

Supplementary Table I. Estimated posterior median, 95% credible intervals, Geweke diagnostic value for all three chains						
Covariates	Chain 1		Chain 2		Chain 3	
	Posterior Median (95% Credible Interval)	Geweke. diag	Posterior Median (95% Credible Interval)	Geweke. diag	Posterior Median (95% Credible Interval)	Geweke. diag
Higher Education	0.0293 (0.0012 - 0.0574)	0.9	0.0294 (0.0010 - 0.0578)	0.4	0.0299 (0.0011 - 0.0581)	0.7
Age (30-49yr)	0.0361 (0.0050 - 0.0670)	-1.3	0.0356 (0.0052 - 0.0668)	-1.9	0.0372 (0.0049 - 0.0672)	-1.5
Obesity	0.0874 (0.0116 - 0.1633)	1.7	0.0881 (0.0142 - 0.1619)	1.5	0.0831 (0.0088 - 0.1579)	1.9
Richest quintile	0.0161 (0.0093 - 0.0250)	-0.5	0.0156 (0.0079 - 0.0234)	0.1	0.0172 (0.0094 - 0.0252)	-0.7
DIC	1530.75		1530.25		1530.18	

Spatio-temporal trends in C-section risk $\{\theta_{kr}\}$, and the posterior risk distributions for 104 local authorities (districts) and nine years were computed. For this, we first estimated the average (mean) risk across the $k=104$ local authorities for each year and MCMC sample, yielding the posterior distribution to these spatial averages for each year, and then the posterior median and 95% credible intervals were computed for the spatially averaged risk for each year. Throughout the analysis, an α level of 0.05 was adopted to indicate statistical significance. The goodness of the Bayesian model fit is measured by the Deviance Information Criterion (DIC) and the Geweke diagnostic. The DIC is defined as $DIC = 2E_{\theta/y}(D) - D[E_{\theta/y}(\theta)]$ where $D(\cdot)$ is the deviance of the model and y is the observed data. A lower DIC indicates a better-fitting, more parsimonious model. Geweke diagnostic is an MCMC convergence diagnostic for which a value between -2 and 2 indicates convergence.

Interpretation of MCMC model: The estimated posterior median RR among women with higher education is estimated to be 15.2 per cent higher compared to women with at most secondary level education. The risk of CS among women aged 30-49 yr is estimated to be 28.9 per cent higher compared to women in the lower age group. Obesity is estimated to increase the risk of CS delivery by 19.8 per cent. Further, we found that the estimated risk of CS among women of the richest wealth quintile is 14.7 per cent higher compared to women of lower wealth quintiles.

Supplementary Table I shows the results from each chain, that is, the posterior median point estimate and 95% credible intervals (2.5%, 97.5%) for four predictor variables. The Geweke diagnostic values indicate MCMC convergence, and the DIC indicates a good model fit for the present dataset.

Spatio-temporal analysis: To check for the presence of spatial autocorrelation, we computed Global Moran's I for residuals from the simple Poisson log-linear model for each year. Results in supplementary table II indicate strong spatial autocorrelation, and all P -values obtained were less than 0.05.

Relative risk (RR): Figure 3 shows that the RR increases over time, reaching its highest level in 2019 compared to any preceding years included in this study. In 2011, RR was found to be highest in north districts in Sikkim and Tawang, West Kameng and Dibang Valley in Arunachal Pradesh, and North Cachar Hills (Dima Hasao) in Assam. In 2012, we found a high value of RR in the northern district of Sikkim, Dibang Valley in Arunachal Pradesh, Cachar in Assam, Champhai district in Mizoram, and Ukhrul district of Manipur. Further, in 2013, a higher RR value was observed in the eastern and western parts of Arunachal Pradesh and lower and upper-western parts of Assam. In 2014, the Dibang Valley and Anjaw districts of Arunachal Pradesh, Cachar district, and the western part in Assam, the Ukhrul districts in Manipur showed higher RR values. Moreover, we found higher RR values in the upper-western districts of Arunachal Pradesh, the lower and western part of Assam, the northern district in Sikkim for the years 2015-19.

Supplementary Table II. Moran's *I* value estimated using year-wise residual of the Poisson log-linear model

Year	Moran's <i>I</i>	<i>P</i> value
2011	0.1442	0.001
2012	0.4214	0.001
2013	0.1928	0.001
2014	0.2186	0.001
2015	0.3721	0.001
2016	0.2277	0.001
2017	0.1871	0.001
2018	0.209	0.001
2019	0.2686	0.001

P<0.001