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Out-of-Pocket Expenditure in Child Immunisation in India: Evidence from a Two-Part Model Analysis

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Abstract:
Child immunisation is one of the most cost-effective public health interventions, yet households in India continue to bear out-of-pocket expenditure (OOPE) despite the availability of free vaccines under the Universal Immunisation Programme. This study examines the incidence and magnitude of OOPE for child immunisation across states, religions, social groups, wealth quintiles, and provider types using a two-part model framework. The first part estimates the probability of incurring any OOPE, while the second part analyses the conditional amount spent among households reporting expenditure. Results reveal stark urban–rural disparities, with urban households consistently spending more when costs are incurred. Wealth gradients are pronounced: richer households spend substantially more, particularly in urban areas, while poorer households often report negligible expenditures, potentially reflecting access barriers. Social and religious stratification further shapes expenditure patterns, with minorities and upper-caste households facing distinct burdens. The choice of provider emerges as the strongest determinant: households using private facilities are overwhelmingly more likely to incur OOPE and spend significantly more than those relying on government services. These findings underscore the need to strengthen public provision, reduce indirect costs, and embed equity monitoring into immunisation policy to achieve universal, financially sustainable coverage.

Keywords: Out-of-pocket expenditure, Child immunisation, Two-part model, Health equity, India

Introduction:

Child immunisation is a highly cost-effective public health intervention worldwide, markedly reducing morbidity and mortality from vaccine-preventable diseases. The Universal Immunisation Programme (UIP) in India, initiated in 1985, has evolved into one of the largest immunisation initiatives globally, reaching millions of children each year (Schueller et al., 2021). Despite significant advancements in coverage, disparities persist across socioeconomic groups, geographic areas, and health systems, with out-of-pocket expenditures (OOPEs) continuing to hinder equitable access. Analysing the financial burden on households is essential, particularly in light of India's pursuit of Universal Health Coverage (UHC).

Out-of-pocket healthcare expenditure refers to direct payments households make at the time of service, excluding reimbursements or insurance coverage. In India, out-of-pocket expenditure (OOPE) has traditionally accounted for a significant share of total health expenditure, often

resulting in catastrophic health spending and subsequent impoverishment (National Health Accounts [NHA], 2024). Although government initiatives such as Ayushman Bharat–Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) have reduced OOPE for hospitalisation, routine immunisation services continue to impose hidden costs on households. These include transportation, lost wages, and informal payments (Economic Survey, 2025). Such expenditures, while seemingly minimal, can significantly affect marginalised families and immunisation rates.
Equity issues are fundamental to immunisation financing. Socioeconomic inequities in child immunisation persist; children from lower-income households are less likely to receive full immunisation and face greater financial barriers (Akhtar et al. 2024). These disparities reflect both horizontal inequities—unequal treatment among those in similar circumstances—and vertical inequities—unequal treatment among those in different circumstances. Both forms undermine fairness in healthcare. Moreover, achieving 90% nationwide coverage requires significant public investment, highlighting the need to reduce household contributions (Schueller et al., 2021).

The financial implications of immunisation are exacerbated by disparities between urban and rural areas. A comparative study conducted in Maharashtra found that rural households frequently incur higher out-of-pocket expenditures due to longer travel distances, restricted access to free vaccines, and reliance on private healthcare providers (Patil et al., 2024). The findings align with broader trends in maternal and child healthcare utilisation, indicating significant variations in expenditure patterns based on place of residence and socioeconomic status (Dutta, 2025). These disparities underscore the need to contextualise OOPE within India's diverse health system.
Reducing out-of-pocket immunisation costs is crucial to achieving SDG 3, which aims for universal access to essential healthcare. The Ministry of Health and Family Welfare's 2024–25 Annual Report recognises advances in immunisation but notes ongoing financial protection issues (MoHFW, 2024). The 2025 Economic Survey stresses the need to boost primary healthcare funding to ease household burdens. These policy documents show growing awareness that financial barriers, even for seemingly free services, can impede public health goals.

Objectives of the Study: 1. To evaluate state-level variations in OOPE in Child Immunisation, highlighting urban-rural disparities.
2. To examine disparities in OOPE in child immunisation across socioeconomic, demographic, and geographic dimensions, including urban–rural residence, religion, caste/social group, and household wealth quintiles.
3. To estimate the incidence of household out-of-pocket expenditure (OOPE) on child immunisation in India by analysing the probability that families incur any financial cost despite the availability of free vaccines under the Universal Immunisation Programme.

Methods and Data Source

This research utilised a cross-sectional analytical design, drawing on nationally representative survey data regarding child immunisation and household health expenditures. The main dataset is sourced from the National Sample Survey (NSS) 75th Round conducted during 2017-18. These sources offer comprehensive data on household expenditure, immunisation service

utilisation, and socioeconomic characteristics, facilitating a thorough analysis of out-of-pocket expenditure (OOPE) patterns. The NSS health expenditure surveys are well-suited for this analysis, as they encompass both direct medical costs and indirect non-medical costs, including transportation and lost wages. (Srivastava et al., 2021).

Analytical Framework: Two-part Model

Health expenditure data frequently exhibit zero-inflation, with many households reporting no expenditure, alongside right-skewness, where a small percentage report significantly high costs. To tackle these distributional challenges, we utilised a two-part model (TPM), a commonly employed econometric method in health economics (Belotti et al., 2015).

Part 1:

A binary logistic regression estimates the probability that a household reports any out-of-pocket expenditure for child immunisation. Independent variables comprise the child's age, maternal education, household wealth quintile, urban-rural residence, and region.

Part 2:

A log-linear model is utilised to estimate the magnitude of out-of-pocket expenditures (OOPE) for households with positive expenditures. This specification addresses the skew in expenditure data and facilitates robust inference.

The TPM separates two processes: (a) whether costs are incurred by households, and (b) the amount spent if costs are incurred. This dual structure offers detailed insights into access barriers and financial burdens (Srivastava et al., 2021; Patil et al., 2024).

Dependent Variable: Household out-of-pocket expenditure on child immunisation, quantified in Indian Rupees.

Independent Variables: Place of residence (urban or rural location), Religion (such as Hindu, Muslim, etc.), Social Group (community or caste classification), Wealth Quintile (income-based grouping), Place of Immunisation (institution where vaccination occurs).

Result and Discussion:

State-specific analyses reveal significant variability in out-of-pocket expenditures for child immunisation across India, as shown in Table 1. Household expenditures range from as little as ₹32.66 in Tripura to over ₹1,000 in Delhi. Urban households in nearly all states incur higher out-of-pocket expenditures than their rural counterparts, underscoring the influence of provider mix, service availability, and non-medical costs. Metropolitan states and union territories see much higher urban OOPE. For instance, Delhi (₹1,046.24; 95% CI: 815.11–1277.36), Maharashtra (₹862.15; 95% CI: 745.31–979.00), Karnataka (₹807.55; 95% CI: 700.19–914.91), and West Bengal (₹895.03; 95% CI: 689.40–1100.66) all show the highest levels of urban expenditures. In contrast, rural households in Rajasthan (₹18.66; 7.74–29.58), Jharkhand (₹17.24; 12.30–22.19), and Chhattisgarh (₹24.28; 1.66–46.89) incur low expenditures, often not significantly different from zero. Kerala (urban ₹396.34 vs. rural ₹280.75) and Tamil Nadu (urban ₹700.00 vs. rural ₹249.27) display narrower urban–rural gaps, indicating more consistent access and cost structures. Rural OOPE in Tripura and Sikkim matches or exceeds urban levels, pointing to distinct service dynamics in these regions.

Regional Disparity: In the northern states, Jammu & Kashmir shows significant urban-rural disparities, with urban rates at ₹586.70 compared to rural rates of ₹77.50, while Haryana exhibits similar trends, with urban rates at ₹700.47 versus rural rates of ₹99.51, reflecting reliance on private providers in urban areas. In the eastern states, urban households in West Bengal incur significantly higher out-of-pocket expenditures (₹895.03), approximately 20 times those of rural households (₹44.35). Bihar exhibits a significant disparity, with urban income at ₹493.58 per capita compared to rural income at ₹54.30 per capita. Southern states, namely Tamil Nadu, Karnataka, and Andhra Pradesh, exhibit elevated urban out-of-pocket expenditures (OOPE), indicative of a concentration of private immunisation services in metropolitan areas. Kerala is notable for its substantial out-of-pocket expenditures in rural areas, despite robust public health infrastructure, reflecting non-medical costs.

Meghalaya, a northeastern state, records significant urban expenditures of ₹1005.70, alongside notable rural spending of ₹241.18. This data underscores the geographic and access-related challenges posed by the hilly terrain. Tripura and Manipur exhibit low out-of-pocket expenditures across both strata, indicating effective public provisioning. Union Territories such as Chandigarh, Puducherry, Daman & Diu, Dadra & Nagar Haveli, and Lakshadweep exhibit wide confidence intervals, with some rural estimates even crossing zero, indicative of limited sample sizes and variability.

Table 2 exhibits OOPE for children across socio-economic groups. OOPE for child immunisation varies significantly across religious groups. Hindus exhibit the highest overall mean expenditure, recorded at ₹288.51 (95% CI: 273.94–303.09). Urban households allocate approximately ₹616.27, whereas rural households spend around ₹83.01.

Muslims exhibit the lowest overall mean expenditure at ₹151.23, with rural households spending ₹54.53 and urban households ₹263.63. Christians exhibit an average expenditure of ₹250.39, with rural households spending ₹138.01 and urban households spending ₹470.18. Other religions, including smaller faith groups, incur the highest urban out-of-pocket expenditures (₹723.84), suggesting reliance on private providers or geographic access barriers. Religious minorities, especially Christians and "Others," experience elevated out-of-pocket expenses in both rural and urban settings, whereas Muslims report comparatively lower costs. Hindus, as the predominant group, exhibit significant urban-rural disparities, indicative of systemic inequities in access to and selection of providers.

Marked differences emerge across caste and social categories. Scheduled Tribes (ST) and Scheduled Castes (SC) exhibit the lowest out-of-pocket expenditure (OOPE) overall, at ₹102.97 and ₹103.02, respectively. Rural households incur expenditures of approximately ₹53–57, while urban households spend between ₹204 and ₹302. Other Backward Classes (OBC) exhibit elevated expenditure levels, totalling ₹219.68 overall, with rural households averaging ₹97.30 and urban households averaging ₹400.51. Upper-castes report the highest out-of-pocket expenditure (₹523.20 overall), with urban households spending approximately ₹891.80, in contrast to rural households at ₹112.72. Out-of-pocket expenditures are significantly differentiated by social class. Marginalised groups, such as Scheduled Tribes and Scheduled Castes, experience reduced costs, presumably due to their dependence on government facilities. In contrast, upper castes face significantly higher out-of-pocket expenditures in urban settings, indicative of their increased utilisation of private healthcare providers. This pattern highlights persistent disparities in healthcare financing.

OOPE increases sharply with household wealth. The poorest households allocate an average of ₹62.06 in total expenditure, with rural households spending ₹77.50 and urban households spending ₹149.24. The poorer and middle quintiles exhibit moderate expenditure levels, recorded at ₹88.81 and ₹152.22 overall, respectively. Notably, the disparity between rural and urban areas is increasing within the middle quintile, with urban expenditure at ₹248.50 compared to rural expenditure at ₹150.75. Richer households exhibit an overall expenditure of ₹259.14, characterised by minimal rural spending of ₹8.21 (confidence interval includes zero) and high urban spending of ₹413.75. The wealthiest households incur the highest out-of-pocket expenditures (₹788.07 overall), with urban households allocating over ₹1,018.19, compared with rural households, which spend ₹71.49. Out-of-pocket expenditures (OOPE) exhibit a significant correlation with wealth, with the wealthiest quintile incurring expenditures nearly 15 times those of the poorest quintile. Urban households in the wealthiest quintile bear the highest financial burden, reflecting their reliance on private providers and elevated indirect costs. In rural areas, expenditure estimates for wealthier groups frequently approach zero, implying either minimal spending or restricted access to services.

The most striking disparity emerges between government and private facilities. Government facilities exhibit low out-of-pocket expenditures (₹15.59 overall), with rural households incurring ₹13.44 and urban households ₹19.49. Private facilities incur significant expenses, averaging ₹1745.27 overall, with rural households allocating ₹809.92 and urban households ₹2304.59. Provider selection is the primary factor influencing out-of-pocket expenditures (OOPE). Government facilities offer immunisation at minimal cost, whereas private facilities charge upwards of ₹2,000 in urban regions. This significant disparity underscores the essential function of public provision in ensuring financial protection.

Regression Results:

The coefficient for urban versus rural residence regarding the probability of out-of-pocket expenditures (OOPE) is not significant (−0.014; CI: −0.123, 0.095). This suggests that households in urban areas do not differ in their likelihood of incurring OOPE from rural households. Among households that engage in spending, urban residence is significantly correlated with increased expenditure (0.502; CI: 0.432–0.572, ***). This indicates that although the probability of expenditure is comparable, the extent of spending is significantly greater in urban regions, aligning with dependence on private providers and elevated indirect costs.

There is no significant difference in the probability of incurring out-of-pocket expenses (0.012; ns), however, conditional expenditure is significantly lower (−0.537; ***), indicating that Muslim households spend less when they do incur costs. Christians exhibit a significantly higher likelihood of incurring out-of-pocket expenses (1.420; ***), yet their conditional expenditure is lower (−0.368; ***), suggesting a greater frequency of expenses but smaller amounts.

Other religions are associated with a higher likelihood of incurring out-of-pocket expenses (0.607; ***), along with marginally increased conditional expenditure (0.138; †). Religious minorities exhibit unique patterns; Christians and “Others” are more prone to experience out-of-pocket expenditures (OOPE), whereas Muslims incur lower expenses when they do. This underscores the variation in financial burden among religious groups, potentially indicating disparities in provider selection and geographic distribution.

The likelihood of out-of-pocket expenses (OOPE) is significantly higher among the middle and richer quintiles (Q2–Q4), with coefficients ranging from 0.185 to 0.226; * to **. The richest quintile (Q5) exhibits no notable variation in probability.
Conditional expenditure increases systematically with wealth accumulation. Quintile 3 (0.175; **), Quintile 4 (0.343; ***), and Quintile 5 (0.674; ***) demonstrate significantly increased spending.
Wealthier households exhibit a higher propensity to spend and allocate greater amounts, with the richest quintile showing the highest conditional expenditure levels. This gradient indicates an increased reliance on private providers and greater financial capacity, while also highlighting equity issues, as lower-income households may encounter hidden barriers to access.
Scheduled Castes (SC) exhibit a reduced likelihood of incurring out-of-pocket expenditures (−0.497; ***), with no significant variation in conditional expenditure. Other Backward Classes (OBC) exhibit a reduced likelihood of incurring Out-of-Pocket Expenditure (OOPE) (−0.520; ***), yet they tend to spend more when such expenditures occur (0.151; *). Individuals from upper castes exhibit a marginally reduced likelihood of incurring out-of-pocket expenses (−0.211; **), while their conditional expenditure is significantly elevated (0.542; ***). Marginalised groups, such as Scheduled Castes (SC) and Other Backwards Classes (OBC), are less likely to report out-of-pocket expenditures (OOPE), suggesting dependence on public facilities or restricted access to resources. In contrast, upper castes exhibit significantly higher expenditures when costs are incurred, indicating social stratification in provider selection and financial responsibility.

The most significant predictor in both parts of the model is the place of immunisation. Households utilizing private facilities exhibit a markedly higher likelihood of incurring out-of-pocket expenses (6.569; ***), and conditional expenditure is significantly elevated (0.926; ***).
Provider selection is the primary factor influencing out-of-pocket expenditures. Private immunisation services result in increased incidence and greater expenditure, highlighting the essential role of public facilities in providing financial protection.
Both components of the regression model exhibit significant positive coefficients (0.012; *** for probability, 0.023; *** for expenditure), suggesting systematic variation among states. This indicates variations in the organisation of health systems, in public provision, and in the extent of private-sector involvement.

Conclusion: This research conducts a thorough analysis of out-of-pocket expenditure (OOPE) related to child immunisation in India, utilising a two-part model to differentiate between the likelihood of incurring costs and the conditional amount of expenditure. The findings indicate that although the probability of households reporting out-of-pocket expenditures is relatively consistent across urban and rural areas, the level of expenditure is markedly higher in urban areas. This indicates that urban households, while enjoying increased access to immunisation services, face a disproportionate financial burden primarily due to dependence on private providers and elevated indirect costs, including transportation and lost wages.
Socioeconomic and demographic factors significantly influence out-of-pocket expenditure patterns. Wealth gradients are significant, with affluent households spending markedly more, especially in urban settings. Nonetheless, the minimal expenditure observed among lower-

income households may not inherently indicate financial security; instead, it may reflect unmet needs or restricted access to services. Social stratification significantly influences out-of-pocket expenditures (OOPE): Scheduled Castes and Scheduled Tribes tend to incur lower OOPE, whereas upper-caste households exhibit substantially higher spending, underscoring disparities in provider selection and financial responsibility. Religious disparities are evident, as Christians and other minority groups are more prone to out-of-pocket expenditures (OOPE), whereas Muslims indicate lower conditional spending levels.

The primary factor influencing out-of-pocket expenditures (OOPE) is the source of immunisation. Households that use private facilities are significantly more likely to incur expenses and experience considerably higher costs than those that depend on government services. This highlights the essential need to expand public provision, especially in urban areas where the predominance of the private sector creates unequal financial burdens.

The study reveals ongoing disparities in immunisation financing related to wealth, caste, religion, and geography. Policy initiatives should concentrate on enhancing free public immunisation services, minimising indirect costs, and integrating equity monitoring into standard health system assessments. Addressing financial barriers is crucial to achieving universal, equitable, and sustainable immunisation coverage in India, thereby facilitating progress toward the Sustainable Development Goals and the overarching aim of Universal Health Coverage.

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Table 1: Mean Out of Pocket Expenditure in child immunization across states in India, NSS, 2017-18

States	Mean (95% confi. Interval)		
	All	**Rural**	**Urban**
JAMMU& KASHMIR	255.64 [177.26, 334.01]	77.50 [63.43, 91.58]	586.70 [366.81, 806.58]
HIMACHAL PRADESH	129.86 [66.73, 192.98]	79.34 [44.66, 114.03]	387.34 [47.43, 727.25]
PUNJAB	317.22 [252.34, 382.10]	150.75 [105.47, 196.02]	482.45 [362.28, 602.62]
CHANDIGARGH	295.50 [103.41, 487.58]	8.21 [-2.57, 18.98]	395.54 [138.88, 652.19]
UTTARANCHAL	148.15 [106.23, 190.06]	71.49 [44.02, 98.95]	282.30 [178.94, 385.66]
HARYANA	381.38 [301.81, 460.94]	99.51 [66.34, 132.69]	700.47 [538.01, 862.92]
DELHI	1008.79 [788.68, 1228.90]	316.07 [38.92, 593.22]	1046.24 [815.11, 1277.36]
RAJASTHAN	118.28 [86.18, 150.37]	18.66 [7.74, 29.58]	311.81 [221.35, 402.26]
UTTAR PRADESH	174.42 [148.04, 200.80]	47.15 [36.67, 57.64]	366.56 [302.98, 430.14]
BIHAR	183.87 [146.72, 221.03]	54.30 [39.33, 69.27]	493.58 [375.24, 611.93]
SIKKIM	62.65 [32.29,	70.50 [33.11, 107.89]	35.09 [-3.70, 73.87]

	93.01]		
ARUNACHAL PRADESH	236.78 [180.35, 293.21]	201.48 [144.33, 258.62]	312.15 [184.55, 439.75]
NAGALAND	100.41 [78.46, 122.35]	66.95 [46.52, 87.38]	168.38 [117.88, 218.87]
MANIPUR	49.44 [31.77, 67.11]	33.93 [20.40, 47.47]	72.80 [33.57, 112.04]
MIZORAM	103.16 [57.81, 148.52]	31.27 [12.05, 50.49]	206.29 [101.14, 311.45]
TRIPURA	32.66 [24.00, 41.33]	33.36 [23.22, 43.51]	30.75 [14.04, 47.45]
MEGHALAYA	431.78 [312.94, 550.62]	241.18 [188.37, 293.99]	1005.70 [575.89, 1435.51]
ASSAM	92.48 [65.81, 119.14]	41.79 [29.41, 54.16]	265.93 [157.63, 374.24]
WEST BENGAL	354.60 [276.40, 432.79]	44.35 [20.26, 68.45]	895.03 [689.40, 1100.66]
JHARKHAND	118.99 [84.33, 153.65]	17.24 [12.30, 22.19]	397.85 [272.06, 523.63]
ORISSA	146.21 [101.03, 191.39]	97.06 [57.35, 136.78]	304.69 [164.26, 445.13]
CCHATTISGARH	150.03 [102.85, 197.22]	24.28 [1.66, 46.89]	366.41 [246.26, 486.56]
MADHYA PRADESH	188.23 [139.08, 237.37]	34.59 [17.07, 52.10]	439.93 [314.98, 564.87]
GUJRAT	355.60 [295.78, 415.41]	141.76 [88.20, 195.33]	555.08 [452.37, 657.79]
DAMAN & DIU	161.81 [13.73, 309.88]	13.95 [-13.40, 41.30]	381.03 [26.99, 735.08]

D & N HAVELI	293.04 [9.58, 576.51]	10.98 [-0.22, 22.19]	611.67 [16.63, 1206.71]
MAHARASTHRA	479.13 [417.81, 540.46]	92.95 [67.13, 118.77]	862.15 [745.31, 979.00]
ANDHRA PRADESH	306.25 [210.86, 401.65]	104.20 [67.06, 141.33]	644.67 [399.38, 889.95]
KARNATAKA	460.96 [404.20, 517.73]	138.96 [104.36, 173.56]	807.55 [700.19, 914.91]
GOA	461.22 [187.71, 734.74]	102.70 [-98.60, 304.00]	678.69 [264.51, 1092.87]
LAKSHADWEEP	116.04 [-1.31, 233.38]	150.00 [-7.96, 307.96]	21.43 [-20.57, 63.43]
KERALA	331.44 [272.35, 390.53]	280.75 [206.81, 354.69]	396.34 [300.63, 492.06]
TAMIL NADU	448.62 [392.62, 504.62]	249.27 [192.25, 306.30]	700.00 [597.58, 802.43]
PUDUCHERYY	152.65 [49.38, 255.92]	3.70 [-3.56, 10.96]	226.44 [73.71, 379.18]
A & N ISLANDS	271.80 [135.99, 407.62]	32.47 [-30.75, 95.70]	536.77 [269.69, 803.86]
TELANGANA	380.94 [288.62, 473.25]	155.54 [112.92, 198.16]	625.25 [440.03, 810.47]

Source: Authors calculation from NSS 2017-18 data

Table 2: Mean out of pocket expenditure in Child immunization by different socio-economic variables in India, 2017-18

	All	Rural	Urban
Variables	**Mean [95% CI]**	**Mean [95% CI]**	**Mean [95% CI]**
Religion			
Hindu	288.51 [273.94, 303.09]	83.01 [75.90, 90.11]	616.27 [580.85, 651.68]
Muslim	151.23 [131.79, 170.67]	54.53 [45.09, 63.97]	263.63 [223.33, 303.92]

Christian	250.39 [216.41, 284.38]	138.01 [113.40, 162.63]	470.18 [383.84, 556.52]
Others	342.03 [275.24, 408.83]	149.05 [111.20, 186.90]	723.84 [543.24, 904.44]
Social Class			
ST	102.97 [87.31, 118.64]	53.24 [45.84, 60.64]	301.68 [230.23, 373.13]
SC	103.02 [88.46, 117.57]	57.11 [48.05, 66.16]	204.05 [162.18, 245.91]
OBC	219.68 [204.47, 234.90]	97.30 [86.80, 107.79]	400.51 [366.52, 434.50]
Others	523.20 [489.43, 556.98]	112.72 [96.66, 128.78]	891.80 [830.60, 953.01]
Wealth			
Poorest	62.06 [54.06, 70.06]	77.50 [63.43, 91.58]	149.24 [109.86, 188.62]
poorer	88.81 [78.17, 99.45]	79.34 [44.66, 114.03]	168.85 [136.37, 201.34]
Middle	152.22 [136.73, 167.72]	150.75 [105.47, 196.02]	248.50 [211.78, 285.22]
Richer	259.14 [236.42, 281.87]	8.21 [-2.57, 18.98]	413.75 [370.83, 456.68]
Richest	788.07 [738.06, 838.08]	71.49 [44.02, 98.95]	1018.19 [951.42, 1084.97]
Place of Immunization			
Government	15.59 [14.23, 16.95]	13.44 [12.05, 14.83]	19.49 [16.62, 22.37]
Private	1745.27 [1673.54, 1817.00]	809.92 [751.91, 867.94]	2304.59 [2198.68, 2410.50]

Source: Authors Calculation from NSS 2017-18 data

Table 3: Two -part Model regression result

Predictors	Part 1: (Logit Coefficient [95% CI])	Part 2: (Log Linear Coefficient [95% CI])
Place of residence (urban vs rural)		
Rural	ref	ref
Urban	-0.014[-0.123, 0.095]	0.502 [0.432, 0.572] ***
Religion		
Hindu	ref	ref
Muslim	0.012 [-0.130, 0.154]	-0.537 [-0.624, -0.450] ***
Christian	1.420 [1.257, 1.584] ***	-0.368 [-0.502, -0.233] ***
Others	0.607 [0.374, 0.841] ***	0.138 [-0.012, 0.289] †
Wealth quintile		
Poorest	ref	ref
Poorer	0.185 [0.032, 0.338] *	0.016 [-0.099, 0.131]
Middle	0.226 [0.074, 0.379] **	0.175 [0.064, 0.285] **

Richer	0.223 [0.064, 0.382] **	0.343 [0.232, 0.454] ***
Richest	0.048 [-0.122, 0.218]	0.674 [0.564, 0.783] ***
Social group		
ST	ref	ref
SC	-0.497 [-0.671, -0.323] ***	-0.027 [-0.172, 0.118]
OBC	-0.520 [-0.677, -0.363] ***	0.151 [0.022, 0.281] *
Others	-0.211 [-0.373, -0.049] **	0.542 [0.412, 0.671] ***
Source of immunization		
Public	ref	ref
Private	6.569 [6.435, 6.704] ***	0.926 [0.844, 1.008] ***
State fixed effects	0.012 [0.007, 0.018] ***	0.023 [0.020, 0.026] ***
Constant	-3.497 [-3.677, -3.317] ***	4.324 [4.172, 4.475] ***