

# Prevalence of Brain Tumor in Thailand from 2005 to 2014: Data from the National Health Security Office

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**Objective:** To evaluate the prevalence of brain tumors in Thailand, using the National Health Security Office (NHSO) database.

**Material and Method:** The patients admitted under the Universal coverage (UC), between 2005 and 2014 with the principal diagnosis of brain tumors (malignant tumor ICD (International Statistical Classification of Diseases and Related Health Problems) code C 700, 709, 710-19, 728-9, 751-3, 793; benign tumor code D 320, 329, 330-3, 337, 339, 352-4, and tumor of uncertain behavior code D 420, 429, D 430-3, 438-9, D443-5) were selected from the database of the NHSO and analyzed for the prevalence.

**Results:** A total of 93,810 admissions had claimed treatment fee from the NHSO. The prevalence of brain tumors in Thailand from the NHSO database were 12.79/100,000 populations in the year 2005 and to 25.04/100,000 populations in the year 2014. Benign tumors were more frequent than malignant tumors (13.8 benign tumors compared to 11.9 malignant tumors per 100,000 populations in 2014). Brain and other CNS tumors accounted for 56% of the total brain tumors, followed by cerebral metastasis and meningioma. Health region 1, in the northern part of Thailand, had the highest prevalence of brain tumors, whereas lowest prevalence of brain tumors was observed in southern part, health region 12.

**Conclusion:** The prevalence of brain tumors in Thailand is gradually increasing but still low compared to other western countries. The number of admissions was highest in the health region 1 and lowest in the health region 12.

**Keywords:** Prevalence, Brain tumor, National health security office, Thailand

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All Thai populations are covered by health care system. Statistically, 48.3 out of 65.1 millions of Thais are covered by the Universal health coverage (74.2%) and received the financial support from the National Health Security Office (NHSO)<sup>(1)</sup>. The remainders are either covered by the Social Security Office or the Civil Servant payment scheme. All treatment from every hospital in Thailand would send reports to the NHSO for reimbursement.

In this report, we gathered the data from the NHSO between 2005 and 2014 from every hospital that provides the treatments for brain tumors<sup>(2)</sup> (malignant tumor ICD (International Statistical Classification of Diseases and Related Health Problems)<sup>(3)</sup> code C 700, 709, 710-19, 728-9, 751-3, 793; benign tumor code D 320, 329, C 700, 709, 710-19, 728-9, 751-3, 793 and code D 320, 329, 330-3, 337, 339, 352-4; and tumor of uncertain behavior code D 430-4, 438-9,

D443-5, 420 & 429) and claimed money from the NHSO. The tumors of spinal cord and spinal meninges were excluded (code D 434, D 421).

Notably, some tumors are difficult to be classified, such as central neurocytoma, atypical meningioma, and invasive pituitary adenoma. Cavernous hemangioma is a malformation and was not included in the study.

The statistical analyses were performed by the SPSS v. 16 and the Excels.

## Results

There were a total of 93,810 brain tumor cases admitted between 2005 and 2014. The prevalence of brain tumors among Thai populations had gradually increased each year and almost doubled during this 10-year period. There was a bimodal age distribution, smaller peak at the age 10-14 years and another peak at 65-74 years. There was a shift of peak prevalence from 65-69 years in the year 2012 to 70-74 years in the year 2013 and 2014. The prevalence was higher in males especially in the age group of 65 years and above but females were more affected in the middle age group

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(age of 30-64) (Table 1, 2 and Fig. 1, 2). Even in the pediatric age-group (0-19 years), the trends of increased prevalence in this 10-year period was also observed (Table 3).

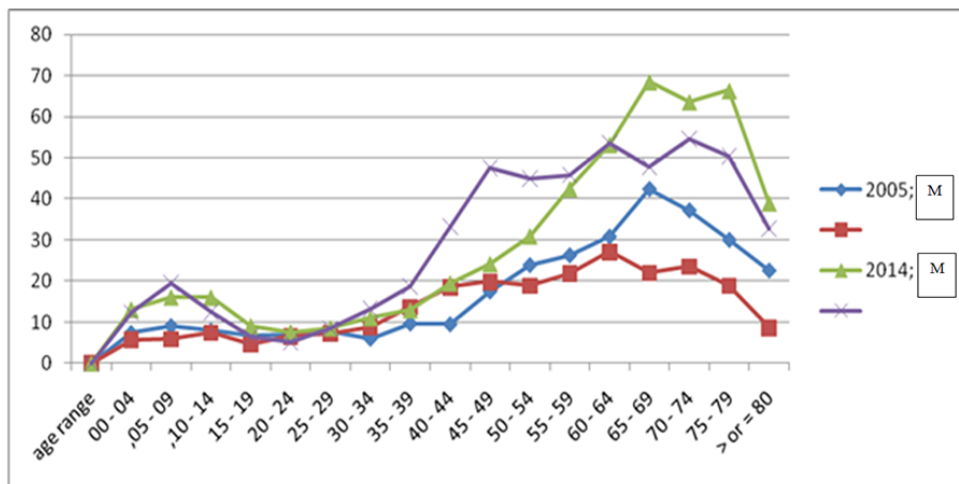
For comparisons between codes (codes D were for benign tumors or tumors of unknown behavior,

and codes C were for malignant tumors: ICD 10 TM)<sup>(3)</sup>, the prevalence of benign brain tumors was higher than malignant tumors (Table 4). In the year 2014, the prevalence of benign and malignant tumors was 13.20 and 11.84, respectively, giving total brain tumor prevalence at 25.04. The total number of the patients

**Table 1.** Prevalence of brain tumors in Thailand from 2005 to 2014, both gender combined

Age range	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
00-04	6.70	6.10	6.50	9.00	9.50	8.90	9.30	12.20	11.50	12.90
05-09	7.70	8.30	9.90	10.90	11.30	12.80	12.60	14.40	15.80	17.80
10-14	7.90	9.90	12.10	10.70	12.50	12.80	13.00	11.80	17.10	14.50
15-19	6.10	7.60	8.20	8.20	6.90	6.70	9.40	9.80	9.30	8.20
20-24	7.10	7.00	7.60	7.60	6.30	8.50	9.00	7.80	8.00	6.90
25-29	8.10	6.70	9.40	9.90	9.70	8.60	9.90	8.60	11.50	9.10
30-34	8.00	10.10	10.30	11.20	10.90	11.10	11.90	14.70	11.60	12.80
35-39	12.30	12.70	12.90	16.20	16.70	17.20	16.40	17.50	17.90	16.30
40-44	14.80	16.50	17.40	21.80	23.30	23.80	23.80	23.00	26.10	27.40
45-49	19.70	21.70	23.10	26.30	28.50	29.60	31.90	35.60	34.00	37.00
50-54	22.00	22.30	26.40	31.20	32.80	33.60	36.60	36.70	38.70	39.40
55-59	25.00	25.40	33.30	36.10	38.30	40.50	43.30	44.40	43.10	45.40
60-64	29.80	34.10	35.70	40.80	42.80	45.60	49.20	50.10	49.90	54.80
65-69	32.00	40.50	41.40	52.70	52.00	48.40	55.50	56.00	59.70	59.20
70-74	30.80	36.50	42.20	45.10	46.90	46.60	51.40	53.90	60.40	60.70
75-79	24.00	26.60	34.70	42.60	44.60	49.10	51.20	47.80	56.80	58.70
80-84	14.00	20.90	16.60	18.80	22.20	27.80	28.10	30.90	34.30	35.80
Total	12.79	14.42	16.12	18.61	19.50	20.34	21.94	22.88	24.25	25.04

The prevalence was calculated based on the NHSO population database



Blue line = males in the year 2005; Red line = females in the year 2005; Green line = males in the year 2014; Purple line = females in the year 2014

**Fig. 1** The prevalence of brain tumors in Thailand, by age and gender between 2005 and 2014.

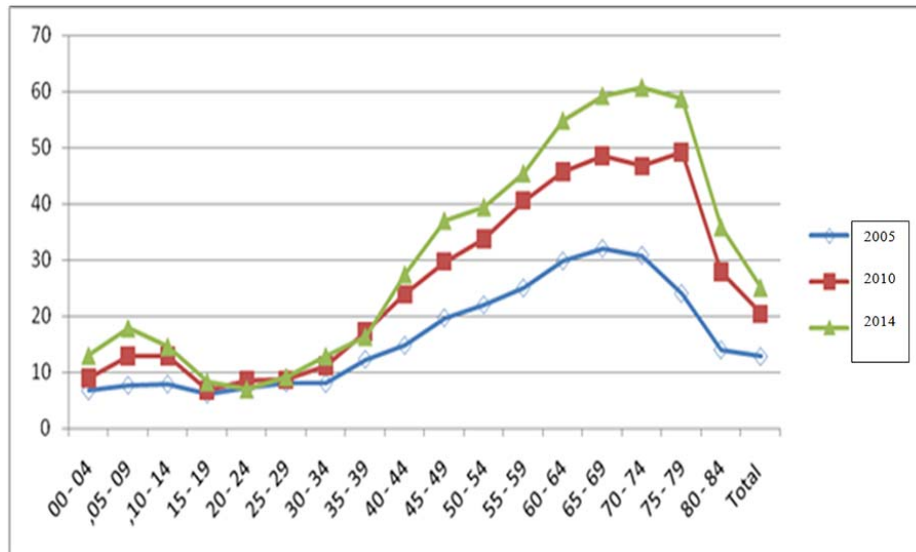
**Table 2.** Prevalence of brain tumors in Thailand by age and gender, between 2005 and 2014

Age range	2005			2014			2005; rate/100,000			2014; rate/100,000		
	Males	Females	Populations	Males	Females	Populations	Males	Females	Populations	Males	Females	Populations
00-04	128	96	3,381,769	243	216	3,599,931	7.43	5.79	3,599,931	13.11	12.36	3,599,931
05-09	197	125	4,268,003	307	351	3,711,283	9.11	5.94	3,711,283	16.11	19.44	3,711,283
10-14	183	166	4,504,100	307	226	3,725,773	7.96	7.52	3,725,773	16.03	12.48	3,725,773
15-19	134	88	3,853,717	190	130	4,105,312	6.85	4.64	4,105,312	9.06	6.47	4,105,312
20-24	108	99	3,049,229	138	84	3,426,851	6.95	6.62	3,426,851	7.63	5.19	3,426,851
25-29	114	102	2,857,417	119	97	2,523,289	7.81	7.29	2,523,289	8.63	8.47	2,523,289
30-34	105	154	3,482,310	163	172	2,764,467	6.03	8.84	2,764,467	11.05	13.34	2,764,467
35-39	179	277	3,865,295	210	289	3,169,489	9.71	13.70	3,169,489	12.94	18.69	3,169,489
40-44	171	367	3,779,816	348	610	3,623,729	9.52	18.51	3,623,729	19.50	33.18	3,623,729
45-49	268	353	3,307,501	440	930	3,777,068	17.50	19.87	3,777,068	24.18	47.52	3,777,068
50-54	304	288	2,798,540	503	802	3,413,572	23.90	18.87	3,413,572	30.96	44.84	3,413,572
55-59	263	254	2,163,176	568	716	2,899,933	26.28	21.85	2,899,933	42.46	45.83	2,899,933
60-64	225	248	1,642,995	590	700	2,416,831	30.81	27.17	2,416,831	53.20	53.52	2,416,831
65-69	281	173	1,448,198	535	446	1,716,798	42.33	22.05	1,716,798	68.47	47.68	1,716,798
70-74	180	143	1,089,451	358	378	1,256,322	37.17	23.63	1,256,322	63.57	54.53	1,256,322
75-79	83	85	726,183	273	271	949,914	30.00	18.91	949,914	66.30	50.36	949,914
≥80	70	45	827,295	176	211	1,096,640	22.56	8.70	1,096,640	38.95	32.73	1,096,640
Total	2,993	3,063	47,044,995	5,468	6,629	48,177,202	13.12	12.64	48,177,202	22.84	27.35	48,177,202

Gender and age groups were divided based on the UC treatment scheme from the NHSO database and website

**Table 3.** Prevalence of pediatric brain tumors in Thailand from 2005 to 2014, both gender combined

Prevalence	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
0-19 (pediatrics)	7.16	8.10	9.33	9.73	10.08	10.29	11.07	11.98	13.32	13.22



Blue line = the year 2005; Red line = the year 2010; Green line = the year 2014

**Fig. 2** The prevalence rate for brain tumors in Thailand, gender combined.

were counted and revealed that the patients with brain tumors had an average of 1.56 admissions annually. The number of admissions per patient per year had gradually increased but stayed static around 1.5-1.6. Interestingly, the patients using the UC treatment scheme had not increased very much and also decreased slightly in the year 2013 and 2014.

**Specific codes or nonspecific codes: Brain and other CNS tumors**

The codes for ICD 10 are specific in some parts such as C711 refers to malignant neoplasm of the brain at the frontal area. However, ICD 10 also has C710 for malignant neoplasm of the brain and code C719 for malignant neoplasm of the brain unspecified. So, one tumor may be coded differently among hospital depending on the coders. The authors explored some brain tumors to find out the preferences of the coders in registering of the brain tumors.

The records for the majority of brain tumor treatments were categorized as unspecified neoplasm

(rank 1, 2 and 3) (Table 5), which accounted for 64.45% of neoplasm of brain and this made other codes of neoplasm of brain unreliable.

**Endocrine tumor**

There are codes for endocrine tumors classified into benign tumor, malignant tumor, and tumor of uncertain behavior. As we evaluated the numbers of those three categories, the question were raised, such as too many tumors are registered as malignant pituitary tumors and malignant craniopharyngioma. Another quarter of tumors were classified as tumors of unknown behavior, for which most of them had surgical procedures.

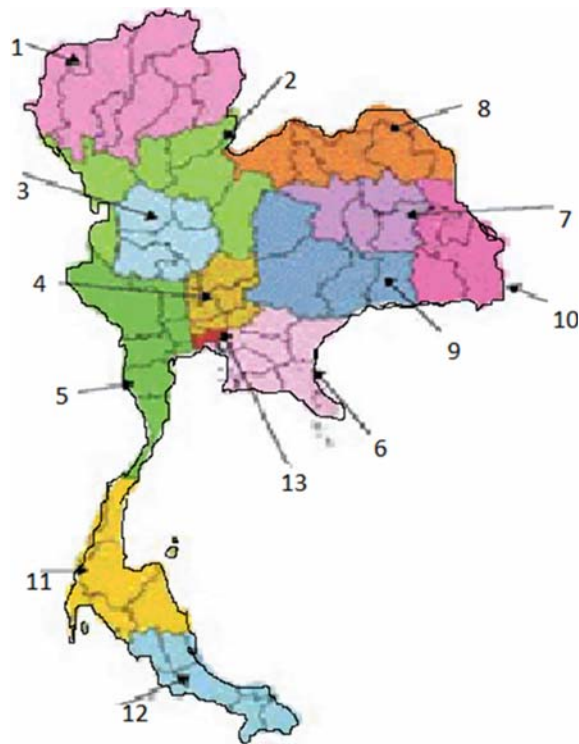
As a training center, Prasat Neurological Institute never had a report of malignant pituitary tumor in our digital pathological database since 1994. In the World Health Organization classification, the pituitary carcinoma is a clinical diagnostic term which needs metastasis of the tumor to fulfill the diagnosis.

The endocrine gland tumors coding C758,

**Table 4.** Total admissions and prevalence for brain tumors in Thailand, combined data: benign and malignant tumors

	Admission/PR										Sum*/ aver PR
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Total D	3,113/6.58	3,667/7.71	3,977/8.52	4,624/9.85	4,953/10.41	5,147/10.69	5,678/11.80	5,888/12.11	6,133/12.62	6,376/13.20	49,556/10.35
Total C	2,943/6.22	3,190/6.71	3,545/7.60	4,114/8.76	4,323/9.09	4,649/9.66	4,878/10.41	5,238/10.77	5,653/11.63	5,721/11.84	44,254/9.24
Combined C&D	6,056/12.80	6,857/14.42	7,522/16.12	8,738/18.61	9,276/19.50	9,796/20.35	10,556/21.94	11,126/22.88	11,786/24.25	12,097/25.04	93,810/19.59
Number of the patients	4,102	4,559	4,892	5,498	5,778	6,166	6,722	7,075	7,373	7,748	5,9913
Number of admission/case	1.48	1.50	1.54	1.59	1.61	1.59	1.57	1.57	1.60	1.56	1.57
Population (M)	47.34	47.54	46.67	46.95	47.56	48.14	48.12	48.62	48.61	48.31	477,864,852

\* Sum of population NHSO 2005 to 2014: 477,864,852.  
D = benign or uncertain behavior tumor; C = malignant tumor; M = million



**Fig. 3** Health regions in Thailand.

C759, D358, D359, D448 and D449, neoplasm with pluriglandular involvement, unspecified and neoplasm of endocrine gland, unspecified are too unspecified and likely to be extracranial such as thyroid, parathyroid, adrenal gland tumor. We, therefore, decided to exclude C758, C759, D358, D359, D448 and D449 from the analyses.

Based on limitations of the coders mentioned earlier, the authors would discuss the brain tumors by dividing them into groups of diagnosis in order to reduce the effects by the coders (Table 6).

#### Grouping of brain tumor

The authors divided the tumors into seven groups that could provide more accuracy of data collection. Most of the tumors were the brain and the others, CNS tumors, accounting for 56% of the total brain tumors, followed by metastatic brain tumors and the meningioma at 19.9% and 15.6%, respectively. The percentage of tumors and primary brain tumors were also calculated. The brain and other CNS tumors were 69.84% and meningioma was 19.21%. The prevalence of each group of tumors is shown in Table 7. The prevalence had been increasing every year and was 13.47/100,000 population for the brain and other CNS

**Table 5.** Number of admissions and percentage of brain and other CNS tumors from 2005 to 2014

Codes of ICD10	Diagnosis	Number	Rank	% total
C710	Malignant neoplasm of cerebrum, except lobes and ventricles	1,288		2.47
C711	Malignant neoplasm of frontal lobe	1,808		3.46
C712	Malignant neoplasm of temporal lobe	907		1.74
C713	Malignant neoplasm of parietal lobe	728		1.39
C714	Malignant neoplasm of occipital lobe	251		0.48
C715	Malignant neoplasm of cerebral ventricles	411		0.79
C716	Malignant neoplasm of cerebellum	3,669	4	7.02
C717	Malignant neoplasm of brain stem	1,332		2.55
C718	Malignant neoplasm of overlapping sites of brain	597		1.14
C719	Malignant neoplasm of unspecified	12,047	2	23.06
C728	Malignant neoplasm: overlapping lesion of brain and other parts of CNS	40		0.08
C729	Malignant neoplasm of central nervous system, unspecified	358		0.69
D330	Benign neoplasm of brain, supratentorial	1,395		2.67
D331	Benign neoplasm of brain, infratentorial	672		1.29
D332	Benign neoplasm of brain, unspecified	4,202	3	8.04
D430	Neoplasm of uncertain behavior of brain, supratentorial	3,133	5	6.00
D431	Neoplasm of uncertain behavior of brain, infratentorial	1,979		3.79
D432	Neoplasm of uncertain behavior of brain, unspecified	17,421	1	33.35
Total		52,238		100.00

**Table 6.** Number of admissions and percentage of endocrine tumors: Pituitary, Craniopharyngioma and pineal tumors from 2005 to 2014

Diseases	ICD	2005	2010	2014
Benign neoplasm of pituitary gland	D352	148	234	382
Benign neoplasm of craniopharyngeal duct	D353	5	41	30
Benign neoplasm of pineal gland	D354	14	8	6
Neoplasm of unknown behavior of pituitary gland	D443	65	108	118
Neoplasm of unknown behavior of craniopharyngeal duct	D444	63	105	107
Neoplasms of unknown behavior of pineal gland	D445	35	53	58
Neoplasms of unknown behavior with pluriglandular involvement, unspecified	D448	3	2	3
Neoplasm of unknown behavior of unspecified endocrine gland	D449	0	3	4
Malignant neoplasm of pituitary gland	C751	31	26	28
Malignant neoplasm of craniopharyngeal duct	C752	2	1	3
Malignant neoplasm of pineal gland	C753	53	111	132
Malignant neoplasm with pluriglandular involvement, unspecified	C758	0	0	3
Malignant neoplasm of endocrine gland, unspecified	C759	9	12	19

tumors followed by 5.21/100,000 population for cerebral metastasis and 4.14/100,000 population for meningioma.

#### **Brain tumors in the health region**

The admissions for brain tumor were more frequent in health region 1, the northern part of Thailand, especially for meningioma and metastatic tumors. The admissions were low in health region 12, the southern most of Thailand. In the year 2005, health

region 1 had the highest admission number for six out of the seven tumor groups (except pineal tumors), and in the year 2014, health region 1 still had the highest admissions for the meningioma, pituitary tumors, tumors of the cranial nerve and metastatic tumors.

#### **Discussion**

ICD 10: 2010 provides codes for all kind of brain tumors. The codes are not in the terms of

**Table 7.** Number and prevalence by groups of the brain tumor in 2005,2010 and 2014

Tumors	Codes	Total amount	%*	% primary tumor	2005		2010		2014		Average PR
					Number of admissions	PR**	Number of admissions	PR**	Number of admissions	PR**	
Meningioma	D320, D329, D420, D429, C700, C709	14,407	15.40	19.21	859	1.81	1,521	3.16	1,998	4.14	3.015
Brain and other	D330, D331, D332, D337, D339, D430, D431, D432, D438, D439	52,381	56.00	69.84	3,479	7.35	5,425	11.27	6,511	13.48	10.962
CNS tumors	C710, C711, C712, C713, C714, C715, C716, C717, C718, C719, C728, C729										
Cranial nerve tumors	D333, D433, C722, C723, C724, C725	1,565	1.70	2.08	126	0.27	154	0.32	206	0.43	0.328
Tumors of the pituitary gland	D352, D443, C751	3,597	3.80	4.79	244	0.52	368	0.764	528	1.09	0.753
Tumors of the pineal gland	D354, D445, C753	1,851	2.00	2.47	102	0.22	172	0.357	196	0.41	0.387
Cranio-pharyngioma	D353, D444, C752	1,194	1.30	1.60	70	0.15	147	0.305	140	0.29	0.250
Metastatic tumors	C793	18,623	19.90		1,174	2.48	2,007	4.169	2,515	5.21	3.897

\* Total admission between 2005 and 2014

\*\* Population of NHISO database sum from 2005 to 2014: 477,864,852

PR = prevalence rate (/100,000 populations)



**Table 8.** Number of admissions of brain tumors by health regions in Thailand

Health region	Meningioma		Glioma and others CNS tumor		Cranial nerve tumor		Tumor of pituitary gland		Tumor of Pineal gland		Craniopharyngioma		Metastatic tumor		Total							
	2005	2009	2014	2005	2009	2014	2005	2009	2014	2005	2009	2014	2005	2009		2014						
1	114**	169**	230**	363**	485*	573	24**	16*	33**	36**	25	68**	11	11	15	18**	11*	10	334**	409**	462**	3,417**
2	66	112	190*	249	304#	311##	7	14	14	17	18	37	8	11	9	5	7	14	72	109	180	1,754
3	71	87	145	247	368	463	3##	5#	8#	12	16##	33	5	16	4#	4	6	8	43	74	141	1,759
4	52	92	165	215	346	391#	6	16*	8#	20	31*	52	6	5##	3##	3	1##	16*	58	101	145	1,732#
5	64	81	154	253	499	559	13	21**	10	29*	36**	49	9	22	17	11*	6	18*	81	81	164	2,177
6	65	92	143	308	410	578	12	6	32*	19	22	58	12*	30**	12	3	8	14	69	177*	198	2,268
7	54	78	134	234	439	621**	4#	10	18	7#	17	32	7	18	17	1##	6	8	83	73#	157	2,018
8	60	93	152	260	371	449	4#	8	15	24	28	27##	16**	6#	38*	7	5	10	101*	132	214	2,020
9	82*	119*	186	334	507**	619*	17*	14	23	23	17	37	4#	23*	37*	5	5	10	94	143	238*	2,537*
10	35##	65##	106##	326*	394	596	3##	5#	9	10	22	19##	10	8	10	5	5	5##	60	112	177	1,982
11	71	84	137	244	346	488	6	6	14	5##	20	28	5	7	8	1##	13**	16*	37#	87	112	1,735
12	49#	68#	118#	210#	250##	458	12	4##	4##	19	10##	27#	2##	6	12	2#	3#	5##	32##	38##	98##	1,427##
13	70	94	135	174##	335	409	13	16*	18	22	28	59*	6	12	12	3	7	6	93	170	221	1,903
Total	853	1,234	1,995	3,417	5,054	6,515	124	141	206	243	290	526	101	175	194	68	83	140	1,157	1,706	2,507	

\* Second most frequent, \*\* Maximal number

# Second least number, ## Minimal number



pathological diagnosis as in clinical practice (such as anaplastic astrocytoma) but some other codes depend on tumor locations, such as C711 for frontal lobe, C716 for tumor in the cerebellum (Table 9).

The ICD 10 classification cannot subcategorize malignant tumors, such as glioblastoma multiforme, anaplastic ependymoma or even medulloblastoma and uses the same code. The malignant tumors of the cranial nerve such as olfactory nerve (C722), optic nerve (C723), acoustic nerve (C724) and others cranial nerve (C725) were not included in the present study because the authors do not think there are such a tumor.

High prevalence means the patients frequently admitted to the hospitals resulted in high incidence, high recurrence and needs of admission for further treatment such as chemotherapy which require six admissions for completing a single chemotherapy course. The awareness of people, the advancement of the hospitals and health care system are also affecting the prevalence numbers. Our data are on a year by

year basis, i.e., the patient who is admitted this year would be counted again if he returns the following year.

#### **Prevalence for comparisons**

The prevalence of brain tumors in Thailand is lower than western countries<sup>(7-11)</sup>. The possible reasons may include the real incidence is lower or the medical facilities are not as good, in which these factors will need to be explored further.

The trends in the Surveillance, Epidemiology, and End Results (SEER) Cancer Incidence Rate Trends with Join point analyses from 1992 to 2012 for the most common cancers, by gender, for all racial and ethnic groups combined, found that the incidence of brain tumors in the US populations has declined slightly on an average of 0.3% per year for men and 0.2% for women<sup>(10)</sup>. These trends are different from the present study for which the prevalence showed a high increase.

The report of brain tumor incidence from Zhejiang province is 8.53/100,000 population and

**Table 9.** ICD 10 TM

	Malignant tumor	Unknown behavior	Benign tumor
<b>MENINGES</b>			
Cerebral meninges	C700	D420	D320
Meninges unspecified	C709	D429	D329
<b>BRAIN</b>			
Supratent NOS	C710	D430 brain supratentorial	D330 supratentorial
Frontal lobe	C711		
Temporal lobe	C712		
Parietal lobe	C713		
Occipital lobe	C714		
Cerebral ventricle	C715		
Cerebellum	C716	D431 infratentorial	D331 infratentorial
Brainstem	C717		
Overlapping lesion	C718		
Brain unspecified	C719	D432 brain unspecified D437 others CNS	D332 brain unspecified D337 others CNS
<b>Cranial nerve, other CNS</b>			
Olfactory nerve / bulb	C722	D433 cranial nerve	D333 cranial nerve
Optic nerve	C723		
Acoustic nerve	C724		
Other cranial nerve	C725		
Overlapping lesion CNS	C728		
CNS unspecified	C729	D439	D339
Pituitary gland	C751	D443	D352
Craniopharyngeal duct	C752	D444	D353
Pineal gland	C753	D445	D354
Metastatic tumor	C793		

has increased 1.58% annually from the year 2000 to 2009<sup>(11)</sup>.

**Suggestions for further study**

The number of new cases of each type of tumor is needed for actual incidences. The details of each patient’s identification number should be obtained for more accuracy for the survival analysis, so it can be compared to other studies.

**Conclusion**

The prevalence of brain tumors is gradually higher but still low compared to the western countries. Health region 1 has the highest admission numbers and the lowest are in health region 12.

**What is already known on this topic?**

The number of tumor treated in each hospital, prevalence and incidence of each tumor.

**What this study adds?**

This study adds the prevalence of brain tumors in Thailand from the database of the NHSO.

**Potential conflicts of interest**

None.

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**Table 10.** Health regions in Thailand

Health region	Provinces
1	Chiang Mai, Chiang Rai, Nan, Phrae, Phayao, Mae Hong Son, Lampang, Lamphoon
2	Phitsanulok, Phetchabun, Tak, Sukhothai, Uttaradit
3	Nakhon Sawan, Phichit, Kamphaengphet, Uthaitхани, Chainat
4	Saraburi, Nakhon Nayok, Nonthaburi, Pathumthani, Ayuthaya, Lopburi, Singburi, Angthong
5	Phetchaburi, Ratchaburi, Nakhonpathom, Kanchanaburi, Samutsakhon, Samutsongkhram, Suphanburi, Prachuapkhirikhan
6	Chonburi, Chantaburi, Chachoengsao, Prachinburi, Sakaeo, Rayong, Trat, Samutprakarn
7	Khon Kaen, Roi Et, Mahasarakham, Kalasin
8	Udornthani, Loei, Nongbualumpu, Sakon Nakhon, Nakhon Phanom, Nong Khai, Bungkarn
9	Nakhon Ratchasima, Chaiyaphum, Buriram, Surin
10	Ubon Ratchathani, Amnat Charoen, Mukdaharn, Yasothon, Si Sa Ket
11	Suratthani, Nakhon Srithammarat, Krabi, Chumphon, Ranong, Phangnga, Phuket
12	Songkla, Narathiwat, Yala, Trang, Satun, Pattani, Pattalung
13	Bangkok

**Table 11.** The prevalence of brain tumors in the present study compared with other studies

Data	Year	Prevalence					
		Pediatrics	Benign	Malignant	All	Meningioma	Pituitary tumor
USA <sup>(7)</sup>	2004		166.5	59.9	209		
	2010	35.4	177.3	61.9	221.8		
USA <sup>(8)</sup>	2002-2006					97.5	
Thailand (the present study)	2004	7.16	6.58	6.22	12.79	1.81	0.52
	2010	10.29	10.69	9.66	20.34	3.16	0.76
	2014	13.22	13.2	11.84	25.04	4.14	1.09
USA <sup>(9)</sup>	2002						16.7

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ความชุกของเนื้องอกในสมองในประเทศไทยระหว่างปี พ.ศ. 2548 ถึงปี พ.ศ. 2557 ข้อมูลจากสำนักงานหลักประกันสุขภาพ  
แห่งประเทศไทย

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วัตถุประสงค์: เพื่อประเมินความชุกของเนื้องอกในสมองในประเทศไทยโดยดูข้อมูลจากสำนักหลักประกันสุขภาพแห่งประเทศไทย

วัสดุและวิธีการ: ผู้ป่วยโรคเนื้องอกในสมองภายใต้หลักประกันสุขภาพแห่งประเทศไทยระหว่างปี พ.ศ. 2548 ถึงปี พ.ศ. 2557 ที่เข้ารับการรักษา  
ในโรงพยาบาลทั้งเนื้องอกชนิดร้ายเนื้องอกชนิดไม่ร้ายและเนื้องอกชนิดที่ไม่ทราบพฤติกรรม (รหัส ICD เนื้องอกชนิดร้าย C 700, 709, 710-19,  
728-9, 751-3, 793 เนื้องอกชนิดไม่ร้ายรหัส D 320, 329, 330-3, 337, 339, 352-4 และเนื้องอกชนิดที่ไม่ทราบพฤติกรรมรหัส D 420,  
429, 430-4, 438-9, 443-5) ได้ถูกวิเคราะห์เพื่อศึกษาความชุก

ผลการศึกษา: มีการเข้ารับการรักษาภายใต้หลักประกันสุขภาพทั้งสิ้น 96,676 ครั้ง ระหว่างช่วงเวลาที่กำหนดพบความชุกของโรคเนื้องอกในสมอง  
เพิ่มขึ้นเรื่อยๆ โดยในปี พ.ศ. 2548 พบความชุก 12.79/100,000 เพิ่มขึ้นเป็น 25.04/100,000 ในปี พ.ศ. 2557 เนื้องอกชนิดไม่ร้ายแรงพบได้บ่อยกว่า  
ชนิดร้ายแรงในปี พ.ศ. 2557 พบเนื้องอกชนิดไม่ร้ายแรง 13.8 และพบชนิดร้ายแรง 11.9/100,000 เนื้องอกของสมองและระบบประสาทส่วนกลาง  
เป็นเนื้องอกที่พบได้บ่อยถึงร้อยละ 56 ของเนื้องอกทั้งหมดพบมะเร็งแพร่กระจายและเนื้องอกของเยื่อหุ้มสมองพบในลำดับถัดมาเขตสุขภาพที่ 1  
พบความชุกของเนื้องอกสมองสูงที่สุดส่วนเขต 12 เป็นเขตที่มีความชุกต่ำที่สุด

สรุป: ความชุกของเนื้องอกในสมองในประเทศไทยเพิ่มขึ้นเรื่อยๆ แต่ยังคงน้อยกว่าเมื่อเทียบกับประเทศทางตะวันตกอื่นๆ โดยพบมากที่สุดเขตสุขภาพที่  
1 และพบน้อยที่สุดเขตสุขภาพที่ 12

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