INCOME, EXPENDITURES, HEALTH FACILITY UTILIZATION, AND HEALTH INSURANCE STATUS AMONG PEOPLE ACCESSING ANTIRETROVIRAL THERAPY: RESULTS OF A FACILITY EXIT INTERVIEW

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ACRONYMS

AEM	HIV/AIDS Epidemic Model
ART	Antiretroviral Therapy
CI	Confidence Interval
DEFF	Design Effect
FMI	Fraction of missing information
GoV	Government of Vietnam
HSPH	Hanoi School of Public Health
LSMS	Living Standard Measurement Survey
MMT	Methadone Maintenance Therapy
MoH	Ministry of Health
NSHI	National Social Health Insurance
PLWHA	People Living with HIV/AIDS
PWID	People Who Inject Drugs
SHI	Social Health Insurance
VAAC	Vietnam Authority of HIV/AIDS Control
VND	Vietnamese Dong
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

Rationale

There were an estimated 256,000 people living with HIV in Vietnam in 2014, while the number of new infections is about 14,000 per year. The number of reported cases of HIV declined rapidly from 2007 to 2009, before which it was over 20,000 cases per year. Vietnam relied on external support for about 70 to 75% of its HIV/AIDS expenditures for the period 2008-2010, and external support has been critical in supporting HIV/AIDS programs. Evidence is needed to show that continued support for HIV/AIDS services after the withdrawal of external sources is a critical public health and development need. An analysis of past HIV/AIDS interventions, the amounts of their financing, and the modeling of the impact of those interventions can help to illuminate the function of past activities in limiting the spread of HIV, preventing AIDS-related deaths, and preventing people from falling into poverty. By providing a 'counter-factual' picture of what would have happened in the past without HIV/AIDS prevention and treatment activities, this analysis can help to supplement existing analyses that project the HIV/AIDS epidemic into the future.

Comprehensive data on how much ART clients pay for services, their income, and their insurance status is either incomplete or out of date. Specific to Vietnam, studies assessing out-of-pocket payments and catastrophic payments for health care among people living with HIV/AIDS (PLWHA) date from 2005 to 2012, and show that households with PLWHA pay up to 4 to 5 million VND per year for medical care, substantially more than household without a PLWHA.

While these studies paint a picture of some of the socio-economic effects of and the burden of paying for health care associated with HIV/AIDS, more, and more up-to-date, evidence is still needed in Vietnam. Less is known about the income of PLWHA, with no study since 2008 assessing their income, which is needed to start understanding a fuller picture of the socioeconomic consequences of HIV/AIDS and HIV/AIDS interventions in Vietnam.

Objectives of this report

The **primary objective** of this study is to estimate the average income and general expenditures of PLWHA. The null hypothesis is that income among PLWHA is the same as that of the general population.

Additionally, this study will help to inform estimates of the potential liability faced by Vietnam's Social Health Insurance scheme if it assumes responsibility for paying for HIV/AIDS treatment. VAAC is also seeking answers to questions about why patients are not enrolling in the insurance scheme and how to increase the enrollment rate.

The secondary research questions for this study include:

(1) Estimating the inpatient admittance rate among PLWHA over the year prior to implementing the survey.

(2) Estimating the proportion of PLWHA that would be exempt from making copayments under the social health insurance scheme.

(3) Collecting data on PLWHA's perception of the social health insurance scheme.

A final objective of this report is to present results from a survey of MMT clients also seeking HIV/AIDS treatment with respect to their inpatient admission rates over the year prior to data

collection, their health insurance status, and their perception of the social health insurance scheme. These results are based on a separate survey done with MMT clients, the methods and primary results of which are described elsewhere (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project October 2015).

Methods

The survey was conducted at facilities offering antiretroviral therapy (ART) in seven provinces: Binh Thuan, Dien Bien, Ho Chi Minh City, Ha Noi, Lai Chau, Long An, and Thanh Hoa.

Sample design and size: We used a three-stage stratified cluster design to build the sample. In the first stage, the 63 provinces of Vietnam were stratified into six regions: Mekong River Delta, South East, Northern Midlands and Mountain Areas, Red River Delta, Central Coastal Area & Central Highlands, and North Central Area. Note that the Central Coastal Area and the Central Highlands were combined because in August 2014 no facilities in the Central Highlands offered MMT and this survey was conducted in conjunction with a survey of MMT clients. In these six regions, 25 provinces did not have an MMT facility in August 2014, and were excluded from the selection process. Seven provinces were selected at random with probability of selection proportional to the size of the population for data collection from the remaining 38 provinces.

Once provinces were selected, facilities offering ART were stratified by the type of facility (central hospitals, provincial hospitals, district hospitals, provincial AIDS centers, district health centers with functions only for prevention, and district health centers with functions for prevention and treatment (dual function)). We selected 42 facilities at random with probability of selection proportional to the number of the ART clients at a facility; if only one facility was in a stratum, it was selected with certainty.

At each facility, the field staff had a target of interviewing 20 ART clients, and a total of 843 ART clients were interviewed. Within facilities, clients were selected on an opportunistic basis – the first twenty clients to agree to the interview and meet the inclusion criteria were included in the sample.

Questionnaires: The instrument used in the 2012 Living Standards Measurement Survey (LSMS) formed the basis for the income and expenditure proportions of the survey. Our survey was conducted at health facilities, not in households, and not all of the data available at the household would be available to individuals at health facilities. Thus, we shortened and simplified the LSMS instrument for this survey. During this process, we maintained the overall categories of income and expenditures as used in the LSMS survey in our questionnaire as prompts for the respondents.

Additional modules related to outpatient utilization and expenditures, inpatient utilization and expenditures, health insurance coverage, and perception of health insurance were included based on previous studies done by Abt Associates, Inc.

Field work: The questionnaires were piloted at one site in Hanoi, and modifications made based on that experience. After being informed of the study by facility staff, survey staff assessed whether the ART client was eligible to participate in the survey. If the respondent was eligible, the interviewer explained the study in detail and administered a verbal informed consent process. The survey was administered electronically. All surveys were conducted by trained staff from the Hanoi School of Public Health. Teams of field staff visited each facility, together with a supervisor to identify and solve any problems, answer questions, and coordinate the data collection effort.

Data analysis: Because we used three-stage sampling, all results presented reflect the survey design and survey weights, and Taylor-linearized standard errors are used to estimate all the confidence intervals presented in this report. In order to account for the missing data when reporting results, we employ multiple imputation using chained equations to impute missing data for income and expenditures.

Income: We report the 'income including respondents' share of household income'. We calculate the individual's 'share' of household income by dividing items reported as 'household income' by the total number of adults of working age in the household. Income is reported as annual income.

Expenditures: Similar to income, we assess the annual 'expenditure including respondents' share of household expenditures'. Again, we calculate the 'share' of expenditures attributed to the respondent by dividing any 'household expenditures' by the total number of adults of working age in the household.

Poverty: We use official GoV definitions of poverty to define poverty. In 2013, the GoV defined poverty as an income less than 570,000 VND for rural areas and 710,000 VND for urban areas per person per month. We inflation-adjust the poverty line to the end of 2014 using the consumer price index. For Ho Chi Minh City, we use 16,000,000 VND as the annual individual poverty line, and for Hanoi, we use 750,000 VND per month as the individual poverty line. For other provinces, we use the urban poverty line to define poverty.

In order to compare the income of respondents to the national average, we use data representing the productivity of the employed population in Vietnam. The 2013 estimate of average income among those employed was 68.7 million VND. We again inflation-adjust using the consumer price index.

Catastrophic payments: We use the WHO definition of catastrophic payments, with some modification, for these analyses. This definition assess the percentage of 'capacity to pay' expenditures devoted to health care with more than 40% of 'capacity to pay' expenditures defined as a 'catastrophic payment'. We use the average food expenditures from the 45th to 55th percentile from the 2012 LSMS survey as our measure of subsistence expenditures, and inflation-adjust it to 2014 using the consumer price index. Expenditures above this subsistence level are considered 'capacity to pay'.

Results

Income: About 62% (95% CI: 57% to 67%) of respondents reported earning income as an individual (Table ES 1). The average income, including respondents' share of household income, was 33,105 (95% CI: 29,401 to 36,808) thousand VND, of which 84.5% was directly attributable to the respondent, with the remainder comprised of the respondents' share of household income. The average income, including respondents' share of household income, was less than the national average income of working people ($p < 0.001$). Among respondent reporting that they were currently employed, the average income, including respondents' share of household income, was 47,847 (95% CI: 43,705 to 51,988) thousand VND, which is also statistically significantly different than the national average ($p < 0.001$).

Table ES 1: Reported annual income of respondents, on average (VND thousands)

Variable	n	Mean / Percentage	95% Confidence Interval	
Proportion with any individual income in last year	843	62%	57% to 67%	
		VND thousands		**p-value compared to national average**
Average individual income (all respondents)	843	27,972	24,493 to 31,451	<0.001
Average individual income (including respondents' share of household income)	842	33,105	29,401 to 36,808	<0.001

An estimated 37% of ART clients had income below the poverty line. This compares with a reported 5.8% of the population of Vietnam as a whole in 2014. In Ho Chi Minh City and Ha Noi, 33% of ART clients had income below the poverty line, while 43% (95% CI: 34% to 53%) of respondents in other provinces had income below the poverty line.

Job Status: Overall, 61% of ART clients reported that they currently had full-time, part-time, or self-employment, while 21% reported that they were not working (whether seeking work or not). The remainder reported they were homemakers, students, or retired.

Expenditures: The average annual expenditures (including the respondents' share of household expenditures) were 29,234 thousand VND (95% CI: 25,671 to 32,797 thousand VND). Expenditures for health (including condoms and health insurance) constituted 4.5% of expenditures.

Health service utilization: ART clients utilized outpatient care 1.1 times in the 30 days before the interview, and 30% (95% CI: 26.3% to 34.0%) reported having procured condoms in the last 30 days (Table ES 2). About 4% (95% CI: 2.5% to 5.4%) made a prior outpatient visit in the last 30 days for an HIV-related reason. Thirteen percent (95% CI: 9.8% to 15.4%) of respondents reported an inpatient admission in the last 12 months, and 5% (95% CI: 2.9% to 7.4%) reported an inpatient admission for an HIV-related reason. Among those with an inpatient admission in the last 12 months, the average number of admissions was 1.3 (95% CI: 1.17 to 1.49), which translates into 0.17 inpatient admittances per ART client per year. The inpatient admittance rate for HIV/AIDS related reasons (including oppourtunistic infections) is 0.05 admissions per patient per year.

Table ES 2: Health service utilization

Variable	n	Proportion / Mean	95% Confidence Interval
Respondent reported they were on MMT at time of survey	843		
Proportion		19%	12.3% to 26.5%
Procured condoms in last 30 days	843		
Proportion		30%	26.3% to 34.0%
Average number of outpatient visits in last 30 days (including day of interview)	842	1.11	1.08 to 1.14
Percentage of patients with any inpatient admittance in last year	843	13%	9.8% to 15.4%
Percentage of patients with any HIV-related inpatient admittance in last year	843	5%	2.9% to 7.4%
Number of admissions among patients with any admission	110	1.3	1.17 to 1.49
Average length of stay among those admitted	109	15.2	8.5 to 22.0
Number of HIV-related admissions among patients with any HIV-related admissions	45	1.00	N/A
Average length of stay among those admitted for HIV-related reason	45	24.6	9.9 to 39.2

Respondents spent on average 1.3 million VND for health care. Expenditures for inpatient care accounted for 61% of all health expenditures, and expenditures for HIV/AIDS specific care was just over 1% of total expenditures, on average, or about 25% of all health expenditures. HIV/AIDS specific expenditures were largely for inpatient care and laboratory tests related to opportunistic infections

Catastrophic expenditures: Catastrophic expenditures measured as greater than 40% of capacity to pay were incurred by 3% of the respondents (95% CI: 2% to 4%), which increases to 5% (95% CI: 3% to 6%) when costs of transportation to health facilities is included. For HIV-related health expenditures, these two figures are 1% (95% CI: 0% to 2%) and 2% (95% CI: 1% to 4%), respectively (Figure ES 1).

We consider four scenarios for assessing the potential impact of different financing options for ART: (i) Current HIV-related health expenditures as measured in the survey. (ii) 20% copayments for ART, not including the antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. (iii) 20% copayments for the full costs of ART, including first line antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. (iv) The full costs of ART services, including first line antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. We also calculate catastrophic expenditures under different thresholds (30% and 20% of capacity to pay).

Catastrophic expenditures would remain low if patients that do not receive government subsidies for social health insurance incurred a 20% copayment for non-ARV drug costs, at about 1%. This increases to about 7% of respondents when ARV drugs are included in copayments.

Figure ES 1: Percentage of patients incurring catastrophic payments under different user fee scenarios
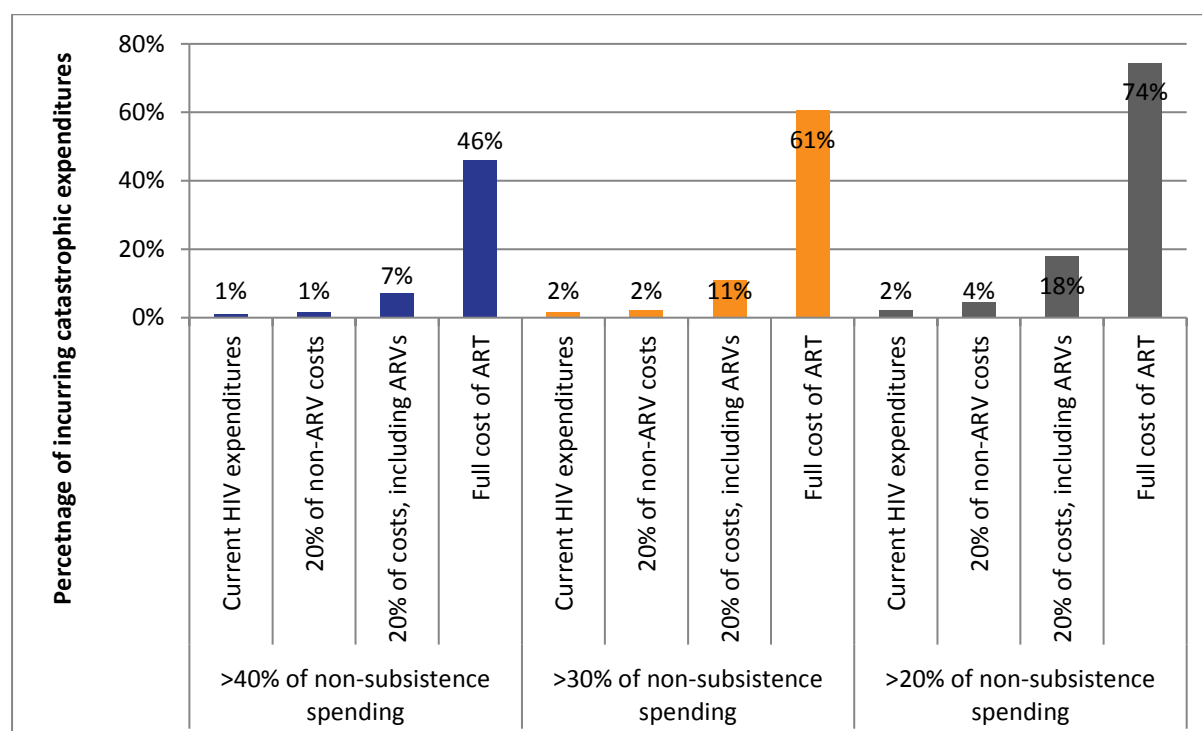
Health insurance status: The majority (53%) of respondents reported being enrolled in the national social health insurance scheme (95% CI: 46.4% to 59.3). However, currently the national

social health insurance (NSHI) scheme is not able to contract with Provincial AIDS centers and single function district health centers. Thus, about 31% (95% CI: 20% to 42%) of respondents both attend a health facility that is able to enter a contract with the NHSI and are enrolled in the NHSI. About 32% of respondents would be exempt from making copayments in the NSHI because they belong to a minority population, have a poor card, are a member of the military/police, performed war service, or belong to other classes exempt from making copayments.

Among respondents who reported that they did not have health insurance, 27% (95% CI: 20.2% to 32.7%) reported that they did not have health insurance for reasons related to affordability of the premium, while 20% (95% CI: 15.5% to 23.9%) reported that they did not need health insurance. Thirteen percent (95% CI: 10.0% to 16.7%) cited reasons related to difficulties involved in obtaining or keeping health insurance. A further 48% of respondents (95% CI: 40.4% to 56.2%) reported other reasons for not having health insurance. These responses included forgetting to enroll/renew and not being sure of the reason.

Perceptions of health insurance: Respondents were asked eight questions related to their concern with falling ill, the potential effects of illness on their financial situation, and their views of health insurance. With the exception of 3 questions, over 80% of respondents indicated concern with falling ill, the potential effects of illness on their financial situation, and favorable views of health insurance. The three exceptions are: (i) 66% of respondents strongly agreed or agreed that they knew where to get health insurance, (ii) 39% of respondents strongly agreed or agreed that they forgo health services because they do not have enough cash to pay for health care services, and (iii) 31% of respondents strongly agreed or agreed that there is no need to put aside money for health emergencies.

Among people without health insurance, 42% of ART clients disagreed or strongly disagreed with the statement, "I know where to get health insurance," and 38% agreed with the statement "Having national health insurance means that I will get lower quality care."

Conclusions

HIV positive people are poorer than the population of Vietnam on average, with incomes almost half of the average for people of employment age. Despite the relative poverty of people on ART, provision of HIV/AIDS treatment does not represent a large financial burden on the affected households. For example, studies from 2008/2009 (when ART was scaling up) indicated that families with people living with HIV/AIDS spent nearly 4 million VND on health care (not adjusting for inflation), while in 2015, ART clients spent just over 1 million VND on health care. Consequently, catastrophic expenditures for HIV/AIDS care were incurred by about 1% of respondents. If patient had to pay the full costs of ART themselves, it is estimated that 46% would incur catastrophic expenditures for the most basic package of care.

The success of the ART program in providing free-to-patients care has likely prevented an already relatively poor population from sinking further into poverty. Further, ART has lowered the need for inpatient care, with inpatient admissions estimated at upward of 30 per 100 patients (per year) at the in 2008/2009, while in 2015, there were about 17 admissions per 100 ART patients (per year), which is about the same as the inpatient admission rates for the entire national social health insurance scheme. Less than 1/3rd of these admissions among ART clients were for HIV/AIDS reasons. Survey data are not useful for determining causes, but earlier detection and treatment, new regimens, and a cohort of patients that have been on ART longer all likely have contributed to improved health. In addition, social health insurance has reduced the amount paid among those that are admitted for inpatient care.

In terms of health insurance, we find that the majority of ART clients (53%) are enrolled in NSHI. However, about 22% of ART clients receive ART care at facilities that currently cannot enter contracts with the NSHI. The numbers indicate, without any changes, currently only about 31% of

ART clients would immediately be eligible for NSHI reimbursement for ART treatment. Addressing this shortfall should be a priority as the NSHI takes over responsibility for financing ART treatment.

We also found some difference between those with health insurance and those without health insurance in terms of their perception of health insurance, with people without health insurance having a more pessimistic view of health insurance. The reasons for these views and how to change these views need further research.

Limitations: This survey was a cross-sectional survey which was administered in health facilities. Not administering the survey at home and/or with all working adults in a household may bias the results, especially in comparison to studies that did survey respondents are their houses. In general, we shortened the LSMS questionnaire; asking fewer questions is generally associated with lower levels of total expenditures than asking more detailed questions. Further, some degree of recall bias is expected.

Discussion: The relatively low economic status of ART clients should be considered in the future when designing policies to finance ART care. The current free-of-charge services likely enable ART clients stay on treatment, and increasing the financial burden of ART treatment may adversely affect adherence and retention rates among ART clients. Our scenario analyses suggest that a 20% copayment rate for ART care, including antiretroviral drugs, may be associated with about a 6% increase in catastrophic payments among ART clients compared to the current situation. This suggests that when the NSHI assumes financial responsibility for ART treatment, ensuring that all ART clients eligible for free or subsidized enrollment are able to claim their status is important. Further, ensuring full enrollment in health insurance and careful consideration of how to finance antiretroviral drugs also need to be considered carefully.

I. INTRODUCTION

There were an estimated 256,000 people living with HIV in Vietnam in 2014 (EPP Technical Working Group and Ministry of Health 2013), while the number of new infections is about 14,000 per year (Viet Nam Authority of HIV/AIDS Control (VAAC) 2014). The number of reported cases of HIV declined rapidly from 2007 to 2009, before which it was over 20,000 cases per year (Viet Nam Authority of HIV/AIDS Control (VAAC) 2014). The decline in the yearly rate of new infections coincided with efforts to expand both HIV prevention and treatment services, including efforts to reach female sex workers, men who have sex with men, people who inject drugs (PWID) with preventative messages and materials, prevention of mother to child transmission of HIV, testing for HIV, antiretroviral therapy (ART), and other prevention efforts (Viet Nam Authority of HIV/AIDS Control (VAAC) 2014).

Vietnam relied on external support for about 70 to 75% of its HIV/AIDS expenditures for the period 2008-2010 (UNAIDS 2012), and, while updated figures are pending, external support has been critical in supporting the interventions listed above. The MoH's Vietnam Authority of HIV/AIDS Control (VAAC) and other Government of Vietnam (GoV) stakeholders have critical gaps in their knowledge of the future financial burden to be expected after transitioning HIV/AIDS services currently financed by external sources to domestic sources. In addition, evidence is needed to show that continued support for HIV/AIDS services after the withdrawal of external sources is a critical public health and development need. An analysis of past HIV/AIDS interventions, the amounts of their financing, and the modeling of the impact of those interventions can help to illuminate the function of past activities in limiting the spread of HIV, preventing AIDS-related deaths, and preventing people from falling into poverty. By providing a 'counter-factual' picture of what would have happened in the past without HIV/AIDS prevention and treatment activities, this analysis can help to supplement existing analyses that project the HIV/AIDS epidemic into the future (Viet Nam Authority of HIV/AIDS Control (VAAC) 2014).

1.1 Literature review

Studying the health and socioeconomic impact of HIV and AIDS is well acknowledged in the literature as critical to understanding the total effect the HIV/AIDS epidemic has on a society as well as designing appropriate interventions to ameliorate these negative effects (The Commission on Macroeconomics and Health 2001, Haacker; 2004). Evidence on the effectiveness of various preventive and treatment interventions are regularly compiled and updated in existing software used to model the epidemic (Eaton, Johnson et al. 2012, Stover, Brown et al. 2012, Eaton, Menzies et al. 2013, Nalyn Siripong, Wiwat Peerapatanapokin et al. 2013, Futures Institute 2014). These models have been widely accepted as reasonable approximations for determining the population-level health effects of HIV/AIDS interventions.

Less well established are methods to measure the socioeconomic outcomes resulting from HIV/AIDS prevention, care, and treatment. Some proponents argue for the 'full-income method' – the amount of income lost (sometimes including the potential future growth in income) due to a death (Jamison, Summers et al. 2013). Other analysts have used 'the statistical value of life' to measure the economic consequences of ill-health and death (Ozawa, Mirelman et al. 2012). The statistical value of life can be measured based on the differences in pay and the differences in the probability of death between 'risky' and 'safe' jobs (among other possible methods). While compelling, it is not clear if the metric is generalizable to broader populations (which, for example, do not work in sectors where jobs have a measurable risk of death), nor is data from developing countries widely available for these metrics. Both the full-income and statistical value of life methods,

in broad strokes, estimate the net present value of the stream of future benefits of a life; these tend to be valued at or above the current income level of the person.

These approaches overcome (or overlook) the contradictory findings of previous macroeconomic models assessing health and economic outcomes using macroeconomic data (Dixon, McDonald et al. 2002, Gaffeo 2003, Haacker; 2004), and it is not clear if population average data, as used in the full income method and the value of a statistical life, can apply to clients of methadone maintenance clinics or people living with HIV/AIDS (PLWHA). Criticisms of the full-income and statistical value of life methods include that they ignore the role of unemployment; for example, in situations of high unemployment the death of one individual simply means a job opportunity for another person (although perhaps some 'friction costs' associated with recruiting, hiring, and training new workers would be incurred in the transition) (Koopmanschap, Burdorf et al. 2005). In a review of studies assessing the economic impact of HIV/AIDS, Beegle and DeWeert (2008) argue that macroeconomic models necessarily make assumptions that "describe the microsocioeconomic behaviors of agents in the economy" (p. S90), and the differences in these assumptions ultimately have a large impact on the conclusions drawn. They conclude, "Compared with empirical studies of national income, and despite facing challenges in practice, micro-impact studies have appeal because in theory they offer more direct evidence of the impact of AIDS" (p. S90) (Beegle and De Weerdt 2008). In situations where little is known about PLWHA, then, gathering empirical data on the income, expenditures, and poverty status of PLWHA and population subgroups most at risk of HIV infection is a necessary first step in building a better understanding of the socioeconomic implications of the epidemic. For example, the full income method may not be convincing to policy makers when up to 50% of PLWHA also inject drugs because the assumption that the productivity of PLWHA is the same as that of other citizens is not verifiable without further data. Further, some of the effects of interventions, such as methadone maintenance therapy (MMT) and ART, may have positive effects on people's productivity, income, and other socioeconomic outcomes (rather than just averting negative outcomes).

Several studies have documented that spending on health among HIV positive people can constitute 'catastrophic' expenditure (driving people or families into poverty or causing financial hardship) or form a prohibitive barrier to accessing HIV/AIDS and related treatment (Pradhan and Prescott 2002, Kouanda, Bocoum et al. 2010, Riyarto, Hidayat et al. 2010, Tran, Duong et al. 2013, Tran and Nguyen 2013). Specific to Vietnam, studies assessing out-of-pocket payments and catastrophic payments for health care among PLWHA include:

1. Case studies in 2005 with 125 households with PLWHA found that they pay 13 times more than the average household for medical care, with about one out of three PLWHA having a job and contributing to the household. The study also concluded that HIV/AIDS will cause 'most' of the households to fall into poverty, or fall deeper into poverty (UNDP and AUSAID 2005).

2. A survey in 2008 comparing 452 households with PLWHA to 452 households without a PLWHA in six provinces (Ha Noi, Lang Son, Quang Ninh, Cao Bang, Ho Chi Minh City, and An Giang) found PLWHA households in urban areas had about 30% lower income than households without PLWHA; in rural areas there was little difference. It is not clear what caused the difference in urban areas – it could have been a result of the HIV infections themselves, higher average incomes in urban areas, or due to other confounding factors. Households with PLWHA had over 5 million VND in direct health care expenditures per year, compared to just under 3 million for other households; the authors estimate that between 49,000 and 90,000 people fell into poverty because of HIV/AIDS at the time of the study (Strategic Consultancy Company Limited and Medical Committee Netherlands-Vietnam 2009).

3. A national survey of 1,206 PLWHA in 2009 estimated that, on average, PLWHA spend over 4 million VND per year for health care and health care related services (such as transportation to health facilities) (Hammett TM, Nguyen TP et al. 2010).

4. A survey of 1,016 PLWHA in hospitals in three provinces (Ha Noi, Hai Phong and Ho Chi Minh City) in 2012 found patients spend on average $188 per year (about 3.9 million VND) on health care, and about 35% had catastrophic health expenditures (and over 73% would be affected if antiretroviral therapy (ART) were not provided at subsidized prices to patients) (Tran, Duong et al. 2013).

While the above studies paint a picture of some of the socio-economic effects of and the burden of paying for health care associated with HIV/AIDS, more, and more up-to-date, evidence is still needed in Vietnam. Less is known about the income of PLWHA, with no study since 2008 assessing their income, which is needed to start understanding a fuller picture of the socioeconomic consequences of HIV/AIDS and HIV/AIDS interventions in Vietnam.

1.2 Objectives of the survey

This study represents one component of larger efforts to estimate the effects of past investments in HIV/AIDS prevention and treatment efforts. There is no current data on the income of PLWHA (especially in comparison to the mean income of the entire population) to inform estimates of the economic impact of HIV/AIDS prevention and treatment efforts. Thus, the **primary objective** of this study is to estimate the average income and general expenditures of PLWHA. The null hypothesis is that income among PLWHA is the same as that of the general population.

Additionally, this study will help to inform estimates of the potential liability faced by Vietnam's Social Health Insurance scheme if it assumes responsibility for paying for HIV/AIDS treatment. A recently concluded assessment of this potential liability concluded that data on the following three variables (amongst others) were needed to reach better estimates of the potential liability: (i) The inpatient admittance rate among PLWHA accessing HIV/AIDS treatment services. (ii) The amount of copayment that PLWHA would incur under the social health insurance scheme (which depends upon people's status as poor, near-poor, member of a minority population, etc.). (iii) The proportion of PLWHA that currently are enrolled in the social health insurance scheme (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project September 2014).

In response to item #3 on this list, VAAC has already conducted an assessment of the health insurance status of PLWHA, which found that about 30% of PLWHA and accessing HIV/AIDS treatment are enrolled in insurance. Thus, VAAC also is seeking answers to questions about why patients are not enrolling in the insurance scheme and how to increase the enrollment rate.

The secondary research questions for this study include:

(1) Estimating the inpatient admittance rate among PLWHA over the year prior to implementing the survey.

(2) Estimating the proportion of PLWHA that would be exempt from making copayments under the social health insurance scheme.

(3) Collecting data on PLWHA's perception of the social health insurance scheme.

While only 4% of PLWHA registered at health facilities outside of Ho Chi Minh City are also on MMT, over 15% of MMT clients also access HIV/AIDS treatment (based on VAAC data from August 2014). Thus, a final objective of this report is to present results from a survey of MMT clients also seeking HIV/AIDS treatment with respect to their inpatient admission rates over the year prior to data collection, their health insurance status, and their perception of the social health insurance scheme. These results are based on a separate survey done with MMT clients, the methods and primary results of which are described elsewhere (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project October 2015).

1.3 Organization of the report

Section 2 of this report details the methodology used, including sampling, questionnaire construction and testing, survey implementation, a data analysis methods. The third section reports the results of the survey, separated into seven sections: 1. Characteristics of respondents; 2. Annual income and poverty status of respondents; 3. Annual expenditures of respondents; 4. Health facility utilization for HIV prevention, outpatient, and inpatient care; 5. Catastrophic payments for HIV/AIDS care and health care as observed for the respondents, and catastrophic expenditures under different client copayment scenarios; 6. Health insurance status of respondents; and, 7. Health insurance perception among respondents. The fourth section of the report discusses the implications of the results and discusses the limitations of the findings. The annexes provide more detailed technical discussions of the methods and results, and present the results, based on a separate survey, for health facility utilization for outpatient and inpatient care, health insurance status, and health insurance perception among the MMT respondents who were HIV positive.

2. METHODS

2.1 Overview

The survey was conducted at facilities offering ART services in seven provinces: Binh Thuan, Dien Bien, Ho Chi Minh City, Ha Noi, Lai Chau, Long An, and Thanh Hoa. In each province, a random sample of facilities offering ART services as of August 2014 were visited, with a target of interviewing 20 ART clients at each facility. Field staff from the Hanoi School of Public Health (HSPH), who were trained on the questionnaire and interviewing techniques, interviewed a total of 843 ART clients using a pre-tested questionnaire. Data were collected from 04 May 2015 through 10 June 2015.

The remainder of this section provides further details on the methods used for this survey, starting with the sample design, questionnaire construction, ethical review, organization of the survey, the pilot and training of field staff before the start of data collection, the procedures used during the field work, and ending with a discussion of the data analysis approach used.

2.2 Sample design

As of August 2014 (the date when the sample was established), there were a total of 83,395 adult clients registered at 259 ART centers (excluding prisons, 06 centers, and other special service ART sites) in all 63 provinces of Vietnam. We used a three-stage stratified cluster design to build the sample.

In the first stage, the 63 provinces of Vietnam were stratified into six regions: Mekong River Delta, South East, Northern Midlands and Mountain Areas, Red River Delta, Central Coastal Area & Central Highlands, and North Central Area. Note that the Central Coastal Area and the Central Highlands were combined because in August 2014, no facilities in the Central Highlands offered MMT, and to minimize budget, this survey was combined with a separate survey of MMT clients. In these six regions, 25 provinces did not have an MMT facility in August 2014, and were excluded from the selection process (see Annex 1). Thus, the sample is representative of all provinces with at least one MMT facility as of August 2014 because all these provinces could have been selected for the sample. The results of this survey are not applicable to the 25 provinces not included in the original sampling frame.

Due to limited funds available for data collection, seven provinces were selected for data collection from the remaining 38 provinces. First, six provinces were selected, one from each region. Selection was done at random with probability of selection proportional to the size of the HIV and methadone maintenance patient population in each region. One additional province was drawn at random with the probability of selection proportional to the population (of HIV and methadone maintenance patients) from the remaining provinces (irrespective of region). The final sample included seven provinces: Binh Thuan, Dien Bien, Ho Chi Minh City, Ha Noi, Lai Chau, Long An, and Thanh Hoa (see Figure 1).

Stratification by region was done to ensure national representativeness. Note, however, that five of the six regions have only one province included in the sample. Thus, results should not be considered representative at the regional level.

Figure 1: Provinces included in the sample
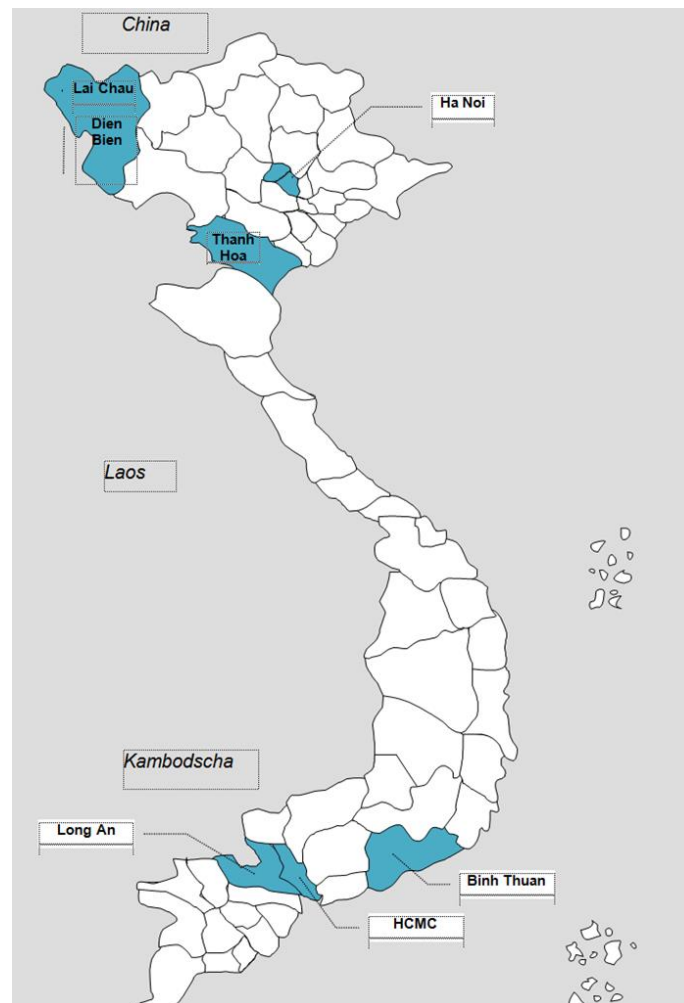
A total of 42 facilities are included in these analyses. Once provinces were selected, facilities offering ART were stratified by the type of facility (central hospitals, provincial hospitals, district hospitals, provincial AIDS centers, district health centers with functions only for prevention, and district health centers with functions for prevention and treatment (dual function)). Other types of health facilities, such as military, pediatric, and prison facilities, are excluded. There were only 3 central hospitals and AIDS centers available for sampling and these were selected with certainty. For provincial hospitals (n = 6), district hospitals (n =12), and dual-function AIDS centers (n=6), we selected a facility if it was the only one of its type in a selected province; in provinces with more than one facility, facilities were selected at random with the probability of selection proportional to the number of ART clients. For single function AIDS centers, we selected facilities at random with the probability of selection proportional to the number of ART clients in each province where they were represented. The final sample included 3 central hospitals, 3 provincial hospitals, 6 district hospitals, 3 provincial AIDS centers, 24 district health centers with functions only for prevention, and 3 district health centers with functions for prevention and treatment.

2.2.1   Sample size

Our null hypothesis is that PLWHA have the same average income as the general population:

H_0: Y_{PLWHA} = $Y_{general\ population}$

H_A: Y_{PLWHA} ≠ $Y_{general\ population}$,

where Y represents the average income. The average income in Vietnam in 2013 was US$2,042.

Utilizing the following formula, we estimate the minimal detectable difference (d) for a sample of 840 patients will be about US$260 with standard type I and type II error rates. Failure to detect differences smaller than US$260 is viewed as acceptable by VAAC.

$$d = \sqrt{2 * \frac{(z_{\alpha/2} + z_\beta)^2 \sigma^2}{nm}[1 + (m-1)p]}$$

Where:

d = minimal detectable difference

α = 0.05

β = 0.80

σ^2 = 1,174,401 (based on recent household survey of general population income)

n = number of facilities visited (42)

m = number of patients per facility (20)

ρ = correlation within facilities (assumed to be 0.40)

This is equivalent to being able to detect whether the income of PLWHA is greater than 13% different than the general population's income.

2.2.2   Final sample

A final sample of 843 ART clients from 42 clinics in seven provinces completed the survey (see Table 1).

Table 1: Final sample

Province	Facilities offering ART in August 2014	Facilities included in sample	Adults enrolled in ART care, August 2014	Patients sampled (/target number)
Binh Thuan	3	2	462	40 (/40)
Dien Bien	7	3	2,045	60 (/60)
Ha Noi	20	9	8,832	183 (/180)
Lai Chau	4	2	485	40 (/40)
Long An	3	3	1,001	59 (/60)
HCM city	26	19	21,531	379 (/380)
Thanh Hoa	8	4	2,147	82 (/80)
Subtotal: provinces included in sample	*74*	*42*	*36,503*	*843 (/840)*
National Total	**250**	**250**	**83,395**	**83,395**
Sample provinces as a percentage of national total	*29%*	*16%*	*44%*	*1.0%*

The seven provinces included in the sample contained 29% of all facilities offering ART services in August 2014. ART clients in the seven provinces included in the sample represent 44% of nationwide

adult ART clients as of August 2015. The 843 respondents in the final sample represent 1.0% of all adult ART clients in Vietnam, and 2.3% of adult ART clients in the seven provinces included in the sample.

Table 2: Final sample by facility strata

Strata	# of facilities with ART nation-wide	% of patients nation-wide	# of facilities with ART in sampled provinces	% of patients in sampled provinces	# of facilities in sample	# of patients surveyed	% of patients surveyed
Central hospital	5	6%	3	12%	3	61	7%
Provincial hospital	58	25%	6	7%	3	59	7%
District hospital	64	16%	12	13%	6	120	14%
Dual functional district health center	41	5%	6	1%	3	59	7%
Provincial AIDS center	28	8%	3	3%	3	60	7%
Single functional district health center	88	40%	41	65%	24	484	57%

The final sample under-represented adult ART clients at provincial hospitals and over-represented adult ART clients at single function district health centers as compared to the national population of adult ART clients (see Table 2). This, in part, reflects that 25% of all single function district health centers are located in Ho Chi Minh City. The final calculations assign survey weights to patients to account for differences between the sample and the population of adult ART patients (see "Data analysis" section below).

2.3 Questionnaires

The instrument used in the 2012 Living Standards Measurement Survey (LSMS) formed the basis for the income and expenditure proportions of the survey instrument used for this study (personal correspondence: Hoang Van Minh 12 December 2014). The LSMS is a household survey that has been used in multiple countries, with questions validated for Vietnam. However, our survey differed from the LSMS because our survey was conducted at health facilities, not in households. This affects results because not all of the data available at the household would be available to individuals at health facilities. Second, the LSMS is a lengthy survey, and we did not think that clients at health facilities would have the time to complete the entire LSMS survey at the health facility. Thus, we shortened and simplified the LSMS instrument for this study. During this process, we ensured that no domains of the LSMS were eliminated. That is, we maintained the overall categories of income and expenditures as used in the LSMS survey in our questionnaire as prompts for the respondents. Thus, for example, rather than asking for income based on specific crops, we prompted respondents for income based on crop types (staple crops, vegetable, industrial crops, fruit, aquaculture, forestry, and livestock/poultry). We retained examples of different crop types to help guide respondents.

The LSMS questionnaire was written and administered in Vietnamese, and translated into English for purposes of data analysis.

Additional questions were added to our survey related to expenditures for HIV prevention, outpatient utilization and expenditures, inpatient utilization and expenditures, health insurance coverage, and perception of health insurance. The questions for these portions of the survey instrument were based on Abt Associates' database of surveys used for National Health Accounts

and insurance enrollment. These questions were translated into Vietnamese by research staff, and orally back translated into English to ensure accuracy.

The entire research team reviewed the questionnaires and discussed the wording and order of the questions. The survey was finalized after being field tested at a pilot (discussed below in the 'Pilot and training of field staff' section).

2.4 Ethical review

This study received approval from the Abt Associates, Inc. Institutional Review Board in March 2015 and the Hanoi School of Public Health (HSPH) Ethical Review Board for Biomedical Research in April 2015. All respondents gave oral informed consent to participate in the survey, and were offered the opportunity to ask questions before the start of the interview. Respondents were also given contact information should they have any questions about the study after they completed the survey. Due to the sensitive information collected (including questions designed to assess income, wealth, their status as a methadone recipient and thus prior use of heroin, and HIV status), we used oral informed consent and did not collect names during the consent process. During the survey, we did not collect names, addresses, phone numbers, dates of birth, or other direct identifiers. Some indirect identifiers, such as age (in years) and sex, were collected. Measures taken to protect the security of the data are provided in the 'Field work' section below.

2.5 Organization of the survey

The survey data collection was implemented by the HSPH under contract with VAAC. The HFG project provided technical support in drafting study protocols and questionnaires and conducting data analysis. The study objectives and proposed methodology were presented at VAAC in January 2015 for discussion with national and international partners and stakeholders.

2.6 Pilot and training of field staff

Field staff were trained on the data collection instruments, recruitment and sampling procedures, providing respondents with informed consent to participate in the survey, ethical considerations, and best practice approaches to dealing with vulnerable populations. Training took place in Hanoi the week of 10 April 2015 through 17 April 2015, including pilot tests. Twelve data collectors were trained, along with five supervisors. Representatives from HSPH, VAAC, and HFG all assisted with the training.

The questionnaire and the recruitment and sampling procedures were pilot tested at the OPC Tây Hồ ART clinic in Hanoi. Each data collector completed at least one survey during the pilot testing. After testing, the research team and data collectors met to discuss modifications to the questionnaire and lessons learned. The team finalized the questionnaire based on feedback from the pilot testing experience.

2.7 Field work

2.7.1   Respondent recruitment and consent

The ART client survey questionnaire was addressed to ART clients 18 years of age or older. Additionally, potential respondents were screened to ensure that they were attending the ART clinic on that day for themselves (and not, for example, picking up drugs for another client).

Survey staff visited the sampled facilities and first identified the clinic where ART is offered in the facility. ART clients were first informed of the study by physicians/nurses/facility staff at the end of their regular interactions at the health care facility; staff only recruited patients attending the facility

for ART. Staff were told that patient participation is voluntary and given a script with a brief description of the study for them to use to inform patients about the survey.

After being informed of the study by facility staff, survey staff read their recruitment script which included screening questions to identify whether the ART client was eligible to participate in the survey. If the respondent was eligible, the interviewer discussed and explained the study in detail and administered a verbal informed consent process. If a potential respondent agreed to participate in the survey, the interviewers met with them individually at a private spot in the facility.

The survey was administered electronically, and the interviewer indicated whether the respondent agreed to participate after informed consent by entering their personal code on the tablet computer. A paper copy containing contact information for the study's principal investigators and the local IRB was provided to the respondent. The first 20 clients that gave consent and met eligibility requirements were interviewed at each facility. On average, an interview took about 32 minutes to complete.

Due to the length of the survey, an incentive was offered to respondents to participate in the study. This incentive, paid by the data collection team, was VND 42,000 ($2.00) which is in line with GoV guidelines for in-depth interviews.

2.7.2   Data collection

All surveys were conducted by trained field staff from the HSPH. Teams of field staff visited each facility, together with a supervisor, who identified and solved any problems, answered questions, and coordinated the data collection effort. Field staff collected information on password protected and encrypted tablet computers. They double entered numeric data, especially related to monetary values for income and expenditure, on-site. They first entered the numeric response on the tablet computer, and then were prompted to re-enter the value without being able to see the first entry. If the two entries were different, the field staff had to correct one of the entries to ensure agreement between the two entries.

Completed forms were submitted via internet to HSPH. Ona web services (https://ona.io/ttct/) were used to upload data from the tablets. The files were converted into Stata readable electronic files and were provided to Abt Associates Inc. through Abt's secure File Transfer Protocol (FTP) site. After downloading the data, Abt staff removed them from the web portal.

In 23 of the 42 facilities (54.8%), the target of 20 respondents was achieved. At six facilities (14.3%), 21 respondents were included in the sample and at three facilities (7.1%) 23 respondents were included in the sample because multiple ART clients started recruitment and informed consent before the final sample was established. In those cases, the additional respondents were retained for data analysis, with the sampling weights adjusted to reflect the actual number of respondents. In the remaining ten facilities, fewer than 20 respondents were available on the day of the survey, with from 18 respondents at two facilities (4.8%) and 19 respondents at eight facilities (19.0%). In these facilities, the lower than target number of respondents was due to a lack of clients attending the ART facility on the day of the data collection.

2.8 Data analysis

Data were analyzed in Stata/MP 12.1 (StataCorp LP 2013).

2.8.1   Survey weights

ART clinics all serve different numbers of clients. Because we sampled a set number of patients at each facility, regardless of the number of clients at a particular facility, the final sample does not proportionately reflect the number of ART clients in each facility, province, or region. Thus,

sampling weights are needed to ensure the representativeness of the results. Because we used three-stage sampling (to select provinces, facilities, and patients within a facility), the sampling probability is calculated separately for each region, province, and facility. Annex A provides details on the calculations used to determine survey weights. All results presented reflect the survey design and survey weights.

2.8.2   Standard errors and confidence intervals

Errors in surveys are caused by both non-sampling and sampling errors. Non-sampling errors result from faulty questionnaire construction, failure to follow the sampling procedures, data entry errors, poor understanding of the questions on the part of respondents, failure of respondents to answer questions accurately, and other implementation errors. There are limited statistical options for assessing non-sampling error. These types of errors are best addressed by careful construction of the questionnaire, training of field staff, etc. It should be noted, however, that non-sampling errors inevitably occur in surveys of this nature.

Sampling error results from the fact that the actual sample achieved in this survey is just one of many possible samples that could have been drawn from the same population using the same sampling design. Each of these samples would yield different results from the results presented in this report. In order to account for this variability, or sampling error, Taylor-linearized standard errors are used to estimate all the confidence intervals presented in this report. The Taylor-linearized standard errors can be calculated in Stata using the "svy:" prefix before the estimation command (StataCorp LP 2013). The reported 95% confidence intervals can be interpreted as the range in which 95% of mean or proportions for a given variable would fall among all the possible samples drawn from the same population using the same design.

In addition to reporting the means or proportions for a given variable, we calculated the design effect (DEFF) for each of the variables representing primary and secondary objectives in the report. The DEFF is the ratio of the variance of the survey as implemented and the variance that would have been if the sample had been selected entirely at random (rather than using a multi-stage design with respondents clustered in facilities). The DEFF is a function of the correlation of answers given by respondents at in one cluster (in this case facility) and the size of the clusters. The DEFF for selected variables are reported in Annex B.

2.8.3   Missing data

Some respondents reported not knowing the amount of income or expenditures for certain categories. These data often, but not exclusively, related to income or expenditures earned by others in their household, and are considered 'missing information'. For income, the number of missing responses amounted to about 0.4 percent of all answers, and for expenditures about 5.7 percent of answers were missing (see Appendix C, table 1 and table 2). In the case of income, data were more likely to be missing for sources of income that made up a greater percentage of income among those with complete data (notably income related to pay for work and business activities). For expenditures, data were more likely to be missing for categories with relatively lower contributions to total expenditures.

In order to account for the missing data when reporting results, we impute missing data for income and expenditures. In order to impute missing data, we employ multiple imputation using chained equations (StataCorp LP 2013). The method of imputations generates regression equations predicting the missing data based on data that are present. We use predictive mean matching to impute the missing data. This method estimates a regression model for the missing data, predicts the values, and finds the person or people with the closest value(s) to the prediction, and uses the value of that near/nearest person to fill in the missing data. The advantage of this method is that it does not fill in missing values with numbers that are outside the observed range – namely, it will not predict negative numbers for missing values. We randomly select the missing value from the nearest

10 people, and generate 10 datasets. Imputing data allows, to the extent possible, to control for patterns in the missing data. For example, if people with lower income or expenditures (or who do not currently have a job, etc.) are more likely to have missing data, the imputed data will reflect this. Thus, in this example, the mean income or expenditures among people reporting data is likely to be higher than those that do not report data, and imputing missing data allows us to correct for this potential bias.

This approach allows us to calculate the fraction of missing information (FMI), which is defined as the proportion of variance across the 10 datasets due to the random selection of 'nearest neighbor' values compared to the total variance, including the variance across the 10 datasets and the variance amongst the respondents (see Annex C Table 3).

We use all of the demographic variables, current job type, and all of the income variables to predict data missing for income. We use and all of the demographic variables, current job type, current income, and all of the expenditure variables to predict missing expenditure variables. We predict individual missing variables first, and then add the results to generate estimates of total income and expenditures. While this 'passive' imputation is not recommended for running regressions or other analyses of the data (White, Royston et al. 2011), we use this method for presentation purposes only. Using the approach of calculating totals first and then imputing missing values for that total variable, for example, will result in the sub-categories of income or expenditure not adding up to the total. We also report the mean value among respondents who did answer the question, and the mean value with the imputed data (see Annex C Table 3).

2.8.4 Definitions used for income, expenditures, poverty, and catastrophic payments

Income and expenditures in this report are assessed for the individual respondent, which differs from many surveys. For example, the LSMS assesses household income and expenditures rather than individual income and expenditures. Given the extent to which households function as units, sharing food, housing, etc., the household is the logical unit for measuring income and expenditures. However, our survey took place at ART clinics, and we did not have access to all members or working age members of the respondents' households. Thus, we did not have a valid means of ascertaining household income and expenditures. We have, therefore, modified some of the definitions and metrics used to assess poverty and catastrophic expenditures to suit the data we had available. The following sections describe how we define the main metrics used in this report to accomplish the primary and secondary objectives of the survey.

Income: The basic metric is the income of the individual respondent. In certain cases, the individual respondent may not be able to accurately report the income from certain activities. For example, the entire family may share the revenue from a family business or agricultural endeavor, and the respondent may not know their individual income from that activity or endeavor. In these cases, the respondent was asked to specify the total income from the activity, endeavor, or category of income, and specify that this was 'household income'. In these cases, we calculate the 'share' of income attributed to the respondent by dividing the 'household income' by the total number of adults of working age in the household. We present income earned solely as an individual, but the main outcome is measured by the latter metric, labelled "income including respondents' share of household income".

Income is reported as annual income. For routine income, such as payment for work, we asked the respondent to specify the amount of payment received over the last 30 days, and we estimate the annual income by multiplying the response by 12.

Expenditures: Similar to income, we assess the annual expenditures of the individual respondents. Again, for some categories of responses, respondents were not able to differentiate between individual and household expenditures, and we calculate the 'share' of expenditures attributed to the

respondent by dividing the 'household expenditure' by the total number of adults of working age in the household. We present expenditures incurred solely as an individual, but the main outcome is measured by the latter metric, labelled "expenditure including respondents' share of household expenditures".

Poverty: We use official GoV definitions of poverty to define poverty in this report. In 2013, the GoV defined poverty as an income less than 570,000 VND for rural areas and 710,000 VND for urban areas per person per month (General Statistics Office of Viet Nam 2014). We update the poverty line to the end of 2014 using the consumer price index (General Statistics Office of Viet Nam 2015). For Ho Chi Minh City, we use 16,000,000 VND as the annual individual poverty line (Decision No 03/2014/QD – UBND 2014), and for Hanoi, we use 750,000 VND per month as the individual poverty line (Decision No 01/2011/QD-UBND of Ha Noi People's Committee). For other provinces, we use the urban poverty line to define poverty. All of the ART facilities were located in urban areas, and in our survey it is not possible to know if a respondent lived in an area officially classified as urban or rural. However, it is likely that some respondents (especially those outside of Ha Noi and Ho Chi Minh City) live in rural areas, and we present results for these areas separately for both income and expenditures. In these areas, the poverty rate may be over-estimated because the poverty line in rural areas is less than that used in the results presented.

The poverty line is treated as an individual, income-based metric. That is, to be considered non-poor, a respondent should report "income including respondents' share of household income" of equal to or more than the poverty line. Note that since some respondents do not have any individual income, this may over-estimate the poverty rates compared to if total household income were used.

Note that we also compare annual expenditures to the poverty line. This is done for informational purposes only; the official measure is based on income. However, expenditures for some households (especially households with some reliance on agriculture for income) may be more constant over time that income, and thus may better represent the economic situation of the respondents (Xu, Evans et al. 2003).

In order to compare the income of respondents to the national average, we use data representing the productivity of the employed population in Vietnam. The 2013 estimate of average income among those employed was 68.7 million VND (General Statistics Office of Viet Nam 2015); we again update this using the consumer price index (General Statistics Office of Viet Nam 2015). Because not all of our respondents are employed, we compare the average income of all respondents to this value, and then compare again only for those respondents reporting having a job.

Catastrophic payments: We use the WHO definition of catastrophic payments, with some modification, for these analyses (Xu, Evans et al. 2003). This definition assess the percentage of 'capacity to pay' devoted to health care, with more than 40% of 'capacity to pay' defined as a 'catastrophic payment'. Following previous analyses form Vietnam, we include as sensitivity analyses catastrophic payments defined as 30% and 20% of capacity to pay (Tran, Duong et al. 2013).

To estimate capacity to pay, WHO recommends taking the average food expenditure per household across the 45th to 55th total expenditure percentiles in a nationally representative survey (Xu, Evans et al. 2003; Tran, Duong et al. 2013). This measure is deemed the 'subsistence' level of expenditures needed to live; any expenditure above this subsistence level is deemed 'capacity to pay'. The data in our survey do not reflect results for the general population, but for the subpopulation of clients of ART facilities, and it is not certain that the results from our survey will reflect subsistence level spending for the general population. For that reason, we use the average from the 2012 LSMS survey as our measure of subsistence expenditures (personal correspondence: Hoang Van Minh 03 September 2015), and adjust it to 2014 using the consumer price index (General Statistics Office of Viet Nam 2015).

3. RESULTS

3.1 Demographic and socioeconomic characteristics of the respondents

This section provides an overview of the demographic and socioeconomic status of the respondents to the survey. This includes age, sex, education, marital status, whether respondents live alone, size of their households and whether the respondent is a member of minority population, has a poor card, is a member of the military/police, performed war service, or other class exempt from copayments under the national social health insurance (NSHI) scheme (Table 3). For the sake of presentation, respondents have been grouped into categories for education and marital status.

Table 3: Demographic and socioeconomic characteristics of the respondents

Variable	n	Mean / Percentage	Standard Error
Age (in years)	843	36.3	0.36
Sex	843		
Male		64%	3.4%
Highest education level attained	843		
No qualification		11%	1.5%
Primary school		25%	2.0%
Secondary / High school		54%	2.4%
Above High school		9%	2.0%
Marital Status	843		
Single		23%	2.6%
Married / Long-term partner		56%	2.8%
Widowed		11%	1.8%
Divorced / separated		10%	1.0%
Live Alone	843	6%	0.7%
Size of household	842		
People of working age		2.9	0.05
People not of working age		1.8	0.05
Total number of people in household (including respondent)		4.7	0.06
Member of a group exempt from copayments under NSHI*	843	32%	3.5%

* Member of minority population, has a poor card, is a member of the military/police, performed war service, or eligible other class

Respondents were, on average, just over 36 years old and about 64% of respondents were male. About 32% of respondents reported they were member of a group that is eligible for NSHI without copayments. For education, the results report the highest level attained; for example, a person who had attended high school but not finished would be considered to have attained secondary school education. About 11% of respondents had not finished primary school, with 25% completing primary school but not secondary school. The majority of respondents had completed either secondary school (33.5%) or high school (20.5%), with 9% having completed a higher degree. The majority of respondents (56%) were currently married or living with a long-term partner, with 23% reporting they were single, 10% reporting they were divorced or separated, and 11% reporting they were widowed.

A household is defined as the group of people sharing a common living structure and eating and sleeping arrangements. A person is considered to live in a household if they eat the majority of their meals in a week in the household. The average household size is 4.7 people, composed of 2.9 people of working age (including the respondent) and 1.8 people not of working age.

3.2 Income

3.2.1 Individual income

The primary objective of this survey was to assess respondents' current income in order to determine if ART clients make more, about the same, or less than the average person in Viet Nam.

Table 4: Reported annual income of respondents, on average (VND thousands)

Variable	n	Mean / Percentage	95% Confidence Interval	p-value compared to national average
Proportion with any individual income in last year	843	62%	57% to 67%	
		VND thousands		p-value compared to national average
Average individual income (all respondents)	843	27,972	24,493 to 31,451	<0.001
Average individual income (including respondents' share of household income)	842	33,105	29,401 to 36,808	<0.001
Average individual plus share of household income by category				
Pay received as compensation for work	842	25,583 (77%)	22,679 to 28,487	
Benefits	842	913 (3%)	363 to 1,463	
Rent of land, equipment, etc.	842	496 (1%)	186 to 807	
Agricultural activities	842	1,000 (3%)	510 to 1,489	
Business	842	1,309 (4%)	72 to 2,547	
Other	842	3,803 (11%)	2,628 to 4,978	

Table 4 shows that 62% (95% CI: 57% to 67%) of respondents reported earning income as an individual. The average income, including respondents' share of household income, was 33,105 (95% CI: 29,401 to 36,808) thousand VND, of which 27,972 (95% CI: 24,493 to 31,451) thousand VND, or 84.5%, of income was directly attributable to the respondent, with the remainder comprised of the respondents' share of household income. The average income, including respondents' share of household income, was less than the national average income of working people, which was estimated at 69,870 thousand VND (p<0.001). Among respondent reporting that they were

currently employed, the average income, including respondents' share of household income, was 47,847 (95% CI: 43,705 to 51,988) thousand VND, which is also statistically significantly different than the national average (p<0.001).

The majority of income came from pay received as compensation for work, with 25,583 thousand VND received as income from this source, representing 77% of all income. Benefits include allowances, severance pay, unemployment benefits, standard pension, premature pension, allowances for loss of working capacity, and other benefits/allowances and comprised about 3% of income. Rent of land, equipment, buildings, etc. comprised 1% of income on average. Agricultural activities, including crops, aquaculture, livestock or other animal products, and forestry, comprised 3% of income, net of agricultural expenditures. Income from own- or household-business activities comprised 4% of income, net of expenses. Finally, other income, including gifts and remittances, weddings, funerals, social benefits, assistance for disasters and fires, insurance, interest, donations, and any other income, comprised 11% of income.

Table 5: Reported annual income of respondents by category of respondent, on average (VND thousands)

Category	N	Income (thousands VND)	
		Mean	95% Confidence Interval
Sex	842		
Male		35,835	31,322 to 40,349
Female		28,345	22,935 to 33,756
MMT client (self-reported)	842		
Not an MMT client		34,385	30,116 to 38,655
MMT client		27,779	22,130 to 33,428
Location	842		
Ho Chi Minh City		42,595	36,461 to 48,730
Hanoi		29,144	21,378 to 36,909
Other provinces		27,781	21,335 to 34,228
Age Category	842		
25 and under		37,418	23,262 to 51,575
26 to 30		29,771	21,348 to 38,194
31 to 35		36,800	31,694 to 41,905
36 to 40		33,124	26,851 to 39,396
41 to 45		40,769	23,663 to 57,876
Over 45		18,692	10,597 to 26,786
Marital status	842		
Single		34,695	27,715 to 41,675
Married / long-term partner		32,441	27,821 to 37,062
Widowed		23,219	17,135 to 29,302
Divorced / Separated		44,463	32,524 to 56,403
Education	842		
No qualification		17,010	13,006 to 21,013
Primary school		26,421	21,710 to 31,132
Secondary / High school		35,341	30,524 to 40,159
Higher than high school		57,263	43,228 to 71,298
Job Status	842		
Homemaker, not currently employed		10,000	7,235 to 12,765
Currently have full- or part-time job, or self-employed		47,847	43,705 to 51,988
Member of a group exempt from copayments under NSHI	842		
Not eligible		38,473	34,246 to 42,699

Member of minority, have poor card, military/police, war service, or other class exempt from copayments under NSHI scheme	21,674	16,651 to 26,696

Females reported lower incomes than males (Table 5). Further, respondents who self-report to be enrolled in MMT services or live outside of Ho Chi Minh City also have lower incomes than respondents who did not report they were attending MMT services or live in Ha Noi or other provinces outside of Ho Chi Minh City. As expected, respondents who currently have a job have a higher income than those without, and those with higher levels of education tend to have higher incomes. Finally, respondents who reported they were members of at least one group that is eligible for no copayments under the NHSI had lower incomes than those that were not eligible for such a subsidy.

3.2.2 Poverty

Table 6: Percentage of respondents with income below the poverty line

Variable	n	Percentage	95% Confidence Interval
Average individual income below poverty line	843	45%	40% to 49%
Average individual income plus share of household income below poverty line	842	37%	32% to 42%
*Poverty status by category**			
MMT client (self-reported)	842		
Not an MMT client		37%	32% to 41%
MMT client		39%	28% to 49%
Location	842		
HCM City and Hanoi		33%	29% to 38%
Other provinces		43%	34% to 53%
Job Status	842		
Homemaker, not currently employed		73%	66% to 80%
Currently have full- or part-time job, or self-employed		14%	10% to 18%
Member of a group exempt from copayments under NSHI	842		
Not eligible		31%	27% to 36%
Member of minority, have poor card, military/police, war service, or other class exempt from copayments under NSHI scheme		49%	41% to 57%

* Measured as individual income plus individual share of household income.

About 45% (95% CI: 40% to 49%) had individual incomes below the official GoV urban poverty line; when the respondents' share of household income is added to the individual income, then 37% (95% CI: 32% to 42%) of respondents had incomes below the official GoV urban poverty line (Table 6). This compares with a reported 5.8% of the population of Vietnam as a whole in 2014. As noted in the methods section, these figures likely over-estimate the poverty rate because (i) poverty calculations should be based on household income, which was not available for this survey, and (ii) some of the respondents live in rural areas, data for which again are unavailable for this survey but has a lower poverty line than urban areas. When looking at the poverty rates in Ho Chi Minh City and Ha Noi, 33% (95% CI: 29% to 38%) of respondents had individual income plus individual share of

household income below the poverty line, while 43% (95% CI: 34% to 53%) of respondents in other provinces had income below the poverty line. The higher poverty rate in other provinces likely reflects both higher poverty rates in these provinces in general and some respondents in these provinces living in rural areas.

The poverty rate was similar between those who reported they were also on MMT compared to those who reported that they were not on MMT. The poverty rate among respondents who had a job at the time of the survey was 14% (95% CI: 10% to 18%), substantially lower than the 73% (95% CI: 66% to 80%) poverty rate among those without a job. The relatively high poverty rate among those without a job may, again, reflect the failure of the survey to fully capture the income of the entire household, while the relatively low poverty rate among those with a job does indicate that employment is closely linked with non-poverty status.

Apart from those without a job, the highest poverty rate was among respondents who reported that they were a member of at least one group eligible to be exempt from making copayments under the NSHI scheme, where 49% of people (95% CI: 41% to 57%) had income below the poverty line. Among those not eligible to be exempt from making copayments, 31% (95% CI: 27% to 36%) had income below the poverty line.

3.2.3   Job status

Table 7: Job status at the time of the survey

Variable / Job status	n	Percentage	SE
Employment status, all respondents	843		
Full time employment		34%	3.1%
Part time employment		15%	1.5%
Self-employed		12%	1.6%
Not working (seeking or not)		21%	2.1%
Homemaker, retired, student, other		18%	2.0%
Employment status, currently on MMT	153		
Full time employment		26%	4.7%
Part time employment		16%	3.0%
Self-employed		10%	3.0%
Not working (seeking or not)		28%	5.9%
Homemaker, retired, student, other		20%	5.3%
Employment status, not on MMT	690		
Full time employment		36%	3.0%
Part time employment		14%	1.6%
Self-employed		13%	1.9%
Not working (seeking or not)		19%	2.0%
Homemaker, retired, student, other		18%	2.1%
Employment status, HCM City and Hanoi	562		
Full time employment		39%	3.1%
Part time employment		14%	1.7%
Self-employed		16%	2.0%
Not working (seeking or not)		23%	2.4%
Homemaker, retired, student, other		7%	1.3%
Employment status, other provinces	281		
Full time employment		28%	7.3%
Part time employment		15%	2.7%
Self-employed		6%	1.7%
Not working (seeking or not)		17%	3.4%
Homemaker, retired, student, other		34%	5.4%

The questionnaire asked people to identify their type of employment at the time of the interview (including full time employment, part time employment, self-employed, on leave/sick leave, seeking work, retired, homemaker, student, and not working, not looking for work). Overall, 61% of ART clients reported that they currently had full-time, part-time, or self-employment, while 21% reported that they were not working (whether seeking work or not) (Table 7). Of the entire population, only 1.6% reported they were not working but seeking work, which is the official definition of being unemployed; most people out of work were not seeking work and thus would not be considered part of the labor force. The national unemployment rate in Vietnam was about 1.9% in 2014.

About 52% of those reporting they were currently enrolled in MMT reported that they had full-time, part-time, or self-employment, while about 63% of those not enrolled in MMT reported that they had full-time, part-time, or self-employment. About 69% of ART clients in Ha Noi and Ho Chi Minh City reported being employed (full-time, part-time, or self), compared with about 48% of ART clients in other provinces.

3.3 Expenditures

Average annual expenditures (including the respondents' share of household expenditures) at the time of the survey were 29,234 thousand VND (95% CI: 25,671 to 32,797 thousand VND, see Table 8). Expenditures reported for the individual, rather than for the household, constituted 52% of expenditures, on average. Expenditures for health (including condoms and health insurance) constituted 4.5% of expenditures; more details on these expenditures are provided in the "Health expenditures and health facility utilization" section below.

Table 8: Reported annual expenditures of respondents at time of the survey, on average (VND thousands)

Variable	n	VND thousands	
		Mean	95% Confidence Interval
Average individual expenditures	823	15,230	13,178 to 17,282
Average individual expenditures including respondents' share of household expenditures	823	29,234	25,671 to 32,797
Average individual plus share of household expenditures by category			
Condoms	823	67 (<1%)	50 to 84
Outpatient care	823	284 (1%)	96 to 472
Inpatient care	823	805 (3%)	230 to 1,381
Health insurance	823	173 (1%)	87 to 258
Food	823	9,425 (32%)	8,580 to 10,270
Housing	823	1,346 (5%)	994 to 1,697
Utilities	823	3,263 (11%)	2,869 to 3,657
Transportation	823	3,598 (12%)	3,068 to 4,128
Education	823	1,310 (4%)	1,005 to 1,615
Other expenditures	823	8,963 (31%)	6,720 to 11,207

The largest categories of expenditures were for food (32% of expenditures, on average) and 'other expenditures' (31% of expenditures), which includes remittances, personal items, entertainment, cigarettes and alcohol, travel, clothing, wedding and funeral expenditures, gifts, and other expenditures not captured elsewhere.

Males had higher expenditures than females (Table 9), although by 2.6 million VND per year. Further, respondents who self-report to be MMT clients had similar expenditures compared to respondents who were not MMT clients. While respondents in Ho Chi Minh City reported the

highest income, respondents in Hanoi reported the highest levels of expenditures. Both Ho Chi Minh and Hanoi reported higher levels of expenditures than in other provinces. As found for income, respondents who currently have a job have higher expenditures than those without, and those with higher levels of education tend to have higher expenditures. Finally, respondents who reported they were members of at least one group that is eligible for no copayments under the NHSI had lower expenditures than those that were not eligible for such a subsidy.

Table 9: Reported annual expenditures (including respondents' share of household expenditures), by category of respondent (VND thousands)

Category	N	Expenditures (thousands VND)	
		Mean	95% Confidence Interval
Sex	823		
Male		30,205	27,069 to 33,340
Female		27,545	21,822 to 33,268
MMT client (self-reported)	823		
Not an MMT client		29,340	25,019 to 33,660
MMT client		28,794	24,638 to 32,951
Location	823		
Ho Chi Minh City		31,969	28,364 to 35,573
Hanoi		38,549	28,622 to 48,476
Other provinces		20,642	17,893 to 23,390
Age Category	823		
25 and under		41,786	29,714 to 53,858
26 to 30		28,425	21,230 to 35,619
31 to 35		27,378	22,977 to 31,779
36 to 40		34,249	24,939 to 43,559
41 to 45		29,630	20,935 to 38,324
Over 45		21,563	17,827 to 25,299
Marital status	823		
Single		36,970	26,695 to 47,245
Married / long-term partner		26,226	22,203 to 30,249
Widowed		25,118	20,513 to 29,723
Divorced / Separated		33,112	26,362 to 39,862
Education	823		
No qualification		15,677	12,518 to 18,836
Primary school		23,017	19,721 to 26,313
Secondary / High school		30,572	27,163 to 33,981
Higher than high school		54,332	35,623 to 73,042
Job Status	823		
Homemaker, not currently employed		19,835	16,985 to 22,684
Currently have full- or part-time job, or self-employed		35,240	30,796 to 39,683
Member of a group exempt from copayments under NSHI	823		
Not eligible		30,607	27,088 to 34,127
Member of minority, have poor card, military/police, war service, or other class exempt from copayments under NSHI scheme		26,307	20,572 to 32,041

3.4 Health expenditures and health facility utilization

3.4.1 HIV prevention

All respondents were asked questions about whether they were enrolled in MMT and condom procurement and payments for condoms in the last 30 days. Overall, 19% (95% CI: 12.3% to 26.5%) of respondents reported that they were enrolled in MMT, while 30% (95% CI: 26.3% to 34.0%) reported having procured condoms in the last 30 days (Table 10).

Table 10: Summary statistics for MMT and condom purchasing

Variable	n	Mean	95% Confidence Interval
Respondent reported they were on MMT at time of survey	843		
Proportion		19%	12.3% to 26.5%
Procured condoms in last 30 days	843		
Proportion		30%	26.3% to 34.0%
Among those procuring condoms	222		
Average amount spend on condoms in last 30 days			
VND '000s		20.5	15.3 to 25.6
Where condoms were obtained (among those obtaining condoms)*	246		
… from government health facility		35%	25.3% to 44.6%
… from private health facility		2%	0% to 3.0%
… from pharmacy / shop		60%	50.4% to 70.4%
… from outreach / peer educator		7%	3.4% to 11.4%
… from other source		0%	0% to 1.2%

*Multiple places allowed for each respondent; values add up to over 100%

Among those who procured condoms, they paid, on average, 20.5 thousand VND. The most common place for procuring condoms was at pharmacies or other shops (60%), followed by government health facilities (35%).

3.4.2 Outpatient care

Ninety percent of patients reported that they received antiretroviral drugs during their visit to the health facility on the day of the interview (Table 11), while 31% received a consultation, and 17% received a laboratory test. Since ART is provided free of charge, 3.7% (95% CI: 1.4% to 5.9%) paid for any services on the day of the survey, while 1.5% (95% CI: 0.1% to 2.8%) of respondents paid for HIV/AIDS related services. All of the respondents who reported HIV/AIDS related expenditures stated that these payments were for laboratory or imaging tests.

Among those that paid for any health services (including HIV-related expenditures), the average expenditures on the day of the survey was 398 thousand VND (95% CI: 0 to 837 thousand VND). Among the 12 respondents that reported HIV-related expenditures on the day the survey, the average payment was 220 thousand VND (95% CI: 141 to 299 thousand VND).

Table 11: Summary statistics for outpatient visit on day of interview

Variable	n	Proportion / Mean	95% Confidence Interval
Services received at facility (day of interview)*	843		
Consultation		31%	25.4% to 37%
Laboratory test		17%	9.3% to 24.6%
X - Ray		1%	0% to 1.8%
Anti-retroviral drugs		90%	84% to 95.1%
Tuberculosis drugs		6%	2.6% to 9%
Treatment for Sexually Transmitted Infection		0.3%	0% to 0.7%
Psychological counseling or treatment		3%	1.5% to 5.3%
Information and education about HIV/AIDS		3%	1.1% to 5.2%
PMTCT		0.4%	0% to 1.0%
Others		0.6%	0% to 1.3%
Don't know / unsure / no answer		1.0%	0.1% to 1.9%
*Multiple responses allowed; answers may total more than 100%			
Proportion that paid for services at the facility on day of interview	843	3.7%	1.4% to 5.9%
Amount paid, among those that paid for services	29		
VND '000s		398	0 to 837
Proportion that paid for HIV-related laboratory services at the facility on day of interview	843	1.5%	0.1% to 2.8%
Amount paid for HIV-related laboratory services, among those that paid for services	12		
VND '000s		220	141 to 299

The majority (69%) of respondents came to the ART clinic on the day of the interview using their own motorbike (95% CI: 63.2% to 75.7%), while 86% (95% CI: 81.2% to 90.3%) of respondents paid some money for transportation to the health facility (Table 12). The average amount paid for transportation to the ART clinic was 37.6 thousand VND (95% CI: 22 to 53 thousand VND). This translates into an annual expense of about 387 thousand VND (95% CI: 224 to 551) for transport to the ART clinic for the average ART client, representing about 11% of total annual transporation expenditures.

Table 12: Summary statistics for transportation to health facility

Variable	n	Proportion / Mean	95% Confidence Interval
Mode of transportation to facility (day of interview)	843		
On foot		3%	0.9% to 5.4%
Bicycle		4%	1.3% to 6.8%
Bus		15%	9% to 21.5%
Motorbike taxi		3%	1.2% to 4.6%
Taxi (car)		0.4%	0% to 0.9%
Own motorbike		69%	63.2% to 75.7%
Own car		2%	0.4% to 2.6%
With family / friend		2%	0.9% to 2.9%
Other		2%	0% to 3.6%
No answer / unsure		0.1%	0% to 0.2%
Proportion that paid for transportation to the facility	843	86%	81.2% to 90.3%
Amount paid, among those that paid for transport	716		
VND '000s		37.6	22 to 53
Estimated yearly expenditures for transportation to health facility for ART	840		
among all respondents, in VND '000s		387	224 to 551

The average person had 1.11 outpatient visits, including the visit on the day of the interview, in the 30 days before the survey took place (Table 13). Note that some patients had more than 2 visits, including the visit on the day of the interview, in the last 30 days. About 4% (95% CI: 2.5% to 5.4%) made a prior outpatient visit in the last 30 days for an HIV-related reason. The majority of outpatient visits previous to the day of the survey were to hospitals (34% at urban or district hospitals, and 25% at provincial hospitals), with 21% (95% CI: 9.0% to 32.2%) having prior visits to the ART clinic in the last 30 days.

Among the 72 respondents reporting an outpatient visit within the last 30 days outside of the visit on the day of the survey, the average expenditure for the visit was 186 thousand VND (95% CI: 65 to 307 thousand VND). Payments for HIV-related care was 39 thousand VND (95% CI: 0 to 84 thousand VND) among patients that had any prior outpatient visit in the last 30 days. This translates into an estimated 334 thousand VND (95% CI: 160 to 508 thousand VND) per person per year for outpatient care (including the expenditures reported in Table 11 associated with the visit on the day of the survey). For HIV-related outpatient care, the average respondent spent 38 thousand VND per year (95% CI: 0 to 84 thousand VND) (including the expenditures on the day of the survey).

Table 13: Summary statistics for outpatient visits in the past 30 days

Variable	n	Proportion / Mean	95% Confidence Interval
Average number of visits in last 30 days (including day of interview)	842	1.11	1.08 to 1.14
Location of services (prior to day of interview)*	72		
Commune Health Station		14%	4.6% to 22.6%
Urban/rural district hospitals		34%	20.9% to 47.4%
Provincial/city hospitals		25%	12.2% to 37.6%
Central hospitals		0%	N/A
Private hospitals		3%	0% to 5.7%
Private clinic		3%	0% to 7.3%
Home visit by doctor/health practitioner		1%	0% to 2.2%
OPC/ARV		21%	9.0% to 32.2%
*Multiple responses allowed; answers may total more than 100%			
Average amount paid per visit, among those with previous visit	72		
VND '000s		186	65 to 307
Proportion with previous visit in last 30 days for HIV-related issue	842	4.0%	2.5% to 5.4%
Average amount paid for HIV services, among those with previous visit	72		
VND '000s		39	0 to 84
Estimated annual expenditures for outpatient care (all respondents)	839		
VND '000s		284	96 to 472
Estimated annual expenditures for HIV-related outpatient care (all respondents)	842		
VND '000s		38	0 to 84

3.4.3 Inpatient care

Thirteen percent (95% CI: 9.8% to 15.4%) of respondents reported an inpatient admission in the last 12 months, and 5% (95% CI: 2.9% to 7.4%) reported an inpatient admission for an HIV-related reason (Table 14). HIV-related admissions include admissions for opportunistic infections. Among those with an inpatient admission in the last 12 months, the average number of admissions was 1.3 (95% CI: 1.17 to 1.49), with an average length of stay of 15.2 days (95% CI: 8.5 to 22.0). (This translates into 0.17 inpatient admittances per respondent per year.) No respondent had more than one admission for an HIV-related reason, while among those with an HIV-related admission, the average length of stay was 24.6 days. Among inpatient admissions, 49% were at a provincial hospital, 38% at a district hospital, 9% at a central hospital, and 4% at a private or other health facility.

The average expenditure for inpatient admissions was 6,410 thousand VND (95% CI: 1,586 to 11,233) among those with any inpatient admissions, which translates into 805 thousand VND (95% CI: 230 to 1,381) per year per respondent (including those without any inpatient admission). The

average expenditure for HIV-related inpatient admissions was 4,134 thousand VND (95% CI: 1,403 to 6,865) among respondents with any HIV-related inpatient admittance, which translates into 214 thousand VND (95% CI: 66 to 361) per year per respondent (including those without any HIV-related inpatient admission).

Table 14: Summary statistics for inpatient visits in the past 12 months

Variable	n	Proportion / Mean	95% Confidence Interval
Percentage of patients with any inpatient admittance in last year	843	13%	9.8% to 15.4%
Percentage of patients with any HIV-related inpatient admittance in last year	843	5%	2.9% to 7.4%
Number of admissions among patients with any admission	110	1.3	1.17 to 1.49
Average length of stay among those admitted	109	15.2	8.5 to 22.0
Number of HIV-related admissions among patients with any HIV-related admissions	45	1.00	N/A
Average length of stay among those admitted for HIV-related reason	45	24.6	9.9 to 39.2
Average amount paid for inpatient care, among those with admission	110		
VND '000s		6,410	1,586 to 11,233
Average amount paid per HIV-related inpatient care, among those with HIV-related admission	45		
VND '000s		4,134	1,403 to 6,865
Average amount paid for inpatient care per year, among all patients	843		
VND '000s		805	230 to 1,381
Average amount paid for HIV-related inpatient care per **year, among all patients**	843		
VND '000s		214	66 to 361

3.5 Catastrophic payments

A secondary objective of this survey is to estimate the catastrophic payments associated with health care and for HIV-related health care. We use the World Health Organization's definition of catastrophic payments, which counts payments for health in excess of 40% of capacity to pay as incurring financial hardship. In addition, we assess the catastrophic payment rates at 30% and 20% of capacity to pay as sensitivity analyses. We assess different types of expenditures for catastrophic payments:

1.   Health expenditures as a percentage of capacity to pay.

2.   Health expenditures plus costs for transportation to health facilities as a percentage of capacity to pay.

3.   HIV-related health expenditures as a percentage of capacity to pay.

4.   HIV-related health expenditures plus costs for transportation to health facilities for HIV-related care as a percentage of capacity to pay.

5.   Finally, we assess HIV-related health expenditures as a percentage of capacity to pay under different copayment scenarios. Four scenarios are considered. (i) Current HIV-related health expenditures as measured in the survey. (ii) 20% copayments for ART, not including the antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. (iii) 20% copayments for the full costs of ART, including first line antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. (iv) The full costs of ART services, including first line antiretroviral drugs, for patients who are not exempt from making copayments under the NSHI scheme. The source of the estimated costs of ART is a recently completed report assessing the health insurance liability for ART (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project September 2014).

Catastrophic expenditures measured at the traditional level of greater than 40% of non-subsistence expenditures were incurred by 3% of the respondents (95% CI: 2% to 4%), which increases to 5% (95% CI: 3% to 6%) when costs of transportation to health facilities is included (Table 15). For HIV-related health expenditures, these two figures are 1% (95% CI: 0% to 2%) and 2% (95% CI: 1% to 4%), respectively.

Table 15: Percentage of respondents incurring catastrophic payments

Variable	n	Without transportation		Including transportation to health facility	
		Percentage	95% Confidence Interval	Percentage	95% Confidence Interval
Proportion with catastrophic payments for health care	823				
>40%		3%	2% to 4%	5%	3% to 6%
>30%		4%	3% to 6%	7%	4% to 9%
>20%		7%	5% 9%	12%	8% to 15%
Proportion with catastrophic payments for HIV-related health care	823				
>40%		1%	0% to 2%	2%	1% to 4%
>30%		2%	1% to 3%	4%	2% to 6%
>20%		2%	1% to 3%	6%	4% to 9%

For HIV-related expenditures, a copayment rate of 20% of ART excluding antiretroviral drugs would result in about 1% of respondents incurring catastrophic expenditures for HIV-related health services (not including transportation costs) using expenditures in excess of 40% of non-subsistence expenditures as the metric of financial hardship (Figure 2). A copayment rate of 20% including antiretroviral drugs would result in about 7% of respondents incurring catastrophic expenditures for HIV-related health services. If patients had to pay the full costs of ART (including first line antiretroviral drugs), 46% of respondents would incur catastrophic expenditures. Note that the 32% of respondents who were exempt from making payments under the NSHI scheme due to their status as a minority, having a poor card, military/police, war service, etc. are assumed in these scenarios to not incur copayments in any of these scenarios, although we included any payments made for HIV-related care reported in this survey. Thus, over 67% of patients not in this 'exempt from copayment' category would incur catastrophic expenditures if they had to pay the full costs of ART. Using expenditures in excess of 20% of non-subsistence expenditures as the threshold for

catastrophic expenditures, 74% of respondents would incur catastrophic payments. This is due to (i) some respondents in the 'exempt from copayment' category were reported to incur catastrophic expenditures in this survey at this level, and (ii) the vast majority of the remainder of patients would incur catastrophic expenditures under this metric if they had to pay the full costs of ART.

Figure 2: Percentage of patients incurring catastrophic payments under different copayment scenarios
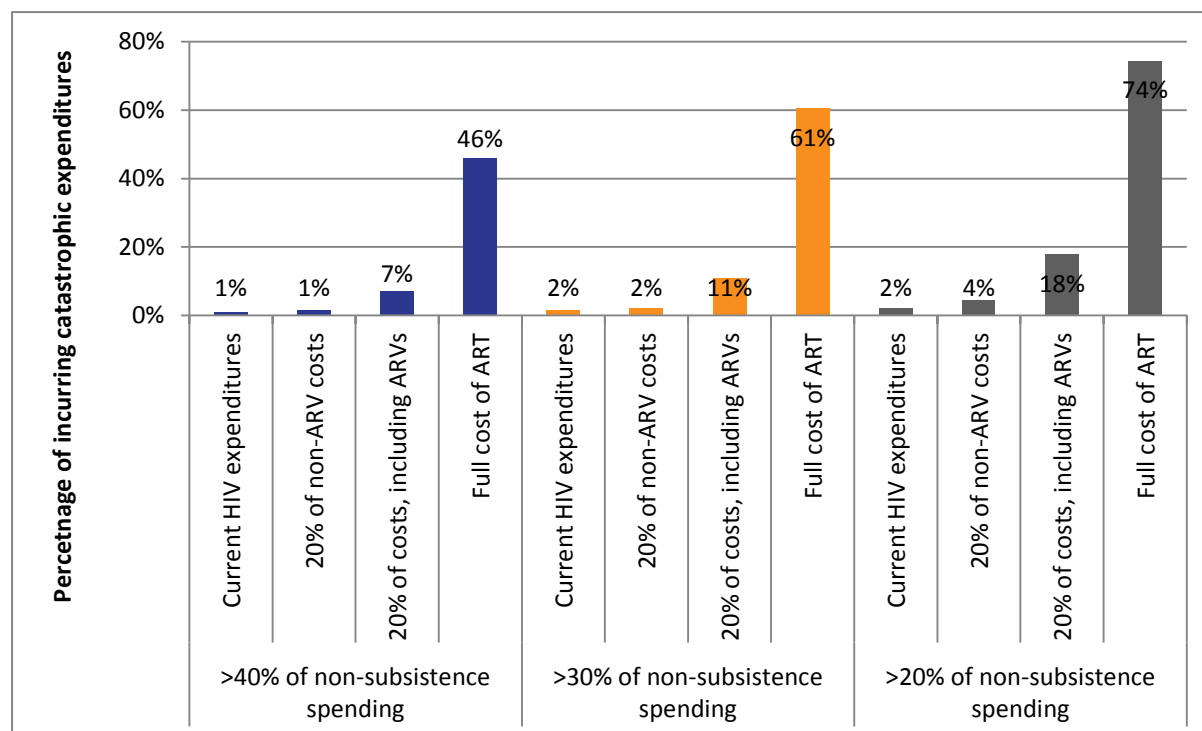
3.6 Health insurance ownership and use

The majority (53%) of respondents reported being enrolled in the national social health insurance (NSHI) scheme (95% CI: 46.4% to 59.3%), with about 57% of respondents (95% CI: 50.5% to 63.1%) reporting being enrolled in any kind of health insurance (Table 16). However, currently the NSHI is not able to contract with Provincial AIDS centers and single function district health centers. Thus, about 31% (95% CI: 20% to 42%) of respondents both attend a health facility that is able to enter a contract with the NHSI and are enrolled in the NHSI. This 31% is very close to previous VAAC estimates of 30% of ART patients (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project September 2014).

Among those with health insurance, 27% (95% CI: 16.0% to 38.4%) heard about health insurance from media outlets (including television, radio, and print media), 26% (95% CI: 19.5% to 31.8%) heard about health insurance from a health care provider, 20% (95% CI: 13.4% to 26.2%%) from friends or family, and 18% (95% CI: 11.5% to 24.6%) from their or their spouses employer (note that respondents could select more than one answer). Those with health insurance paid on average 453 thousand VND per year (95% CI: 291 to 616 thousand VND) for the health insurance premium.

Among respondents who reported that they did not have health insurance, 27% (95% CI: 20.2% to 32.7%) reported that they did not have health insurance for reasons related to affordability of the premium, while 20% (95% CI: 15.5% to 23.9%) reported that they did not need health insurance. This latter category included people who simply said health insurance was not necessary in general, and those who stated that they did not need health insurance in the last year because they did not

have a need to make any claims. Thirteen percent (95% CI: 10.0% to 16.7%) cited reasons related to difficulties involved in obtaining or keeping health insurance as why they did not have health insurance. These reasons included not knowing where to procure health insurance, difficulty with filing paperwork, or living in a province that is not their registered place of residence. A further 48% of respondents (95% CI: 40.4% to 56.2%) reported other reasons for not having health insurance. These responses included forgetting to enroll/renew and not being sure of the reason, with 3 respondents reported not having health insurance for reasons related to HIV/AIDS stigma.

Table 16: Health insurance ownership and expenditures

Variable	n	Mean / Percentage	95% CI
Have any type of health insurance	843	57%	50.5% to 63.1%
Have national social health insurance	843	53%	46.4% to 59.3%
Where they learned about insurance (if own insurance)*	420		
Family or friends		20%	13.4% to 26.2%
Employer / spouses employer		18%	11.5% to 24.6%
Health care provider		26%	19.5% to 31.8%
Media (TV, radio, print, etc.)		27%	16.0% to 38.4%
Other		16%	9.0% to 22.3%
Not sure		5%	0.7% to 8.4%
Amount spent on insurance in last year (if own insurance)	425		
VND '000s		453	291 to 616
Among those without health insurance, reasons for not obtaining health insurance*	602		
Do not need health insurance		20%	15.5% to 23.9%
Cannot afford health insurance		27%	20.2% to 32.7%
Health insurance is hard to get / complicated paperwork / etc.		13%	10.0% to 16.7%
Other		48%	40.4% to 56.2%

*Multiple responses allowed; answers may total more than 100%

Among those with health insurance, 33% (95% CI: 26.6% to 39.2%) reported using their health insurance in the last 12 months, and 14% (95% CI: 8.0% to 19.9%) reported using their health insurance for an HIV-related health service, which represents less than 8% of all respondents (Table 17). Among those using their health insurance for HIV-related health services, the majority reported using their health insurance for outpatient care, with 14% (95% CI: 3.0% to 25.6%) reporting using their health insurance for inpatient care.

Among respondents that had health insurance but did not use their health insurance for HIV-related care, 55% (95% CI: 43.2% to 65.8%) said they did not need to use their health insurance because HIV-related care is provided free of charge to them. A further 10% (95% CI: 5.7% to 15.0%) said that their health insurance does not pay for HIV-related care, and 33% (95% CI: 24.0% to 42.6%) were not sure why they had not used their health insurance for HIV-related care.

Among those with health insurance, 75% (95% CI: 68.1% to 81.0%) reported being 'satisfied' with their health insurance. Among the 41 respondents that reported not being satisfied with their health insurance, the most common reasons for not being satisfied included that the health insurance

processes were too complicated or burdensome (38%) and that using their health insurance would mean getting low quality care (34%).

Table 17: Health insurance use in the last 12 months

Variable	n	Percentage	95% CI
Have used health insurance for any health services	445	33%	26.6% to 39.2%
Have used health insurance for HIV-related health services	439	14%	8.0% to 19.9%
Services used (if used health insurance for HIV-related health services)*	55		
Consultation		64%	51.7% to 75.3%
Laboratory		54%	39.1% to 69.7%
Imaging / functional diagnosis		38%	16.0% to 59.3%
Drugs / medicines		81%	68.4% to 92.9%
Inpatient care		14%	3.0% to 25.6%
Unsure / no answer		11%	1.7% to 20.8%
Report being satisfied with health insurance	371	75%	68.1% to 81.0%
Among those not satisfied with health insurance, reason for dissatisfaction	41		
If I use health insurance, I get low quality care		34%	15.6% to 52.0%
Health insurance processes are too complicated / too much paperwork		38%	17.7% to 57.5%
People with my health insurance have to wait too long to receive care at the health facility		11%	2.0% to 20.9%
To get benefit, I have to reveal my name / other stigma related issue		7%	0% to 18.3%
Other		7%	0% to 14.6%
Unsure / no answer		3%	0% to 7.7%
Among those not using health insurance for HIV-related services, reason for not using	424		
HIV/AIDS treatment is free of charge		55%	43.2% to 65.8%
Health insurance does not reimburse me for these services / HIV/AIDS not covered by health insurance		10%	5.7% to 15.0%
Reimbursement processes is too complicated		2%	0% to 3.8%
Other		1%	0% to 1.8%
Unsure / no answer		33%	24.0% to 42.6%

*Multiple responses allowed; answers may total more than 100%

3.7 Perceptions of health insurance

Respondents were asked eight questions related to their concern with falling ill, the potential effects of illness on their financial situation, and their views of health insurance. For each question, respondents were asked to rate their opinions on a five point scale from "strongly agree" to "strongly disagree" (Figure 3). In general, agreement with the questions would indicate concern about falling ill, or a favorable opinion regarding health insurance, although for two questions, this

pattern was reversed, with disagreement indicating concern about falling in or a favorable opinion regarding health insurance (these two questions are colored with white dots in Figure 3).

With the exception of 3 questions, over 80% of respondents indicated concern with falling ill, the potential effects of illness on their financial situation, and favorable views of health insurance. The three exceptions are: (i) 66% of respondents strongly agreed or agreed that they knew where to get health insurance, (ii) 39% of respondents strongly agreed or agreed that they forgo health services because they do not have enough cash to pay for health care services, and (iii) 31% of respondents strongly agreed or agreed that there is no need to put aside money for health emergencies.

These answers may depend on whether a person currently has health insurance. For example, there may be less need to put aside money for health emergencies if you have health insurance. On the other hand, people that perceive the need and have acted to enroll in health insurance may be more concerned about health emergencies than people who do not have health insurance. When separating respondents with health insurance from those that do not have health insurance, the results for the three questions are mixed:

(i)   72% of respondents with health insurance strongly agreed or agreed that they knew where to get health insurance (possibly indicating that some of them are covered through their spouses' or other family members insurance), while 58% of respondents without health insurance strongly agreed or agreed.

(ii)   39% of respondents with health insurance and 40% of respondents without health insurance strongly agreed or agreed that they forgo health services because they do not have enough cash to pay for health care services.

(iii)   35% of respondents with health insurance and 26% of respondents without health insurance strongly agreed or agreed that there is no need to put aside money for health emergencies, which may indicate that health insurance does alleviate some of the perceived financial concern with falling ill.

Figure 3: Percentage of patients agreeing with questions related to need for and use of health insurance
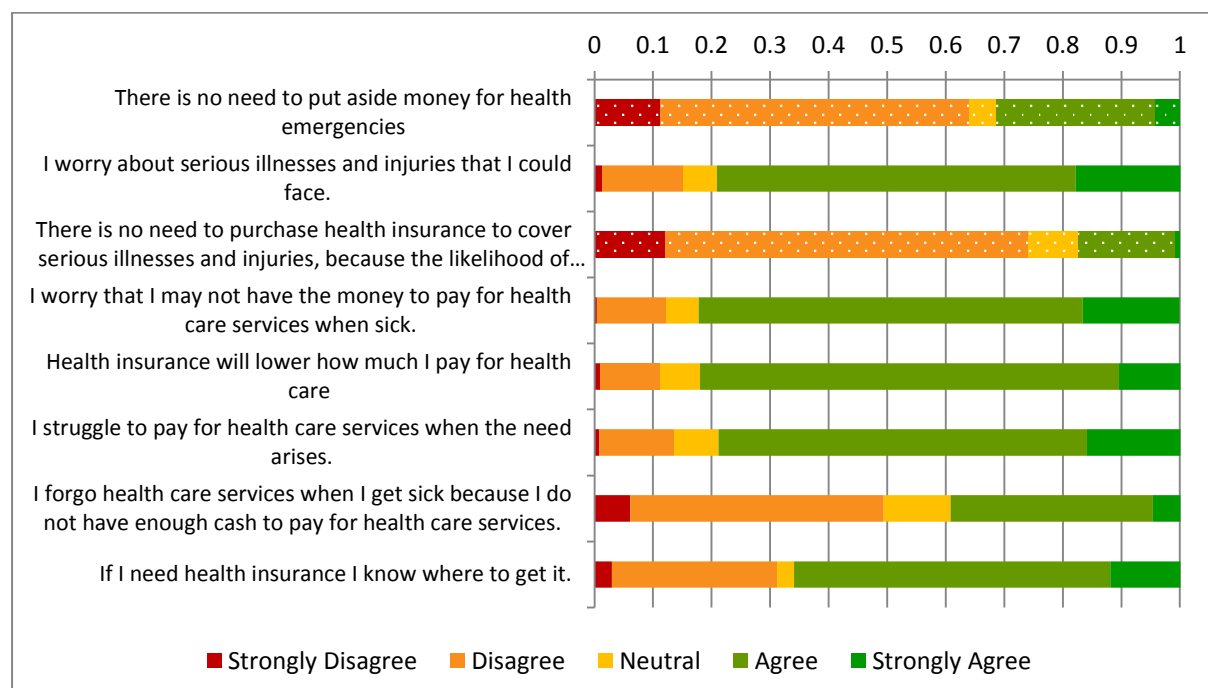
We ran principal components analysis on the responses. Principal components analysis is a technique to create an index out of related questions that all relate to an underlying but unmeasured or unobserved variable. It does this by assigning weights, or loading factors, to each of the questions based on how much of the variability one question 'explains' among the other questions, with questions that explain higher levels of variance receiving greater weights.

The principal components analysis suggests that there are two 'unobserved' variables being measured by these eight questions. Table 18 lists the questions with the highest loading factors for each of the two unobserved variables, with questions higher in the table getting higher weights than questions lower in the table. In general, questions with high weights for the first unobserved variable are related to concern over falling ill or paying for health care related to illness. The questions with high weights for the second unobserved variable relate more to the ability of or need for health insurance to alleviate the concerns with falling ill.

For the first unobserved variable related to concern over falling ill, people with health insurance scored 0.03 higher on the index than those without health insurance (p = 0.79). This indicates that those with and without health insurance are almost equally concerned with falling ill and the potential financial effects of falling ill. Note, however, that this is a cross sectional survey, so the relationship between insurance and this perception is not clear. For example, people with health insurance might have had more concern about falling ill and the potential financial effects of falling ill if they did not have health insurance. This higher concern may be what caused them to procure health insurance, and once they have health insurance, this concern is lowered. On the other hand, it may be that people do not link concern about falling ill and the potential financial effects of falling ill with health insurance.

For the second unobserved variable related to the ability of or need for health insurance to alleviate the concerns with falling ill, people with health insurance score 0.5 points higher on the index (p = 0.001), with higher scores indicating a more favorable view of health insurance. Again, it is not clear from this survey whether this means that people with health insurance have a favorable view of the ability of or need for health insurance to alleviate the concerns with falling ill because of their experience with health insurance or that the more favorable view causes them to procure health insurance. However, for indeterminate reasons, respondents without health insurance have a lower perception of the ability of health insurance to alleviate the concerns with falling ill than people with health insurance.

Table 18: Questions with the highest loading factors for health insurance perception

First unobserved variable	Second unobserved variable
I struggle to pay for health care services when the need arises	There is no need to purchase health insurance to cover serious illnesses and injuries, because the likelihood of them occurring is so low
I worry that I may not have the money to pay for health care services when sick	Health insurance will lower how much I pay for health care
I worry about serious illnesses and injuries that I could face	If I need health insurance I know where to get it
I forgo health care services when I get sick because I do not have enough cash to pay for health care services	There is no need to put aside money for health emergencies

In addition to general questions about health insurance, the survey also asked respondents to answer a series of "True/False" questions about the NSHI scheme (Figure 4). Answering "True" indicates a favorable view of the NSHI for all but one question (which is colored with white dots in Figure 4). Over 80% of respondents reported a favorable view of the NHSI on 6 out of the 9 questions. The three exceptions are:

(i)   36% of respondents said "false" to 'Having NSHI means that I will get lower quality care than if I pay for healthcare by another means', indicating that a majority of respondents associate the NSHI with lower quality care. The percentage of respondents answering "false" was 33% and 38% among those with and without health insurance, respectively.

(ii)   62% of respondents answered "true" to 'Having NSHI can reduce the likelihood of missing work because of a health emergency' (which may be related to the high percentage of respondents that do not have a job). 62% of both respondents with and without health insurance answered "true" to this question.

(iii)   71% answered "true" to 'NSHI will allow me to think more about the quality of care I will receive and less about the amount I will pay' (72% of insured and 70% of uninsured answered "true".)

The one questions where there was more than a 5 percentage point difference between those with insurance and those without insurance was for 'NSHI will protect you from incurring significant costs in times of health emergencies', where 92% of people with health insurance answered "true", compared with 83% of people without health insurance.

Figure 4: Percentage of patients agreeing with questions related to the national social health insurance scheme
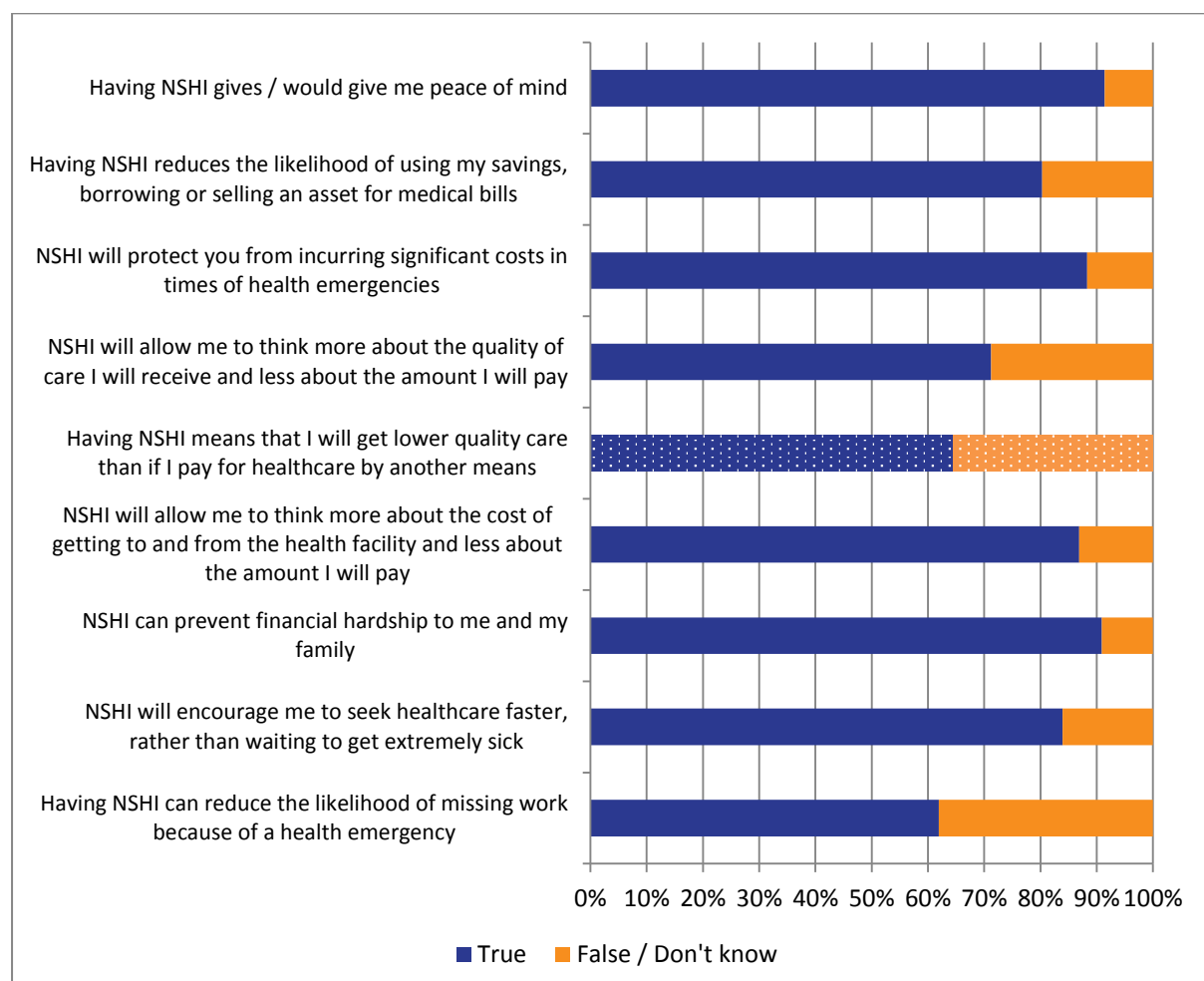
4. DISCUSSION

4.1 Summary and discussion of the main results

HIV positive people are poorer than the population of Vietnam on average, with incomes almost half of the average for people of employment age. Despite the relative poverty of people on ART, provision of HIV/AIDS treatment does not represent a large financial burden on the affected households. For example, studies from 2008/2009 (when ART was scaling up) indicated that families with people living with HIV/AIDS spent nearly 4 million VND on health care (not adjusting for inflation), while in 2015, ART clients spent just over 1 million VND on health care. Consequently, catastrophic expenditures for HIV/AIDS care were about 1%. If patient had to pay the full costs of ART themselves, it is estimated that 46% would incur catastrophic expenditures for the most basic package of care. The success of the ART program in providing free-to-patients care has likely prevented an already relatively poor population from sinking further into poverty.

While there are likely biases in the way the data was collected (discussed in more detail in the "Limitations" section below) that may lead to under-reporting of income compared with other methods, it is unlikely that this bias would account for the large difference in income found in this study. Further, reported annual expenditures among ART clients was 29,234 thousand VND, which is less than the reported income. Finally, we found that 61% of ART clients had employment of any kind (full-time, part-time, or self-employment), with 34% reporting that they were employed full-time, supporting the hypothesis that ART clients have lower economic productivity than the population in general.

Table 19: Comparison of ART clients with national average statistics

Variable	All respondents	Respondents with employment	National Average
Proportion with <u>income</u> below poverty line	37%	14%	5.8% (2014)
Proportion with <u>expenditures</u> below poverty line	22%	16%	N/A
Proportion with a poor card	14%	10%	5.8% (2014)
Proportion with card indicating near-poor	4%	3%	7% (2012)
Unemployment (out of work among all)	1.6% (19% not working, not seeking work)	N/A	1.9% (2014)

N/A = Data are not available

Comparing other measures of socio-economic status among ART clients to the national average also support the main findings of these analyses (Table 19). The proportion of respondents with reported income below the poverty line was 37%, compared with 5.8% nationally. Among ART clients who had any type of employment, the poverty rate was 14%. When assessing expenditures compared to the income poverty line, 22% of respondents would be considered poor, and 16% of those with employment would be poor. Nationally, about 5.8% of people possess a poor card; among ART

clients this was 14% (and 10% among employed ART clients). It is likely that this measure has less bias than recalling the details of income or expenditures, and again indicates a high level of poverty among ART clients.

While this high level of poverty and low level of income might indicate that ART clients would be susceptible to catastrophic payments for health, we find that about 5% of ART clients incurred catastrophic health payments (including costs for transportation to the health facility), and 2% of ART clients incurred catastrophic payments for HIV-related health care. The reasons for this decline in health related expenditures and catastrophic payment cannot be ascertained with certainty from this survey, but we consider two hypotheses:

1.   The inpatient admission rate has declined since 2012. One report found an inpatient admission rate of over 1 per ART client per year (Duong, Kato et al. 2014), whereas we find and inpatient admittance rate of 0.17 per ART client per year. While decreasing inpatient admissions likely account for lower health expenditures, the reasons for lower inpatient admissions are not clear from this survey. Changing treatment guidelines to start ART at a higher CD4 count and changing first line drug regimens may have helped lower the incidence rate of opportunistic infections. A more mature ART program may also have a different mix of ART clients. All these reasons may affect outpatient care as well.

2.   The increase coverage of health insurance among ART clients. While this should not affect primary ART care, since these services have been and continued to be offered free of charge to patients at the time of the survey, insurance coverage may affect payments for treatment of opportunistic infections, especially on an inpatient basis.

In terms of health insurance, we find that the majority of ART clients (53%) are enrolled in NSHI. However, about 22% of ART clients receive ART care at facilities that currently cannot enter contracts with the NSHI. Currently, the GoV is considering financing ART through the NSHI scheme. The numbers indicate, without any changes, currently only about 31% of ART clients would immediately be eligible for NSHI reimbursement for ART treatment. Addressing this shortfall should be a priority as the NSHI takes over responsibility for financing ART treatment. This may take the form of ensuring that all facilities offering ART treatment can contract with the NSHI, or shifting the primary point of care for some ART clients. However, even with these changes, a substantial proportion of ART clients do not have health insurance; increasing health insurance enrollment among ART clients is also a priority activity.

We found that most ART clients were concerned about falling ill and that falling ill may cause financial hardship. However, there was some difference between those with health insurance and those without health insurance in terms of their perception of health insurance to alleviate these issues, with people without health insurance having a more pessimistic view of health insurance. The reasons for these views and how to change these views need further research. However, we found a very low percentage of ART clients use health insurance for HIV-related reasons, with a majority of respondents indicating that they did not use health insurance for HIV-related issues because HIV-related treatment is provided free of charge to them. Thus, if patients had to start paying for HIV-related care, more would use their health insurance for this treatment. Further, those without health insurance would likely see a greater need for health insurance.

The results indicate that ART clients learned about health insurance from multiple channels, with no one channel being the dominant form of learning about health insurance. While this suggests that multiple methods of informing ART clients may be necessary, the results are not conclusive about the best methods of informing ART clients about health insurance in the future. Among people without health insurance, many (48%) could not cite the reason why they did not have health insurance; this population may represent 'low hanging fruit' in terms of increasing insurance enrollment in the future. However, 27% of respondents without health insurance indicated financial concerns about enrolling in health insurance, and means of addressing these concerns need to be addressed. Finally, 20% of respondents without health insurance did not think that they needed

health insurance and 13% of respondents without health insurance thought that enrolling in health insurance was difficult. These figures demonstrate that there remain both conceptual and logistical challenges to increasing health insurance enrollment among ART clients.

4.2 Limitations

This survey was a cross-sectional survey which was administered in health facilities. Not administering the survey at home and/or with all working adults in a household may bias the results, especially in comparison to studies that did survey respondents are their houses. Previous research has shown that estimates of expenditures are subject to error (Lu, Chin et al. 2009). In general, we shortened the LSMS questionnaire to include fewer questions in order to accommodate respondents' willingness to be interviewed at the health facility. Asking fewer questions is generally associated with lower levels of total expenditures than asking more detailed questions (Lu, Chin, et al. 2009). While we cannot know the direction or the degree of bias incurred due to these factors, we suspect that our results may under-estimate expenditures and income, especially if compared to the results from other surveys like the LSMS which have more detailed questions and occur in the household.

While this is cause for caution when interpreting the results presented here, it seems that it would have little impact on the main conclusions related to expenditures. As noted above, the level of income and expenditures in this survey are relatively consistent, and markedly lower than the national average. Further data which are less subject to bias, such as possession of poor cards and job status, suggest that ART clients have high rates of poverty and joblessness. These finding support the main finding of low economic status of ART clients.

Cross-sectional surveys should be interpreted as descriptive of a situation at a point in time, and should not be used for causal inferences. For example, this survey cannot convincingly demonstrate the difference in perception of health insurance between those with and without health insurance because the enrolling in health insurance may alter people's perception of health insurance.

4.3 Conclusions

This study shows that ART clients have lower economic status than the average for the entire population of Vietnam. This lower economic status should be considered in the future when designing policies to finance ART care. For example, results from a survey among HIV positive MMT clients suggest that health insurance enrollment in that population is lower than it is among ART clients in general (see Appendix D). Currently, catastrophic payments for health care appear quite modest, and are incurred at very low rates for HIV-related health care, among ART clients. These low payment rates likely enable ART clients stay on treatment, and increasing the financial burden of ART treatment may adversely affect adherence and retention rates among ART clients. Our scenario analyses suggest that a 20% copayment rate for ART care, including antiretroviral drugs, may be associated with about a 6% increase in catastrophic payments among ART clients compared to the current situation. This suggests that when the NSHI assumes financial responsibility for ART treatment, ensuring that all ART clients eligible for free or subsidized enrollment are able to claim their status is important. Further, very few patients appear to be able to readily afford the full cost of ART treatment. Thus, ensuring full enrollment in health insurance, and careful consideration of how to finance antiretroviral drugs also need to be considered carefully.

ANNEX A: DETAILED DESCRIPTION OF THE CALCULATIONS OF SURVEY WEIGHTS

To reflect the probability of each respondent being included in the survey, we use the following notation:

P_{1rp}: The first stage probability of province p being selected in region r (for one province r = the entire nation).

P_{2rpf}: The second stage probability of facility f being selected in each province p.

P_{3rpfi}: The third stage probability of individual i being selected at facility f in each province p.

The probability of province p being selected is defined as:

$$P_{1rp} = \frac{M_p}{\sum M_{rp}}$$

Where M_p is the number of adult ART clients in a province and $\sum M_{rp}$ is the total number of adult ART clients in region r.

The formula for the second stage of sampling is defined as:

$$P_{2rpf} = \frac{\sum M_{pfs}}{\sum M_p} \; x \; \frac{M_{fs}}{\sum M_{pfs}}$$

Where $\sum M_p$ is the number of adult ART patients in province p, $\sum M_{pfs}$ is the sum of all ART clients in the province in strata s (where s represents central hospital, provincial hospital, district hospital, provincial AIDS center, district health center with functions only for prevention, or district health center with functions for prevention and treatment), and M_{fs} is the number of ART clients at a facility of strata s, with at least one facility from each strata s included in the sample if there are any facilities of strata s present in province p. In cases where there is only one facility of a particular stratum in a province, then M_{fs} is equal to $\sum M_{pfs}$.

The formula for the third stage of sampling is defined as:

$$P_{3rpfi} = \frac{G_{pfsi}}{M_{fs}}$$

Where G_{pfsi} is the number of clients interviewed at a facility, and M_{fs} is the total number of ART clients at a particular facility.

The final probability of selection is therefore defined as:

$P_{rpfi} = P_{1rp} \times P_{2rpf} \times P_{3rpfi}$

The sampling weight for an individual i in facility f in province p and region r is then defined as:

$W_{rpfi} = 1 / P_{rpfi}$

These weights are used for all results presented in this report.

Annex A Table 1 lists the provinces that were not included in the sample frame because as of August 2014 they did not have any health facilities offering MMT services. The results of this survey are not representative of these provinces, which represent 12.9% of adult ART clients.

Appendix A Table 1: Provinces not included in the sample frame

Province	Region	Number of adult ART clients in August 2014
Bac Lieu	Mekong River Delta	527
Bac Ninh	Red River Delta	358
Binh Duong	South East	1121
Binh Dinh	Central coastal area & central highlands	285
Binh Phuoc	South East	366
Ca Mau	Mekong River Delta	532
Dac Lac	Central coastal area & central highlands	359
Dac Nong	Central coastal area & central highlands	100
Dong Thap	Mekong River Delta	801
Gia Lai	Central coastal area & central highlands	162
Hau Giang	Mekong River Delta	262
Kien Giang	Mekong River Delta	992
Kon Tum	Central coastal area & central highlands	56
Lam Dong	Central coastal area & central highlands	260
Ninh Thuan	Central coastal area & central highlands	77
Phu Yen	Central coastal area & central highlands	58
Quang Nam	Central coastal area & central highlands	180
Quang Ngai	Central coastal area & central highlands	137
Soc Trang	Mekong River Delta	640
Tay Ninh	South East	1041
Tien Giang	Mekong River Delta	801
Thua Thien Hue	North Central area	208
Tra Vinh	Mekong River Delta	266
Vinh Long	Mekong River Delta	749
Vinh Phuc	Red River Delta	453
Subtotal		10,791
(% of all ART clients in Vietnam)		(12.9%)

ANNEX B: DESIGN EFFECTS FOR SELECTED VARIABLES

Variable	Estimate	SE	N	DEFF	SE / Estimate
Job Status (proportion)					
Full time employment	0.34	0.031	843	3.702	0.09
Part time employment	0.15	0.015	843	1.510	0.10
Self-employed	0.12	0.016	843	1.943	0.13
Not working (seeking or not)	0.21	0.021	843	2.189	0.10
Homemaker, retired, student, other	0.18	0.020	843	2.250	0.11
Annual income (VND thousands)					
Average individual income (all respondents)	27,972	1,712	843	1.702	0.06
Average individual income (including respondents' share of household income)	33,105	1,823	842	1.796	0.06
Annual expenditures (VND thousands)					
Average individual expenditures	15,230	1,010	843	1.812	0.07
Average individual expenditures, including respondents' individual share of household expenditures	29,234	1,753	843	2.344	0.06
Inpatient admissions					
Number of inpatient admissions per person per year	0.16	0.0167	843	1.132	0.11
Insurance status and ownership					
Member of minority, have poor card, military/police, war service, or other class exempt from copayments under NSHI scheme	0.32	0.035	843	4.792	0.11
Enrolled in national social health insurance scheme at the time of the survey	0.53	0.032	840	3.420	0.06

Variables represent the measures used for the primary and secondary objectives of the survey. Estimates present the mean values across all respondents. The SE reports the Taylor-linearized standard errors. N is the number of respondents, and the DEFF is the design effect.

ANNEX C: MISSING DATA AND FRACTION OF MISSING INFORMATION

Appendix C Table 1: Missing data for income

Variable	Number of answers completed	Number of answers not completed
Payment for work	840	3
Benefits		
Allowances	841	2
Severance pay	843	0
Unemployment benefits	843	0
Standard pension	843	0
Premature pension	843	0
Allowances for loss of working capacity	843	0
Other benefits/allowances	843	0
Rent		
Rent of house or land	838	5
Rent for equipment, other	841	2
Agricultural activities		
Staple crops	840	3
Vegetables	842	1
Industrial crops	842	1
Fruit	843	0
Agricultural byproducts	843	0
Livestock / animals	838	5
Aquaculture	841	2
Forestry	840	3
Expenditures for crops	843	0
Expenditures for livestock / animals	831	12
Expenditures for aquaculture	841	2
Expenditures for forestry	840	3
Business activities		
Income from business	840	3
Value of products from business for own use	840	3
Value of business byproducts	842	1
Expenditures for business	836	7
Other sources of income		
Gifts / remittances	839	4
Weddings	839	4
Funerals	835	8
Social benefits	837	6
Assistance for disasters / fires	841	2
Insurance	837	6
Interest	838	5
Other monthly income	842	1
Donations	843	0
Other yearly income	829	14
Percentage of missing responses:		**0.4%**

Appendix C Table 2: Missing data for current expenditures

Variable	Number of answers completed	Number of answers not completed
Health expenditures		
Condoms	813	30
Outpatient care	839	4
Inpatient care	842	1
Health insurance	818	25
Food		
Regular food expenditures	733	110
Food for special occasions	667	176
Housing		
Rent or mortgage payments	842	1
Maintenance	766	77
Utilities		
Electricity	804	39
Water	804	39
Cooking fuel	792	51
Telecommunications	826	17
Transportation	798	45
Education	801	42
Other expenditures		
Remittances	838	5
Personal items, toiletries, etc.	814	29
Entertainment	822	21
Cigarettes and alcohol	833	10
Other monthly expenditures	832	11
Travel	793	50
Clothing	729	114
Weddings	711	132
Gifts	761	82
Other major purchases	830	13
Other yearly expenditures	761	82
Percentage of missing responses:		**5.7%**

Appendix C Table 3: Fraction of missing information for selected variables

Variable	FMI*	Mean value using only observed data	Mean value including imputed data
Full time employment	No missing data	No missing data	No missing data
Average individual income (all respondents)	0.004	27,920	27,972
Average individual income (including respondents' share of household income)	0.005	32,327	33,105
Average individual expenditures	0.004	15,407	15,230
Average individual expenditures, including respondents' individual share of household expenditures	0.005	28,953	29,234

*The fraction of missing information (FMI) is the proportion of all variance (or all uncertainty) that is due to the missing data. For example, if the FMI is 0.03, it indicates that 3% of total variance is due to missing data. The FMI is a more accurate indicator of the impact of missing data than the percentage of individual observations that are missing because it accounts for the degree to which missing data can be predicted based on available data. Thus, while 5.7% of data points are missing for expenditures, the FMI is 0.5%. The reason the FMI is lower is because it is well predicted by other variables in the dataset.

ANNEX D: RESULTS FOR HIV POSITIVE MMT CLIENTS

This section reports results from a separate survey among MMT clients (Vietnam Authority of HIV/AIDS Control and Health Financing and Governance Project October 2015). In that survey, MMT clients that reported that they were HIV positive were asked additional questions about their past outpatient and inpatient care, as well as their health insurance status and perception. The results for this subset of MMT clients are presented in this annex, for comparison with ART clients in general.

Outpatient care

Appendix D Table 1: Summary statistics for outpatient visits in the past 30 days

Variable	n	Proportion / Mean	95% Confidence Interval
Made a visit to health facility for non-MMT reason in last 30 days	235	55%	46.7% to 63.7%
Average number of visits in last 30 days (if any visit)	126	1.06	1.01 to 1.12
Location of services (prior to day of interview)*	126		
Commune Health Station		1%	0% to 1.7%
Urban/rural district hospitals		53%	41.3% to 64.1%
Provincial/city hospitals		29%	19.1% to 39.6%
Central hospitals		0%	0% to 0.1%
Private hospitals		4%	0% to 7.7%
Private clinic		1%	0% to 1.4%
Home visit by doctor/health practitioner		0%	N/A
OPC/ARV		5%	0% to 10.3%
Other			
*Multiple responses allowed; answers may total more than 100%			
Average amount paid per visit, among those with previous visit	126		
VND '000s		112	0 to 241
Average amount paid for HIV services, among those with previous visit	126		
VND '000s		29	0 to 70
Estimated annual expenditures for non-MMT outpatient care (all respondents)	232		
VND '000s		1,450	0 to 3,072
Estimated annual expenditures for HIV-related outpatient care (all respondents)	235		
VND '000s		220	0 to 500

Inpatient care

Variable	n	Proportion / Mean	95% Confidence Interval
Percentage of patients with any inpatient admittance in last year	235	16%	9.5% to 22.7%
Percentage of patients with any HIV-related inpatient admittance in last year	235	7%	3.2% to 11.3%
Number of admissions among patients with any admission	38	1.09	0.86 to 1.33
Average length of stay among those admitted	35	14.6	7.4 to 21.9
Number of HIV-related admissions among patients with any HIV-related admissions	22	1.00	N/A
Average length of stay among those admitted for HIV-related reason	22	17.7	5.2 to 30.2
Average amount paid for inpatient care, among those with admission	38		
VND '000s		1,758	781 to 2,735
Average amount paid per HIV-related inpatient care, among those with HIV-related admission	22		
VND '000s		2,676	849 to 4,503
Average amount paid for inpatient care per year, among all patients	235		
VND '000s		272	99 to 446
Average amount paid for HIV-related inpatient care per year, among all patients	235		
VND '000s		192	38 to 345

Health insurance ownership and use

Variable	n	Mean / Percentage	95% CI
Have any type of health insurance	235	43%	34.5% to 51.2%
Have national social health insurance	235	38%	29.5% to 45.6%
Where they learned about insurance (if own insurance)*	107		
Family or friends		40%	27.4% to 51.7%
Employer / spouses employer		8%	0% to 16.3%
Health care provider		18%	10.9% to 25.6%
Media (TV, radio, print, etc.)		28%	16.3% to 39.7%
Other		13%	5.3% to 20%
Not sure		0%	0% to 1%
Amount spent on insurance in last year (if own insurance)	110		
VND '000s		277	204 to 351
Among those without health insurance, reasons for not obtaining health insurance*	191		
Do not need health insurance		19%	11.7% to 25.6%
Cannot afford health insurance		27%	19.4% to 35.5%
Health insurance is hard to get / complicated paperwork / etc.		19%	11.3% to 26.6%
Other		43%	33.5% to 52.0%

*Multiple responses allowed; answers may total more than 100%

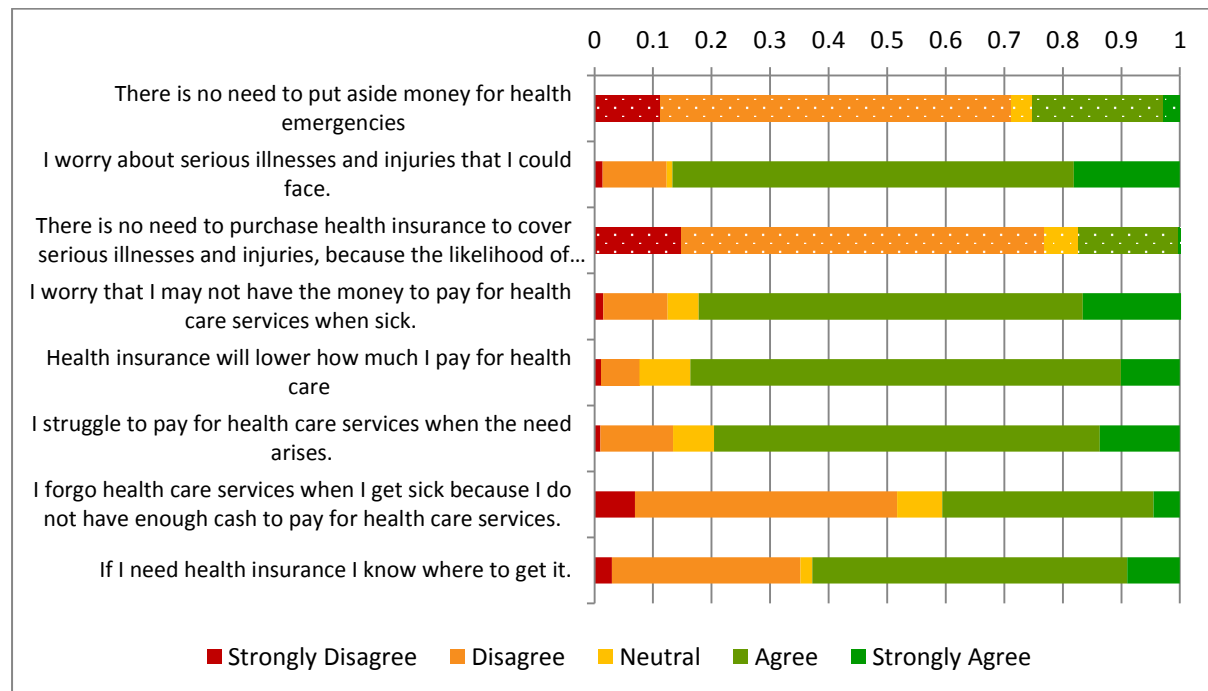## Appendix D Table 4: Health insurance use in the last 12 months

Variable	n	Percentage	95% CI
Have used health insurance for any health services	105	38%	25.7% to 49.6%
Have used health insurance for HIV-related health services	103	21%	12.2% to 30.6%
Services used (if used health insurance for HIV-related health services)*	22		
Consultation		63%	63.2% to 63.2%
Laboratory		45%	45.2% to 45.2%
Imaging / functional diagnosis		13%	13.4% to 13.4%
Drugs / medicines		70%	70.4% to 70.4%
Inpatient care		27%	27.2% to 27.2%
Unsure / no answer		20%	19.5% to 19.5%
Report being satisfied with health insurance			
	116	82%	73.5% to 89.5%
Among those not satisfied with health insurance, reason for dissatisfaction	5		
If I use health insurance, I get low quality care		11%	0% to 31.8%
Health insurance processes are too complicated / too much paperwork		20%	0% to 56.3%
People with my health insurance have to wait too long to receive care at the health facility		0%	N/A
To get benefit, I have to reveal my name / other stigma related issue		0%	N/A
Other		69%	29% to 108.3%
Unsure / no answer		0%	N/A
Among those not using health insurance for HIV-related services, reason for not using	107		
HIV/AIDS treatment is free of charge		44%	N/A
Health insurance does not reimburse me for these services / HIV/AIDS not covered by health insurance		18%	N/A
Reimbursement processes is too complicated		0.6%	N/A
Other		39%	N/A
Unsure / no answer		0%	N/A

*Multiple responses allowed; answers may total more than 100%

Perceptions of health insurance

Appendix D Figure 1: Percentage of patients agreeing with questions related to need for and use of health insurance

Legend: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

Categories (top to bottom):
- There is no need to put aside money for health emergencies
- I worry about serious illnesses and injuries that I could face.
- There is no need to purchase health insurance to cover serious illnesses and injuries, because the likelihood of…
- I worry that I may not have the money to pay for health care services when sick.
- Health insurance will lower how much I pay for health care
- I struggle to pay for health care services when the need arises.
- I forgo health care services when I get sick because I do not have enough cash to pay for health care services.
- If I need health insurance I know where to get it.

Appendix D Figure 2: Percentage of patients agreeing with questions related to the national social health insurance scheme

	True	False / Don't know
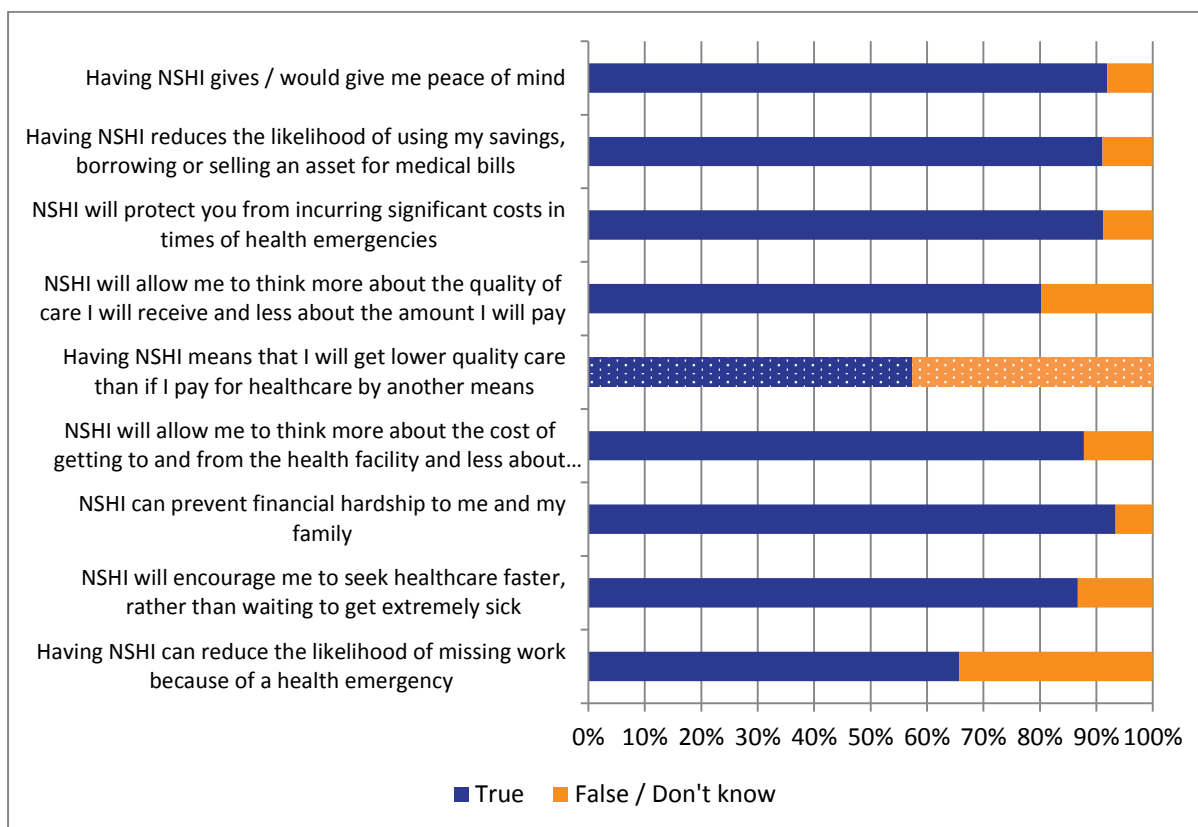
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