team will charge amount as MRP or total invoice bill.	Billing
11	Vendor Invoice and Patient Draft Bill will be checked by billing for confirmation	Billing

Surgeon informs OT Coordinator about Implant case



OT Coordinator informs OT Pharmacy about implant requirement



OT Pharmacy informs vendor for Implant

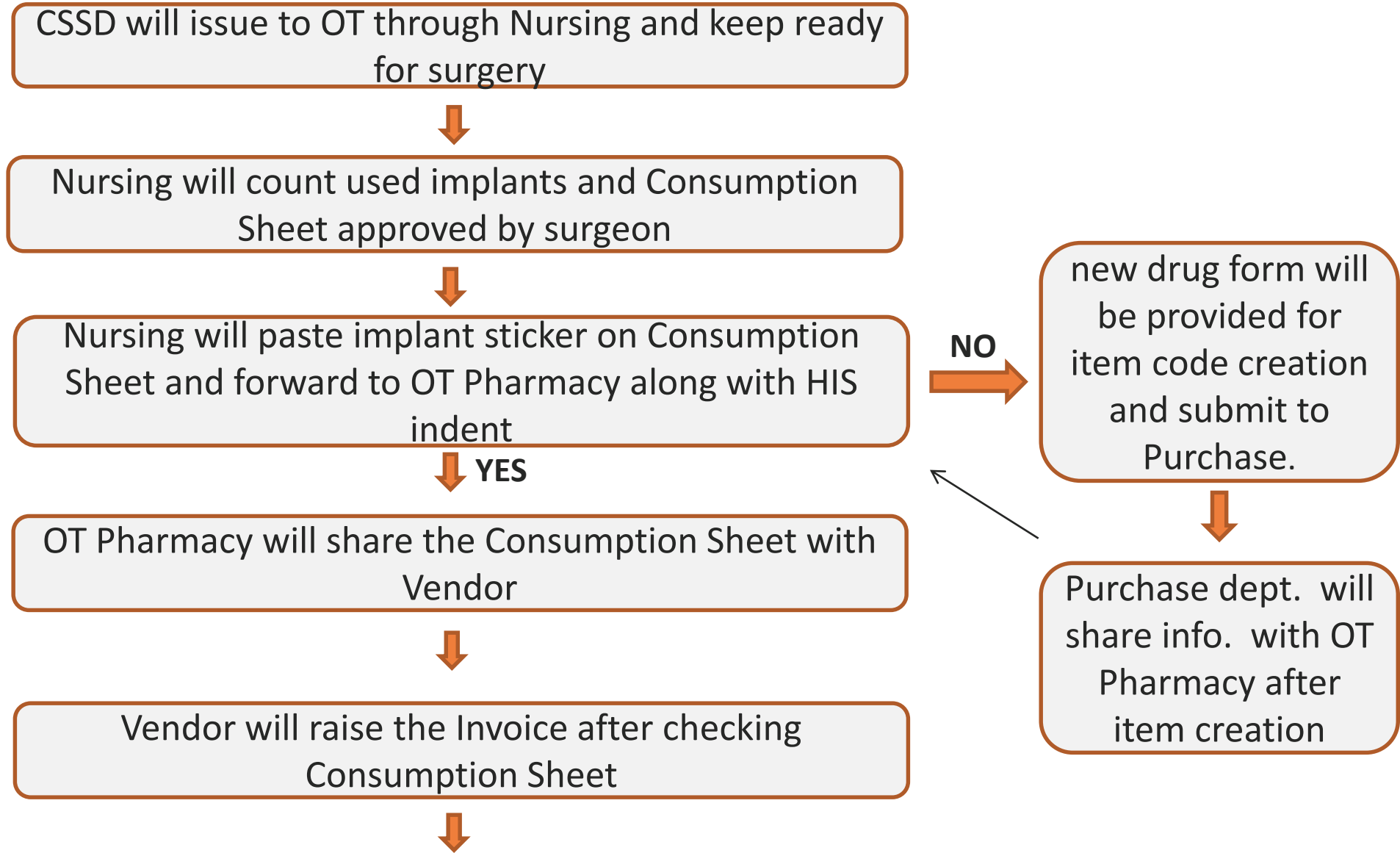


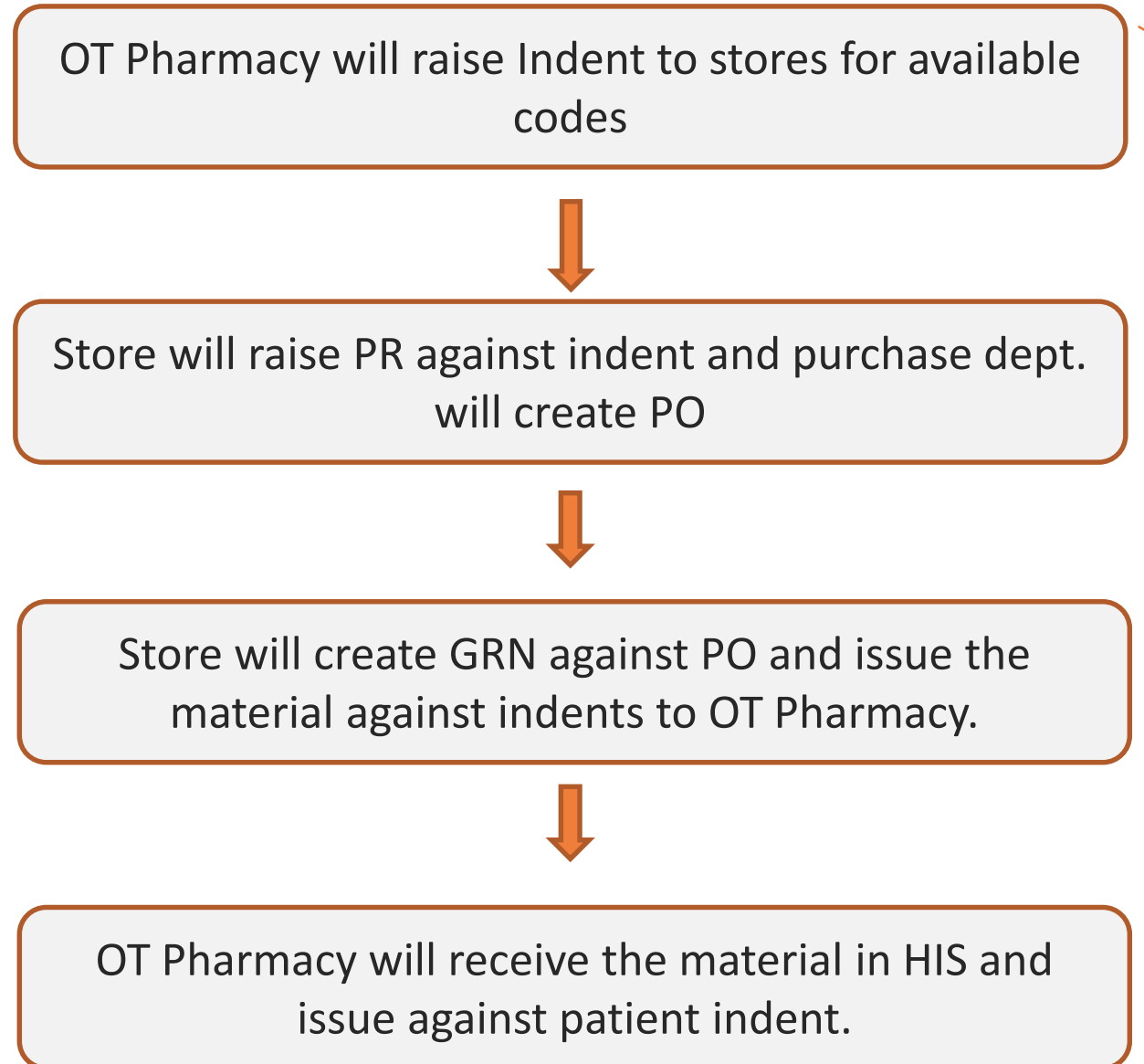
Vendor will supply to OT Pharmacy



OT Pharmacy will issue to CSSD through Nursing







- ❑ Till February'19 the departmental consumption at CMRI was 50% of the total consumption loosing on significant savings of the hospital.
- ❑ After project implementation in March – April'19, the departmental consumption has been reduced to 42% and patient consumption increased to 58%.
- ❑ The average departmental consumption of Medical Consumables (MC) has been reduced from 51.44 lakhs per month (April'18 – Feb'19) to 37.96 lakhs per month after project implementation in March – April'19.
- ❑ The major area of concern is still the departmental consumption of Implants with an average monthly value of 33.80 lakhs per month.

- ❑ The proposed implant billing process has already been presented and will be implemented in May'19 leading to significant savings in departmental consumption.
- ❑ Out of 363-line items whose scope of conversion was to be evaluated through various user departments in hospital, 120-line items were finally identified and implemented from March'19 onwards.
- ❑ After 120-line items were converted to patient billing, the potential savings after project implementation is 26.40 lakhs per annum.
- ❑ The total departmental consumption quantity of 120-line items has been reduced from 41373 (Apr'18 – Dec'18) to 27430 (Apr'19) and patient consumption quantity increased from 11244 to 40904 during the same period.

- ❑ Implementation of Proposed Implant Billing process in OT with help of nursing team and billing team to further minimize department consumption.
- ❑ Fine tuning of Auto-Populate indenting process in HIS in coordination with IT team to further streamline dept. consumption.
- ❑ The nursing team to be sensitized more to minimize the departmental consumption of identified 120 items and convert more to patient billing to increase savings and profit margin.
- ❑ Every user department should also keep a check on stock holding value and consumption should be done as per the occupancy of the hospital.

- Christiansen, N.; Kaltschmitt, M.; Dzukowski, F.; Isensee, F. Electricity consumption of medical plug loads in hospital laboratories: Identification, evaluation, prediction and verification. *Energy Build.* 2015, 107, 392–406.
- Thinate, N.; Wongsapai, W.; Damrongsak, D. Energy Performance Study in Thailand Hospital Building. *Energy Procedia* 2017, 141, 255–259.
- Hu, S.; Chen, J.; Chuah, Y. Energy cost and consumption in a large acute hospital. *Int. J. Arch. Sci.* 2004, 5, 11–19.
- Rohde, T.; Martinez, R. Equipment and energy usage in a large teaching hospital in Norway. *J. Healthc. Eng.* 2015, 6, 419–434.

- García-Sanz-Calcedo, J.; Gómez-Chaparro, M. Quantitative Analysis of the Impact of Maintenance Management on the Energy Consumption of a Hospital in Extremadura (Spain). *Sustain. Cities Soc.* 2017, 30, 217–222.
- Kundurs, G.D. *Hospitals: Facilities Planning and Management*; Tata McGraw-Hill Education: New Delhi, India, 2004.
- Norm DIN 4710:2003-01. In *Statistics on German Meteorological Data for Calculating the Energy Requirements for Heating and Air Conditioning Equipment*; Beuth Verlag: Berlin, Germany, 2003.

*Thank
you*