

I SUPPLEMENTARY MATERIAL

Regional and demographic disparities in low-risk hospital deliveries in Brazil's Public Health System

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Table 1S. Absolute number of vaginal and cesarean deliveries in the SUS (2009-2023)

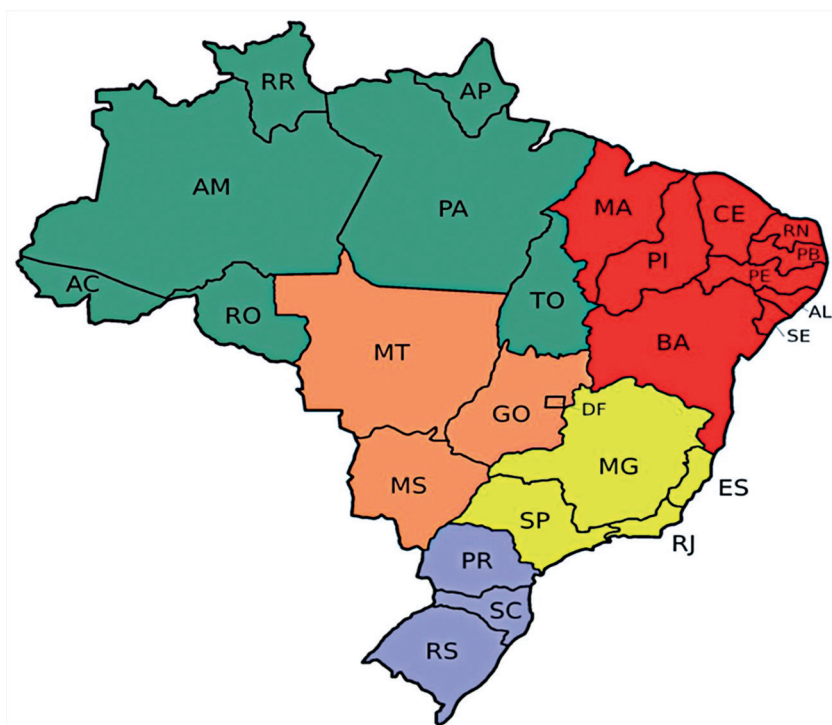
Brazil Year	Vaginal delivery		Cesarean delivery		p value*
	freq.	%	freq.	%	
2009	1,258,102	68	603,806	32	< 0.001
2010	1,190,275	66	621,270	34	
2011	1,141,508	64	637,558	36	
2012	1,068,181	63	638,695	37	
2013	1,053,751	62	650,813	38	
2014	1,052,904	61	662,433	39	
2015	1,096,703	63	649,596	37	
2016	1,035,371	62	626,630	38	
2017	1,031,378	61	654,101	39	
2018	1,024,679	60	682,141	40	
2019	997,646	59	695,999	41	
2020	914,722	57	679,453	43	
2021	885,027	57	665,913	43	
2022	814,311	56	642,887	44	
2023	771,880	55	622,411	45	
Total	15,336,438	61	9,733,706	39	

*Trend χ^2 test.

Table 2S. Characterization of Brazilian regions

Region	Socioeconomic and demographic features	States (N° of states and municipalities)
North	Inhabitants: 17,354,884 Populational density: 4.5 inhabitants/km ² GDP per capita: 33,123 Household income per capita: 1,302	States: Acre (AC), Amapá (AP), Amazonas (AM), Pará (PA), Rondônia (RO), Roraima (RR), Tocantins (TO) N° of states: 7 N° of municipalities: 450
Northeast	Inhabitants: 54,658,515 Populational density: 36.1 inhabitants/km ² GDP per capita: 25,401 Household income per capita: 1,146	States: Alagoas (AL), Bahia (BA), Ceará (CE), Maranhão (MA), Paraíba (PB), Pernambuco (PE), Piauí (PI), Rio Grande do Norte (RN), Sergipe (SE) N° of states: 9 N° of municipalities: 1,794
South	Inhabitants: 29,937,706 Populational density: 53.2 inhabitants/km ² GDP per capita: 55,942 Household income per capita: 2,167	States: Paraná (PR), Rio Grande do Sul (RS), Santa Catarina (SC) N° of states: 3 States N° of municipalities: 1,191
Southeast	Inhabitants: 84,840,113 Populational density: 91.8 inhabitants/km ² GDP per capita: 63,327 Household income per capita: 2,237	States: Espírito Santo (ES), Minas Gerais (MG), Rio de Janeiro (RJ), São Paulo (SP) N° of states: 4 N° of municipalities: 1,668
Midwest	Inhabitants: 16,289,538 Populational density: 16.3 inhabitants/km ² GDP per capita: 65,651 Household income per capita: 2,202	States: Goiás (GO), Mato Grosso (MT), Mato Grosso do Sul (MS), Distrito Federal (DF) N° of states: 4 N° of municipalities: 467

Source: Developed by authors, with data from the 2022 Census of the Brazilian Institute of Geography and Statistics <<https://www.ibge.gov.br/estatisticas/sociais/trabalho/22827-censo-demografico-2022.html>>



Source: <https://www.infoescola.com/geografia/mapa-do-brasil/>

Regions by color: northeast, red; north, green; midwest, orange; southeast, yellow; and south, purple.

Figure 1S. Map of Brazilian states and regions

Table 3S. Average SUS financing value, length-of-stay, and in-hospital mortality rate by Brazilian region and mothers' age group (2023)

Average SUS financing value (2023)									
Delivery	Region	<15 years	15-19 years	20-24 years	25-29 years	30-34 years	35-39 years	40+ years	Total
Vaginal	North	\$170.56	\$172.51	\$173.88	\$174.13	\$173.81	\$174.64	\$175.16	\$173.62
	Northeast	\$163.85	\$163.92	\$164.09	\$164.27	\$163.90	\$164.22	\$163.89	\$164.08
	Southeast	\$176.78	\$176.03	\$175.66	\$175.18	\$175.40	\$175.42	\$176.63	\$175.56
	South	\$180.01	\$178.50	\$178.96	\$179.07	\$178.79	\$178.97	\$179.71	\$178.92
	Midwest	\$172.51	\$172.80	\$173.82	\$174.07	\$174.24	\$174.94	\$176.25	\$173.87
Delivery	Region	<15	15-19	20-24	25-29	30-34	35-39	40+	Total
C-section	North	\$218.43	\$224.07	\$225.17	\$226.54	\$228.35	\$232.11	\$234.65	\$226.51
	Northeast	\$215.20	\$216.98	\$217.21	\$217.44	\$217.40	\$218.36	\$219.06	\$217.43
	Southeast	\$228.72	\$227.19	\$225.90	\$226.29	\$228.16	\$230.81	\$233.12	\$227.34
	South	\$232.00	\$231.35	\$229.23	\$229.39	\$230.47	\$231.83	\$234.16	\$230.19
	Midwest	\$215.74	\$219.32	\$220.31	\$221.17	\$221.96	\$226.65	\$228.14	\$221.39
Average LOS (2023)									
Delivery	Region	<15	15-19	20-24	25-29	30-34	35-39	40+	Total
Vaginal	North	1.96	2.01	2.02	2.00	2.00	2.10	2.12	2.02
	Northeast	1.91	1.85	1.83	1.81	1.84	1.86	1.90	1.83
	Southeast	2.70	2.42	2.37	2.33	2.33	2.34	2.46	2.36
	South	2.41	2.20	2.16	2.12	2.12	2.15	2.17	2.15
	Midwest	2.15	2.07	2.04	2.01	1.99	2.04	2.09	2.03
Delivery	Region	<15a	15-19a	20-24a	25-29a	30-34a	35-39a	40+a	Total
C-section	North	2.63	2.74	2.71	2.69	2.71	2.89	3.00	2.73
	Northeast	2.51	2.53	2.51	2.48	2.50	2.59	2.67	2.52
	Southeast	2.77	2.65	2.60	2.59	2.60	2.72	2.81	2.63
	South	2.61	2.53	2.51	2.50	2.51	2.59	2.74	2.53
	Midwest	2.44	2.54	2.57	2.62	2.64	2.77	3.04	2.62
In-hospital mortality rate (2023)									
Delivery	Region	<15a	15-19a	20-24a	25-29a	30-34a	35-39a	40+a	Total
Vaginal	North	0.00	0.39	0.33	0.33	0.36	0.57	0.91	0.37
	Northeast	0.00	0.28	0.18	0.23	0.53	0.42	0.53	0.29
	Southeast	0.00	0.14	0.15	0.23	0.05	0.14	0.00	0.15
	South	0.00	0.22	0.10	0.04	0.13	0.00	0.00	0.10
	Midwest	0.00	0.26	0.10	0.33	0.22	0.23	0.00	0.21
Delivery	Region	<15a	15-19a	20-24a	25-29a	30-34a	35-39a	40+a	Total
C-section	North	0.00	0.33	0.56	0.24	0.70	1.20	0.49	0.50
	Northeast	0.00	0.21	0.26	0.35	0.51	0.25	0.33	0.32
	Southeast	1.31	0.30	0.21	0.26	0.45	0.78	0.15	0.34
	South	0.00	0.47	0.20	0.37	0.19	0.33	1.03	0.31
	Midwest	0.00	0.23	0.29	0.34	0.11	0.61	0.61	0.30

LOS: length-of-stay.

Table 4S. Differences in SUS financing values (in US\$) by delivery type across Brazilian regions (2023)

Region	Total SUS financing value			Average SUS financing value	
	Vaginal delivery	C-section	Total	Vaginal delivery	C-section
North	\$18,735,968.38	\$18,924,515.45	\$37,660,483.83	\$173.62	\$226.51
Northeast	\$39,271,007.37	\$42,443,621.94	\$81,714,629.32	\$164.08	\$217.43
South	\$16,641,958.05	\$20,482,708.07	\$37,124,666.13	\$178.92	\$230.19
Southeast	\$47,398,143.37	\$44,971,511.96	\$92,369,655.33	\$175.56	\$227.34
Midwest	\$10,714,973.82	\$12,586,753.37	\$23,301,727.18	\$173.87	\$221.39
Total	\$ 132,762,050.99	\$139,409,110.80	\$272,171,161.79	\$172.00	\$223.98
p value*	[p= 0.008]				

* The average SUS financing value was statistically higher in the cesarean section than in the vaginal delivery group using the Mann-Whitney U test, with a significance level of $p < 0.05$, using the currency conversion rate at the established date.

Table 5S. Differences in mean length-of-stay by delivery type across Brazilian regions (2023)

Region	Total LOS			Mean LOS	
	Vaginal delivery	C-section	Total	Vaginal delivery	C-section
North	217,548	228,062	445,610	2.02	2.73
Northeast	438,854	491,457	930,311	1.83	2.52
South	199,842	224,938	424,780	2.15	2.53
Southeast	637,173	519,331	1,156,504	2.36	2.63
Midwest	125,175	148,948	274,123	2.03	2.62
Total	1,618,592	1,612,736	3,231,328	2.10	2.59
p value*	[p=0.008]				

* Mean length-of-stay was statistically higher in the cesarean section group than in the vaginal delivery group using the Mann-Whitney U test, with a significance level of $p < 0.05$.

LOS: length-of-stay.

Table 6S. Differences in in-hospital maternal mortality by delivery type across Brazilian regions (2023)

Region	Total deliveries			Vaginal deliveries			Cesarean deliveries		
	Procedures		Mortality	Procedures		Mortality	Procedures		Mortality
	N	N		N	N		N	N	
North	191,460	82	0.04	107,911	40	0.04	83,549	42	0.05
Northeast	434,553	132	0.03	239,347	69	0.03	195,206	63	0.03
South	181,997	37	0.02	93,015	9	0.01	88,982	28	0.03
Southeast	467,802	107	0.02	269,982	40	0.01	197,820	67	0.03
Midwest	118,479	30	0.03	61,625	13	0.02	56,854	17	0.03
Total	1,394,291	388	0.03	771,880	171	0.02	622,411	217	0.03
p value*	[p=0.180]								

* Relative mortality was similar in both groups according to the Mann-Whitney U test, with a significance level of $p < 0.05$.