Benefit Incidence Analysis of Inpatient Care in Government Facilities: A State Wise Analysis

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Preface

Equity is one of the cornerstones of Government Policy as the National Health Policy 2017 clearly emphasizes the focus on universal access to health by all. Given the important role of government in health financing in the country it is also important to see whether these investments are equity enhancing. This study tries to answer this question by analysing the redistribution of public subsidies provided in government health facilities across the states in India.

The Benefit Incidence Analysis (BIA) is a common technique employed to measure the benefits received by citizens using public health facilities. It helps us to assess the distributional impact of government spending among different economic groups. The present study is based on the utilisation data for inpatient care/hospitalisation from National Sample Survey (NSS) 75th round on morbidity and health care. The state-wise data on public subsidy or government investment is taken from the National Health Account (NHA) estimates for India, 2017-18.

The utilisation pattern for in-patient care in government facilities has been pro-poor across different income groups, given their population share. Benefit Incidence Analysis, based on the utilisation of in-patient care at government facilities also suggests that the utilisation pattern is pro-poor across the country barring a few states. The present result is at a variance from previous studies on BIA based on the NSS data for 2004 and 2014, suggesting that public subsidy for inpatient care in 2017-18 is more equity-enhancing as compared to previous years suggesting an improvement in effectiveness of government investment. Even at the state level, the distribution of public subsidies is pro-poor in most of the states.

The present study provides an important baseline to monitor the progress made by the government in terms of equity. It will help us to monitor the effectiveness of government investment especially concerning the utilisation of poor and vulnerable sections

1 Introduction

In recent years, many countries have adopted universal health coverage (UHC) as a national aspiration. Even in India, it has been high on the agenda since its adoption as one of the Sustainable Development Goals (Mor, 2023). One of the goals of Universal Health Coverage (UHC) is the attainment of equitable access to health services across all socioeconomic groups (Xu and Colón-Ramos, 2015). Given the government's commitment to providing UHC, it is important to assess the effectiveness of government spending on health (NHP 2017, MoHFW). One of the commonly used techniques to assess the effectiveness of government spending on health care is the benefit incidence analysis (BIA), which enables us to assess the distributional incidence of health spending (Mcintryre et al, 2011).

Benefits from governmental expenditure, especially in the case of merit goods like healthcare call for careful examination as a skewed distribution of such benefits across socio-economic groups is unjust and unfair (Bravemen and Gruskin, 2003). Chaudhary and Dubey (2020) have argued that equitable distribution of public spending is an effective tool for enchancing the access to healthcare. Furthermore, an understanding of the nature of distribution also enables us to gain insights on the effectiveness of public expenditure (Browser et al., 2019). In this regard, BIA can be an important tool to monitor the effectiveness of government investment. BIA in its present form owes its existence to the work done by Meerman (1979) on Malaysia and Selowsky (1979) on Colombia. Numerous studies have followed since then to analyse the 'benefits' (Castro-Leal et al., 1999; Demery, 2000; Khan et al., 2017; Lanjouw and Ravallion, 1998; McIntyre and Ataguba, 2011; Selden and Wasylenko, 1992; Wagstaff, et al, 2007; Younger, 2002)

In the Indian context, studies on BIA are mostly based on health survey data from the National Sample Survey (NSS) which provides detailed information on the utilisation of health services. Lately, the National Family Health Survey (NFHS) has also been used for BIA. To compute public expenditure in these studies, either the budget data was used or it was estimated indirectly from the survey data (Mahal, 2001; Bose and Baneriee,2019; Bowser et al., 2019; Selvaraj et al., 2021; Mohanty et al., 2020).

2 Review of Literature

The BIA studies are mostly based on the NSS health survey as the survey provides detailed information on utilization of different health services and their corresponding expenditures. Some of the important studies related to BIA are the following:

1. The first BIA study of governments' expenditure on health in the country was based on the NSS 50th round for 1995-96 (Mahal, 2001). It analysed benefit distribution for different services like outpatient care, inpatient care, immunisation, antenatal care, and post-natal care. The study showed that the benefits of curative care in public facilities was pro-rich. The analysis was also conducted at the subnational level and most of the states showed a pro-rich distribution.

2. Another study based on the 71st round of 2014 reported a pro-rich distribution of benefits in public hospitals for inpatient care (Bowser et al., 2019). The study also pointed out the difference in distribution across the states (Bowser et al., 2019).

3. A longitudinal study comparing BIA between 2004 and 2017-18 observed pro-rich distribution in 2004 which had significantly declined over time leading to less pro-rich distribution in 2017-18 (Selvaraj et al., 2021).

4. Another BIA study based 71st round of 2014 on inpatient utilization by those suffering from non-communicable diseases reveals that the public subsidy had a pro-rich distribution both in rural and urban areas (Bose and Banerjee, 2019).

5. Lately, NFHS data has also been used for BIA. The information related to institutional deliveries in NFHS includes types of providers and out-of-pocket expenditure. BIA using NFHS data of 2015-16 suggests that the distribution of benefits for institutional delivery at different levels of care had a pro-poor distribution (Mohanty et al., 2020).

3 Methodology

3.1 Estimation of Public Subsidy for Inpatient Care

The unit cost of providing inpatient care in public facilities was derived from the National Health Accounts (NHA) data for India, 2017-18. This dataset provides information both at the union as well as at the state level. For the first time, the NHA has been used to arrive at the public subsidy, unlike previous studies which relied either on the budget data or indirect estimates based on the survey data. This study uses the NHA classification of providers and functions for government expenditure to arrive at the estimates. The government's expenditure on in-patient care comprises the expenditures on community health centres (general health hospitals), sub-district and district hospitals, teaching medical college hospitals, mental hospitals, and other specialised hospitals. Additionally, primary health centres and health and wellness centres have been considered as they provide in-patient and childbirth services in some states. Further, expenditures on institutes like AIIMS and institutions of national importance have also been considered for relevant states. The analysis also takes into consideration the expenditure on union and state government employees and government-sponsored health insurance schemes (for example, RSBY, CGHS, ECHS, ESIS, and other state-sponsored health insurance schemes). The unit cost was estimated by dividing the total expenditure by population.

3.2 Different Economic Groups

The study has classified the population into different economic groups using the household consumption expenditure data as reported in the NSS (2017-18) health and morbidity round. Consumption expenditure is a common indicator of living standard. The survey provides information on the usual consumption expenditure of the household in the last 30 days. The monthly per capita consumption expenditure (MPCE) was calculated using household size based on which, the households were categorised into five quintiles.

3.3 Out-of-Pocket Expenditure

The household health survey of NSS provides detailed information on the utilisation of inpatient services, outpatient services, and services related to mother and child health such as antenatal, postnatal care, and child vaccination. The information on inpatient care includes the type of providers- public or private and associated medical and non-medical expenses. The public provider includes PHC/CHCs, public hospitals, and medical colleges, the private provider comprises all private hospitals (run by charitable organisations or NGOs or trusts, private nursing homes, daycare centres, private medical colleges and hospital, super-specialty hospitals, etc.). The medical expenditure includes expenditures incurred on fees, medicine, diagnostic tests, and other medical expenditure such as attendant charges, physiotherapy, medical appliances, blood, oxygen, etc. It also provides expenditure on patient transportation. The survey also provides information on reimbursements received for the health expenditures mentioned above. To calculate the out-of-pocket expenditure, we have used the definition as prescribed in the National Health Accounts (NHSRC, 2016). Specifically, it is given as follows:

Out-of-Pocket Expenditure= Health Expenditure - Reimbursement

3.4 Inequality Measurement

Benefit Incidence analysis measures the extent of equity/inequity in any public system. One way to understand is to see the distribution of government expenditure also referred as subsidy across different economic groups. Mathematically it is given as (Mohanty, 2020):

$$\mu_j = \sum \alpha_{ij} (\beta_i / \alpha_i)$$

Where,

μ_j = Public Subsidy to Group j
α_{ij} = utilization of service (i) by group j
β_i = Government expenditure net of OOPE for services (i)
a_i= Utilisation of service (i) by all group

Concentration Curve and Concentration indices (CI) are used in the exercise to measure inequality across the economic groups. The concentration curve helps us to graphically represent inequality and the concentration index helps us to measure the inequality (O'Donnell, et al 2008).

The concentration index is defined as follows:

$$CI = 2/\mu \, Cov\,(h, r)$$

Here CI stands for Concentration Index; h is the health variable; μ is the mean of health variable; r is the rank of individual in terms of MPCE. CI ranges between -1 and 1. The sign of CI help us to know whether distribution is pro-poor or pro-rich. The present study includes the utilization of public services and the distribution of benefits from public expenditure, (-) negative sign indicates the pro-poor distribution and (+) positive sign indicates pro-rich distribution.

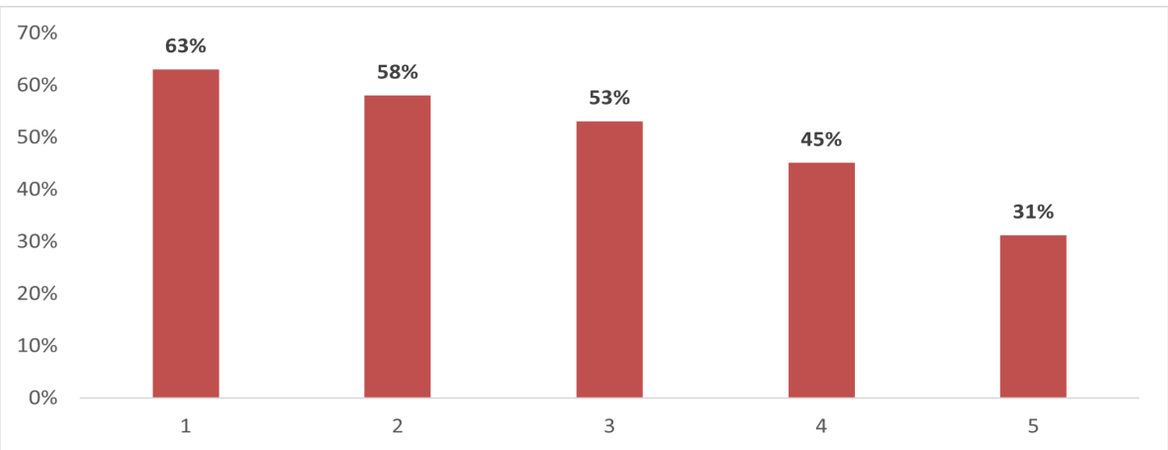
4 Utilisation of Inpatient Care/ Hospitalisation

4.1 Utilisation of Inpatient Care in Public Facilities

The hospitals in India can be broadly divided into two parts the government-owned and managed and the private hospitals which mostly include the big corporate hospitals and nursing homes.

Among those who have gone for hospitalization, there is a higher dependency at the lower consumption class to go for public facilities. Among the poorest group around 63% go for public facilities whereas for the richest group, the corresponding share is 31% (Figure 1).

Figure 1: Share of public facility utilisation in India among different consumption class



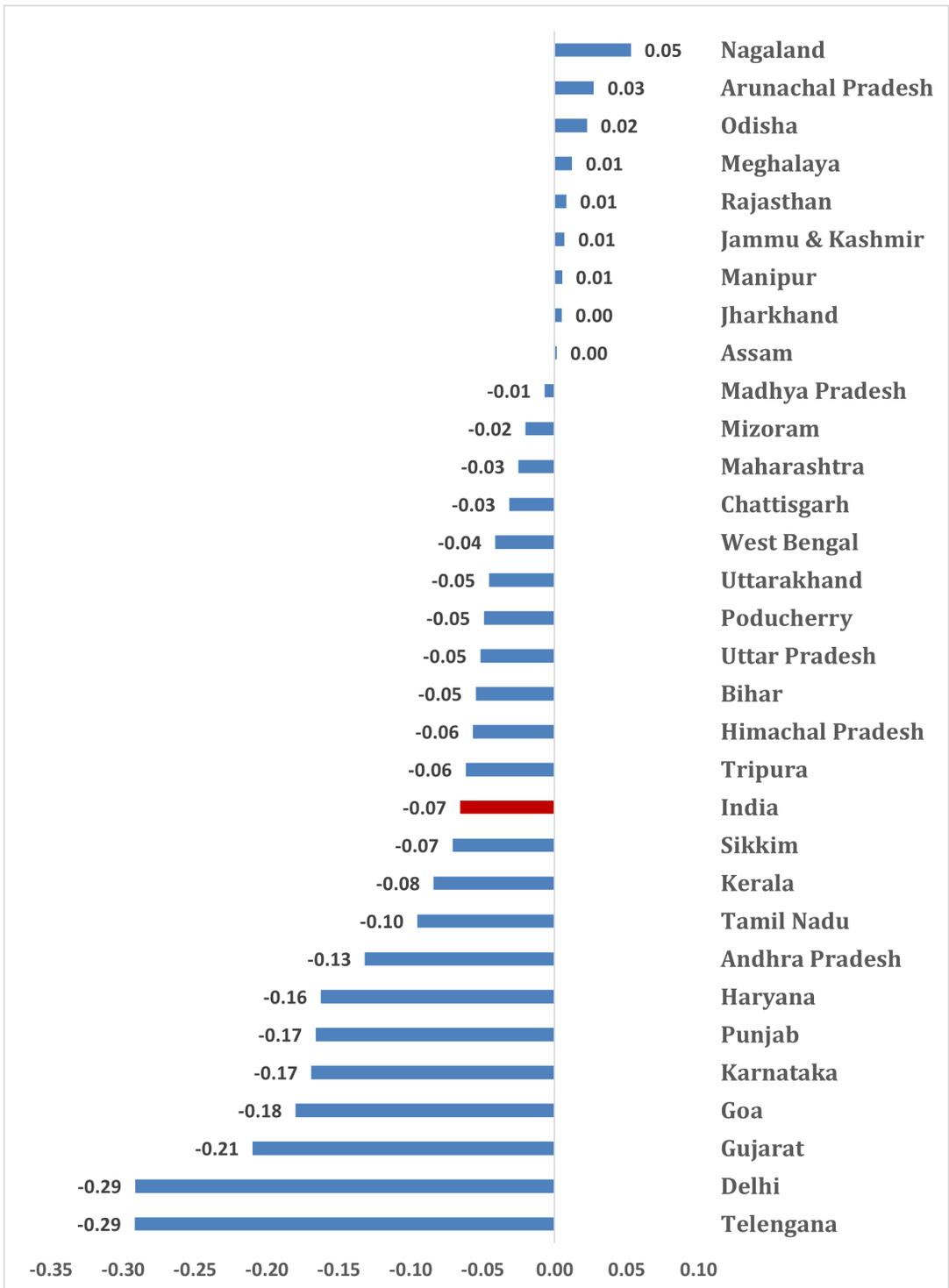
Source: Computed by the authors from NSS 2017-18

4.2 Inequity in Utilisation of Inpatient Care

This section presents the analysis of the extent of inequality in the utilisation of services at public health facilities. Inequality in utilisation is based on differences in the utilisation rate of public facilities across the consumption groups. Hospitalisation rate as an important measure of health inequality (Wagstaff et al., 2007). It can be used to measure access to hospitalisation care across different economic groups.

Inequality is measured through a concentration index based on population across the quintile groups based on MPCE and their corresponding utilisation rate. For the country, the concentration index is estimated to be -0.07, indicating an overall pro-poor distribution in utilization based on the total population. However, we witness a pro-rich distribution in the utilisation of public facilities in states like Nagaland, Arunachal Pradesh, Meghalaya, Manipur, Assam, Jharkhand, Odisha, Rajasthan, and Jammu and Kashmir. On the other hand, in states such as Andhra Pradesh, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Punjab, Sikkim, Tamil Nadu, Telangana, West Bengal, and Uttar Pradesh, the utilisation is pro-poor (Figure 2).

Figure 2: State-wise Concentration index for utilization of inpatient care in public facilities (2017-18)



Source: Computed by the Authors from NSS 2017-18

5 Benefit Incidence Analysis

In this exercise, the government expenditure for inpatient care or the subsidies has been derived from the NHA classification of healthcare provider and healthcare function. Since the inpatient care in India is not just limited to the secondary and tertiary level services this classification by health care function enables us to identify the flow of funds by the government across different levels of facilities for inpatient care. The total amount under this category was divided by the number of hospitalisation cases in public facilities to arrive at the per capita cost for providing services. Table 1 shows how the unit cost of inpatient care in public facilities across states.

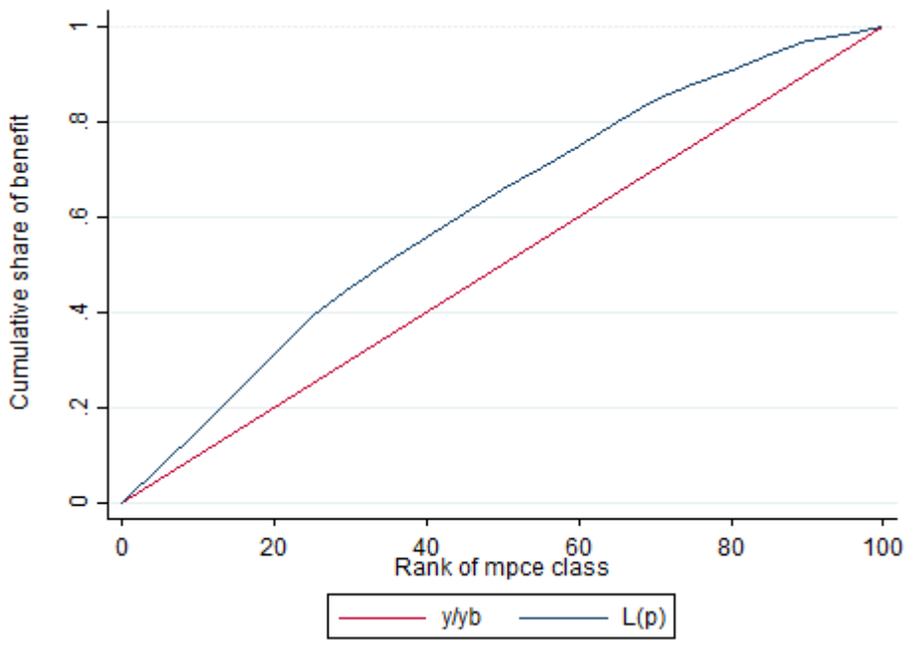
Table 1: Unit cost of inpatient care across states, 2017-18 (in Rs.)

States	Per capita government expenditure for inpatient care (Rs)
Tripura	2,346
Himachal Pradesh	4,696
Odisha	5,206
West Bengal	5,633
Manipur	6,963
Jammu and Kashmir	7,472
Bihar	7,720
Uttar Pradesh	8,105
Madhya Pradesh	8,409
Jharkhand	9,383
Karnataka	11,627
Rajasthan	12,212
Chhattisgarh	12,789
Andhra Pradesh	13,338
Kerala	13,448
Haryana	13,733
Assam	15,022
Tamil Nadu	17,512
Mizoram	17,785
Punjab	18,746
Gujarat	21,608
Telangana	28,353
Uttarakhand	32,571
Maharashtra	38,619
Nagaland	40,692
Meghalaya	56,737
Delhi	61,319
Sikkim	64,594
Goa	69,180
Arunachal Pradesh	96,520
India	13,648

Source: Computed by the authors

The Concentration curve depicts that the benefits from governmental spending for in-patient care are pro-poor in India (Figure 3). The negative value of the Concentration Index (-0.22) reflects the same.

Figure 3: Distributional of benefits across quintiles groups in India, 2017-18



Source: Computed by the authors from NSS 2017-18

Compared to previous studies on BIA using NSS data done by Mahal et. al. (2001), Bowser et al. (2019), and Selvaraj et al. (2021) for India, the findings of this study suggest that for the first time, the sign of CI has reversed (Table 2). This also means that for the first time, the benefits of government spending for inpatient care are pro-poor.

Table 2: Benefit incidence of public spending on inpatient care in India based on different studies based on the health survey of NSS

Years of Survey	Mahal et al, 2001	Bowser et al., 2019	Selvaraj et al., 2021
1995-96	0.214		
2004			0.247
2014		0.067	
2017-18			0.202

Note: Mahal et al., 2001 analysis is based on curative care.

At the state level, all states except Nagaland had a pro-poor concentration of benefits, clearly highlighting the fact that most of the states have shown the same pattern as seen in the national average (Table 3).

Table 3: Concentration Index (CI) of benefits derived from inpatient care at public facilities across states

State	CI	Std. Error	p-value
Jammu & Kashmir	-0.05	0.01	0.00
Himachal Pradesh	-0.17	0.02	0.00
Punjab	-0.22	0.01	0.00
Uttarakhand	-0.17	0.01	0.00
Haryana	-0.19	0.01	0.00
Delhi	-0.26	0.00	0.00
Rajasthan	-0.10	0.00	0.00
Uttar Pradesh	-0.13	0.00	0.00
Bihar	-0.22	0.01	0.00
Sikkim	-0.14	0.00	0.00
Arunachal Pradesh	-0.09	0.01	0.00
Nagaland	**0.01**	**0.01**	**0.06**
Manipur	-0.23	0.02	0.00
Mizoram	-0.05	0.01	0.00
Tripura	-0.19	0.03	0.00
Meghalaya	-0.03	0.01	0.00
Assam	-0.09	0.00	0.00
West Bengal	-0.09	0.01	0.00
Jharkhand	-0.07	0.01	0.00
Odisha	-0.11	0.01	0.00
Chhattisgarh	-0.12	0.00	0.00
Madhya Pradesh	-0.09	0.00	0.00
Gujarat	-0.18	0.00	0.00
Maharashtra	-0.14	0.00	0.00
Andhra Pradesh	-0.21	0.00	0.00
Karnataka	-0.15	0.01	0.00
Goa	-0.22	0.01	0.00
Kerala	-0.18	0.01	0.00
Tamil Nadu	-0.12	0.00	0.00
Puducherry	-0.14	0.01	0.00
Telangana	-0.15	0.01	0.00
India	**-0.22**	**0.00**	**0.00**

6 Conclusion

In this study, two types of inequities were analysed. The first part looked at the inequity in utilisation for in-patient care at government facilities and the second part looked at the inequity in distribution of benefits in government facilities across different income groups. Concentration index was used to measure the extent of inequality. Our analysis highlights an inequality in the utilization of public hospitals, revealing a pro-rich trend in some states such as Nagaland, Arunachal Pradesh, Meghalaya, Manipur, Assam, Jharkhand, Odisha, Rajasthan, and Jammu and Kashmir.

The distribution of benefits in the government facilities was found to be pro-poor, suggesting the poor are getting more benefits compared to the rich at public facilities. However, Nagaland emerges as the only state that exhibits a pro-rich distribution of the benefits provided within government facilities. The concentration index for BIA shows a negative sign for the first time in India. The previous studies based on the NSS data of 2004 and 2014 had positive sign for concentration index, that is, the distribution was pro-rich.

BIA acts as an important tool to understand the magnitude of these subsidies or governmental expenditures and their distribution across the socio-economic groups. BIA provides insight into whether public investment is effectively enhancing equity in healthcare access and utilization. Essentially, BIA serves as a vital measure of health equity, which helps in gauging the effectiveness of government investments in healthcare.

7 Policy Recommendations

• The northeastern states rely considerably on public healthcare facilities. However, there exists an inequality in utilisation, implying a pro-rich distribution in several regions. States like Assam, Manipur, Meghalaya, and Nagaland demonstrate such a disparity where utilisation patterns are skewed towards the wealthier segments of the population. Therefore, there is an urgent need to improve access to public facilities in these states.

• Apart from the northeastern states, Jammu and Kashmir, Jharkhand, Odisha, and Rajasthan also show a pro-rich distribution in the utilisation of in-patient care at public health facilities. It is, therefore, imperative that these states improve the utilisation of services at public facilities for the economically disadvantaged.

• Furthermore, in Nagaland, the government subsidies exhibit a bias towards the rich. Therefore, there is a need for improvement of the access to healthcare services, especially for those belonging to the poorer groups.

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