

## **CHAPTER-7**

# **EVALUATION OF IN-PATIENT SERVICES THROUGH OUTCOME INDICATORS**



## Chapter - 7: Evaluation of In-Patient Services through Outcome Indicators

The productivity, efficiency, clinical care capability and service quality of hospital were evaluated through certain outcome indicators (OIs) viz., Bed Occupancy Rate, Leave Against Medical Advice Rate, Average Length of Stay, Bed Turnover Rate and Referral Out Rate. The categorization and methodology of evaluating these OIs are given in the table below:

**Table-7.1: Calculation of quality indicators**

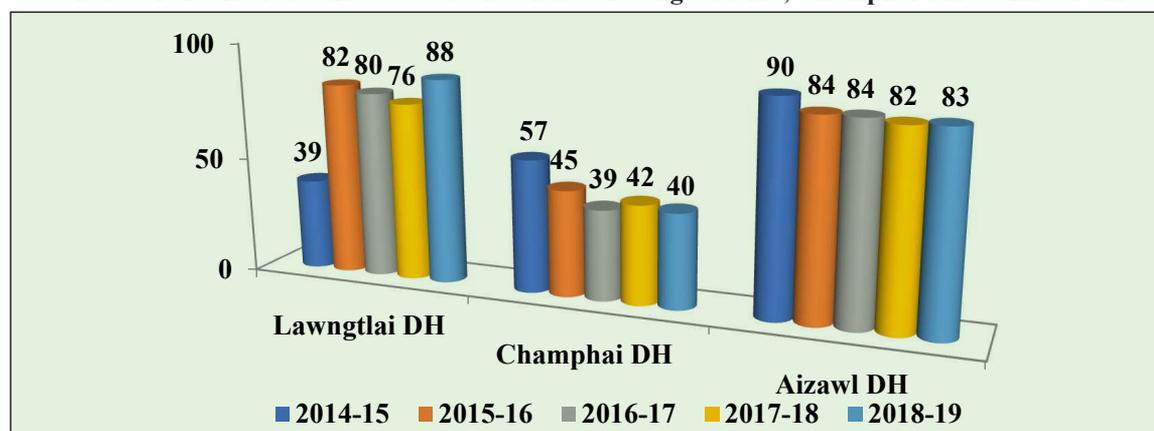
Type	Quality Indicator	Numerator	Denominator
<b>Productivity of hospital</b>	BOR (in <i>per cent</i> )	Total patient bed days X 100	Total no. of functional beds X No. of days in a month
<b>Clinical care capability of hospital</b>	ALoS (in days)	Total patient bed days	Discharges in the year (including death, LAMA, referred)
<b>Service quality of hospital</b>	LAMA (Rate/ 1,000)	Total no. of LAMA X 1,000	Total no. of admission
<b>Efficiency</b>	BTR	Total discharge including death	Total no. of functional beds
	ROR (in <i>per cent</i> )	Total no. of cases referred to higher centres	Total no. of admission

Source: IPHS norm

### 7.1 Bed Occupancy Rate

The Bed Occupancy Rate is the average occupancy of hospital beds within a given time period. It is an indicator of the productivity of the hospital services and is a measure of verifying whether the available infrastructure and processes are adequate for delivery of health services. As per IPHS norms, the BOR of hospitals should be at least 80 *per cent* (As per a study conducted by KPI institute, a global institutional research, the ideal BOR is 85-90 *per cent*. Values below 70 *per cent* and above 95 *per cent* can be regarded as a reason for concern and measures are to be taken immediately). The BOR of the selected DHs are represented in chart-7.1:

**Chart-7.1: BOR of the three test checked DHs - Lawngtlai DH<sup>20</sup>, Champhai DH & Aizawl CH**



Source: Records of test checked DHs

It can be seen from the above that BOR of Lawngtlai DH during 2014-15 and 2017-18 was 39 per cent and 76 per cent which were below the minimum benchmark of 80 per cent as per IPHS. BOR of Champhai DH during the audit period was constantly lower than the prescribed minimum level of 80 per cent ranging from 39 to 57 per cent. Low BOR can be attributed to the fact that the availability of beds was much higher than the prescribed number of beds.

Aizawl CH, on the other hand, has an overall BOR ranging from 82 to 90 per cent during 2014-19. However, on analysing the ward-wise BOR of Aizawl CH, it was observed that wards like NICU and Cardiology ward had more than 100 per cent BOR during the five years period while wards like Maternity and Pregnancy Ward, Eye Ward, etc. had below the minimum level of 80 per cent. Since Aizawl CH was better equipped than other DHs, the BOR was higher, it being a referral centre too.

Audit observed that a higher BOR posed risk of overcrowding which would incapacitate the hospital to provide the crucial medical care to the patients in need during the times of overcrowding. On the other hand, lower BOR also indicated that resources were not being utilised to the optimum.

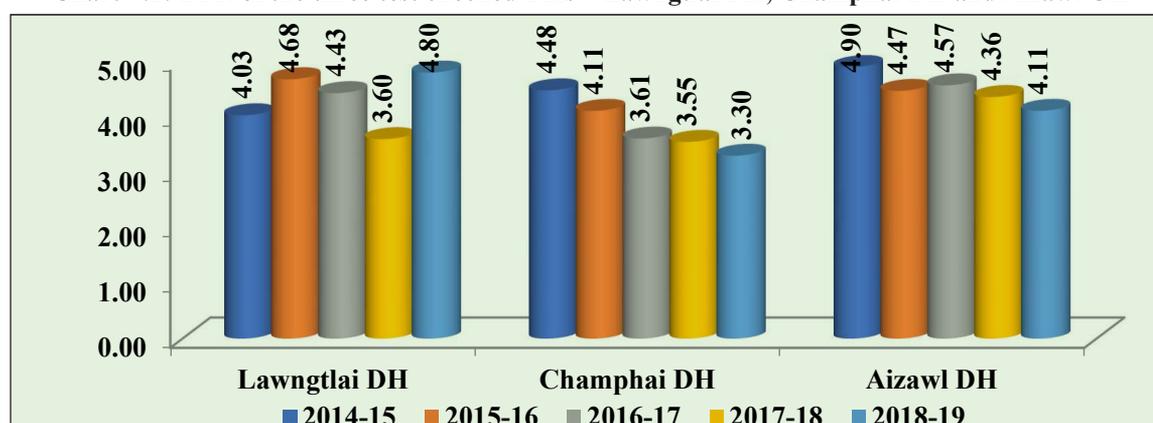
## 7.2 Bed Turnover Rate

Bed Turnover Rate (BTR)<sup>21</sup> is a measure of the utilisation of available bed capacity and serves as an indicator of the efficiency of the hospital. It is the number of times there is change of occupant for a bed during a given time period. The BTR of the test-checked DHs during 2014-19 is represented in chart-7.2:

<sup>20</sup> Midnight head count of In-patients was conducted from March 2018 only

<sup>21</sup> BTR = No. of patients discharged (including death) in a given time period/ No. of functional beds in the hospital during that time

Chart-7.2: BTR of the three test checked DHs – Lawngtlai DH, Champhai DH and Aizawl CH



Source: Records of test checked DHs

The average BTR per month of Lawngtlai DH, Champhai DH and Aizawl CH for the period 2014-19 was approximately 4.31, 3.81 and 4.48 respectively. High BTR indicates high utilisation of the inpatient beds in a department while low BTR could be attributed to fewer patient admissions or longer duration of stay in the departments.

### 7.3 Referral Out Rate

As per IPHS norms, referral services to higher centres denote that the facilities for treatments were not available in the hospitals. The Referral Out Rate (ROR)<sup>22</sup> in the two<sup>23</sup> test-checked DHs during 2014-19 are given in table-7.2:

Table-7.2: ROR of Lawngtlai and Champhai DHs

Year	Lawngtlai DH		Champhai DH <sup>24</sup>	
	No. of referral made	Rate per thousand	No. of referral made	Rate per thousand
2014-15	51	28.80	30	7.48
2015-16	42	20.70	41	10.98
2016-17	52	29.43	--	--
2017-18	68	46.70	--	--
2018-19	76	37.46	62	15.66

Source: records of test-checked DHs

In Lawngtlai DH, the ROR ranges from 21 to 47 per thousand during 2014-19 while ROR of Champhai DH ranged from 7 to 16 per thousand during the same period.

### 7.4 Average Length of Stay

Average Length of Stay (ALoS) is an indicator of clinical care capability and determines the efficiency and effectiveness of interventions. Length of Stay is the time between the admission and discharge/ death of the patient. Improving and reducing length of stay

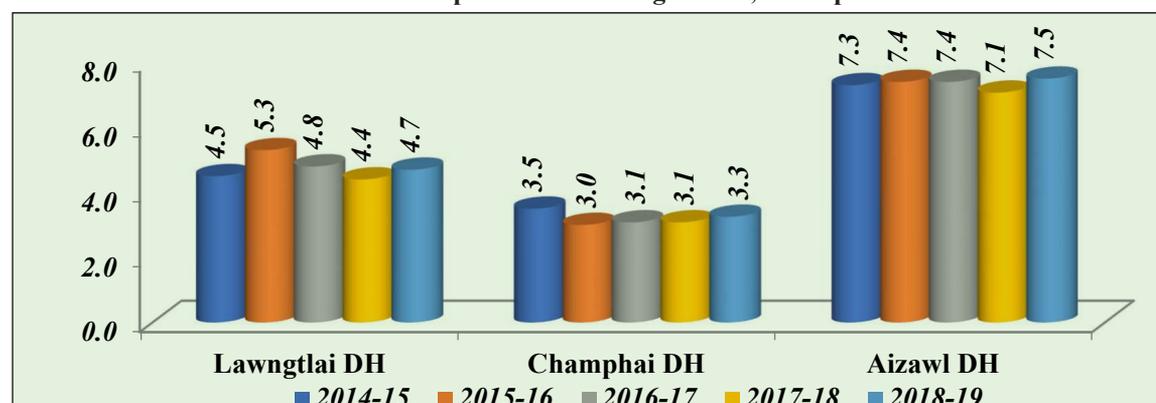
<sup>22</sup> ROR= (No. of Refer out x 1,000) ÷ No. of New admission

<sup>23</sup> Records not available for Aizawl CH

<sup>24</sup> Records for the period January 2017 to December 2018 was not available in Champhai DH

improves financial, operational and clinical outcomes by decreasing the cost of care for a patient. ALoS in the three test-checked district hospitals was as shown in chart-7.3:

**Chart-7.3: ALoS of the three sampled DHs – Lawngtlai DH, Champhai DH and Aizawl CH**



Source: records of test-checked DHs

It can be seen from the above that the ALoS per month for the audit period was approximately five days, three days and seven days for Lawngtlai DH, Champhai DH and Aizawl CH respectively.

## 7.5 Left Against Medical Advice

As per IPHS, Left Against Medical Advice (LAMA) rate<sup>25</sup> measure the service quality of a hospital. LAMA refers to a patient who leaves the hospital against the advice of the doctor. LAMA rate for the three DHs for the period 2014-2015 to 2018-19 is shown in table-7.3:

**Table-7.3: LAMA status of the three test checked DHs**

Year	Aizawl CH		Champhai DH <sup>26</sup>		Lawngtlai DH	
	No. of LAMA	Rate	No. of LAMA	Rate	No. of LAMA	Rate
2014-15	23	4.30	8	2.27	1	0.76
2015-16	20	2.25	91	24.93	7	3.40
2016-17	6	0.37	64	18.02	2	1.01
2017-18	5	0.80	26	6.92	4	2.59
2018-19	2	0.27	82	19.35	6	3.08

Source: records of test-checked DHs

It can be seen that there were 20 cases of LAMA in Lawngtlai DH, 271 cases in Champhai DH and 56 cases in Aizawl CH during the period 2014-19. The average rate of LAMA in the three sampled DHs was thus, calculated approximately at 2.17, 14.30 and 1.60 for Lawngtlai DH, Champhai DH and Aizawl CH respectively.

<sup>25</sup> No. of LAMA during a given period/ No. of admissions during the period X 1,000

<sup>26</sup> Records for the period January 2017 to December 2018 was not available

## 7.6 Outcomes *vis-à-vis* Availability of Resources in District Hospitals

The relative monthly performance of the test-checked hospitals on various outcome indicators worked out by audit and the corresponding availability of resources for the period 2014-19 is shown in the table below:

**Table-7.4: Outcomes *vis-à-vis* availability of resources in District Hospitals**

Hospital	Productivity	Efficiency	Clinical care	Service quality	Availability of resources		
	BOR (%)	BTR (%)	ALoS in days	LAMA per 1000	Doctors (%)	Nurses (%)	Essential drugs (%)
Aizawl CH	85	4.49	7.34	1.60	182	90	9
Champhai DH	48	3.81	3.20	15.52	74	107	38
Lawngtlai DH	73	4.31	4.74	2.17	78	139	50
<b>Benchmark</b>	<b>80-100%</b>	<b>4.34</b>	<b>6.28</b>	<b>4.42</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

As seen from table above that every hospital under performed one or more outcome indicator. The details in this regard are as follows:

- The bed occupancy rate in Champhai DH and Lawngtlai DH was below the IPHS benchmark of 80 *per cent* having 75 and 34 functional beds of respectively.
- The Average length of stay in Aizawl CH was higher at 7.34 days per patient per month than the than the benchmark of 6.28 days per patient per month for the three test checked DHs indicating an inadequate intervention with availability of 182 *per cent* doctors and 90 *per cent* staff nurses against IPHS.
- LAMA rate was high in Champhai DH at 15.52 per 1,000, indicating a failure of the consensus and understanding between the attending physician and patients regarding the need for continued hospitalisation.

## 7.7 Comparison of Outcome Indicators of Test checked DHs with State's Figures

Comparison of Outcome Indicators of test checked DHs with State's figures is shown in the table-7.5:

**Table-7.5: Comparison of Outcome Indicators of test checked DHs with State's figures**

Year	DHs	Bed Occupancy Rate		Average Length of Stay		Bed Turnover Rate	
		DHs	State	DHs	State	DHs	State
2014-15	Lawngtlai DH	38.95	54.44	4.5	5.18	4.03	3.96
	Champhai DH	56.83		3.5		4.48	
	Aizawl CH	90.08		7.3		4.90	
2015-16	Lawngtlai DH	82.36	56.99	5.3	5.17	4.68	3.45
	Champhai DH	45.36		3.0		4.11	
	Aizawl CH	84.13		7.4		4.47	
2016-17	Lawngtlai DH	79.67	54.4	4.8	5.01	4.43	3.22
	Champhai DH	38.65		3.1		3.61	
	Aizawl CH	84.00		7.4		4.57	
2017-18	Lawngtlai DH	76.21	49.34	4.4	4.74	3.60	2.98
	Champhai DH	42.23		3.1		3.55	
	Aizawl CH	82.48		7.1		4.36	
2018-19	Lawngtlai DH	87.56	56.71	4.7	5.3	4.80	2.95
	Champhai DH	40.45		3.3		3.30	
	Aizawl CH	83.44		7.5		4.11	

Source: records of test-checked DHs

It can be seen from the table that:

- Hospitals (both Government and Private) in the State had a BOR ranging from 49 to 57 per cent during 2014-19. Champhai DH recorded a lower BOR than the State's average during 2015-16 to 2018-19;
- The average length of stay of patient in Lawngtlai DH and Champhai DH was more favourable than the State's average during the audit period. However, Aizawl CH recorded an average length of stay of approximately seven days which was higher than the State's average during 2014-19. Higher ALoS in Aizawl CH can be attributed to the fact that critically ill patients were being referred from various health institutions from the different districts; and
- The three test-checked DHs recorded a BTR which was constantly higher than the State's average during 2014-19.

### **Conclusion**

Wards like NICU and Cardiology ward in Aizawl CH had more than 100 per cent BOR during the five years period, while wards like Maternity and Pregnancy Ward, Eye Ward, etc. had below the minimum level of 80 per cent. The referral rates from other DHs to Aizawl CH was higher due to better facilities there. Rate of LAMA was high in Champhai DH at 15.52 per 1,000 against the benchmark of 4.42.

**Recommendations**

- i. *The Government should adopt an integrated approach, allocate resources in ways which are consistent with patient priorities and needs to improve the monitoring and functioning of the district hospitals towards facilitating a significant change in health outcomes.*
- ii. *Corrective action be taken to reduce LAMA rates in Champhai DH.*
- iii. *The referral rates from DHs need to be reduced by providing comprehensive and quality care in all DHs by increasing physical infrastructure and manpower in these DHs.*

**Aizawl**  
**The 12 July, 2021**

  
**(SARAT CHATURVEDI)**  
**Principal Accountant General, Mizoram**

**Countersigned**

**New Delhi**  
**The 14 July, 2021**

  
**(GIRISH CHANDRA MURMU)**  
**Comptroller and Auditor General of India**

