

Balmant, Nathalie Vieira¹; de Paula Silva, Neimar¹; de Sá Pereira, Bruna Maria¹; Silva, Deliane S.¹; Terres, Letícia R.¹; Rocha, Maycon F.S.S.¹; Fonseca, Nayara R.¹; Schmidt, Tauana P.¹; Santos, Marceli Oliveira²; de Camargo, Beatriz¹

¹Divisão de Pesquisa Clínica e Desenvolvimento Tecnológico

²Divisão de Vigilância e Análise de Situação Coordenação de Prevenção e Vigilância

Background

Early diagnosis and survival of Central Nervous System (CNS) tumors is still a challenge. Treatment requires a specialized center with a multidisciplinary team. Knowledge about delays in health care system is important to build improvements in early diagnosis and treatment.

Purpose

The aim of this study was to identify delays in the Brazilian health care system among children and adolescents (aged 0-19 years) with CNS tumors.

Material and Methods

This cross-sectional study included 2,339 cases of CNS tumors from 145 Brazilian Hospital-Based Cancer Registries (2007-2011). The term "delay" was used to designate the time interval (Figure 1). Delays were analyzed in two groups of patients: Group 1 - without a previous histopathological diagnosis - 1,513 pts (64.7%) and Group 2 - with a previous histopathological diagnosis - 826 pts (35.3%) (Figure 2). Referral, hospital, health care, treatment and diagnosis delays were calculated in days, as well as the median and 25th and 75th percentiles among categories. Mann-Whitney and Kruskal-Wallis was used to test differences (SPSS-20.0). Significance was considered as $p < 0.05$.

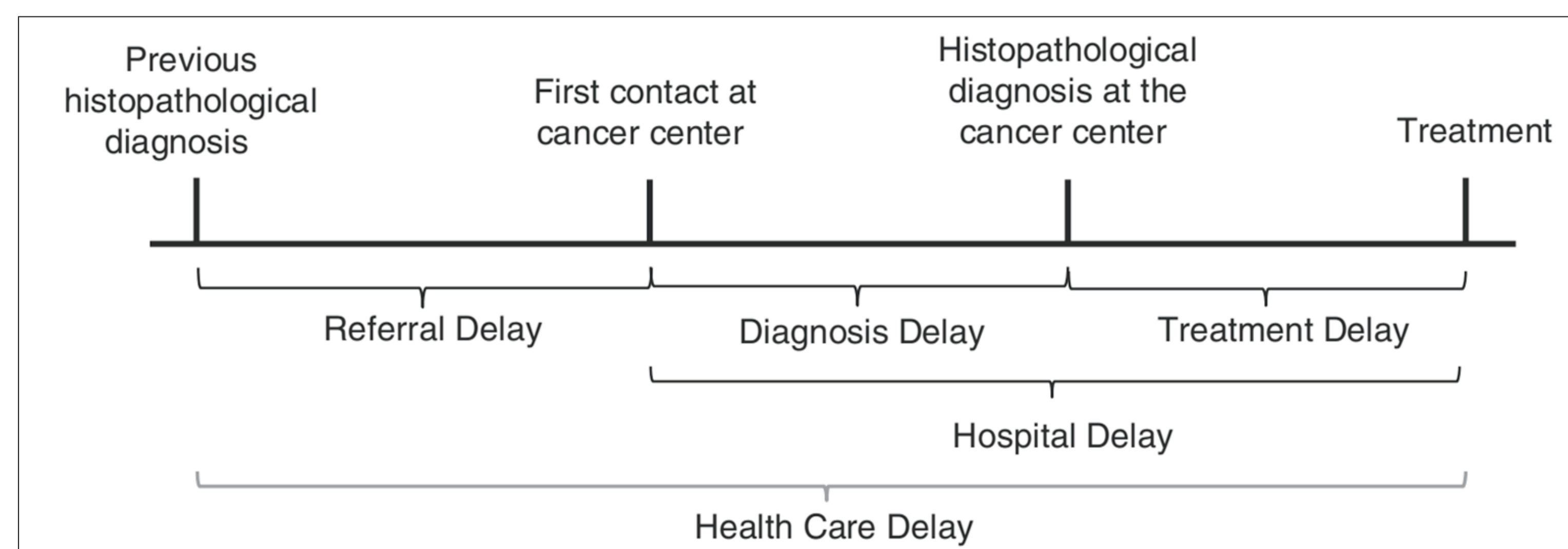


Figure 1. Diagnosis delay in cancer care pathways, adapted from Dang-Tan and Franco

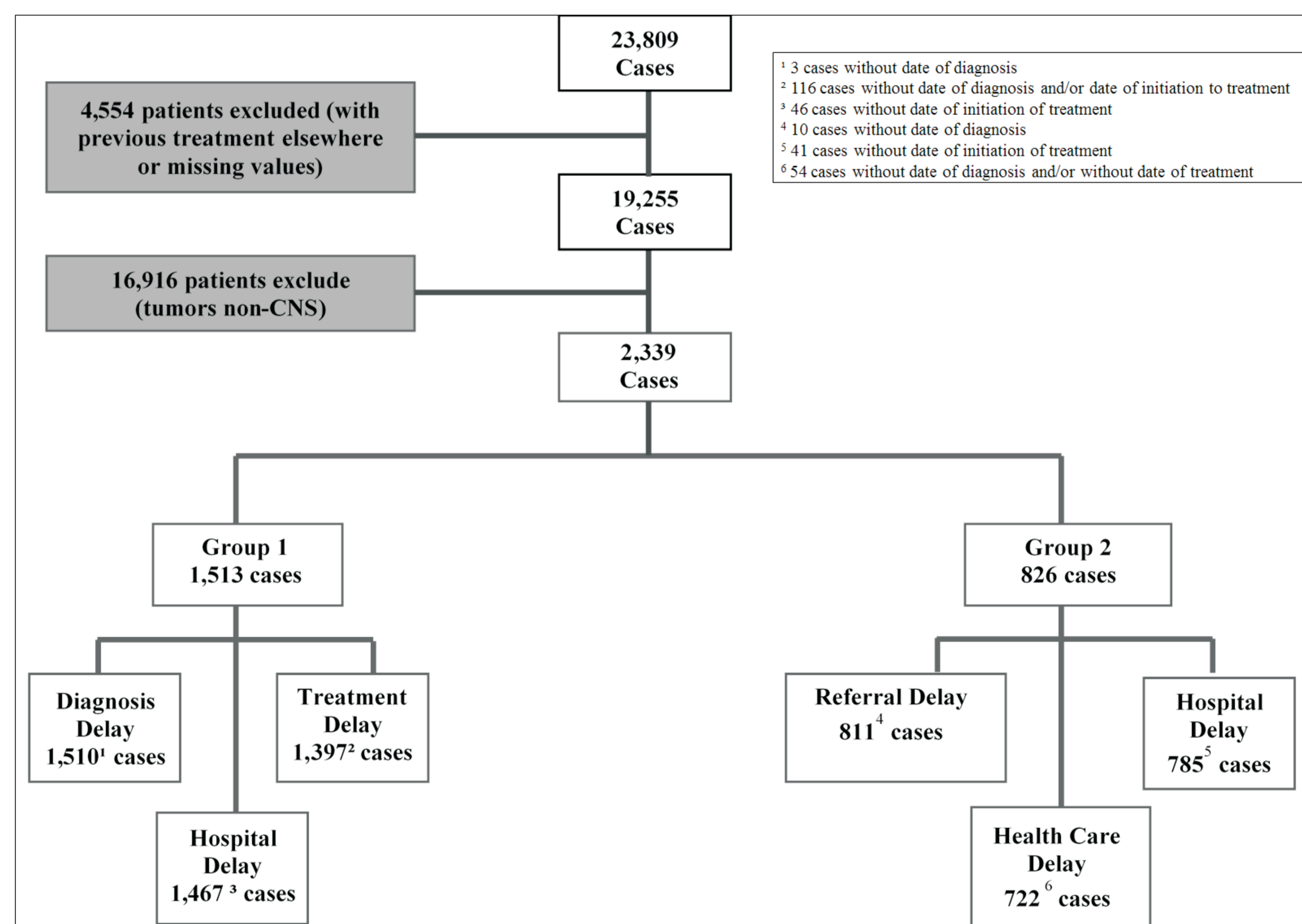


Figure 2. Patients with CNS tumors selected from the Brazilian HBCRs according to information available. Group 1, patients without previous histopathologic diagnosis; Group 2, patients with previous histopathologic diagnosis, Brazil, 2007-2011.

Results

Male gender was predominant (54.6%). Astrocytoma was the commonest tumor (36.2%). More than half of patients came from the Southeast region (57.7%). Most of delays increased with age. Patients with 'other gliomas' had the shortest diagnosis, health care system and referral delays and the longest treatment delay. Patients from the North region had the longest diagnosis and hospital delays while from South region had the shortest. Delays varied between Brazilian geographic regions, patients from the North and Northeast regions had the longest delays (Tables 1 and 2).

Table 1: Distribution, median delays and 25th;75th percentiles (in days) according to clinical and sociodemographic variables for patients without previous diagnosis (Group-1), Brazil, 2007-2011

	n(%)	Diagnosis Delay		Treatment Delay		Hospital Delay	
		n	Median (Q1-Q3)	n	Median (Q1-Q3)	n	Median (Q1-Q3)
Overall	2,339						
Gender							
Male	1,276 (54.6)	807	8.0 (3.0-23.0)	749	0.0 (0.0-7.5)	784	14.0 (5.0-40.0)
Female	1,063 (45.4)	703	8.0 (2.0-22.0)	648	0.0 (0.0-8.0)	683	13.0 (5.0-36.0)
			$p=0.488^a$		$p=0.280^a$		$p=0.861^a$
Age-group (years)							
0-4	657 (28.1)	444	7.0 (2.0-19.0)	417	0.0 (0.0-7.5)	433	12.0 (4.0-32.0)
5-9	774 (33.1)	478	8.0 (1.0-21.0)	444	0.0 (0.0-7.8)	467	12.0 (5.0-34.0)
10-14	569 (24.3)	376	8.0 (3.0-23.8)	342	0.0 (0.0-8.3)	365	14.0 (5.0-46.0)
15-19	339 (14.5)	212	13.0 (4.3-38.5)	194	0.0 (0.0-11.0)	202	23.0 (6.8-62.5)
			$p < 0.001^b$		$p=0.923^b$		$p < 0.001^b$
CNS tumor subgroup							
Ependymoma and choroid plexus	294 (12.6)	200	8.0 (2.0-22.0)	186	0.0 (0.0-6.0)	194	10.5 (4.8-33.0)
Astrocytoma	846 (36.2)	587	10.0 (3.0-26.0)	538	0.0 (0.0-7.0)	565	14.0 (5.5-40.5)
Intracranial and intraspinal embryonic tumors	553 (23.6)	365	7.0 (2.0-19.0)	345	0.0 (0.0-8.0)	359	11.0 (4.0-35.0)
Others gliomas	297 (12.7)	158	4.0 (0.0-13.3)	148	4.0 (0.0-16.8)	153	15.0 (5.0-40.5)
Other intracranial and intraspinal tumors	349 (14.9)	200	10.5 (3.0-34.0)	180	0.0 (0.0-7.8)	196	21.0 (5.0-47.8)
			$p < 0.001^b$		$p < 0.001^b$		$p=0.008^b$
Region							
North	58 (2.5)	29	17.0 (0.0-43.0)	29	0.0 (0.0-22.0)	29	31.0 (1.0-59.5)
Northeast	487 (20.8)	286	10.5 (1.8-31.0)	263	0.0 (0.0-12.0)	265	15.0 (5.0-51.5)
Midwest	117 (5.0)	56	10.5 (3.0-21.5)	42	3.5 (0.0-18.3)	53	14.0 (2.5-40.0)
Southeast	1,350 (57.7)	909	9.0 (3.0-23.0)	841	0.0 (0.0-7.0)	890	14.0 (5.0-37.0)
South	327 (14.0)	230	6.0 (2.0-14.0)	222	0.0 (0.0-5.3)	230	9.0 (3.0-24.3)
			$p=0.012^b$		$p=0.052^b$		$p=0.003^b$

Q1-25th percentil; Q3-75th percentil; a p-Value: Mann-Whitney test; b p-Value: Kruskal-Wallis test.

Table 2: Distribution, median delays and 25th;75th percentiles (in days) according to clinical and sociodemographic variables for patients with a previous diagnosis (Group-2), Brazil, 2007-2011.

	n(%)	Referral Delay		Hospital Delay		Health Care System Delay	
		n	Median (Q1-Q3)	n	Median (Q1-Q3)	n	Median (Q1-Q3)
Overall	2,339						
Gender							
Male	1,276 (54.6)	460	20.0 (7.0-46.0)	449	12.0 (1.0-27.0)	444	36.0 (19.0-82.8)
Female	1,063 (45.4)	351	16.0 (7.0-44.0)	336	10.0 (2.0-33.0)	328	37.0 (19.0-84.0)
			$p=0.234^a$		$p=0.370^a$		$p=0.997^a$
Age-group (years)							
0-4	657 (28.1)	209	14.0 (6.0-30.0)	204	11.0 (1.0-27.8)	201	31.0 (17.0-71.0)
5-9	774 (33.1)	291	19.0 (7.0-42.0)	286	9.0 (1.0-25.0)	282	35.0 (18.8-90.5)
10-14	569 (24.3)	189	20.0 (8.0-44.5)	181	13.0 (3.0-27.0)	178	39.5 (19.0-69.0)
15-19	339 (14.5)	122	33.0 (12.8-74.0)	114	14.5 (2.8-44.0)	111	62.0 (27.0-130.0)
			$p < 0.001^b$		$p=0.102^b$		$p < 0.001^b$
CNS tumor subgroup							
Ependymoma and choroid plexus	294 (12.6)	92	19.5 (7.0-58.0)	90	12.5 (1.8-32.5)	89	41.0 (15.5-94.5)
Astrocytoma	846 (36.2)	257	23.0 (7.0-60.5)	243	13.0 (1.0-38.0)	241	48.0 (21.0-114.0)
Intracranial and intraspinal embryonic tumors	553 (23.6)	185	20.0 (9.0-38.0)	183	7.0 (1.0-21.0)	180	35.0 (20.0-62.5)
Others gliomas	297 (12.7)	136	14.0 (6.0-28.0)	132	11.0 (3.0-24.0)	129	28.0 (14.0-54.0)
Other intracranial and intraspinal tumors	349 (14.9)	141	18.0 (6.0-54.5)	137	13.0 (4.0-29.5)	133	37.0 (20.0-87.5)
			$p=0.013^b$		$p=0.029^b$		$p=0.001^b$
Region							
North	58 (2.5)	28	18.5 (9.8-45.8)	27	33.0 (7.0-56.0)	26	58.5 (36.0-166.5)
Northeast	487 (20.8)	192	27.5 (10.3-62.8)	190	18.0 (6.0-36.0)	183	57.0 (27.0-100.0)
Midwest	117 (5.0)	60	24.0 (9.0-48.5)	60	0.0 (0.0-14.0)	59	14.0 (2.5-40.0)
Southeast	1,350 (57.7)	439	15.0 (6.0-38.0)	419	10.0 (2.0-26.0)	418	31.0 (14.8-69.3)
South	327 (14.0)	92	18.0 (8.0-34.0)	89	7.0 (1.0-24.5)	86	30.0 (18.8-83.5)
			$p < 0.001^b$		$p < 0.001^b$		$p < 0.001^b$

Q1-25th percentil; Q3-75th percentil; a p-Value: Mann-Whitney test; b p-Value: Kruskal-Wallis test.

Conclusion

Important disparities were seen across Brazilian regions. North and Northeast had the longest delays in the health care system. Adolescents had the longest delays. The diagnosis (Group 1) and referral (Group 2) delays can be a major issue to improve care of patients with CNS tumors.