

# Distribution of Physicians to Public Health Facilities and Factors Contributing to New Medical Graduates Serving in Public Facilities, 2016–2020, Thailand

Chutima Siripanumas<sup>1</sup>, Rapeepong Suphanchaimat<sup>1,2</sup>, Natthaprang Nittayasoot<sup>1</sup>, Krisada Sawaengdee<sup>2</sup>

<sup>1</sup>Division of Epidemiology, Department of Disease Control, Ministry of Public Health, Nonthaburi, Thailand; <sup>2</sup>International Health Policy Program, Ministry of Public Health, Nonthaburi, Thailand

Correspondence: Chutima Siripanumas, Email csiripanumas@gmail.com

**Background:** In Thailand, the shortage and maldistribution of physicians in the public sector is a critical public health problem. The aims of this study are to describe the retention situation of new physicians and to determine factors associated with new physicians' decision to serve in public facilities.

**Methods:** Data of new physicians from the Human Resource Office of the Permanent Secretary System (HROPS) were analysed in order to describe the retention situation of new physicians. A retrospective cohort study was conducted to determine factors associated with new physicians' decision to remain in public service. The data were collected between Oct 2021 and Jan 2022. Cox regression was performed.

**Results:** According to the HROPS database, most new physicians remained in hospitals affiliated to the Office of the Permanent Secretary (OPS) of the Ministry of Public Health (MOPH) (83.5%). Among the physicians resigning from MOPH hospitals, 80.6% resigned due to career factors. From a retrospective cohort study, physicians in the special recruitment track had the lowest incidence rate of resigning. In terms of satisfaction, most physicians were least satisfied with salary levels and workload. The majority of physicians felt satisfied with being close to their families. The Cox regression revealed that physicians graduating from private medical schools or from abroad had a higher risk of leaving public facilities.

**Conclusion:** To lessen the burden of physician shortage and maldistribution, the proportion of students recruited in the special track should be enhanced. High workload and inappropriate income should be addressed. Allocating new physicians to work in their hometown is recommended.

**Keywords:** physicians, retention, public health facilities, medical schools, Thailand

## Introduction

The World Health Organization (WHO) promotes the benchmark for a desirable doctor–population ratio at 1:1000.<sup>1,2</sup> In Thailand, the ratio was 0.92: 1000, slightly lower than the WHO benchmark.<sup>3</sup> Not only is this an insufficient number, but maldistribution is also a problem. Globally, half of the population lives in rural areas, but less than 38% of nurses and less than 25% of the physicians work there, leading to inadequacy of the provision of health services and compromise of healthcare quality.<sup>4–6</sup> Keeping health workers in rural and remote areas is challenging for many countries. Data from the Department of Health Service Support, Ministry of Public Health (MOPH), Thailand, found that 78.5% of private hospitals were located in urban areas.<sup>7</sup> The resignation of health workers from public facilities aggravates the maldistribution problem, as most health facilities in rural areas are public run. High workload and low income among physicians in public service, in part, contribute to the resignation from public facilities and this worsens the inequitable distribution of the health workforce in the country.<sup>8,9</sup>

A decision to retain in rural and underdeveloped regions was affected by many factors, such as financial reason, opportunity for career advancement, working conditions and workload, and personal issue (including familiarity and

acceptance with rural lifestyle).<sup>10,11</sup> WHO provides policy recommendations for increasing and retaining the number of health workers in remote and rural areas,<sup>4</sup> which consists of four categories: education, regulatory, financial incentives and personal and professional support. Thailand also has strategies to deal with physician shortage problems. The proposed strategies include three-year compulsory service in public health facilities for new graduates and a special recruitment track. Thailand's special rural recruitment track consists of the Collaborative Project to Increase Production of Rural Doctors (CPIRD) and the One District One Doctor programme (ODOD). Both admission tracks employ key strategies to target high-school students from underserved areas. These strategies include direct recruitment of students from rural areas, utilization of existing health facilities outside of major cities as training sites, early rural service exposure and regulated rural placement, and mandatory service with nonadherence penalty obligation. The normal track is the default of the admission into medical schools. Medical graduates in the normal track and the CPIRD track are obliged to serve in public facilities for three years upon graduation. A non-adherence penalty for both programmes is US \$ 11,300 (400,000 Baht). For the ODOD programme, the non-adherence fine is US\$ 56,000 (2,000,000 Baht) as the time bound for public service upon graduation is twelve years. The reason for this difference is ODOD track directly recruits students from extremely underserved districts (in other words, the competition for university admission is confined to a district level, whereas the competition for CPIRD track or normal track programme is at provincial or national levels).<sup>12</sup>

Though there have been studies about factors related to rural retention among new physicians in Thailand,<sup>11,13,14</sup> studies of factors associated with the decision to remain practising in public facilities are sparse. Moreover, up-to-date studies on the employment situation of new physicians in Thailand are lacking.

Therefore, the aims of this study are to: (i) describe the retention situation of new physicians in Thailand, 2016 to 2020; and (ii) to determine factors associated with new physicians' decision to serve in public facilities.

## Method

### To Describe the Retention Situation of New Physicians in Thailand, 2016 to 2020

#### Study Design and Data Source

A cross-sectional study was used. A new physician was classified as a physician who had just graduated from a medical school within the last five years and who had started working in public hospitals affiliated to the Office of Permanent Secretary (OPS), MOPH. Retained physicians were those who stayed in the hospitals affiliated to the OPS or physicians in a residency training programme, who were obliged to return to work in hospitals affiliated to the OPS after completing the training.

Data was obtained from the Human Resource Office of the Permanent Secretary System (HROPS), Personnel Administration Division, OPS, MOPH. The HROPS tracked medical graduates from the dates of entering to leaving the OPS, MOPH health service. The database contains key variables including age, sex, graduated medical schools, training track, years of graduation, salary, name of hospitals during the time of data collection, and dates of entering and leaving the health facilities (if applicable) for each medical graduate.

## Data Analysis

Continuous data were summarised as median and percentiles (P25, P75). Categorical data were summarised as numbers, percentages, ratio and rate.

### To Determine Factors Associated with New Physicians' Decision to Serve Public Health Facilities

#### Study Design

A retrospective cohort was conducted on physicians who graduated in the academic years 2016–18 and provided services in OPS affiliated hospitals. Graduates from the normal track (regardless of the type of medical schools, either public or private) and the CPIRD track as well as those graduating from abroad were included. Physicians from the ODOD programme were excluded as the ODOD programme has higher cost of nonadherence penalty charge and longer time bound to serve public services, relative to graduates from the CPIRD and the normal tracks. Physicians in the in-service

training programme (residency training programme) were also excluded as some residency training courses require the trainee to spend more than three years for in-service training.

## Sample Size Estimation

A formula was used for a cohort study with binary outcomes to estimate the sample size. An exposure variable was being CPIRD and the outcome was the decision to stay beyond the 3-year compulsory public service in the OPS-affiliated health facilities. Prevalence of staying beyond 3 years was 78% and 52% among the CPIRD graduates and normal track graduates, respectively.<sup>12</sup> With a ratio of 1:2 for CPIRD and normal track graduates, the estimated sample size was 120 (40 for CPIRD graduates and 80 for normal track graduates). However, in practice, volunteer physicians were contacted at each medical school with a request to distribute the questionnaire to their ex-classmates without sampling. From 5949 physicians who graduated in the academic years 2016–18, a total of 183 graduates responded to the questionnaire (equivalent to 3.1% response rate). Eighteen ODOT track physicians and 44 physicians on the in-service training programme. Finally, a total of 121 respondents were obtained (73 graduates for normal track graduates and 48 CPIRD graduates).

## Data Collection

As mentioned earlier, volunteer physicians at each medical school were requested to distribute the questionnaire weblink to their former classmates. An online questionnaire was used for data collection. The items in the questionnaire were arranged into three sections: (1) demographics of graduates including age, gender, marriage status, location of residence during the first fifteen years of life, training track (normal track or CPIRD), types of medical school (public or private or abroad) and location of medical school (in Greater Bangkok or outside); (2) working information including location of the hospital during the first year of internship, net income per month and current working status (staying in OPS health facility or already resigned); and (3) satisfaction of life, as measured by Likert scale (ranging from dissatisfied, neutral and satisfied) in the following aspects: career, financial status, working conditions, personal issues, and other factors. Note that the questionnaire was newly developed by the research team. The data was collected between Oct 2021 and Jan 2022.

## Data Analysis

Continuous data were summarised as median and percentile (P25, P75). Categorical data were summarised as number, percentage and ratio. An analytic study was performed using cox regression to identify factors associated with new physicians' decision to serve public facilities. The independent variables consisted of gender, marriage status, location of residence, being an intern in the same region as hometown ("Yes" [region of residence during childhood aged 1–15 years being the same region of hospital during the first year of internship] and "No" in other wise), training track, types of medical school and satisfaction in the five proposed aspects. The dependent variable was staying in OPS health facilities or having resigned.

All factors were tested with the univariable analysis first. The independent variables that showed a p-value of less than 0.1 in the univariable analysis were later checked for proportionality hazard assumption by including time-dependent covariates in the model. The variables that did not violate proportionality hazard assumption were finally included in the multivariable analysis. In those steps, results were presented in the form of hazard ratio (HR) and 95% confidence interval (CI).

## Results

### Retention Situation of New Physicians

The study population comprised 10,067 physicians who graduated in the academic years 2016–20 and had joined the OPS health facilities. The male to female ratio was 1:1.2. The median career duration (P25, P75) was 747 days (381, 1475). Of all physicians, 83.5% stayed in the OPS health facilities, while 16.4% had already left. The most common reasons for resigning were career factors (80.6%) (for instance, resignation for continuing education), followed by personal issues (14.2%) (for instance, being close to family and coming back to the hometown). The least common reason for resigning was financial factors (0.3%), [Table 1](#).

**Table 1** Characteristic of Medical Graduates in Academic Years 2016–18

Variable Name	Category	Sample Size (n)	Percentage
Sex	Male	4656	46.3
	Female	5411	53.7
Current working status	Staying in OPS health services	8407	83.5
	Resigned	1656	16.4
Reason for resigning	Career	1326	80.6
	Personal issues	233	14.2
	Others	59	3.6
	Working condition	22	1.3
	Financial	5	0.3

Table 2 shows the incidence rate of resigning from the OPS health service. Male physicians showed a higher incidence rate of resigning than females (66.0 and 58.9 per 1000 person-years for males and females respectively). According to training track, physicians from the normal track had the highest incidence rate of resigning compared with physicians from the CPIRD and ODOD tracks (63.4, 11.8 and 5.7, respectively). The incidence rate of resigning was highest among physicians graduating from private medical schools and medical schools from abroad (also referred to later as international medical schools). The academic year 2016 saw the greatest incidence rate of resigning compared with other graduation years (74.6). However, medical graduates in 2020 had the lowest incidence rate of resigning (7.0).

## Factors Associated with New Physicians' Decision to Serve Public Health Facilities

Of 121 respondents, most were female (male to female ratio was 1:1.4). The median age (P25, P75) was 27 years (27, 28). The median career duration was 1324 days (1324–1689). The median net income was US\$ 560 USD (US\$ 280–770). Of these, 81% stayed in OPS health service. The study found higher resigning rates in males than females (54.9 and 37.7, respectively). Married physicians had higher resigning rates than single physicians (64.7 and 42.6, respectively). By location of residence,

**Table 2** Incidence Rate of Resigning from OPS Health Services Among Medical Graduates in Academic Years 2016–20, Thailand

Variable Name	Category	Sample Size (n)	Incidence Rate Per 1000 Person-Years At Risk
Sex	Male	4656	66.0
	Female	5411	58.9
Training track	Normal track	9267	63.4
	CPIRD	607	11.8
	ODOD	152	5.7
Types of medical schools	Public school outside Greater Bangkok	4647	34.5
	Public school in Greater Bangkok	4933	83.4
	Private and international	480	152.6
Graduation year	2016	2003	74.6
	2017	1986	65.2
	2018	1960	62.8
	2019	2059	59.5
	2020	2059	7.0

physicians who lived in the central region had the highest incidence rate of resigning than physicians living in other regions (57.8). In contrast, physicians from rural and urban areas had a lower resignation incidence rate (44.9 and 44.6, respectively). For the training track, normal track physicians had a higher resignation incidence rate than CPIRD track counterparts (54.0 and 30.6, respectively) and physicians from private and international medical schools had far higher resignation incidence rates than other medical schools (81.5). For physicians who currently lived in the same region as their hometown, the incidence rate was 49.0, higher than the physicians whose current residence was not the same as their residence during childhood (28.7), [Table 3](#). Satisfaction was classified into five aspects, as shown in [Table 4](#). In the career aspect, 40.5% of participants felt satisfied with the opportunity for continuing education, while 19.0% did not. For financial factors, most respondents felt satisfied with job security, followed by welfare and being paid their salary on time (57.0, 44.6 and 22.3%, respectively). However, most physicians were least satisfied with their income (19.0%). Regarding working conditions, most physicians felt satisfied with their colleagues, followed by their managers and the referral system (53.7, 44.6 and 39.7%, respectively). Nevertheless, they reported that they were not satisfied with the workload (41.3%). In terms of personal issues, the majority of physicians felt satisfied with being close to family, with opportunities to work in their hometown and with their health condition (40.5, 38.8 and 37.2%, respectively). For other issues, physicians felt satisfied with transportation convenience (55.4%). The multivariable analysis demonstrated a significant association between types of medical school and physician resignation. Private or international physicians posed a significantly higher risk of leaving the OPS health service at about 5.5 times, relative to physicians from public medical schools outside Greater Bangkok (95% CI 1.39–21.37). Physicians who graduated from public medical school in Greater Bangkok had 4.3 times higher risk of leaving OPS health facilities than those graduating from medical schools in the upcountry (95% CI 1.21–15.43), [Table 5](#).

## Discussion

### Findings

Overall, physicians in the special recruitment track had the lowest incidence rate of resigning as evidenced in the above descriptive findings. The resigning rate among normal track and CPIRD graduates was 54.0 and 30.6 per 1000 person-years,

**Table 3** Incidence Rate of Resigning from OPS Health Facilities Among Medical Graduates in Academic Years 2016–18, Thailand

Variable Name	Category	Sample Size (n)	Incidence Rate Per 1000 Person-Years At Risk
Sex	Male	70	54.9
	Female	50	37.7
Marriage status	Single	109	42.6
	Married	11	64.7
Area of hometown	Urban	99	44.6
	Rural	21	44.9
Region of hometown	Central	68	57.8
	North	14	51.7
	Northeast	20	11.5
	South	18	28.3
Training track	Normal track	72	54.0
	CPIRD	48	30.6
Types of medical schools	Public school outside Greater Bangkok	46	15.1
	Public school in Greater Bangkok	53	57.9
	Private and international	21	81.5
Being an intern in the same region as hometown	Yes	94	49.0
	No	26	28.7

**Table 4** Satisfaction Percentage Among Medical Graduates in Academic Years 2016–18, Thailand

Factors	Category	Dissatisfied	Neutral	Satisfied
Financial	Income	33.9	47.1	19.0
	Opportunity for private practice	34.7	43.0	22.3
	Payment on time	29.8	42.2	28.1
	Welfare	25.7	39.7	44.6
	Job security	7.4	35.5	57.0
Career	Opportunity for continuing education	19.0	40.5	40.5
Working conditions	Workload	41.3	38.8	19.8
	Obligated to perform autopsy	16.5	52.1	31.4
	Risk of suing	19.8	48.8	31.4
	Consultation system	23.1	38.0	38.8
	Referral system	24.8	35.5	39.7
	Managers	28.1	27.3	44.6
	Colleagues	19.0	27.3	53.7
Personal issues	Mental health	31.4	33.9	34.7
	Being close to lover	31.4	36.4	32.2
	Physical health	24.8	38.0	37.2
	Working in hometown	30.6	30.6	38.8
	Being close to family	37.2	22.3	40.5
Others	Accommodation	28.9	29.8	41.3
	Civilized province	19.0	31.4	49.6
	Transportation convenience	18.2	26.5	55.4

**Table 5** Factors Associated with New Physicians' Decision to Serve Public Health Facilities Among Medical Graduates in Academic Years 2016–18, Thailand

Variable Name	Characteristics	Crude HR (95% CI)	P-value	Adjusted HR (95% CI)	P-value
Sex	Female	Ref			
	Male	1.5 (0.66–3.51)	0.323		
Training track	Normal track	Ref			
	CPIRD	0.6 (0.22–1.45)	0.237		
Marriage status	Single	Ref			
	Married	0.7 (0.20–2.30)	0.535		
Area of hometown	Rural	Ref			
	Urban	1.0 (0.34–2.93)	0.989		
Region of hometown	Central	Ref			
	North	0.9 (0.26–3.07)	0.858		
	Northeast	0.2 (0.3–1.50)	0.118		
	South	0.5 (0.12–2.19)	0.358		
Types of medical schools	Public school outside Greater Bangkok	Ref			
	Public school in Greater Bangkok	3.9 (1.10–13.84)	0.035	4.3 (1.21–15.43)	0.024
	Private and international	5.5 (1.42–21.29)	0.014	5.5 (1.39–21.37)	0.015

(Continued)

Table 5 (Continued).

Variable Name	Characteristics	Crude HR (95% CI)	P-value	Adjusted HR (95% CI)	P-value
Being intern in the same region as hometown	No	Ref			
	Yes	1.7 (0.50–5.71)	0.399		
Income	Dissatisfied	Ref			
	Neutral	1.5 (0.56–3.90)	0.427		
	Satisfied	0.8 (0.20–3.25)	0.767		
Opportunity for private practice	Dissatisfied	Ref			
	Neutral	0.5 (0.11–2.21)	0.357		
	Satisfied	1.7 (0.50–6.02)	0.380		
Payment on time	Dissatisfied	Ref			
	Neutral	1.4 (0.17–11.17)	0.766		
	Satisfied	1.7 (0.22–12.86)	0.612		
Welfare	Dissatisfied	Ref			
	Neutral	0.5 (0.18–1.18)	0.107		
	Satisfied	0.4 (0.12–1.24)	0.111		
Job security	Dissatisfied	Ref			
	Neutral	1.3 (0.47–3.55)	0.625		
	Satisfied	1.5 (0.49–4.68)	0.478		
Opportunity for continuing education	Dissatisfied	Ref			
	Neutral	0.9 (0.28–3.12)	0.919		
	Satisfied	1.2 (0.35–3.58)	0.845		
Workload	Dissatisfied	Ref			
	Neutral	1.1 (0.45–2.48)	0.907		
	Satisfied	0.2 (0.02–1.41)	0.103		
Obligated to perform autopsy	Dissatisfied	Ref			
	Neutral	0.6 (0.23–1.64)	0.327		
	Satisfied	0.4 (0.14–1.23)	0.111		
Risk of suing	Dissatisfied	Ref			
	Neutral	0.8 (0.29–1.94)	0.550	0.8 (0.31–2.22)	0.720
	Satisfied	0.3 (0.11–1.05)	0.061	0.3 (0.11–1.06)	0.064
Consultation	Dissatisfied	Ref			
	Neutral	1.8 (0.41–8.10)	0.429		
	Satisfied	1.7 (0.35–8.01)	0.526		
Referral system	Dissatisfied	Ref			
	Neutral	1.2 (0.33–4.31)	0.796		
	Satisfied	1.8 (0.48–6.55)	0.390		
Managers	Dissatisfied	Ref			
	Neutral	1.3 (0.38–4.39)	0.689		
	Satisfied	0.9 (0.28–2.80)	0.842		
Colleagues	Dissatisfied	Ref			
	Neutral	0.7 (0.22–2.17)	0.525		
	Satisfied	0.8 (0.31–2.14)	0.675		

(Continued)



**Table 5** (Continued).

Variable Name	Characteristics	Crude HR (95% CI)	P-value	Adjusted HR (95% CI)	P-value
Mental health	Dissatisfied	Ref			
	Neutral	0.6 (0.20–1.86)	0.383		
	Satisfied	1.0 (0.38–2.56)	0.982		
Being close to lover	Dissatisfied	Ref			
	Neutral	0.5 (0.11–2.16)	0.340		
	Satisfied	1.5 (0.50–4.56)	0.461		
Physical health	Dissatisfied	Ref			
	Neutral	0.2 (0.46–1.22)	0.085	0.3 (0.05–1.30)	0.098
	Satisfied	0.9 (0.32–2.46)	0.828	1.3 (0.47–3.83)	0.584
Working in hometown	Dissatisfied	Ref			
	Neutral	1.7 (0.56–5.27)	0.341		
	Satisfied	1.3 (0.44–3.97)	0.611		
Being close to family	Dissatisfied	Ref			
	Neutral	0.8 (0.25–2.25)	0.611		
	Satisfied	1.3 (0.50–3.36)	0.593		
Accommodation	Dissatisfied	Ref			
	Neutral	1.2 (0.45–3.26)	0.703		
	Satisfied	0.8 (0.28–2.44)	0.721		
Civilized province	Dissatisfied	Ref			
	Neutral	0.5 (0.14–2.76)	0.275		
	Satisfied	0.6 (0.26–1.59)	0.335		
Transportation convenience	Dissatisfied	Ref			
	Neutral	0.9 (0.31–2.57)	0.830		
	Satisfied	0.9 (0.30–2.45)	0.766		

respectively. This finding is consistent with previous studies, which suggested that medical graduates admitted via the special recruitment were more likely to remain working in the MOPH health services compared with medical graduates who entered the medical schools through normal national entrance examination.<sup>12,15</sup> Corresponding findings were also observed in Thailand and other countries, such as Canada and Australia, which found that having medical students with rural backgrounds positively influenced rural primary care practices and led to better retention rate.<sup>16–18</sup> Moreover, this Thai study found that the resigning rate was lower among the first-year internships due to the need to complete the first year of work experience to get one-year internship certificate. The internship certificate affects opportunity for continuing education.<sup>19</sup>

In financial terms, most physicians were not satisfied with their level of earning. About 33.9% of the respondents reported not being satisfied with net income, while only 19.0% felt satisfied. The study in Canada and China found that the most important factors influencing recruitment and retention were appropriate income and hours worked.<sup>20</sup> The inappropriateness of income rates and interrupted payments caused physicians to be reluctant to serve in public and rural areas.<sup>21</sup> Note that, from the HROPS database, income was the least common reason for resigning. In contrast, career factors such as continuing education were the most common reason for resigning. This finding implies that though new graduates were not satisfied with the income, increasing the salary itself might not be a sole solution to reduce the resignation rate, unless other supporting factors are in place.

Regarding working conditions, most of the participants felt satisfied with their colleagues. However, they reported that they were not satisfied with the workload. The study in Thailand found that good relationships between peers positively affected rural retention of medical graduates.<sup>11</sup> A systematic review found that working conditions were



significant factors influencing the retention of physicians in under-developed areas.<sup>10</sup> Minimal workload and high incentives in the private sector were among several main causes of brain drain of physicians to the private sector.<sup>18</sup>

Most respondents felt satisfied with being close to family and working in their hometown (40.5% and 38.8%, respectively). A previous study found that graduates had greater satisfaction if being posted in their hometown, neighbouring districts or provinces with the same culture, dialect and social networks.<sup>18</sup> However, the study found discordant results. The resigning rate in our study was higher in physicians who took an internship in the same region as their hometown. A possible reason for this phenomenon might be because the questionnaire focused at the level of region, which is a rough geographical classifier, compared with provinces. The CPIRD track requires graduates to practice in their hometown province. Therefore, the programme requirement is enforced at provincial level. However, provinces close to each other in the same region may exchange their CPIRD graduates as an in-house measure to alleviate shortages of physicians within the region.

Physicians from public medical schools outside Greater Bangkok had the lowest resigning rate, while physicians from private medical schools had the highest resigning rate. The multivariable analysis revealed that private or international physicians had a significantly higher risk of leaving public health facilities, at about 5.5 times the risk faced by physicians from public medical schools outside Greater Bangkok (95% CI 1.39–21.37). The study in Japan found that physicians who graduated from private medical schools were more likely to be involved in private practice relative to public medical school graduates.<sup>22</sup> The graduates from private medical schools are not under mandatory service regulation and do not have to pay non-adherence penalties. This might be a reason why the Thai study found a higher risk of leaving among this group. Moreover, physicians who graduated from public medical school in Greater Bangkok had about 4.3 times higher risk of leaving than those graduating from medical schools in the upcountry (95% CI 1.21–15.43). The medical students in Greater Bangkok medical schools might have their hometown in Bangkok or nearby provinces. Also, medical students in medical schools situated in Greater Bangkok may have less rural experience during the study period, compared with those from upcountry medical schools.

## Limitations

This study faced with some limitations. For example, first, for the situation among new physicians, there was no data on physicians in private hospitals or other settings outside the OPS-affiliated hospitals, for instance, physicians in military hospitals. However, since the majority of physicians served OPS hospitals, the finding can reflect the macro-view of the situation in Thailand. Second, due to the voluntary recruitment of participants, there was a high non-response rate. This problem means the study was not free from non-response bias and the power of the analysis was compromised. Last, due to the use of an online survey, it is difficult to define the population scope to which the questionnaire was distributed, as some people might have difficulties in accessing the online questionnaire via the weblink.<sup>23</sup> However, in this survey, it was fair to assume that every physician had acceptable digital literacy and could easily access this survey by using their smartphone.

## Recommendation for Future Studies

There are a number of gaps in knowledge, following our findings. Further qualitative study that plans to deeply explain the difference in the learning experience of CPIRD curriculum and the normal track curriculum is of great value. Studies that explore reasons why physicians from public school outside Greater Bangkok were more likely to stay in public service than those who graduated from public school in Greater Bangkok are worth conducting.

## Conclusion

Physicians in the special recruitment track had the lowest incidence rate of resigning compared to their normal track counterparts. Multiple factors contributed to physicians' dissatisfaction. Income was one of the least satisfying factors in the views of most medical graduates. The most satisfying factors were relationship with colleagues, being close to family, and having opportunities to work in their hometown. Moreover, physicians from public medical schools outside Greater Bangkok had the lowest resignation rate, while physicians from private medical schools had the highest resignation rate. Increasing the proportion of medical students for special track recruitment and enhancing the production capacity of graduates from public medical schools in the upcountry are likely to be key strategies that help maintain the physician

workforce in public services. Interventions that aim to address physicians' dissatisfaction should be implemented, such as adjusting the income to be proportionate with the workload and promoting opportunities for continuing studies, while maintaining status in the OPS affiliated health facilities.

## Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institute for the Development of Human Research Protections (IHRP), letter head: IHRP 888/2564.

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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