Association Between User Fees and Dropout from Methadone Maintenance Therapy: Results of a Cohort Study in Vietnam

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Abstract—Vietnam launched methadone maintenance therapy (MMT) in 2008 with donor funding. To expand and ensure sustainability of the program, Vietnam shifted the responsibility for financing portions of MMT to provinces and, in 2015, some provinces started collecting user fees for MMT. This study assesses the association between user fees and patient dropout using a one-year observational cohort of 1,021 MMT patients in which three of seven provinces included in the study implemented user fees. We also estimate the catastrophic payments—payments of 40% or more of nonsubsistence expenditures—associated with MMT. Box-Cox proportional hazard models were used to assess the association between user fees and patient dropout. About 85% of the cohort was actively on MMT at the end of the observation period. Of those who stopped MMT care, about 8% dropped out, 3.5% were incarcerated, 1.5% died, and 2% stopped for other reasons. The dropout hazard ratio for paying user fees compared to not paying user fees ranged from 0.70 (unadjusted, \( p = 0.26 \)) to 0.29 (adjusted, \( p = 0.33 \)). However, 29% of patients in provinces implementing user fees incurred catastrophic payments for MMT associated user fees and transportation, compared with 11% of patients in provinces not implementing user fees (\( p < 0.001 \)). In one year of follow-up, we do not find evidence that user fees increased dropout from MMT. However, catastrophic payment rates remain a concern. This study represents an example of one type of monitoring of financial transitions; further and longer-term evaluation of user fees is needed.

INTRODUCTION
Vietnam’s HIV epidemic is largely concentrated in high-risk groups; one of the largest of these is those who use injectable...
drugs, who account for over two thirds of the HIV-positive population.\(^1\) To address this, methadone maintenance therapy (MMT) was first piloted in Hai Phong Province in 2008 and by mid-2015 had expanded to cover about 35,000 patients in 50 different provinces. Over 180 facilities in Vietnam offered MMT in 2015 (Vietnam Authority of HIV/AIDS Control Monitoring and Evaluation data, personal communication, August 19, 2015), with the goal of covering 80,000 of the estimated 171,000 drug users.\(^2\)

MMT was supported by donors during its initial stages but now is transitioning to country ownership—including domestic financing. Based on policies agreed to in 2012, financial responsibility for funding some parts of MMT was devolved to provinces in 2015. Under this policy, local governments were encouraged to provide funding for some aspects of MMT, including investment costs, human resources, and training, with MMT patient co-payments financing about half of the costs.\(^3\) This resulted in some provinces beginning to collect user fees as a means to cover incidental supplies (mineral water, cups, etc.) needed for MMT, with some patients (e.g., those identified as poor or disabled) exempt from the fees. The user fees are not intended to pay for methadone itself, which remains the responsibility of the national government. This decision raises issues about policy making during times of donor funding transitions, such as the effectiveness of user fees as a means of domestic resource mobilization and the implications of user fees on patient outcomes.

This study adds an evaluation dimension related to policy issues surrounding donor transitions out of funding health programs and a country using user fees as a form of domestic resource mobilization to replace some of the funding from the exiting donor. These issues are likely to be important to policy choices in many countries over different types of donor exits. This study focuses on an examination of the association between user fees and patient dropout rates. Willingness-to-pay studies in Vietnam\(^1\) and internationally\(^4\) suggest that MMT patients are willing to pay for MMT services, although a wide body of literature suggests that user fees may dampen demand for general health services.\(^5\) Although different stakeholders may define the success of these types of financial transitions in different ways, there is general agreement that transitions need careful monitoring to ascertain that services provided before the transition are sustained.\(^6,7\)

The implementation of user fees for MMT has several possible effects, including the following:

1. Imposition of fees could affect retention rates. On one hand, they could be a financial burden on patients and cause them to drop out of care. If fees are used to improve services, however, user fees may be associated with increased retention, and small fees may have little or no effect on retention.
2. User fees may provide an incentive or disincentive for enrollment in MMT in similar ways (an issue not addressed in this article).
3. User fees may affect the lives of MMT patients by inducing catastrophic payments—payments of 40% or more of nonsubsistence expenditures—or financial hardship on them and their families.

This study’s primary objective is to assess the association between the implementation of user fees and dropout from MMT care. We assess this association using a one-year prospective cohort of 1,021 patients in seven provinces in Vietnam; three of the seven provinces collected user fees during the study period. Secondarily, we assess reasons for stopping among those that dropped out of MMT care, and we also estimate the level of catastrophic payments associated with MMT user fees.

**MATERIALS AND METHODS**

**The MMT Program and User Fees in Vietnam**

MMT is implemented at government-owned health facilities that operate clinics for MMT. User fees are charged for other services at most government-owned facilities. MMT clinics have dedicated staff, provide on-site oral dosing of methadone, and implement flexible dosing nationwide. Provinces set the amount of user fees. Some patients (e.g., patients identified as poor or disabled) are excluded from the need to pay user fees, and the consequences of not paying user fees are determined locally. User fees are generally collected on a quarterly or monthly basis, although, again, local discretion is allowed in setting the schedule. The revenue generated from user fees at facilities in this study ranged from 90 to 174 USD per patient per year, provided that all patients paid the full user fee amount. Previous studies assessing the cost of providing MMT in Vietnam suggest that the recurrent costs of MMT are about 200 to 250 USD per patient per year,\(^6,9\) suggesting that user fees could constitute a substantial source of financing for MMT.

In Vietnam, a patient is considered to have dropped out from MMT when he or she has not come for MMT for 30 consecutive days and no reason for lack of attendance was given to or ascertained by facility staff. Patients who seek to attend MMT after 30 days of nonattendance must restart the program.
Ethics Statement
This study received approval for baseline and endline data collection from the Abt Associates, Inc. Institutional Review Board in March 2015 and March 2016 and the Hanoi School of Public Health Ethical Review Board for Biomedical Research in April 2015 and April 2016. All respondents gave oral informed consent to participate and were offered the opportunity to ask questions before being interviewed.

Participants
Participants were initially enrolled for another study intending to assess employment and income of MMT patients. This study exploited the existence of those data to form a cohort study. We randomly selected one province from each of Vietnam’s six regions for inclusion in the study, with the probability of selection proportional to the size of the HIV and MMT populations. One additional province was drawn from all of the remaining provinces, again using proportional-to-size sampling. For each of the included provinces (Binh Thuan, Dien Bien, Ha Noi, Ho Chi Minh City, Lai Chau, Long An, and Thanh Hoa), all MMT clinics operational in August 2014 were included, of which there were 35. Within facilities, we selected the first 30 patients to agree to the interview and meet the inclusion criteria (if a clinic had fewer than 30 patients, all patients were targeted for inclusion in the study). Facility staff introduced the study to patients based on a set script and patients then approached the interviewers if they wanted to participate. This made the total target sample size 1,050 MMT patients, of which 1,021 were enrolled. Based on sample size calculations done before the collection of endline data, it was estimated that if 1,000 patients were followed up, we would be able to detect a difference of 19% in the dropout rate associated with user fees, with \( \alpha = 0.05 \) and a power of 0.80.

Inclusion criteria were (1) patients who were 18 years of age or older; (2) patients who had been using methadone for two years or less, in order to limit recall bias; and (3) patients who had been on methadone for one month or more. The baseline data collection occurred in May–June 2015. In May–June 2016, MMT clinics were revisited and patients’ medical records were reviewed to ascertain their treatment status. Additionally, the research team conducted follow-up interviews with MMT patients attending the clinic. Facility staff also attempted to contact patients who dropped out and connect them to study staff. If dropout patients could not be contacted, facility staff and data collectors worked to identify a replacement patient who had dropped out to interview about reasons for dropout.

Data Collection
Trained field staff conducted all surveys. The questions used in the 2012 Living Standards Measurement Survey (LSMS) formed the basis for the expenditure proportions of the surveys (Hoang Van Minh, personal communication, December 12, 2014). However, our survey differed from the LSMS because our survey was conducted at health facilities, not in households; not all of the data available in the household would be available to individuals at health facilities. Second, the LSMS is lengthy, and we shortened the LSMS instrument for this survey. During this process, we ensured that no domains of the LSMS were eliminated. That is, we maintained the overall categories of expenditures as used in the LSMS survey in our questionnaire as prompts for the respondents.

For expenditures, we asked respondents to report average expenditures for different categories “currently” and “before [they] started MMT” at baseline and “currently” at endline. Heroin and methadone expenditures were included in the questionnaires.

Finally, additional modules related to reasons for dropout (or, for patients still active on MMT, whether they knew anybody that dropped out of MMT and the reasons they may have dropped out), and other demographic questions were added to the endline survey. These questions were translated into Vietnamese by research staff and orally back-translated into English to ensure accuracy. Data collectors also interviewed MMT clinic staff to ascertain clinic staffing, policies, and practices.

Data Analysis
We defined the observation time of participants from the date of the baseline interview until either the end of the study period, patient transfer to a different MMT facility, end of MMT treatment (if they stopped with clinic staff permission or failed a urine test), or the date of their last visit (if they died, dropped out, or became temporarily inactive). Dropout is the outcome of interest; patients without this outcome are considered censored. Survival curves were drawn for each province using the Kaplan-Meier method. Group differences between patients in provinces with user fees and those without user fees were assessed using \( t \) tests for continuous variables or global F tests for categorical variables.

We conducted Cox regression survival analyses to assess differences in dropout controlling for baseline characteristics of patients and facilities, with implementation of user fees as the main independent variable. Baseline variables include demographic variables (age, gender, education, employment status, whether they changed jobs...
after starting MMT, size of household, self-reported HIV status, and marital status), economic variables (travel more than 30 minutes to MMT clinic, amount paid for transportation to the MMT clinic, annual expenditures, and poverty status), methadone dosage after three months on MMT, length of time on MMT before entering the study, and fixed effects for province and clinic. In sensitivity analysis, we replace the clinic fixed effects with clinic characteristics (including number of patients per clinic doctor and counseling staff, percentage of staff trained, clinic staff turnover rate, year the clinic started offering MMT, whether the clinic opened before 7 AM, and whether the clinic was open in the afternoon). Finally, we assess a model with an interaction term between baseline poverty and the implementation of user fees to assess whether user fees affect patients living in poverty differently from other patients. P values below 0.05 are considered significant.

In order to account for the missing data in baseline variables (1.0% of income variables and 9.3% of expenditure variables), we imputed missing data for income and expenditures. To impute missing data, we employed multiple imputation using chained equations with predictive mean matching.11 We did not impute missing data for clinical data but categorized the data including one group for which data are missing. Data were weighted to reflect the sample design, and we used linearized standard errors. All analyses were performed in Stata 12.1.

We use the World Health Organization’s definition of catastrophic payments, with some modification, for these analyses.12 Catastrophic payments assess the percentage of a patient’s capacity to pay devoted to health care—in this case MMT. Expenditures of more than 40% of capacity to pay are considered a catastrophic payment. The 40% threshold was formulated for all health payments, and we include only payments for MMT. Thus, we include in sensitivity analyses catastrophic payments defined as 30% and 20% of capacity to pay because using the 40% threshold for payments for one type of health service may underestimate the financial hardship incurred compared to a broader set of expenditures.13 Subsistence expenditure is the average food expenditure per household across the 45th to 55th total expenditure percentiles in a nationally representative survey.13,14 Expenditure above this subsistence level is capacity to pay. We use the 2012 LSMS survey to measure subsistence expenditures (Hoang Van Minh, personal communication, September 3, 2015) and adjust it to 2014–2016 using the Consumer Price Index.15 Payments for MMT include costs paid to facilities and the cost of transportation to the MMT clinic.5

RESULTS

User Fees

Ho Chi Minh City had implemented user fees before baseline data collection; Dien Bien started the implementation of user fees in June 2015, shortly after the baseline data collection; and Binh Thuan started user fees at the end of October 2015. Among the 15 facilities with user fees, 11 reported that they collected fees on a monthly basis; the other four had a flexible collection schedule or weekly collection. Reported monthly fees ranged from VND 165,000 to VND 320,000 (7.50 to 14.50 USD), the mode was VND 240,000 (10.90 USD). The minimum average salary in the private sector in 2015 was 146 USD, indicating that the user fees account for 5% to 10% of the minimum salary level. The consequences for nonpayment of user fees included nothing (two facilities), a warning (11 facilities), or the possibility that patients may be removed from MMT (two facilities). In Binh Tuan, 37% (95% confidence interval [CI], 25%–49%) of patients reported not paying user fees, and the average amount paid (including those not paying anything) was 75 USD (95% CI, 61–89) for the partial year user fees were collected. In Ho Chi Minh City, patients paid 94 USD (95% CI, 82–106) on average, with 37% (95% CI, 30%–45%) of patients not paying user fees; about half of patients reported paying the full amount of the official fee at the health facility. Finally, in Dien Bien, patients paid 110 USD (95% CI, 92–128) on average, with 28% (95% CI, 17%–39%) of patients not paying user fees; about two thirds of patients reported paying the full amount of the official fee at the health facility.

There were multiple differences between patients in provinces without user fees and patients in provinces with user fees (Table 1). Compared with patients in provinces without user fees, patient in provinces with user fees were younger (p < 0.001), were more likely to be female (p = 0.03), were less likely to be married or have a long-term partner (p < 0.001), had different employment patterns (p < 0.001), and were more likely to identify as HIV positive (p = 0.005). They also had lower household expenditures at baseline (p = 0.009), were more likely to have an income below the poverty line (p < 0.001), but were less likely to travel more than 30 minutes to the MMT clinic (p < 0.001). They were also more likely to have newly enrolled in MMT at baseline (p < 0.001) and had different methadone dosages after three months on MMT (p < 0.001). Clinics in provinces with user fees, compared to clinics in provinces without user fees, had more patients per staff (p = 0.01), more patients per staff working in a typical day (p < 0.001), and a lower proportion of staff trained on MMT (p = 0.04).
| Variable | n   | No User Fee Policy |          | User Fee Policy |          | p     |
|----------|-----|--------------------|----------|-----------------|----------|-------|
|          | Mean/Percentage | SE |          | Mean/Percentage | SE |       |
| Clinical |      |                    |          |                  |          |
| Dropped out of MMT care | 1,005 | 7% | 1.3% | 5% | 1.1% | 0.34 |
| Not retained in MMT care | 1,009 | 12% | 1.6% | 12% | 1.6% | 0.88 |
| Length of time on MMT before entering study | 1,021 | <0.001*** |
| One month or less | 2% | 0.6% | 19% | 1.9% |
| Less than one month to two months | 7% | 1.3% | 10% | 1.5% |
| Less than two months to three months | 2% | 0.6% | 2% | 0.5% |
| Less than three months to six months | 30% | 2.1% | 16% | 1.8% |
| Less than six months to 12 months | 28% | 2.2% | 27% | 2.1% |
| >12 months to 24 months | 31% | 2.0% | 26% | 2.2% |
| Methadone dosage at three months of MMT (mg) | <0.001*** |
| Less than 60 | 33% | 2.5% | 20% | 1.9% |
| 60 or more | 63% | 2.5% | 72% | 2.3% |
| Missing | 4% | 0.7% | 7% | 1.6% |
| Number of clients per clinic staff working in MMT clinic | <0.001*** |
| Number of clients per clinic staff working in typical day | 35 | 8 | 1.0 | 16 | 2.8 | 0.01* |
| Proportion of new staff to total staff | 35 | 0.64 | 0.10 | 0.53 | 0.04 | 0.27 |
| Proportion of staff trained on MMT to staff in MMT clinic | 35 | 1.32 | 0.04 | 1.17 | 0.1 | 0.04* |
| Year clinic opened | 35 | 0.06 |
| 2008 to 2010 | 15% | 8.2% | 33% | 12.6% |
| 2011 to 2012 | 25% | 9.9% | 33% | 12.6% |
| 2013 to 2014 | 60% | 11.2% | 33% | 12.6% |
| Open before 7 AM (% yes) | 35 | 75% | 9.9% | 80% | 10.7% | 0.73 |
| Open in afternoon (% yes) | 35 | 75% | 9.9% | 80% | 10.7% | 0.73 |
| Travel more than 30 minutes (one way) to MMT clinic | <0.001*** |
| Amount paid for transport to MMT clinic at baseline (VND thousands) | 1,021 | 16.4 | 7.5 | 29.7 | 23.1 | 0.48 |
| Household expenditures at baseline (annual VND thousands) | 1,021 | 19,587 | 1,487 | 11,607 | 900 | 0.009** |
| Income below poverty line at baseline | 1,021 | 32% | 2.6% | 48% | 2.6% | <0.001*** |
| Socioeconomic |      |                    |          |                  |          |
| Age (years) | 1,021 | 37.7 | 0.5 | 34.7 | 0.5 | <0.001*** |
| Sex (percentage female) | 1,021 | 1% | 0.5% | 4% | 1.0% | 0.03* |
| Marital status at baseline | 1,021 | <0.001*** |

* TABLE 1. Characteristics of Patients by Provincial User Fee Policy (continued on next page) *
Cohort Survival

Of the 1,021 patients enrolled in the study, the status of 12 (1.2%) could not be ascertained due to lost or confused data on their patient medical records. Of the remaining 1,009 patients, 868 (85.0% of the original cohort) remained actively on treatment at endline (including patients who transferred and stopped MMT with staff permission), of whom 726 were interviewed at endline.

| Variable | User Fee Policy | No User Fee Policy |
|----------|----------------|--------------------|
| Single   | 38% 2.5%       | 24% 2.4%           |
| Married/long-term partner | 46% 2.6%       | 64% 2.6%           |
| Widowed/divorced/separated | 16% 2.1%       | 12% 1.7%           |
| Highest education achieved at baseline |                          |
| No qualification | 10% 1.7%       | 7% 1.4%            |
| Primary school | 32% 2.5%       | 21% 2.3%           |
| Secondary/high school | 55% 2.8%       | 62% 2.6%           |
| Higher than high school | 3% 1.1%        | 10% 1.7%           |
| Employment status at baseline |                          |
| Full-time employment | 27% 2.2%       | 22% 2.2%           |
| Part-time employment | 12% 1.7%       | 13% 1.9%           |
| Self-employed | 10% 1.6%       | 23% 2.3%           |
| Not working (seeking or not) | 23% 2.4%       | 23% 2.2%           |
| Homemaker, retired, student | 27% 2.1%       | 18% 1.9%           |
| Change of employment status in year before start of study | 2.7% 0.54       | 32% 2.5%           |
| Size of household (baseline) | 5.0 0.1        | 5.0 0.1            |
| HIV status at baseline (self-reported): Positive | 0.54            | 21% 2.2%           |

* p < 0.05.
** p < 0.01.
*** p < 0.001.

TABLE 1. Characteristics of Patients by Provincial User Fee Policy

FIGURE 1. Kaplan-Meier Survival Curves for Client Dropout, by Province and User Fee Status. Light-Colored Lines Indicate a Province with User Fees; Dark Lines Indicate a Province without User Fees.
| Variable                                                                 | Model 1                        | p     | Model 2                        | p     | Model 3                        | p     |
|-------------------------------------------------------------------------|-------------------------------|-------|-------------------------------|-------|-------------------------------|-------|
| Clinical                                                                 |                               |       |                               |       |                               |       |
| Province had user fee policy                                           |                               |       |                               |       |                               |       |
| No                                                                      | 0.17 (0.02–1.29)              | 0.08  | 0.42 (0.06–3.15)              | 0.39  | 0.15 (0.02–1.06)              | 0.06  |
| Yes                                                                     |                               |       |                               |       |                               |       |
| Length of time on MMT before entering study                             |                               |       |                               |       |                               |       |
| >12 months to 24 months                                                |                               |       |                               |       |                               |       |
| One month or less                                                      | 0.18 (0.03–1.12)              | 0.07  | 0.48 (0.05–4.67)              | 0.51  | 0.19 (0.03–1.05)              | 0.06  |
| Less than one month to three months                                    | 0.53 (0.17–1.67)              | 0.27  | 0.62 (0.20–1.93)              | 0.39  | 0.55 (0.17–1.75)              | 0.30  |
| Less than three months to 12 months                                    | 0.93 (0.43–2.02)              | 0.85  | 0.82 (0.40–1.68)              | 0.57  | 0.99 (0.45–2.17)              | 0.97  |
| Methadone dosage at three months of MMT (mg)                           |                               |       |                               |       |                               |       |
| 60 or more                                                             |                               |       |                               |       |                               |       |
| Less than 60                                                            | 1.36 (0.56–3.29)              | 0.48  | 1.56 (0.64–3.79)              | 0.31  | 1.31 (0.54–3.22)              | 0.54  |
| Missing                                                                 | 0.47 (0.10–2.12)              | 0.31  | 0.35 (0.07–1.69)              | 0.18  | 0.47 (0.11–2.08)              | 0.31  |
| Number of clients per clinic staff working in MMT clinic               |                               |       |                               |       |                               |       |
|                                                                       |                               |       |                               |       |                               |       |
| Proportion of new staff to total staff                                 |                               |       |                               |       |                               |       |
|                                                                       |                               |       |                               |       |                               |       |
| Proportion of staff trained on MMT to staff in MMT clinic               |                               |       |                               |       |                               |       |
| Year clinic opened                                                      |                               |       |                               |       |                               |       |
| 2008 to 2010                                                            |                               |       |                               |       |                               |       |
| 2011 to 2012                                                            | 0.45 (0.15–1.40)              | 0.16  |                               |       |                               |       |
| 2013 to 2014                                                            | 1.85 (0.41–8.30)              | 0.41  |                               |       |                               |       |
| Open before 7 AM (% yes)                                                |                               |       |                               |       |                               |       |
| No                                                                      |                               |       |                               |       |                               |       |
| Yes                                                                     | 0.79 (0.14–4.38)              | 0.78  |                               |       |                               |       |
| Open in afternoon (% yes)                                               |                               |       |                               |       |                               |       |
| No                                                                      |                               |       |                               |       |                               |       |
| Yes                                                                     | 0.97 (0.26–3.58)              | 0.96  |                               |       |                               |       |
| Financial                                                               |                               |       |                               |       |                               |       |
| Travel more than 30 minutes (one way) to MMT clinic                     |                               |       |                               |       |                               |       |
| No                                                                      |                               |       |                               |       |                               |       |
| Yes                                                                     | 1.50 (0.51–4.42)              | 0.45  | 1.67 (0.57–4.94)              | 0.34  | 1.53 (0.51–4.62)              | 0.43  |
| Amount paid for transport to MMT clinic at baseline (VND thousands)     |                               |       |                               |       |                               |       |
|                                                                       |                               |       |                               |       |                               |       |
| Household expenditures at baseline (annual VND thousands)               |                               |       |                               |       |                               |       |
|                                                                       |                               |       |                               |       |                               |       |
| Income below poverty line at baseline                                  |                               |       |                               |       |                               |       |
| No                                                                      |                               |       |                               |       |                               |       |
| Yes                                                                     | 1.17 (0.48–2.84)              | 0.72  | 1.20 (0.47–3.06)              | 0.69  | 0.94 (0.34–2.62)              | 0.90  |

**TABLE 2.** Results of the Cox Survival Regression Analyses (*continued on next page*)
Of the 141 (13.8% of the original cohort) no longer active on MMT care, 81 (7.9%) dropped out of care, 36 (3.5%) were incarcerated, 15 (1.5%) had died, four (2.8%) stopped for unknown reasons but were not considered dropouts, three (2.1%) were hospitalized, and two (1.4%) failed a urine test and were removed from care.

The dropout rate was 5.5 per 100 person-years in provinces with user fees and 11.2 per 100 person-years in provinces without user fees (Figure 1). The provinces with user fees included provinces with relatively low (Ho Chi Minh City), mid-level (Dien Bien), and high (Binh Tuan) dropout rates. Dropout rates in Binh Tuan were lower after the start of user fees (13.9 per 100 person-years) than before the start of user fees (16.6 per 100 person years).

Cox Regression Results

Results of three regressions indicate that patients in provinces with user fees had a lower hazard of dropout than did provinces that did not have user fees, although this result is not statistically significant ($p = 0.06$ to $p = 0.39$ across the models; Table 2). Results do not change substantively when...
excluding Ho Chi Minh City (which had user fees before baseline data collection) from the analyses (data not shown).

Most control variables were associated with dropout in expected directions, although few are statistically significant. Across the models, having greater household expenditures at baseline is associated with lower risk of dropout \( (p < 0.05) \), and being married or having a long-term partner is associated with lower risk of dropout compared to people who are divorced, separated, or widowed \( (p < 0.05) \). Additionally, people who reported that they were homemakers had a higher risk of dropout than people with jobs \( (p < 0.05) \). Similarly, larger household size and being HIV positive are associated with lower risk of dropout \( (p < 0.05) \). In model 3, people living in poverty in provinces that implemented user fees were not significantly more likely to drop out of care than other patients.

**Reasons for Dropout**

Twelve of the 81 (15%) patients interviewed in the baseline survey who dropped out during the study period were interviewed at endline. Additionally, 36 replacement patients who had dropped out (but were not interviewed in the baseline survey) were interviewed. Of the 48 dropouts interviewed, 18 were in provinces with user fees. Of these 18, two (11%) listed payments for MMT as the primary reason they dropped out. A further 108 patients still active on MMT at the end of the study stated that they knew somebody who had stopped MMT, 58 of whom were in provinces with user fees. Eight of these 58 (14%) stated that payment for MMT was a contributing factor for the person they knew to stop. The most common reason for dropout was difficulty attending the clinic due to jobs that required travel, conflicts with work hours, or distance and weather (21/48 or 44%, 52% of dropouts in provinces without user fees and 33% of dropouts in provinces with user fees).

**Catastrophic Payments**

Patients in provinces that implemented user fees had a nonsignificantly higher (3% to 7% depending on the threshold used) incidence of catastrophic expenditure at baseline than patients in provinces that did not implement user fees (Table 3). Ho Chi Minh City had already started user fees at baseline, which may explain, to some degree, the differences at baseline. Patients who dropped out of MMT had lower catastrophic payments at the 20% and 30% of subsistence thresholds \( (p < 0.05) \) than patients who did not drop out (data not shown). At the end of the study period, 11% to 15%, depending on the threshold used, of patients in provinces without user fees incurred catastrophic expenditures (almost entirely for transportation costs), whereas 29% to 48% of patients in provinces with user fees incurred catastrophic expenditures \( (p < 0.001) \).

**DISCUSSION AND CONCLUSIONS**

We find no association between provincial policies on user fees and dropout from or nonretention in MMT. This study was not intended to be a causal study, attributing dropout from MMT to user fees, but as an initial monitoring of a new financial policy related to MMT. Thus, the results should not be construed to indicate that user fees do not cause patients to drop out of MMT. Rather, we conclude that in the short run after the implementation of user fees, there was not a

| Variable                                      | Provinces with User Fees | Provinces without User Fees |
|-----------------------------------------------|--------------------------|-----------------------------|
|                                               | \( n \) | Percentage | 95% CI   | \( n \) | Percentage | 95% CI   | \( p \) |
| Proportion with catastrophic payments for MMT at baseline, based on percentage of nonsubsistence expenditures | 40% | 15% | 10%–19% | 12% | 8%–16% | 0.38 |
|                                               | 30% | 18% | 13%–23% | 14% | 10%–19% | 0.21 |
|                                               | 20% | 23% | 18%–28% | 16% | 12%–21% | 0.07 |
| Proportion with catastrophic payments for MMT at endline, based on percentage of nonsubsistence expenditures | 368 | 29% | 23%–35% | 11% | 7%–16% | <0.001*** |
|                                               | 30% | 37% | 31%–42% | 13% | 8%–18% | <0.001*** |
|                                               | 20% | 48% | 43%–53% | 15% | 10%–20% | <0.001*** |

***\( p < 0.001 \).  

**TABLE 3. Catastrophic Payments Associated with Heroin and MMT**

marked increase in patients dropping out of MMT where user fees were implemented.

Routine monitoring data collected on patient dropout from MMT could also show, on a broad scale, whether or not the dropout rate changed after the implementation of user fees. Routine monitoring data have the advantage of covering all provinces and patients on MMT, and analysis of these data should be conducted to complement the results of this study. However, this study has several advantages that allow it to complement routinely collected data and provide insights that could not be derived from these kinds of data.

First, routinely collected monitoring data often do not collect individual patients’ characteristics. When they do through, for example, electronic medical records, these data only collect clinical data. This study was able to collect a broader set of socioeconomic characteristics of patients. This is important because provinces that choose to implement user fees may also have different patient characteristics, which may confound results relating to dropout. For example, provinces with wealthier patients may choose to implement user fees; thus, comparing the results from these provinces with other provinces may be confounded. The treatment under assessment in this study—user fees—was not randomly assigned. Thus, selection bias is still possible—that is, provinces that decided to collect user fees may be systematically different than provinces that did not collect user fees in ways that were not controlled for in the analyses. Patients in provinces that implemented and did not implement user fees showed multiple differences on measured confounders at baseline; unmeasured confounding still likely exists. Without understanding the processes that provinces used to decide to collect user fees, we cannot fully assess the presence of selection bias. Variations between provinces are much larger than variations between areas collecting user fees and not, on average. This suggests that provincial factors may play a larger role in determining dropout than user fees. Thus, though we found a nonstatistically significant finding that provinces with user fees had a lower dropout rate than provinces without user fees, we cannot rule out that these differences existed (or were greater) before the user fee program. Differences in provincial policy other than user fees and their relation to patient dropout merit further study. However, by controlling for individual-level patient characteristics, the results between provinces with and without user fees are more comparable than would be possible with routine monitoring data.

A second advantage of this study is that we were able to control for patient-level characteristics and thus we were able to identify some associations between these characteristics and dropout. However, we found few factors associated with dropout. One explanation for failure to find many associations is that the dropout rates were low, limiting our ability to find associations. Multiple studies have found age and employment to be significant predictors of retention, whereas we find evidence only that patients reporting that they were homemakers, retired, or students are more likely to dropout than patients who have jobs. We also found in interviews with patients who dropped out that conflicts with job schedules were an important cause of drop out, which contrasts with the quantitative association between homemakers, retired persons, or students and dropout. However, job status was measured at baseline, and some homemakers and students did acquire one during the study period, and conflicting schedules between MMT and a new job may have been a contributing factor to them dropping out. Thus, the results are not necessarily incongruous. We did not find an association between methadone dosing at three months and dropout, unlike previous research. This is potentially because of the national flexible dosing policy used in Vietnam, where dosage at three months should match the patient’s need. We found that marital status and HIV status are associated with dropout, in keeping with previous literature. This information could help to target interventions to improve retention.

A third advantage of this study over routine monitoring data was the collection of patients’ expenditure data. The results from the assessment of catastrophic expenditures caution against complacency. The data on catastrophic payments suggest that the combined effect of MMT and user fees may be burdensome on up to half of MMT patients. Further, 28% to 37% of patients were exempted from paying user fees, suggesting that the catastrophic payments largely affect those who have not been identified as poor or otherwise exempt. Thus, the amount of user fees that patients pay warrants concern in Vietnam and, in other settings, implementation of user fees should consider the equity implication of the policy. This study followed patients for only one year, and in two of the three provinces, user fees were implemented for less than the full year of observation. Thus, it is possible that user fees may affect dropout in MMT over a longer period of time, because the effects of paying user fees may add up over time or as more patients experience a financial crisis that makes payment of fees more burdensome. Thus, continued monitoring of this issue over a longer period is warranted. On the other hand, many who drop out of MMT may revert to heroin use, which was estimated to cause catastrophic payments in over 95% of patients before they started MMT (data not shown), against which user fees look comparatively
affordable. The results related to catastrophic payments at endline represent only those patients active on MMT and are not fully representative of those patients.

This study did not find a statistically significant association indicating that user fees affected dropout among people living in poverty at baseline more than other patients, possibly because of user fee exemptions. However, the sign of the coefficient from the model indicates that this may be a possibility, and further studies assessing the equity implications of the user fee policy are warranted.

A fourth advantage of this study over routine monitoring data was the ability to collect the reasons for dropout from patients who dropped out of care or from patients that knew somebody who had dropped out of care. These results contrast somewhat with the results from the regression analyses, in that two of 18 dropouts interviewed (11%) in provinces with user fees reported payments for MMT as their primary reason for dropping out of MMT. This indicates that user fees may be a cause of dropout, as has been found in a previous case-control study set in Haiphong. However, considering that about 5.6% of patients in provinces with user fees dropped out of MMT, user fees possibly were the primary cause of less than 1% of all patients at baseline to drop out. Patients retained in care stated that user fees were a contributing factor to stopping MMT in fewer than 15% of people they knew who stopped MMT, again suggesting that user fees were a contributing factor to stopping MMT in less than 1% of baseline patients. Though less than 1% of patients may have directly dropped out due to user fees, Vietnam now has over 80,000 patients on MMT. This indicates that if user fees were implemented nationwide, likely up to 800 patients may drop out of MMT directly as a result of user fees. However, the questions administered to patients who dropped out and to patients referring to people they know who dropped out focused on listing the reasons for dropping out and in-depth discussions of patients' overall financial situation of which user fees may be a part and thus we did not capture any indirect effects that user fees may have had on the decision to drop out of MMT.

Our assessment of reasons for dropout, however, has a high risk of selection bias because the reasons we were able to contact the dropout patients is likely correlated with their reasons for dropping out. For example, we may have been less likely to contact patients who had reverted to heroin use or had suffered financial hardship (which may lead to them moving or no longer having a phone). Further research is needed to gain a broader understanding of why patients drop out of MMT.

In most of the facilities included in this study implementing user fees, there was often little punitive action taken against patients who do not pay user fees—this may help explain the lack of association between user fees and dropout. Further, a substantial proportion of patients were exempted from paying user fees. In other settings considering the use of user fees for MMT or similar programs, the design of the user fee program, including amount paid, frequency of payment, exemptions for certain patients, and the consequences for nonpayment, all should be carefully considered and different decisions may indicate that the results of utilization of user fees would be different than those found in this study.

The potential beneficial effects of user fees were not assessed in this study, although results suggest that user fees may be able to finance up to or more than half of the costs of delivering MMT. This indicates that user fees, in settings where patients have the ability to pay them, can prove to be an important source of financing. Other potential benefits include improvements in the quality of services to patients and incentives for staff to work in the MMT clinic, which requires attendance outside of normal work hours. Further assessment of the potential benefits of user fees would help in an overall assessment of the policy and determine whether the benefits outweigh the potential for increased (even if marginal) dropout of patients.

Studies such as this one offer important insights into the transition process for countries implementing reforms associated with the transition. The findings from this study suggest that, in the initial stages of implementation, user fees did not cause a large increase in patient dropout from MMT, but certain features of the policy in Vietnam, such as exemptions for some patients and little disciplinary consequences for nonpayment of user fees, may have contributed to these findings. Second, though not associated with short-term dropout, user fees appear to be financially burdensome on a substantial proportion of patients, which may have equity or longer term implications, and continued monitoring is needed. Ideally, large shifts in policy would be accompanied by more robust evaluations. In this case, either randomized assignment of user fees to MMT clinics or a cohort of patients with longer term study before the implementation of user fees would strengthen the research design. However, there is often not enough time between the announcement of a policy or reform and its implementation to establish such studies. This study, therefore, should be seen as a supplement to other
monitoring data and studies. Further monitoring, using routine monitoring data or using specially designed studies such as this one, as well as operational research and qualitative studies of how user fees affect MMT services is necessary. Thus, studies such as this one should be accompanied by a broader set of studies—even if small scale—assessing the effects of the policy changes.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

No potential conflicts of interest were disclosed.

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