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# Factors Influencing Retention of Medical Graduates in the Health System: A Study from The First Collaborative Project to Increase Production of Rural Doctors (CPIRD) in Thailand

Watcharin Chirdchim, M.D., Ph.D.[1], Sirapong Weawseetong, M.D.[2], Nutthaeak Thangwatthanarat, M.D.[2], Koramit Navacharoenwong, M.D.[2]

[1]Department of Obstetrics and Gynecology, Prapokklao Hospital, Mueang, Chanthaburi 22000, Thailand.

[2]Medical Education Center Prapokklao Hospital, Mueang, Chanthaburi 22000, Thailand.

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## Abstract:

**Objective:** To identify the factors affecting doctor retention in the public health system.

**Material and Methods:** This cross-sectional study surveyed 426 doctors who graduated from Prapokklao Hospital (1976-2018). Data collected included: (1) Basic information (gender, age, resignation age, service length, medical program); (2) Personal factors (income, work hours, shifts, patient load, education, position); (3) Psychological factors (job satisfaction, pride); (4) External factors (relationships, welfare, culture, risks). Statistical analysis involved t-tests, Chi-square tests, and logistic regression to adjust for biases.

**Results:** Continuing in a residency program significantly increased retention in the public health service (odds ratio=7.14, 95% confidence interval=4.72, 10.81, p-value<0.05).

**Conclusion:** Residency training is a key factor for enhancing doctor retention in the public health system.

**Keywords:** CPIRD, doctor retention, resignation

**Contact:** Watcharin Chirdchim, M.D., Ph.D.
Department of Obstetrics and Gynecology, Prapokklao Hospital, Mueang, Chanthaburi 22000, Thailand.
E-mail: watcharin.ch@cpird.in.th

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## Introduction

From 1960 to 1975, there was a significant and persistent shortage of doctors in the public health system in Thailand. During this period, a large number of Thai doctors resigned from government positions and chose to work abroad. As a result, only approximately 300 doctors remained to serve in rural areas[1,2]. In 1976, negotiations between the Ministry of Public Health and Chulalongkorn University led to the establishment of a project aimed at producing doctors for rural areas. This project focused on educating and addressing problems in rural settings. Prapokklao Hospital was the first clinical medical education center in Thailand to produce doctors under the medical education for students in rural area project (MESRAP), a collaboration between Chulalongkorn University and the Ministry of Public Health. Initially, the project was called "The MESRAP," launched in 1976. Later, in 1994, the project was renamed and expanded into 2 programs: the collaborative project to increase production of rural doctors (CPIRD) and the one district one doctor (ODOD) program[3].

Despite efforts through the CPIRD to reduce resignations and increase retention in the public health system, the challenge of keeping doctors remains[4–6]. Even with increased doctor production, retention issues persist[7]. Over 40 years, Prapokklao Hospital has trained more than 800 doctors for rural areas, emphasizing real-world problem-solving in these settings. However, no study has specifically examined retention and resignation rates from these programs. This research aimed to identify the factors influencing doctor retention and resignation, guiding program improvements for sustainable development in line with World Health Organization standards[13].

## Material and Methods

This cross-sectional descriptive study analyzed factors influencing doctor retention and resignation in the MESRAP, ODOD, and CPIRD programs at Prapokklao Hospital. Ethical approval was granted (Approval Number: CTIRECT 04/65) covering the period from September 8, 2022, to September 7, 2023. Participants were informed about the study and provided written consent. Data were collected from November 1, 2022, to August 31, 2023, with 337 questionnaires completed. The study population included 853 doctors who graduated from Prapokklao Hospital's rural doctor program between 1976 and 2018.

The sample size was calculated using Taro Yamane's formula (1973) at a 95% confidence level, requiring 273 participants. Systematic sampling selected 426 doctors. Inclusion criteria were doctors who graduated from the CPIRD, ODOD, and MESRAP programs at Prapokklao Hospital (1976–2018) and consented to participate. Exclusions included non-graduates, those who declined participation, deceased individuals, unreachable contacts, or retirees. Data were collected through phone interviews, covering: 1) Basic information (age, gender, service duration, program type), 2) Personal factors (income, workload, education, position), 3) Psychological factors (job satisfaction), and 4) External factors (work environment, relationships, risks).

Data analysis was conducted using STATA software. Descriptive statistics included mean and standard deviation for quantitative data, and percentages for qualitative data. Inferential analysis used independent t-tests for quantitative data and chi-square tests for qualitative data. Binary logistic regression identified factor relationships, while survival analysis and Kaplan-Meier comparisons evaluated retention rates, with significance set at $p\text{-value}<0.05$ and a 95% confidence interval (95% CI).

## Results

The study included 853 doctors who graduated from the rural doctor program (1976–2018). From this group, 426

were randomly selected for surveys, with 67 excluded based on the criteria, resulting in a final sample of 337 doctors. Ages ranged from 27 to 62 years, averaging 41.8 years. After excluding retirees, 262 doctors (81.1%) remained in the public health system, while 61 (18.9%) had left, as illustrated in Figure 1.

The basic information reveals key findings indicating significant differences in age between doctors who stayed in the system (40.2±7.3 years) and those who resigned (44.6±9.63 years). The average resignation age was 31.8±6.9 years. Length of service and gender significantly influenced retention, with an equal male-to-female ratio (50%) among those who stayed. In the MESRAP program, 70.53% remained, while 29.47% resigned. In the ODOD program, 85.71% stayed and 14.29% left. For the CPIRD program, 86.8% remained and 13.2% resigned, as shown in Table 1.

Section 2 analysis shows significant differences: doctors in the system earn less but work more hours daily and weekly (40.3 vs. 36.0) compared to those who resigned, with fewer shifts (2.5 vs. 3.2). More doctors who stayed pursued training (46.6% residency, 22.9% fellowships) than those who resigned (21.3% and 8.2%). Most who resigned had no additional training (70.5% vs. 30.5%). Resigned doctors were mainly practicing (52.5%) and senior physicians (23.0%), while those who stayed were specialists (21.0%), experts (17.2%), and highly qualified physicians (11.5%). The differences are statistically significant (p-value<0.05), as shown in Table 2. Job satisfaction between the 2 groups shows no significant differences. Most reported being moderately happy (68.32% retained, 67.21% resigned) and moderately proud (64.50% retained, 68.85% resigned). Satisfaction with supervisors (83.61% resigned vs. 73.66% retained) and welfare (73.77% resigned vs. 60.31% retained) was slightly higher among those who resigned. Satisfaction with corporate culture (86.89% resigned vs. 72.14% retained) and risk (82.25% resigned vs. 77.48% retained) also followed this trend. Despite these variations, the differences aren't statistically significant enough to impact retention or resignation decisions, as shown in Table 3.

Table 4 identifies the key factors influencing doctors' decisions to stay or leave the public health system, analyzed through univariable and multivariable methods: age, years of service, gender, income, daily hours, training, and position. Doctors who stay tend to be younger, have fewer years of service, a lower income, work longer hours, and hold higher positions. Continuing education, especially residency, increases the likelihood of staying, while female doctors are more likely to resign. Satisfaction with supervisors, colleagues, welfare, and culture had no significant impact. Notably, doctors who stay earn less (p-value<0.05) but are up to 7 times more likely to pursue further education (p-value<0.05). Researchers used survival analysis and Kaplan-Meier with log-rank tests to further analyze the factors impacting retention. Results showed that continuing education significantly influences the decision to resign from the public health system (p-value=0.000, p-value≤0.05), as shown in Table 5.

Using the Kaplan-Meier method, we found that the highest likelihood of resigning occurs within the first 10 years, especially in the first 5 years of service. Retention improves after 10 years, but the likelihood of resigning rises again after 20 years of service, as shown in Figure 2.

In the first 10 years, retention rates dropped most for doctors without residency training, followed by those with residency, and least for those with advanced residency. By the 30$^{th}$ year, retention was around 60% for non-residency doctors, 70% for residency-trained, and 75% for those with advanced residency, as shown in Figure 3.

**Table 1** Personal information of doctors between those who remain in the system and those who have resigned

| Parameter | Retain (n=262) mean (±S.D.) | Not-retain (n=61) mean (±S.D.) | p-value |
|---|---|---|---|
| Age (years) | 40.2 (±7.3) | 44.6 (±9.6) | <0.05 |
| Age in work | 40.2 (±7.3) | 31.8 (±6.9) | <0.05 |
| Year work | 16.1 (±7.5) | 7.5 (±7.2) | <0.05 |
| Gender (n, %) | | | <0.05 |
| Male | 131.0 (50.0) | 20.0 (32.79) | |
| Female | 131.0 (50.0) | 41.0 (67.22) | |
| Programs (n, %) | | | <0.05 |
| ODOD | 12.0 (4.58) | 2.0 (3.28) | |
| CPIRD | 171.0 (65.27) | 26.0 (42.62) | |
| MESRAP | 79.0 (30.15) | 33.0 (54.10) | |

S.D.=standard deviation, ODOD=one district one doctor, CPIRD=collaborative project to increase production of rural doctors, MESRAP=medical education for students in rural area project

**Table 2** Compensation, work intensity, continuing education and current position of doctors between those who remain in the system and those who have resigned

| Work intensity | Retain (n=262) mean (±S.D.) | Not-retain (n=61) mean (±S.D.) | p-value |
|---|---|---|---|
| Income/month (Baht) | 70,385.4 (±22,626.83) | 78,437.5 (±24,498.29) | 0.0026 |
| Daywork (hours/day) | 7.4 (±1.6) | 6.8 (±2.6) | 0.037 |
| Wage/week (shifts) | 2.5 (±1.8) | 3.2 (±3.8) | 0.015 |
| Patients/day | 44.3 (±21.3) | 44.0 (±22.7) | 0.7315 |
| Working hour/week | 40.3 (±10.6) | 36.0 (±17.5) | 0.0220 |
| Continuing education | | | <0.05 |
| No training | 29 (11.07) | 18 (29.51) | |
| Resident | 129 (49.24) | 27 (44.26) | |
| Fellow | 104 (39.69) | 16 (26.23) | |
| Current position | | | <0.05 |
| Practicing physician | 20 (8.16) | 20 (40.00) | |
| Senior physician | 74 (30.20) | 14 (28.00) | |
| Specialist | 124 (50.61) | 16 (32.00) | |
| Expert | 25 (10.20) | 0 (0.00) | |
| Highly qualified physician | 2 (0.82) | 0 (0.00) | |

S.D.=standard deviation

**Table 3** Job satisfaction of doctors between those who remain in the system and those who have resigned

| Parameter | Retain (n=262, %) | Not-retain (n=61, %) | p-value |
|---|---|---|---|
| Happiness | | | 0.295 |
| Not happy | 0 (0.00) | 1 (1.64) | |
| Slightly happy | 5 (1.91) | 1 (1.64) | |
| Moderately happy | 179 (68.32) | 41 (67.21) | |
| Very happy | 71 (27.10) | 18 (29.51) | |
| Extremely happy | 7 (2.67) | 0 (0.00) | |
| Dignity | | | 0.711 |
| Not proud | 1 (0.38) | 0 (0.00) | |
| Slightly proud | 8 (3.05) | 0 (0.00) | |
| Moderately proud | 169 (64.50) | 42 (68.85) | |
| Very proud | 75 (28.63) | 18 (29.51) | |
| Extremely proud | 9 (3.44) | 1 (1.64) | |
| Supervisor | | | 0.089 |
| Not satisfied | 0 (0.00) | 1 (1.64) | |
| Slightly satisfied | 13 (4.96) | 3 (4.92) | |
| Moderately satisfied | 193 (73.66) | 51 (83.61) | |
| Very satisfied | 49 (18.70) | 5 (8.20) | |
| Extremely satisfied | 7 (2.67) | 1 (1.64) | |
| Risk | | | 0.351 |
| Not satisfied | 1 (0.38) | 1 (1.64) | |
| Slightly satisfied | 6 (2.29) | 1 (1.64) | |
| Moderately satisfied | 203 (77.48) | 52 (82.25) | |
| Very satisfied | 50 (19.08) | 7 (11.48) | |
| Extremely satisfied | 2 (0.76) | 0 (0.00) | |
| Colleague | | | 0.127 |
| Not satisfied | 0 (0.00) | 1 (1.64) | |
| Slightly satisfied | 5 (1.91) | 3 (4.92) | |
| Moderately satisfied | 182 (69.47) | 43 (70.49) | |
| Very satisfied | 69 (26.34) | 12 (19.67) | |
| Extremely satisfied | 6 (2.29) | 2 (3.28) | |
| Welfare | | | 0.188 |
| Not satisfied | 1 (0.38) | 1 (1.64) | |
| Slightly satisfied | 8 (3.05) | 1 (1.64) | |
| Moderately satisfied | 158 (60.31) | 45 (73.77) | |
| Very satisfied | 84 (32.06) | 13 (21.31) | |
| Extremely satisfied | 11 (4.20) | 1 (1.64) | |
| Corporate Culture | | | 0.056 |
| Not satisfied | 1 (0.38) | 1 (1.64) | |
| Slightly satisfied | 6 (2.29) | 1 (1.64) | |
| Moderately satisfied | 189 (72.14) | 53 (86.89) | |
| Very satisfied | 60 (22.90) | 6 (9.84) | |
| Extremely satisfied | 6 (2.29) | 0 (0.00) | |

**Table 4** Univariable and multivariable odds ratios for factors influencing retention and resignation of doctors

| Parameter | Retain (n=262) | Not-retain (n=61) | p-value | Univariable odds ratio | p-value | Multivariable odds ratio | p-value |
|---|---|---|---|---|---|---|---|
| Age | 40.2 (±7.3) | 44.6 (±9.6) | <0.05 | 0.93 | <0.05 | - | - |
| Age in work | 40.2 (±7.36) | 31.8 (±6.86) | <0.05 | 1.22 | <0.05 | 1.07 (0.97, 1.18) | 0.394 |
| Years of service | 16.1 (±7.5) | 7.5 (±7.2) | <0.05 | 1.22 | <0.05 | 1.13 (0.97, 1.32) | 0.143 |
| Gender (n, %) | | | <0.05 | 4.88 | <0.05 | 0.57 (0.35, 0.93) | 0.213 |
| Male | 131 (50.0) | 20 (32.79) | | | | | |
| Female | 131 (50.0) | 41 (67.22) | | | | | |
| Project (n, %) | | | <0.05 | | | - | - |
| ODOD | 12 (4.58) | 2 (3.28) | | 0 | | | |
| CPIRD | 171 (65.27) | 26 (42.62) | | 1.09 | 0.908 | | |
| MESRAP | 79 (30.15) | 33 (54.10) | | 0.40 | 0.246 | | |
| Income/month (Baht) | 70,385.4 (±22,626.8) | 78,437.5 (±24,498.2) | <0.05 | 1.00 | <0.05 | 0.99 (0.97, 1.01) | <0.05 |
| Daywork (hours/day) | 7.4 (±1.6) | 6.8 (±2.6) | <0.05 | 1.16 | <0.05 | 1.37 (1.02, 1.84) | 0.200 |
| Wage/week (shifts) | 2.5 (±1.8) | 3.2 (±3.8) | <0.05 | 0.90 | 0.111 | - | - |
| Working hours/week | 40.3 (±10.6) | 36.0 (±17.5) | <0.05 | 1.03 | <0.05 | 1.05 (0.83, 1.33) | 0.724 |
| Training (n, %) | | | <0.05 | | | | |
| No training | 29 (11.07) | 18 (29.51) | | 0 | | 0 | |
| Resident | 129 (49.24) | 27 (44.26) | | 2.94 | <0.05 | 7.14 (5.32, 9.58) | <0.05 |
| Fellow | 104 (39.69) | 16 (26.23) | | 4 | <0.05 | 3.33 (2.25, 4.93) | 0.108 |
| Position (n, %) | | | <0.05 | | | | |
| Practicing physician | 20 (8.16) | 20 (40.00) | | 0 | | 0 | |
| Senior physician | 74 (30.20) | 14 (28.00) | | 5.26 | <0.05 | 2.63 (1.78, 3.89) | 0.165 |
| Specialist | 124 (50.61) | 16 (32.00) | | 7.69 | <0.05 | 3.22 (2.09, 4.96) | 0.145 |
| Expert | 25 (10.20) | 0 (0.00) | | - | - | - | - |
| Highly qualified | 2 (0.82) | 0 (0.00) | | - | - | - | - |

ODOD=one district one doctor, CPIRD=collaborative project to increase production of rural doctors, MESRAP=medical education for students in rural area project

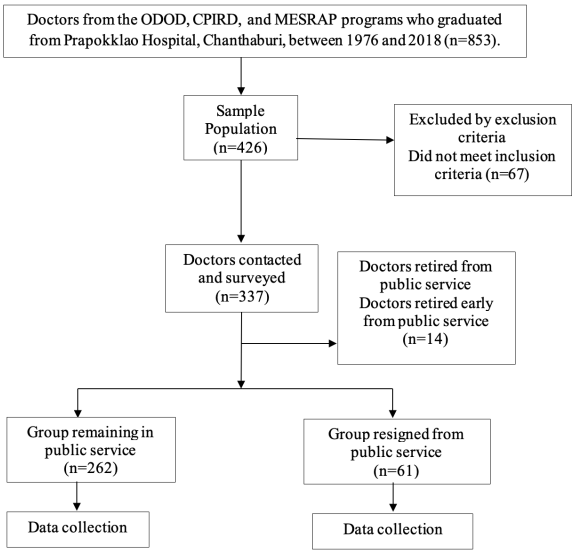



**Figure 1** study flow

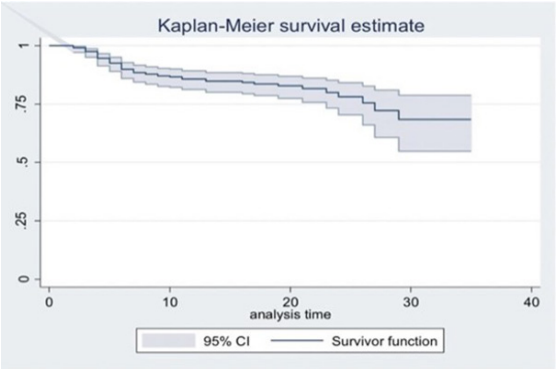
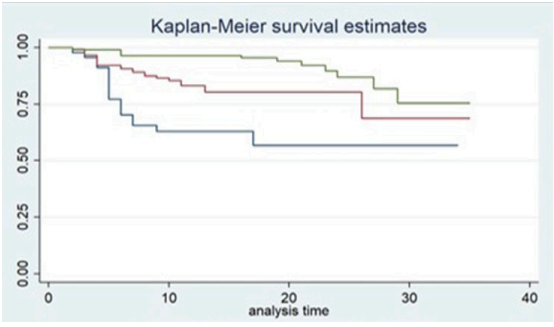



**Figure 2** Comparison of survival functions in the public health system with the variable of years of service (Years)




Green line (Top): Doctors who did not pursue residency training, red line (Middle): Doctors who completed residency training, blue line (Bottom): Doctors who pursued advanced residency training, Analysis time (years)

**Figure 3** Comparison of survival functions in the public health system with the variable of continuing education (Years)

## Discussion

This study surveyed 426 doctors, achieving a participation rate of 37% (323 participants out of 853), which exceeded the required sample size. Among these participants, 262 remain in the public health system, while 61 have resigned. All participants completed the questionnaire, ensuring comprehensive data collection. Initial analyses identified several significant factors associated with retention in the public health system, which were further explored using logistic regression analysis.

One key finding was the variation in resignation rates across different programs. The MESRAP program exhibited the highest resignation rate, followed by ODOD, with CPIRD demonstrating the lowest resignation rate. These findings align with previous studies showing that the CPIRD and ODOD programs achieve higher retention rates compared to regular programs[4]. Younger doctors were more likely to remain in the public health system, with older doctors more frequently resigning. This trend corresponds with the transition from the MESRAP to CPIRD and ODOD programs, which have been bolstered by increased compensation for rural doctors.

Another factor was the age at the final year of service. On average, doctors who resigned were 31 years old in their final year of service, coinciding with the completion of residency and service obligations. This is consistent with earlier studies suggesting that some doctors resign to pursue further education or specialized training[4–7]. Gender also played a role, with female doctors exhibiting higher resignation rates than their male counterparts. This may be attributed to the requirements of the CPIRD and ODOD programs, which often necessitate service in remote hospitals[8].

Income levels emerged as another significant factor. Doctors who resigned reported higher average incomes than those who remained. However, this difference is likely due to transitions to private hospitals rather than public hospitals offering competitive salaries[8]. Prior research highlights that factors like pride, compensation, welfare, and family support significantly influence retention, particularly in rural areas[9]. Working hours also appeared to influence retention. Doctors who remained in the public health system reported working more daily and weekly hours than those who resigned. Interestingly, those who resigned took more weekly shifts, possibly to compensate for lower workloads per shift in private settings compared to their public duties[8].

Opportunities for continuing education strongly influenced retention. Logistic regression analysis revealed that doctors with access to further education were 7 times more likely to remain in the public health system[9–10]. This aligns with studies identifying educational opportunities as critical for extending tenure in the public health system and highlights the role of career advancement in influencing doctors' decisions. Additionally, past research has identified that one of the key reasons for resigning from the public health system is to pursue further education[11].

The current position of doctors was another determinant of retention. Doctors who resigned were mostly practicing physicians, whereas those who remained included a higher proportion of senior physicians and specialists. Career advancement opportunities, therefore, appear to play a pivotal role in retention, as corroborated by previous studies[10].

Contrary to expectations, job satisfaction and pride in work did not show significant differences between the 2 groups. These findings diverge from earlier research that emphasized the importance of happiness and pride in retaining healthcare professionals[1,9,10,12]. Similarly, no significant differences were observed in factors such as relationships with colleagues and supervisors or organizational culture. Despite this, prior research suggests that organizational policies and commitment can influence retention[9].

Finally, family emerged as a decisive factor in retention decisions, with its influence surpassing other

organizational factors[8]. This underscores the importance of personal and familial considerations in shaping the career choices of doctors within the public health system.

When analyzing retention rates in the public health system using survival analysis and the log-rank test, considering opportunities for further education, the results align with the earlier discussion.

### Limitations and recommendations

Retrospective nature: this descriptive study relies on historical data, with some information dating back over 10 years. Although participants provided complete information, some were uncertain about the accuracy of their responses due to the time elapsed since the events.

Survey design: during the design of the survey, questions were tested on doctors who had graduated over 10 years ago. Some personal questions were difficult for respondents to recall and answer. As a result, certain potentially beneficial questions had to be omitted. These included monthly income at the time of resignation, job position at the time of resignation, workload at the time of resignation, daily and weekly working hours at the time of resignation, spouse's domicile, spouse's income, and trends in further education decisions.

Lack of subgroup analysis: researchers did not perform subgroup analyses, such as categorizing responses by different time periods, for ease of calculation. This omission could result in confounding factors related to the trends and influences of different eras, which could impact retention and resignation decisions.

Sample size and depth of analysis: the large sample size prevented in-depth individual interviews. Consequently, the analysis might not fully explore all aspects and reasons behind each factor. The researchers had to rely on explanations and results from previous studies to interpret the findings.

## Conclusion

The opportunity for further education significantly impacts retention, indicating that career advancement, continuing education, promotion, salary increases during education, or other incentives during education may increase retention in the public health system.

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