MANAGERIAL

Using Financial Incentives to Improve the Care of Tuberculosis Patients

Cheng-Yi Lee, MS; Mei-Ju Chi, PhD; Shiang-Lin Yang, MS; Hsiu-Yun Lo, PhD; and Shou-Hsia Cheng, PhD

ABSTRACT

Objectives

Tuberculosis (TB) is a serious public health concern, and Taiwan has implemented a pay-for-performance (P4P) program to incentivize healthcare professionals to provide comprehensive care to TB patients. This study aims to examine the effects of the TB P4P program on treatment outcomes and related expenses.

Study Design

A population-based natural experimental design with intervention and comparison groups.

Methods

Propensity score matching was conducted to increase the comparability between the P4P and non-P4P group. A total of 12,018 subjects were included in the analysis, with 6009 cases in each group. Generalized linear models and multinomial logistic regression were employed to examine the effects of the P4P program.

Results

The regression models indicated that patients enrolled in the P4P program had 14% more ambulatory visits than non-P4P patients (P <.001), but there were no differences in hospitalization rates. On average, P4P enrollees spent $215 (4.6%) less on TB-related expenses than their counterparts. In addition, P4P enrollees had a higher likelihood of being successfully treated (odds ratio, 1.56; P <.001) and were less likely to die compared with nonenrollees.

Conclusions

Patients in the P4P program were less likely to die, were more likely to be treated successfully, and incurred lower costs. Providing financial incentives to healthcare institutions could be a feasible model for better TB control.

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Tuberculosis (TB) is a serious public health concern and a major cause of death worldwide, especially in Asia and Africa.[1] The United Nations Millennium Development Goals state that prevalence and death rates associated with TB should be halved by 2015.[2] To achieve the Millennium Development Goals, target, programmatic, and operational issues have been raised.[3] The delivery of TB care through the optimal use of currently available service resources is an issue that deserves attention. Studies are needed to provide evidence of how to improve the use, quality, effectiveness, and coverage of TB interventions.[3,4]

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There are a rapidly growing number of pay-for-performance (P4P) program models linking financial incentives and patients' healthcare outcomes. Many countries have adopted various types of P4P programs to improve healthcare quality while controlling costs.[5] There has also been a growing literature examining the effects of P4P programs, yet considerable debate continues about the effectiveness of P4P programs on healthcare outcomes.[6-9] Discrepancies in the findings of the empirical studies might be due to the variations in types of financial incentives implemented, the payer mix, and the baseline level of quality care.[10]

Taiwan's TB P4P Program

Among the 23 million residents in Taiwan, the annual incidence rate of TB ranged from 72 to 74 per 100,000 persons from 2004 to 2005, and TB has been the 12th or 13th leading cause of death after 2005, and it is also the most lethal infectious disease.[11] In the past, TB patients were mainly treated in designated TB centers in Taiwan; however, not every TB patient was properly managed because some patients were distantly located from one of these centers.[12,13] Fortunately, Taiwan implemented the National Health Insurance (NHI) program in 1995. The NHI is mandatory and covers over 99% of the population, and 90% of hospitals and clinics nationwide are contracted with NHI.

Under NHI coverage, patients can choose preferred healthcare providers for healthcare needs. Therefore, the Taiwan Centers for Disease Control (Taiwan CDC) decided to expand designated TB treatment units to include any NHI-contracted hospitals that had at least 1 TB or chest specialist. This strategy enabled the healthcare providers to treat TB patients with universal health insurance coverage in Taiwan.

In 2001, the Bureau of NHI implemented a pilot P4P program for TB and several other illnesses (including asthma, diabetes, breast cancer, and cervical cancer) to promote evidence-based follow-up care. Since 2004, the TB P4P program has been administered in cooperation with the Taiwan CDC to simplify bureaucratic processes and claim procedures. NHI-contracted hospitals and clinics (with at least 1 TB or chest specialist) can participate in the TB P4P program voluntarily, and physicians can then enroll their TB patients into the program. The new P4P program increased the participation of healthcare providers in TB control from 68 institutions nationwide in 2002, to 751 hospitals and clinics in 2004.

In addition to the regular NHI fee-for-service payments for treating patients with TB (which include physician counseling fees, medication fees, physical examination fees, and laboratory test fees), hospitals and clinics participating in the P4P program also receive extra payments for recommended services, such as diagnosis confirmation fees and comprehensive follow-up and education fees. Special payment rewards are also made for patients completing treatment. For example, the treatment success reward is 2000 New Taiwan (NT) dollars ($1 US = 30 NT dollars as of 2013) for a case of multidrug-resistant TB, and 1000 NT dollars for a regular TB case. Higher payments for specific laboratory tests are also included.[14,15] Detailed information on the monetary amount of the financial incentives of the TB P4P program compared with regular payment for TB treatment is listed in the **eAppendix Table** (available at **www.ajmc.com**). The P4P financial incentive for a typical TB case over an 8-month treatment period is at least 5500 NT dollars, or approximately US$183.

Under the P4P program, the TB case managers, mainly registered nurses (part-time or full-time staff members as needed in each hospital), play a major role. Once enrolled in the P4P program, each TB patient is assigned to a case manager and an attending physician. The case managers are responsible for supervising each enrolled patient (ensuring that each takes prescribed medications and appears at scheduled follow-up visits), as well as providing health education to patients. They also serve as the liaison between public health authorities and healthcare institutions. The P4P-participating providers are required to report treatment processes and case management status to the Taiwan CDC, which facilitates intensive follow-up. The P4P payment is reimbursed by the Bureau of NHI after verification by the CDC.

This study extends the existing studies in 2 ways. First, previous studies have evaluated the preliminary effects of the TB P4P program by using NHI claims data to identify TB cases,[16,17] and the healthcare expenses have not yet been evaluated. Furthermore, only limited outcomes measures have been reported regarding communicable diseases.[18] Second, the majority of previous studies on P4P programs and healthcare outcomes were conducted in diverse settings in the United States. However, the US healthcare system is characterized by multiple payers; physicians may contract with a number of commercial insurance companies, Medicaid health maintenance organizations, or Medicare groups.

In addition, most P4P programs include relatively small-scale financial intervention—only a few P4P initiatives have expanded to include national coverage in the US healthcare system. Small-scale financial incentive interventions, either from payers or purchasing coalitions, may not capture the attention of physicians.[19] Conversely, Taiwan has implemented a P4P program with a national scope under a universal coverage healthcare system, which provides a favorable research setting to investigate the effects of a P4P program. Therefore, the purpose of this study was to evaluate the effects of the TB P4P program on healthcare expenses and treatment outcomes under a universal coverage system in Taiwan.

METHODS

The NHI P4P program for TB was introduced in 2001. According to Taiwan's Communicable Disease Control Act, doctors are required to report suspected or confirmed TB cases to the Taiwan CDC within 7 days after diagnosis. To avoid the possible confounding effect of the severe acute respiratory syndrome outbreak in 2003 and the Directly Observed Treatment, Short-Course program—the WHO-recommended treatment model for TB—which was implemented in 2006 in Taiwan, this study only analyzed the TB cases confirmed in 2004 and the healthcare expenses incurred in 2004 and 2005.

This was a population-based retrospective study. The data used in this study were acquired from the Taiwan CDC's national TB control database; all cases reported and confirmed in 2004 were included in the analysis.

Data for healthcare utilization and expenses during 2004 and 2005 came from the NHI claims database. The 2 data sets were linked by the subjects' personal identification numbers, and the study was approved by the academic research units of the Taiwan CDC.

To minimize the differences between the characteristics of the patients in the intervention (P4P) and comparison (non-P4P) groups, propensity score matching was adopted in the analysis. We created propensity scores that predicted the probability of patients' enrollment in the P4P program. The covariates included patient characteristics (eg, age, sex, residence area, aboriginal status, Charlson Comorbidity Index [CCI] score, sputum status) and characteristics of healthcare providers (eg, ownership and accreditation level). We employed the Mahalanobis distance calculation method with 1:1 matches between the intervention group and the comparison group based on the propensity score.

Variables of Interest

The dependent variables examined in this study were healthcare utilization, healthcare expenses, and treatment outcomes. TB-related healthcare utilization and expenses were identified by the *International Classification of Diseases, Ninth Revision, Clinical Modification* (*ICD-9-CM*) codes of 010-018 as the primary or secondary diagnosis in the NHI claims database. Healthcare utilization included the number of outpatient visits, emergency department (ED) visits, and hospitalizations related to TB. Healthcare expenses included the expenses for all TB-related outpatient visits, ED visits, and hospitalizations, as well as the total TB-related healthcare expenses incurred by the patients. Finally, the treatment outcomes were classified into treatment success, death, or unfavorable outcomes (ie, lost to follow-up, treatment failure, or still under treatment).

Statistical Analyses

A generalized linear model with logarithmic link and negative binominal distribution was used to estimate the effects of the P4P program on the number of outpatient visits, the number of ED visits, and the number of hospitalizations. The values for healthcare expenses were right-skewed; therefore, we used a generalized linear model with logarithmic link and gamma distribution. The predicted values of healthcare expenses from the regression models were calculated to illustrate the results obtained in the 2 study groups. Finally, we used multinomial logistic regression to examine the effects of the P4P program on treatment outcomes. We used the NCSS (version 2007, Kaysville, Utah) for the propensity score matching and SAS (version 9.1, Cary, North Carolina) for statistical analysis. A *P* value of less than .05 indicates statistical significance.

RESULTS

A total of 16,784 cases of TB were reported to and confirmed by the Taiwan CDC in 2004. The cases with foreign identification numbers or the identification numbers that had no matches in the NHI claims database (N = 1227) were excluded. There were 15,557 subjects included in the analysis. These subjects were treated in 374 hospitals and 377 clinics in 2004; the majority of these cases were treated in hospitals.

The majority of the TB subjects were male (69.3%), living in nonindigenous (91.9%) and nonaboriginal groups (93.5%), and 48.3% were 65 years and older. Concerning the subjects' disease characteristics, 56.4% had positive sputum tests, and 58.5% had a CCI score equal to or greater than 1. About 50.6% of the subjects received TB treatment in public or government-run healthcare institutions, and 58% were treated in the outpatient departments of medical center hospitals and regional hospitals, which are referral hospitals (compared to more local district hospitals and clinics).

The basic characteristics of the subjects and the healthcare providers by P4P and non-P4P groups are shown in **Table 1**. The logistic regression used for the propensity score prediction had a goodness-of-fit examined by the Hosmer-Lemeshow test ($P = .308 > .05$). Before the propensity score matching process, the subjects in the P4P group were less likely to be aboriginal or living in indigenous areas and more likely to have active sputum status than those in the non-P4P group; P4P enrollees tended to be treated in public and higher levels of healthcare institutions. After the propensity score matching process, 12,018 patients were included in the analysis, with 6009 patients in each group. The demographics and disease characteristics of the subjects and the characteristics of their healthcare providers became similar between the 2 groups.

Table 2 shows TB-related healthcare utilization, including the numbers of outpatient visits, the number of ED visits, and the number of hospitalizations. The P4P enrollees used 14% more TB-related outpatient services (incidence rate ratio, 1.14; $P < .001$) than the non-P4P subjects; yet, there was no significant difference in the number of ED visits or hospitalizations between the P4P and non-P4P groups. Patients with comorbidities (CCI

score ≥1) tended to have higher numbers of outpatient and ED visits and hospital admissions (P <.001). Patients 65 years or older had fewer outpatient visits, but more ED visits and hospital admissions (P <.001). Patients who were male or aboriginals or had a positive sputum test had more ED visits and hospital admissions (P <.001).

Table 3 shows the results from the generalized linear model regressions for TB-related healthcare expenses. After controlling for related variables, patients enrolled in the P4P group incurred more TB-related outpatient expenses than the non-P4P patients (β = 0.28; cost ratio [CR], 1.33; P <.001). The P4P enrollees also incurred higher TB-related ED expenses (β = 0.19; CR, 1.20; P <.001), but lower hospitalization expenses (β = –0.10; CR, 0.90; P <.001) than nonenrollees. Finally, the P4P enrollees had slightly lower total TB-related healthcare expenses (β = –0.05; CR, 0.95; P <.001) than non-enrollees, with a cost savings of US$215, or 4.6%, for P4P enrollees versus nonenrollees (US$4674 vs US$4889).

The results also indicated that patients in any of the following groups had significantly higher total TB-related healthcare expenses: demonstrating comorbidities, 65 years or older, positive sputum test, male, treated in a public institution or higher accredited provider (medical centers and regional hospitals). Table 4 shows the effects of the TB P4P program on treatment outcomes at the end of the study period. Of the 12,018 study subjects, 9265 patients were cured (treatment success), 1628 patients were deceased, and 1125 patients were either still under treatment, lost to follow-up, or had treatment failure (noted as "other" in the analysis). Since there was no established software to test the goodness of fit for the multinomial logistic regression, we conducted 2 separate tests for the P4P and non-P4P groups of the outcomes suggested by Begg and Gray.[20] The Hosmer-Lemeshow tests showed marginal goodness of fit (P = .020 and .344, respectively), yet the areas under the receiver operating characteristic curves were .844 and .847, respectively, which indicated a fairly good fit.

After controlling for potential confounding factors and using patients who were deceased as the reference group, we found that patients enrolled in the P4P program were more likely to complete treatment successfully (odds ratio [OR], 1.56; P <.001). The patients who were aboriginals or treated at higher levels of healthcare providers were more likely to be treated successfully, while patients 65 years and older (with positive sputum tests, treated in public healthcare institutions, or with comorbidities) were more likely to die during the treatment course. Of deceased patients, 73.7% had CCI scores ≥1, 81.9% were aged 65 years or older, 73.3% were sputum-positive, 73.9% were male, 98.3% were nonaboriginal, 75.5% were treated in public institutions, and 82.2% were treated in district hospitals and clinics.

DISCUSSION

This study aimed to examine the effects of the TB P4P program jointly introduced by Taiwan's CDC and Bureau of NHI. Findings from the analysis indicated that financial incentives to healthcare providers for better TB treatment resulted in more follow-up visits and higher outpatient expenses. However, the P4P enrollees incurred fewer hospitalization expenses and had slightly lower total TB-related healthcare expenses (4.6%, or US$215 savings) than non-P4P enrollees, implying that reduced TB-related hospitalization expenses might offset the higher expenses associated with outpatient visits. This is the first report on possible savings from the TB P4P program that is similar to the findings of a previous study on the P4P program for diabetes in Taiwan.[21]

Regarding the P4P program's effect on treatment outcomes, we found that the P4P enrollees with TB were more likely to be cured (OR, 1.56, or 236 lives saved). These findings are similar to those of previous reports using only NHI claim data in Taiwan.[16,17] The results reported by Li et al revealed that both the treatment success rate and the average length of treatment for treatment-success cases improved significantly after the introduction of the P4P program for TB.[16] Tsai et al suggested that the P4P program on TB improved the treatment default rate (ie, lost to follow-up) for TB patients.[17] The present study used more comprehensive data by combining the Taiwan CDC mandatory reporting data and the NHI claims data, and the statistical models may have produced more precise estimates. Furthermore, this study employed a propensity score matching technique to increase the comparability of the P4P and non-P4P groups, which may enhance the robustness of the findings.

The TB P4P program included not only the incentives for processes and outcomes measures, but also the "information integrated platform," which improved the cooperation of the public health agencies and healthcare institutions in Taiwan. Via this electronic information–sharing platform, both healthcare providers and public health officials can access the most updated information regarding the treatment progress of individual TB patients, such as their visit records, side effects experienced, prescription records, and follow-up status. Overall, the

platform facilitates the monitoring of patient progress by physicians and case managers. Bardach and colleagues have reported that electronic health records might play an important role among small practices in response to financial incentive programs in the United States.[22] Therefore, the P4P scheme accompanying a well-designed electronic information system could enhance the patient care quality and effectiveness of case management.

While the P4P program for TB care in Taiwan was implemented nationwide under a universal coverage plan, P4P programs in the United States have tended to be on a smaller scale and implemented by individual health plans. We suggest that the scope of application might be expanded, or that a uniform financial design might be implemented across various payers,[8] to strengthen the potential effects in the United States. In addition, the public health authorities might consider incorporating financial incentive components into communicable disease control programs to improve better healthcare outcomes.

Limitations

Several limitations of the study should be mentioned. The enrollment of hospitals and clinics into the TB P4P program was voluntary, and there may be specific characteristics of these health institutions that introduce selection bias into this study. Furthermore, the enrollment of patients into the P4P program was voluntary, so selection bias might exist, although we used propensity score matching to increase comparability between the enrolled and nonenrolled patients. Finally, other factors that might influence the treatment outcome, such as the patients' socioeconomic status, health literacy, and severity of TB, were not controlled for in the analysis. The interpretation of the findings should be conservative.

CONCLUSIONS

The study showed that the financial incentive program for TB treatment and management was associated with an increased number of follow-up visits. Patients enrolled in the program incurred higher expenses for outpatient services but lower hospitalization expenses and total TB-related healthcare expenses. We conclude that the program enrollees were less likely to die, more likely to finish treatment, and incurred lower costs compared with nonenrolled counterparts. Providing financial incentives to healthcare institutions could be a feasible model for better TB control. More detailed cost-effectiveness studies are needed in the future.

Author Affiliations: Centers for Disease Control, Ministry of Health and Welfare (C-YL, S-LY, H-YL), Taipei, Taiwan; Institute of Health Policy and Management, College of Public Health, National Taiwan University (C-YL, S-HC), Taipei, Taiwan; School of Gerontology Health Management; Master's program in Long-Term Care, College of Nursing, Taipei Medical University (M-JC), Taipei, Taiwan.

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Address correspondence to: Shou-Hsia Cheng, PhD, Institute of Health Policy and Management, College of Public Health, National Taiwan University, 17 Xu-Zhou Rd, Taipei, Taiwan. E-mail: shcheng@ntu.edu.tw.

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Take-Away Points

A population-based natural experimental design with propensity score matching was used to examine the effects of a pay-for-performance (P4P) program for tuberculosis (TB) care in Taiwan. Providing financial incentives could be a feasible model for better TB control.

- Patients enrolled in the TB P4P program received more comprehensive ambulatory care and no differences in emergency department utilization or hospitalization.
- The P4P enrollees incurred higher TB-related ambulatory care expenses but lower TB-related hospitalization expenses and 4.6% lower total TB-related expenses.
- The P4P enrollees were more likely to be successfully treated.

■ **Table 1.** Demographics and Characteristics of TB P4P and Non-P4P Patients in Pre-PSM and Post PSM Samples

	Pre-propensity score matching					Post propensity score matching				
	Non-P4P		P4P patients			Non-P4P		P4P patients		
Variables	**N**	**%**	**N**	**%**	***P***	**N**	**%**	**N**	**%**	***P***
Demographics	6175	39.7	9382	60.3	–	6009	50	6009	50	–
Male	4247	68.8	6537	69.7	.241	4147	69.0	4168	69.4	.678
65 years or older	3006	48.7	4511	48.1	.471	2927	48.7	2936	48.9	.870
Aboriginal group	472	7.6	541	5.8	<.001	421	7.0	399	6.6	.426
Indigenous residency	712	11.5	554	5.9	<.001	546	9.1	516	8.6	.335
Disease characteristics										
Sputum-positive	3116	50.5	5662	60.3	<.001	3108	51.7	3160	52.6	.352
CCI ≥1	3557	57.6	5542	59.1	.070	3484	58.0	3548	59.0	.243
Characteristics of healthcare providers										
Public ownership[a]	2926	47.4	4765	50.8	<.001	2800	46.6	2886	48.0	.120
Higher levels of provider[b]	3185	51.6	5832	62.2	<.001	3163	52.6	3203	61.9	.465

CCI indicates Charlson Comorbidity Index; P4P, pay-for-performance; PSM, propensity score matching; TB, tuberculosis.
[a]Public ownership indicates government-run healthcare institutions, as opposed to private institutions.
[b]Higher levels of provider: in Taiwan, medical-center hospitals and regional hospitals are considered higher-level and referral hospitals, compared with district hospitals and clinics.

Table 2. Generalized Linear Models for the Effects of the P4P Program on TB-Related Healthcare Utilization

	Outpatient visits			Emergency department visits			Hospital admissions		
Variables	**IRR**	**95% CI**	***P***	**IRR**	**95% CI**	***P***	**IRR**	**95% CI**	***P***
P4P enrollee	1.14	1.10-1.18	<.001	1.08	0.98-1.18	.123	1.00	0.95-1.05	.981
CCI ≥1	1.17	1.13-1.22	<.001	2.27	2.03-2.54	<.001	2.22	2.09-2.35	<.001
65 years or older	0.88	0.84-0.91	<.001	1.21	1.10-1.34	<.001	1.39	1.32-1.47	<.001
Sputum-positive	0.97	0.93-1.01	.100	1.45	1.32-1.60	<.001	1.09	1.04-1.15	.001
Male	1.02	0.98-1.07	.271	1.46	1.31-1.64	<.001	1.14	1.08-1.21	<.001
Aboriginal	1.05	0.97-1.13	.203	1.51	1.27-1.79	<.001	1.39	1.25-1.54	<.001
Public ownership[a]	0.93	0.90-0.97	<.001	1.01	0.91-1.11	.897	1.10	1.04-1.16	.001
Higher levels of provider[b]	1.15	1.11-1.20	<.001	1.25	1.13-1.39	<.001	1.07	1.01-1.13	.016

CCI indicates Charlson Comorbidity Index; IRR, incidence rate ratio; P4P, pay-for-performance; TB, tuberculosis.
[a]Public ownership indicates government-run healthcare institutions, as opposed to private institutions.
[b]Higher levels of provider: in Taiwan, medical-center hospitals and regional hospitals are considered higher-level and referral hospitals, compared with district hospitals and clinics.

Table 3. Generalized Linear Models for the Effects of the P4P Program on TB-Related Healthcare Expenses

	Outpatient expenses			Emergency department expenses			Hospitalization expenses			Total expenses		
Variables	β	**SE**	***P***	β	**SE**	***P***	β	**SE**	***P***	β	**SE**	***P***
P4P enrollee	0.28	0.01	<.001	0.19	0.05	<.001	–0.10	0.03	<.001	–0.05	0.02	.011
CCI ≥1	0.36	0.02	<.001	0.25	0.05	<.001	0.26	0.03	<.001	0.63	0.02	<.001
65 years or older	–0.15	0.02	<.001	0.19	0.05	<.001	0.50	0.03	<.001	0.60	0.02	<.001
Sputum-positive	0.03	0.01	.035	0.11	0.05	.025	0.35	0.03	<.001	0.36	0.02	<.001
Male	0.09	0.02	<.001	0.08	0.06	.162	0.04	0.03	.141	0.12	0.02	<.001
Aboriginal	–0.10	0.03	.001	–0.04	0.09	.606	–0.23	0.05	<.001	0.03	0.04	.417
Public ownership[a]	–0.14	0.02	<.001	0.15	0.05	.004	0.16	0.03	.200	0.06	0.02	.008
Higher levels of provider[b]	0.20	0.02	<.001	0.04	0.05	.437	–0.37	0.03	<.001	–0.18	0.02	<.001

CCI indicates Charlson Comorbidity Index; P4P, pay-for-performance; TB, tuberculosis.
[a]Public ownership indicates government-run healthcare institutions, as opposed to private institutions.
[b]Higher levels of provider: in Taiwan, medical-center hospitals and regional hospitals are considered higher-level and referral hospitals, as compared to district hospitals and clinics.
β in generalized linear models indicates the differences of logarithm of healthcare expenses after controlling for associate values.

Table 4. Multinomial Logistic Regression for the Effects of the P4P Program on TB-Related Treatment Outcomes

	Treatment success vs death			"Other" status[a] vs death		
Variables	**OR**	**95% CI**	***P***	**OR**	**95% CI**	***P***
P4P enrollee	1.56	1.38-1.76	<.001	1.06	0.90-1.25	.501
CCI ≥1	0.60	0.52-0.68	<.001	0.78	0.66-0.93	.006
65 years or older	0.23	0.20-0.26	<.001	0.18	0.15-0.21	<.001
Sputum positive	0.42	0.37-0.48	<.001	0.47	0.39-0.55	<.001
Male	0.97	0.85-1.11	.652	1.31	1.09-1.56	.005
Aboriginal	3.12	2.13-4.77	<.001	6.67	4.33-10.26	<.001
Public ownership[b]	0.36	0.31-0.41	<.001	0.44	0.37-0.52	<.001
Higher levels of provider[c]	5.14	4.45-5.94	<.001	4.85	4.03-5.84	<.001

CCI indicates Charlson Comorbidity Index; OR, odds ratio; P4P, pay-for-performance; TB, tuberculosis.
[a]"Other" status included patients who were still under treatment, lost to follow-up, or experienced treatment failure.
[b]Public ownership indicates government-run healthcare institutions, as opposed to private institutions.
[c]Higher levels of provider: in Taiwan, medical-center hospitals and regional hospitals are considered higher-level and referral hospitals, as compared to district hospitals and clinics.

eAppendix Table. Comparison of TB P4P Program With Regular Treatment, and P4P's Additional Financial Incentives

Institution Requirements	**Pay-for-Process** (requirements of implemented healthcare level & extra healthcare fees from insurer)	**Pay-for-Outcome** (outcomes of healthcare & extra financial incentives from insurer)
Institutions that don't participate in TB P4P program (non-P4P): （1） Medical institutions must be contracted with Bureau of National Health Insurance. （2） Each licensed physician can treat TB patients. （3） Hiring TB case manager is not required.	All cases reimbursed on fee-for-service basis for physician counseling, drugs, examinations, hospitalizations, and related healthcare expenditures.	（1）250 NT$ of TB case confirmation fees are paid to the institution after verification by CDC. （2）1000 NT$ of TB treatment success fees are paid after verification by CDC.
Institutions that do participate in TB P4P program (P4P): （1）Medical institutions must be contracted with Bureau of National Health Insurance. （2）At least one physician on staff specializing either in chest, infection, or TB; or holding certificate of TB training from health authorities. （3）Establishment of 1 case manager if reported TB cases in 1 year exceed 100. Additional case manager recommended depending on the number of cases. Part-time case manager acceptable if cases number fewer than 100 in a year. （4）Institutions can participate in the P4P program voluntarily.	All cases reimbursed on fee-for-service basis for physician counseling, drugs, examinations, hospitalizations and related healthcare expenditures. For cases enrolled in the P4P program, healthcare institutes can claim additional disease management payment: （1） For continuous care for 3 months, 1500 NT$ of healthcare fees will be paid (ie, 500 NT$/per month, per person) up to 12 months. （2） Higher reimbursement on TB-related examinations.	（1）500 NT$ of TB case confirmation fees are paid to the institution after verification by CDC. （2）2000 NT$ of TB treatment success fees (multidrug-resistant TB), or 1000 NT$ of TB treatment success fees (non-drug-resistant TB) are paid after verification by CDC.

Requirements of data entry for claiming P4P rewards:

1. If medical institutions wish to claim the P4P fees, data entry for progress of treatment such as healthcare indicators and completion and continuous care of TB cases is required; detailed case records, visiting records, treatment, medication records, and biochemical examination records are required as well.
2. Case management fees (1500 NT$) are paid every 3 months per case by insurer. If a case drops out during the treatment period or does not receive complete care, only half of the disease management fees will be paid.

CDC indicates Taiwan Centers for Disease Control; NT$, New Taiwan dollars; P4P, pay-for-performance; TB, tuberculosis.
This table is adapted from the "Standard of National Health Insurance Payment, TB P4P Payment Service," Bureau of National Health Insurance; and from the national tuberculosis policy statement of Taiwan CDC.
Approximately 30 NT$ are equal to $1 US. The payment amount in NT$ are subject to slight discount due to the global budget cap of the national health insurance.