

## To study the utilization patterns of CT Scanner at Medica Hospital, Kolkata.

### INTRODUCTION :

Medical equipment plays a very significant role in the healthcare delivery system. The equipments have become more complex and requires regular specialized maintenance and repair, which is very expensive. Biomedical equipments could account for nearly 60 percent of the cost of a hospital project. Keeping this in view, it is essential to ensure maximum utilization of the equipment with minimum downtime. It should be an earnest endeavor of the management and users to optimize the equipment utilization to obtain maximum return on capital.

### Objectives:

- To observe the patient load of the CT scanner and calculating the utilization index (U.I).
- To analyze the utilization pattern and suggest recommendations to improve the (U.I).

### Study Type:

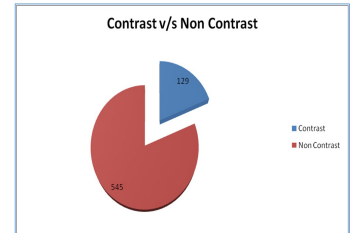
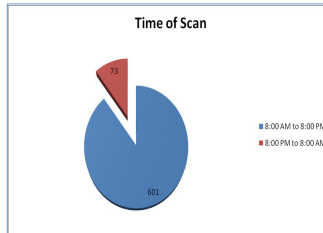
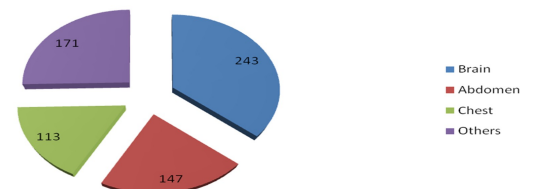
- Prospective

### Methodology :

- The patient load was calculated by the number of by the number of scans done over a one month period.
- The average time taken for all the procedures where collected.
- The total number of CTs done and total time the machine was operated was computed.
- The Utilization Index was computed using the above data.

| Serial No. | Particular                             | Value |
|------------|----------------------------------------|-------|
| 1.         | Patient/Month                          | 674   |
| 2.         | Average Scan Time/Patient (in minutes) | 13.4  |
| 3.         | Equipment Used /Month (in minutes)     | 9012  |
| 4.         | Equipment Used /Month (in hours)       | 150.2 |
| 5.         | Maximum Utilization/Month (in hours)   | 200   |
| 6.         | Utilization Index                      | 75.1  |

### Types of Procedure



### Observations:

- Utilization means the use of the equipment to its full potential. Utilization index is one of the important parameters to monitor the functional status of an equipment.
- Using Utilization Index (U.I) =  $S / T \times 100$   
Where S → Average number of hours the machine is used in a standard day.  
T → Maximum number of hours the machine can be used in a standard day. If the use is less than 50%, it is considered to be under-utilized and hence a bad investment. Some strategies can be built up to improve the utilisation of the equipment.
- Centers for Medicare and Medicaid Services (CMS) defines 100% utilization as equipment operating for 50 hours per week, 52 weeks per year.

### Results:

| Procedures                                                 | Average time taken in minutes | Number of procedures in the month of March 2015 |
|------------------------------------------------------------|-------------------------------|-------------------------------------------------|
| BRAIN(PLAIN)                                               | 4                             | 204                                             |
| BRAIN (PLAIN+CONTRAST)                                     | 12                            | 15                                              |
| BRAIN-ORBIT                                                | 10                            | 1                                               |
| PNS(PLAIN)                                                 | 5                             | 37                                              |
| PNS(PLAIN+CONTRAST)                                        | 15                            | 2                                               |
| NECK(PLAIN)                                                | 12                            | 3                                               |
| NECK(PLAIN+CONTRAST)                                       | 25                            | 2                                               |
| CHEST(PLAIN)                                               | 6                             | 28                                              |
| CHEST (PLAIN+CONTRAST)                                     | 12                            | 16                                              |
| HRCT CHEST                                                 | 10                            | 47                                              |
| HRCT CHEST(PLAIN+CONTRAST)                                 | 25                            | 12                                              |
| ABDOMEN UPPER                                              | 10                            | 8                                               |
| (PLAIN+CONTRAST)                                           | 20                            | 10                                              |
| ABDOMEN LOWER                                              | 10                            | 33                                              |
| (PLAIN+CONTRAST)                                           | 20                            | 0                                               |
| ABDOMEN WHOLE                                              | 12                            | 38                                              |
| ABDOMEN WHOLE (PLAIN+CONTRAST)                             | 25                            | 56                                              |
| KUB(PLAIN)                                                 | 15                            | 19                                              |
| KUB(PLAIN+CONTRAST)                                        | 30                            | 13                                              |
| ANGIO (RENAL, PERIPHERAL, BRAIN, CAROTID ABDOMINAL)        | 25                            | 44                                              |
| ANGIO (CORONARY)                                           | 50                            | 6                                               |
| FNAC PROCEDURE                                             | 45                            | 1                                               |
| BIOPSY PROCEDURE                                           | 50                            | 4                                               |
| PICTAIL PROCEDURE                                          | 50                            | 2                                               |
| ASPIRATION PROCEDURE                                       | 60                            | 3                                               |
| HR TEMPORAL BONES                                          | 15                            | 1                                               |
| DELAYED                                                    | 30                            | 8                                               |
| WRIST, ELBOW, KNEE, ANKLE, PELVIS, THORAX, SPINE, FACE, 3D | 15                            | 33                                              |

### Findings:

- The utilization index is very good however there is scope of improvement.
- The most common procedure was that of Brain (Plain), which is also the least time consuming (4 mins avg).
- The most time consuming procedures involve contrast, delayed and therapeutic procedures like FNAC and Angio.
- There were almost back to back cases during morning and evening; increasing more cases during this time is very tough.
- However the machine was almost idle during the night shift. Barring a few trauma cases it was almost never used despite having a 24\*7 staff in the radiology dept.

### Recommendations:

- If some of the **non critical, non-emergency, therapeutic** examinations of inhouse patients can be done in the night; a lot of slots will open up during the day which can be used to cater to more outpatient examination.
- Medica being a big name; it should use its clout to bring in more CT cases from private nursing homes, poly clinics and individual practitioners. A thorough marketing drive of its imaging services should be undertaken.
- With a Utilization Index of 75.1 already; and Medica being a tertiary level hospital should invest in its own CT system rather than having a profit/cost sharing setup with a third party diagnostic service. It will be a wise investment and will add up to the image of this organization.

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