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The private demand for an AIDS vaccine in Thailand

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Abstract

A contingent valuation survey of Thai adults revealed that private demand for a hypothetical AIDS vaccine that is safe, has no side effects, and lasts 10 years, rises with income, the lifetime risk of HIV infection and vaccine efficacy, and declines with vaccine price and respondent's age. Demand for both high (95%) and low (50%) efficacy AIDS vaccines is substantial. Nearly 80% of adults would agree to be vaccinated with a free vaccine. Government will have an important role to ensure that those at highest risk of HIV infection with low incomes have access to the vaccine and to reinforce other safe preventive behavior to prevent reductions in condom use.

Keywords: AIDS; AIDS vaccine; Demand; Prevention; Willingness to pay; Risk behavior

1. Introduction

As of the end of 2003, about 40 million people worldwide were estimated to be living with AIDS, almost all of them prime-aged adults and 95% of them living in developing countries [1]. Roughly 3 million people died from AIDS in 2003. Prevention programs have been launched in virtually every country—to provide information, raise condom use, reduce numbers of sexual partners, promote safe sex and injecting practices, and to reduce mother-to-child transmission. Nevertheless, more than 15,000 people become newly infected with HIV every day. Despite the best efforts of scientists, there is still no cure for AIDS. The advent of highly active antiretroviral therapy (HAART) has reduced the mortality rate among patients in high-income countries, although it remains costly, suffers from significant implementation problems (side effects, difficult compliance, and viral resistance) and cannot eradicate the virus from the body. A safe, effective and affordable AIDS vaccine would be a valuable addition to the existing arsenal of prevention strategies.

Thailand has one of the most severe AIDS epidemics in Asia and would benefit significantly from a preventive AIDS vaccine. The engine of the Thai epidemic has been heterosexual spread, primarily through commercial sex workers (CSW), their clients, and subsequently the clients' partners and children. In the

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early 1990s, Thailand launched a national program to prevent AIDS, with widespread public information and a campaign to raise condom use especially in commercial sex workers to 100% [2,3], which has had a major impact on the spread of HIV. Nevertheless, nearly a million of Thailand's population of over 60 million have been infected with HIV since the beginning of the epidemic and an estimated 695,000 are living with AIDS [4]. An estimated 29,000 Thais become newly infected with HIV annually primarily through heterosexual, intravenous drug use, and vertical (mother-to-child) transmission. In the short run, reducing the number of new infections further depends critically on strengthening and extending the outreach of prevention programs to groups like intravenous drug users (IDU) and categories of sex workers with low condom use [5]. In the longer run, a preventive AIDS vaccine is key to further reducing the number of new infections [6].

This paper estimates the private demand of Thai adults for a hypothetical preventive AIDS vaccine. There were two primary motives for conducting this research. First, limited knowledge of the potential market is thought to be a barrier to private investment for AIDS vaccine research and development (R&D), particularly for a vaccine targeting the clades of the virus most common in developing countries [7]. The population in greatest need of an AIDS vaccine lives in developing countries, where the epidemic is most severe but the ability to pay is low.

Second, the efficiency and effectiveness of government AIDS vaccination campaigns will depend critically on private individuals' perceptions of the vaccine, their willingness to be vaccinated, and their ability and willingness to purchase vaccines. Understanding individuals' preferences is important information for both: (1) the design of future vaccination strategies; and (2) the study of volunteer preparedness in AIDS vaccine trials. Thailand will face this issue earlier, as it has and continues to play a key role in large-scale efficacy trials.[1] Tangcharoensathien et al. [8] presented estimates of the potential government demand for a preventive AIDS vaccine in Thailand. The study assumed that for a vaccine that is 100% efficacious and that conveys lifelong protection, the government would target vaccination campaigns to the highest risk individuals because of the substantial positive externalities and impact on the overall epidemic. The authors estimated that the government would need to purchase 532,000 doses initially and would require 15,000 doses annually to maintain vaccination levels for eight target population groups.[2] While a useful start in terms of conceptualizing the government response, this and other estimates of potential public sector demand based on public health "need" [9,10] assume that individuals offered a vaccine will agree to be vaccinated. Yet, AIDS is a highly stigmatized disease in most countries, so it is unlikely that everyone would agree to be vaccinated, affecting the coverage and effectiveness of a vaccination program.

The private demand for an AIDS vaccine has important implications for improving the efficiency and effectiveness of public programs. For individuals at high risk of infection, the private benefits from an AIDS vaccine are large—reduced risk of a disease that is 100% fatal and, up to now, incurable. Their proclivity to independently seek out and purchase an AIDS vaccine when it becomes available could reduce the burden of the government in the difficult and costly task of identifying high-risk groups for vaccination and allow programs to focus on ensuring access to those who cannot pay or on providing other cost-effective interventions. Of equal concern to government is the effect of the availability of an AIDS vaccine on risk behavior in the population. Failure to adhere to safe behavior once vaccinated with a less than completely

[1] Between 2000 and 2003, VaxGen, a US company, and the government of Thailand conducted an efficacy trial of a clade B/E gp120 vaccine (AIDSVAX) administered in seven doses among 2500 IDU in Bangkok and found that there was no statistically significant difference in HIV incidence between case and control groups. In 2003, the largest efficacy trial of prime boost combinations of canary pox HIV/E + gp120/E (ALVAC + AIDSVAX) was launched under the Department of Communicable Disease Control of the Ministry of Public Health, the Tropical Medicine Department of Mahidol University, and US Armed Forces Research Institute of Medical Sciences (AFRIMS). The trial will recruit 16,000 HIV-negative volunteers, both male and female, between 20 and 30 years of age.

[2] Target population groups were direct (brothel-based) CSW, indirect (non-brothel-based) CSW, IDU in and out of treatment, male sexually transmitted disease (STD) patients, transport workers, military conscripts and prisoners. If the unit cost of the vaccine were US $15, this would imply an initial public investment of US$17.5 million, excluding the costs of delivering the vaccine.

effective vaccine could eliminate or reverse the potential benefits from a public vaccination program [6].

To date, only two studies have attempted to measure the private demand for an AIDS vaccine in developing countries. The first of these, in the city of Guadalajara, Mexico, used a payment card approach[3] to elicit individuals' willingness to pay (WTP) for an AIDS vaccine that provided 100% efficacy with lifetime protection [11]. Guadalajara is one of the urban centers in Mexico hardest hit by AIDS, with perhaps as many as 7500 AIDS cases between 1984 and 1999 [11]. Median WTP for a vaccine among 234 uninfected adults age 18–60 recruited from plazas, shopping malls, and other public places in the four main districts in Guadalajara was 3000 pesos (US$ 316) [11] and about 80% of respondents were willing to pay a non-zero price (D. Whittington, personal communication). These results, though not representative of the population, suggest that there may be a substantial private market for an AIDS vaccine in middle income developing countries such as Mexico (per capita GNP of US$ 3840), even with a much less severe AIDS epidemic than Thailand (0.3% of adults infected in Mexico, compared to 1.8% in Thailand). The second study, of 890 respondents aged 18–55 in Nairobi and rural Thika, Kenya, used a different payment card approach[4] to ask the respondent the most was that he/she would be willing to pay for a vaccine for him/herself [12]. HIV infection levels in these study areas were high—34% of pregnant women in Thika and 16% in Nairobi were HIV positive. Sixty-eight and sixty-four percent of respondents were willing to be vaccinated with 100 and 50% effectiveness vaccine, respectively. Of the people who would agree to be vaccinated, 21% of respondents were unwilling to pay at any price while more than a fifth were willing to pay more than US$ 7 per vaccine. Private demand did not respond to vaccine efficacy.

In this study, the private demand for a hypothetical preventive AIDS vaccine in Thailand is estimated based on the results of a population-based survey of 2524 Thai adults aged 18–60. The hypothetical AIDS vaccine was described to survey respondents as safe, with no side effects, conveying 10 years of protection from HIV infection, and with an efficacy of either 50 or 95%. The vaccine would convey no benefit to people already infected with HIV.[5] The next section describes the survey and methodology used. This is followed by a presentation of the descriptive and multivariate results on: (a) the demand for a vaccine of different levels of efficacy and at different prices; (b) the willingness to be vaccinated with a free vaccine; and (c) the likely impact of vaccination on condom use. The study concludes by discussing the significance of these results for Thailand and developing countries more generally, in terms of the private market for an AIDS vaccine and public sector vaccination strategies.

2. Methods

2.1. Sample and data sources

The household sample for this study was selected from among households previously interviewed by the 2000 Socioeconomic Survey (SES) of Thailand, conducted by the National Statistical Office (NSO) from February 2000 to January 2001 in some 30,000 households in all 76 provinces of the Kingdom. The SES collects detailed household income and expenditure, plus a few summary variables on members of the household and the household head. The SES sampling frame covers private, non-institutional households residing

[3] The authors showed respondents a list of prices for a hypothetical AIDS vaccine, ranging from very low prices (US$ 0) to very high prices (US$ 8898 or 100,000 pesos), and asked them two questions: (1) the highest price on the list that they were absolutely certain that they *would* pay for the AIDS vaccine (a lower bound); and (2) the lowest price that they were absolutely sure they would *not* pay for the vaccine (an upper bound).

[4] The respondents were asked to select 1 of 36 cards (with different prices ranging from US$ 0 to US$ 360 (Ksh 25,000)) that indicated the highest vaccine price they would be willing to pay for. The interviewer then picked up the card with the next higher value and asked the respondent whether he/she would be willing to pay this higher amount. If the answer is no, the bidding process stopped. If respondents were willing to pay, the interviewer chose card with the next higher price and asked for respondent's willingness to pay again. If the person said yes, the highest price was recorded as his/her WTP. If the answer is no, the next lower price was the WTP.

[5] Vaccines are also under development that would reduce the infectiousness and the rate of disease progression in vaccinated HIV-infected individuals. However, this study assesses demand for a vaccine that would prevent primary HIV infection among HIV-negative adults.

Table 1
Distribution of sample provinces by HIV prevalence and estimated number of households and individuals

Region	Province	1999 HIV prevalence among women at antenatal clinics (%)	Number of households		Individuals	
			Selected[a]	Interviewed (response rate)[b]	Selected	Interviewed (response rate)
Low HIV prevalence (<1%)						
Central	Nakhon Sawan	0.57	85	80 (94.1%)	189	161 (85.2%)
Northeast	Kalasin	0.37	109	99 (90.8%)	251	213 (84.9%)
Middle HIV prevalence (1–2.99%)						
North	Chiang Mai	2.12	160	149 (93.1%)	334	297 (88.9%)
Northeast	Khon Kaen	1.28	157	138 (87.9%)	342	286 (83.6%)
South	Nakhon Si Thammarat	1.99	133	131 (98.5%)	299	282 (94.3%)
Bangkok	Bangkok	2.3	541	411 (76.0%)	1322	811 (61.3%)
High HIV prevalence (≥3%)						
South	Phangnga	5.79	69	66 (95.7%)	152	143 (94.1%)
North	Phayao	4.55	90	89 (98.9%)	179	173 (96.6%)
Central	Ang Thong	4.11	79	72 (91.1%)	179	158 (88.3%)
Total			1423	1235 (86.8%)	3247	2524 (77.7%)
Total (w/o Bangkok)			882	824 (93.4%)	1925	1713 (89.0%)

[a] The number of households interviewed by the SES teams and that had household members 18–60.
[b] The number of households in which at least one household member 18–60 was interviewed.

permanently in municipal areas and non-municipal areas (sanitary districts and villages).[6]

The current study attempted to interview all adults aged 18–60[7] in 1423 households interviewed by the SES in eight provinces and Bangkok during the months of July–October 2000. The provinces were selected to assure geographic variation and variation in HIV infection rates: two adjacent provinces with different HIV infection levels were selected in each of four geographic regions. The ninth area selected was Bangkok, the capital and major metropolitan area in Thailand. The selected provinces, their characteristics, and the size of the intended and actual samples are in Table 1. The total population of the selected provinces represents roughly one-sixth of the population of Thailand.[8] HIV prevalence among pregnant women in these provinces in 1999 ranged from less than 1% to more than 5% [14]. By re-interviewing the same households as the SES, the research team was able to link the results from the vaccine demand survey to the measures of household assets, consumption expenditure, and other variables collected by the SES in the same households.

2.2. Elicitation of vaccine demand

The survey elicited private demand—the willingness to purchase an AIDS vaccine for one-

[6] The SES uses a sample stratified at two stages. The primary sampling units (PSU) in municipal areas are blocks and in non-municipal areas are villages. The PSUs are selected separately and independently in each municipal and non-municipal area by using probability proportional to the total number of households in that block or village. The secondary sampling unit is households, which are randomly selected from a list of private households in every sampled block/village of the NSO sampling frame. A systematically random sample of 15, 9, and 7 private households is then selected from each of sample blocks, sample villages in sanitary districts, and sample villages, respectively.

[7] Adults aged 18–60 were interviewed because they represent the sexually active population most likely to benefit from a preventive AIDS vaccine and they have the purchasing power and independence to make decisions on purchase of a vaccine for themselves. Another section of the questionnaire—not analyzed here—also enquired about purchase of vaccines for children.

[8] The sample is representative of these eight provinces and Bangkok, but not necessarily representative of the entire country. In particular, nearly a third of respondents to this survey (32.1%) were from Bangkok, while only 15% of adults 18–60 nationally live in Bangkok [13].

self at a pre-determined price—for a hypothetical preventive AIDS vaccine using contingent valuation methods (CVM) [15–19], labeled as such because the respondent is asked to state his or her preferences in a hypothetical situation or market.

The elicitation method followed three steps. In the first step, the interviewer reminded the respondent that AIDS is a fatal disease and provided information on: (a) the ways that AIDS is transmitted, using a laminated chart with pictures demonstrating each mode of transmission in Thailand; and (b) the ways to prevent HIV. This was important to clear up any misconception that the respondents might have had about AIDS and to remind him/her of the ways of preventing HIV absent a vaccine.

In the second step, the interviewer described the key characteristics of the hypothetical AIDS vaccine and demonstrated the concept of vaccine efficacy. The hypothetical vaccine was described as safe, having no side effects, effective for 10 years, of a predetermined efficacy (either 50 or 95%) and providing no protection to those already infected with HIV. This list of vaccine characteristics was printed on a laminated card and left in front of the respondent. Vaccine efficacy was demonstrated using a plastic tray, more than 100 small rubber figures, and a pliable plastic loop. The interviewer first scattered 105 of the rubber figures, each representing an individual, on a tray in front of the respondent. She then removed five dolls and placed them outside the tray, explaining that the 100 individuals in the tray were vaccinated and those not in the tray were not. The interviewer then separated the figures in the tray into two groups. When demonstrating 50% efficacy, she separated them into two equal groups and placed the plastic ring around one of the groups. The 50 within the ring received the vaccine and were protected from HIV, while the 50 outside the ring and in the tray received the vaccine but were not protected: they had the same probability of becoming infected as they had before vaccination (those five dolls outside the tray). In demonstrating 95% efficacy, 95 figures were encircled by the plastic ring and 5 were outside the ring and in the tray. The complete description of the vaccine scenario and demonstration are in Appendix A.

Respondents' understanding of the demonstration of vaccine efficacy was tested by asking them to identify: (a) the persons vaccinated (the 100 figures in the tray); (b) those vaccinated and protected (the 50 or 95 figures in the tray, inside the plastic ring); and (c) the number vaccinated but not protected (the 50 or 5 individuals outside of the ring, but in the tray). If the respondent failed to answer all three 'check' questions correctly, the demonstration was repeated and the check questions were asked again. No more than two demonstrations were performed and all respondents continued with the questionnaire, even if they failed the second set of check questions.

In the third and final step, each respondent was asked to suppose that the hypothetical vaccine would be available in limited supply, that those who wanted a vaccine would have to pay for it out of their income, that it would be available at a specified price, and that health insurance would not pay for the vaccine. The respondent was also informed that not everyone would probably want such a vaccine—some would and some would not. This was done to reduce the likelihood that the respondent would agree to purchase the vaccine to please the interviewer. The respondent was then asked, "Suppose the price of the AIDS vaccine were [pre-assigned price]. Would you be willing and able to pay for the vaccine for yourself?" An efficacy of either 50 or 95% and one of eleven prices (from 200 to 60,000 Baht, or US$ 5 to US$ 1500) were printed on the questionnaires (a total of 22 different versions of the questionnaire), which were randomly assigned to each household. All individuals in the same household received the same efficacy-price scenario. The interviewers recorded responses of "yes", "yes, if I had the money", "no", and "don't know/not sure".[9] The dependent variable that measures the demand in this study equals one if the respondent replied "yes"; in the other three cases, it is set to zero. Respondents who said they were unwilling and unable to purchase a vaccine were asked whether they would agree to be vaccinated if the vaccine were free of charge. It has been assumed in this analysis that those who were willing to purchase the vaccine would agree to be vaccinated with a free vaccine.

[9] There were additional questions eliciting the respondent's willingness to pay and the household demand for an AIDS vaccine, but these are not analyzed here.

2.3. Demand model

The individual demand for an AIDS vaccine is assumed to derive from the demand for health. We posited that the respondent would be willing to purchase an AIDS vaccine if it maximized his/her utility relative to the alternative, no vaccine, where utility is defined over health and other consumption goods. His/her indirect utility is a function of relevant prices (the vaccine and alternatives, including their characteristics), household income, and tastes, conditioned on objective measures of the likelihood of becoming infected with HIV and the respondent's understanding of the consequences of HIV and of the vaccine. Consequently, the dependent variable in this study is a measure of the respondent's demand, i.e., whether or not the respondent was willing and able to purchase the described vaccine for him/herself if it were available at a predetermined price. The demand for the AIDS vaccine is stipulated to be a function of the following explanatory variables:

Vaccine price and efficacy: We anticipated that demand will decline with price but will be higher for a more effective vaccine, controlling for price.

Demographic characteristics: We included age, gender, and education to proxy for tastes. These were all measured by dichotomous variables for female gender, different age groups, and different levels of completed education. The comparison groups for these variables were male respondents, those aged 18–19, and those with no formal education, respectively. We had no priors on the effect of gender and age on demand, but to the extent that age is also a proxy for the risk of exposure to HIV, we expected demand to decline with age.

Household ability to pay: This variable was proxied by monthly household consumption expenditure per capita and expressed in logarithmic form. If an AIDS vaccine is a 'normal' good, then controlling for price we expected that demand would rise with this proxy for income. In addition, variables measuring household ownership of durable goods (air conditioner, car, motorbike) and housing characteristics (construction material, piped water, private flush toilet, number of rooms, phone hookup) were included as controls for household wealth and ability to pay.

The respondent's risk of HIV infection: This variable was captured by a set of dichotomous variables measuring different levels of the respondent's subjective assessment of his/her lifetime risk of becoming infected with HIV. Respondents with any positive risk (small or large) or who did not know what their lifetime risk was were compared with those who claimed that they had "no risk" of lifetime infection. This was used instead of indicators of personal behavior because it includes risk both due to the respondent's own behavior and risk of exposure from interaction with others (such as boyfriends and spouses, or by blood transfusion).

Knowledge of HIV and alternative prevention measures: Because the overwhelming majority of respondents were familiar with the major modes of HIV transmission, two sets of variables that showed some variation were used as proxies for the respondent's personal knowledge of AIDS: (1) a set of dichotomous variables indicating whether the respondent believes that there is a cure for AIDS or is unsure whether a cure exists; and (2) a dichotomous variable equal to one if the respondent personally knows someone with AIDS. The comparison groups for these variables were those that understood that there was no cure for AIDS (about 85% of the sample) and those who do not know anyone with AIDS (about 40% of the sample), respectively. We anticipated that demand will be lower among those who believed that there is a cure for AIDS and higher among those who knew someone with AIDS. This knowledge variable is likely to influence the respondent's understanding of the consequences of AIDS infection and the costs of prevention alternatives.

Finally, variables reflecting respondents' comprehension of the vaccine demonstration and region of residence were included. The regional variables were not easily interpreted as a regional effect, as they pick up all other variation that occurred at a regional level (such as in prices, climate, HIV infection, and the rel-

ative performance of regionally defined field teams) and that were not picked up by controls for wealth and other factors already in the regression.

3. Results

3.1. Characteristics of respondents

A total of 3247 individuals age 18–60 were listed on the household roster of the SES in the nine surveyed provinces. Of these, 2524 (77.7%) were successfully interviewed between October 2000 and February 2001. The response rate for individuals was 61% for Bangkok and 89% for the other eight provinces; at least one person was interviewed from 86.8% of the households in the original sample (76% for Bangkok, 93% elsewhere). Overall, the response rate was significantly lower among men, individuals from the highest consumption quintile, those living in urban areas and those living in Bangkok, the northeast, and central regions (compared to the south). Only 3.4% (110 individuals) of the SES sample of adults refused to participate. Table 1 shows the distribution of households and individuals by region, province, and HIV prevalence among women attending antenatal clinics. A third of all of the households were from Bangkok.

Among the respondents who were successfully interviewed, 56% were female (Table 2). More than a quarter each were under 30 (27%), 30–39 (28%), and 40–49 (27%), leaving 18% in the oldest group, from 50 to 60. Most respondents (54%) had completed some amount of primary schooling (Table 3). Forty-four percent had more than primary schooling and only 2% had no formal schooling. Women represented more than half of all respondents with no schooling and primary schooling, but also the majority of those with university and vocational education.[10]

Table 2
Distribution of respondents by age and gender

Gender	Age group				
	18–29	30–39	40–49	50–60	Total
Male	319	298	288	197	1102 (43.6)
Female	373	405	387	257	1422 (56.4)
Total (%)	692 (27.4)	703 (27.9)	675 (26.8)	454 (17.9)	2524 (100.0)

3.2. Knowledge of AIDS

Almost all respondents (99.8%) had heard of AIDS. When prompted on the knowledge of AIDS transmission routes, knowledge was high for unprotected sex (97.3%), needle sharing (97.9%), blood transfusion (95.8%), and birth to an infected mother (91.2%). However, only 75.4% were aware that HIV could be transmitted via breastfeeding. About 5% of the respondents thought that AIDS could be cured; 33.6% did not believe or were unsure whether someone who appeared healthy could be infected with HIV. Forty-three percent reported personally knowing someone infected with AIDS (range from 1 to 100 persons). Of those knowing someone with AIDS, 96% reported that some of those they knew had already died.

3.3. Self-assessment of lifetime risk of HIV infection

Regarding the perception of personal HIV risk, 43.9% of respondents felt that they had some lifetime risk of getting HIV; 1.1% reported having a large chance of AIDS risk; and 0.2% knew they were already infected. Nearly half (49%) reported that “it is impossible for them to get infected with AIDS”.

3.4. Understanding of vaccine efficacy

Three-quarters of respondents correctly answered the three questions checking understanding of vaccine efficacy following the first demonstration and the cumulative percent that passed the check questions following a second demonstration was 90.5%. Comprehension was significantly related to both education and income: 96% of those with secondary education passed the check questions, compared with an 86% pass rate for those with primary and 61%

[10] Compared with our sample of eight provinces and Bangkok, the national population of 18–60-year-olds is less female (53%) and slightly younger (30% under 30 and 41% 40 and older, compared to 27 and 45%, respectively, in the sample). The national population of 18–60-year-olds has a smaller share with no schooling (0.01% compared to 2% in the sample) and with university education (9% compared to 16% in the sample) and more with primary (66%, compared to 54% in the sample) [13].

Table 3
Distribution of respondents by gender and completed schooling

Gender	Highest level of schooling completed							
	None	Lower primary	Upper primary	Lower secondary	Upper secondary	University	Vocational	Total
Male	7 (14.3)	356 (39.1)	207 (45.4)	138 (52.1)	91 (54.5)	169 (42.8)	134 (47.7)	1102
Female	42 (85.7)	555 (60.9)	249 (54.6)	127 (47.9)	76 (45.5)	226 (57.2)	147 (52.3)	1422
Total	49 (100.0)	911 (100.0)	456 (100.0)	265 (100.0)	167 (100.0)	395 (100.0)	281 (100.0)	2524
Percent	1.9	36.1	18.1	10.5	6.6	15.7	11.1	

pass rate for those with no schooling. Among the highest consumption/capita quintile, the pass rate was 97%, compared to 86% among the lowest quintile. A slightly higher share of respondents understood the demonstration of 50% efficacy (91.5%) than 95% efficacy (89.5%) ($P = 0.090$).

3.5. The demand for an AIDS vaccine

Randomization of the two efficacy levels and 11 prices across the households resulted in a sample of between 97 and 131 respondents for each vaccine efficacy-price combination (Table 4). Six percent said that they would purchase the vaccine "if they had the money", 62% said that they would not buy the vaccine and 2% did not know whether they would buy it. In general, the demand for an AIDS vaccine declined with price from nearly two-thirds of respondents at a price of 200 Baht ($5) to 15% or less at a price of 20,000 Baht ($500) or higher. Demand generally declined monotonically with price and was lower for a 50% effective vaccine at any given price.

Table 4
Percent of respondents willing and able to purchase an AIDS vaccine, by price and vaccine effectiveness (n = number of respondents; N = number of households)

Price (Baht)	Percent purchasing a vaccine	
	50% efficacy (n; N)	95% efficacy (n; N)
200	65.1 (126; 56)	64.3 (126; 57)
500	52.6 (114; 56)	61.1 (126; 56)
1000	41.0 (100; 53)	54.1 (122; 57)
3000	30.9 (97; 54)	40.8 (120; 60)
5000	22.4 (107; 54)	26.6 (109; 57)
7500	17.0 (112; 57)	25.4 (114; 54)
10000	18.8 (112; 51)	26.6 (109; 56)
15000	19.1 (115; 58)	14.5 (131; 58)
20000	14.9 (121; 57)	14.9 (107; 55)
40000	6.2 (129; 59)	9.8 (102; 53)
60000	6.5 (108; 57)	12.0 (117; 60)
Total	26.8 (1241; 612)	32.7 (1283; 623)

Equivalent prices in US$ are $5, $12.50, $25, $75, $125, $188, $250, $375, $500, $1000, and $1500. Difference in demand by vaccine efficacy (total) is statistically significant ($\chi^2_{(1)} = 10.5247$, $P = 0.001$).

To control for clustering of respondents in households and to examine the determinants of individual demand, a probit model of the demand for an AIDS vaccine was estimated. Forty respondents who said that the vaccine was not safe and/or were HIV infected, were regarded as "scenario rejecters" and dropped from the regression. The dependent variable was a dichotomous variable, which equaled one if the respondent was able and willing to purchase the vaccine for him/herself at the assigned price, and zero otherwise.

Variable definitions and descriptive statistics are in Appendix B. Probit results are shown in the first column of Table 5 for the pooled sample of all respondents, regardless of the level of vaccine efficacy, and separately in columns 2 and 3 for those offered a 50 or 95% effective vaccine. The probit coefficients have been transformed into marginal changes in the probability of purchasing the vaccine for a one-unit change in the explanatory variable, evaluated at the mean of all explanatory variables. For dichotomous explanatory variables, the comparison is the evaluation of the dependent variable when the explanatory variable is set equal to one, compared with the value when set equal to zero. Coefficients for household asset variables and regions have been suppressed to conserve space,[11] with a joint test of assets and regions presented at the bottom of the table.

[11] The full set of regression results is available from the authors on request.

Table 5
Probit of the demand for an AIDS vaccine

Variable	Both		50% effective		95% effective	
	d*p*/d*x*	*T*	d*p*/d*x*	*T*	d*p*/d*x*	*T*
Vaccine characteristics						
Price (log)	−0.110	18.43	−0.102	17.41	−0.116	15.42
95% efficacy	0.057	2.50				
Demographic						
Female	−0.021	2.10	−0.047	1.98	0.005	0.26
Married	−0.043	1.98	−0.069	1.74	−0.022	0.65
Age 20–24	0.140	3.22	0.041	0.73	0.227	2.59
Age 25–29	0.049	1.32	−0.080	1.05	0.179	2.63
Age 30–34	0.097	2.06	0.046	0.51	0.140	1.40
Age 35–39	0.019	0.29	−0.007	0.09	0.021	0.20
Age 40–44	0.018	0.33	−0.031	0.38	0.053	0.53
Age 45–49	−0.007	0.12	−0.100	1.20	0.081	0.80
Age 50+	−0.062	1.13	−0.086	1.20	0.044	0.53
Primary	0.084	1.03	0.084	0.66	0.085	0.78
Secondary	0.064	0.75	0.079	0.57	0.034	0.34
University	0.106	1.15	0.101	0.62	0.089	0.75
Vocational	0.085	0.92	0.043	0.27	0.101	0.84
Economic						
Household consumption	0.067	3.43	0.026	1.01	0.105	4.67
Personal risk						
Any risk	0.082	3.51	0.072	1.86	0.090	3.47
Don't know risk	0.092	2.22	0.015	0.44	0.172	2.48
Knowledge						
AIDS is curable	0.024	0.59	−0.011	0.19	0.059	1.13
Don't know if curable	0.021	0.50	0.017	0.24	0.027	0.71
Know someone with AIDS	0.061	2.95	0.061	2.89	0.062	1.50
Understood demonstration	0.071	1.60	0.056	1.03	0.089	1.90
Pseudo R^2	0.1874		0.1911		0.2009	
Observed *P*	0.302		0.272		0.331	
Predicted *P*	0.266		0.232		0.295	
Sample size	2484		1221		1263	
Joint tests (*P*)						
Age	0.0000		0.0000		0.0000	
Education	0.4645		0.3015		0.0170	
Assets	0.4433		0.0000		0.6520	
Regions	0.0102		0.3377		0.0007	
Self-assessed risk	0.0001		0.1676		0.0002	

Note. Also in the regressions but not shown is a set of household assets (air conditioning, car, phone, housing materials, flush toilet, number of rooms) and location (region and urban residence). These coefficients are not shown to conserve space and are available from the authors on request. Reported *T*-statistics reflect the significance of the underlying probit coefficient, not the marginal effect, which is computed at the mean of all variables. All standard errors were corrected to account for correlations across members of the same household.

Looking first at the column of pooled results of all respondents, the demand for a 95% effective vaccine is nearly 6 percentage points higher compared to a 50% effective vaccine. While this result is statistically significant, it is not a large difference, indicating that respondents value a partially effective vaccine almost as much as a highly effective one. As expected, demand declines with higher prices and rises with higher

consumption/capita. Demand is significantly greater among those who believe they have any lifetime risk of becoming infected with HIV, who are not sure of their risk, or who personally have known someone with AIDS.

Once price, income, and risk are controlled for, other demographic variables have limited relation with demand. Women are less likely than men to pay for an AIDS vaccine, and demand is highest among those in their early 20s and lowest among those over 50, compared with young people under 20. Married respondents have lower demand, as might be expected. Those who understood the demonstration had higher demand, but this result is not statistically significant.

Looking to the separate regressions for vaccines of different efficacies, demand declines with increased price for both vaccines but only a 95% effective vaccine is a 'normal' good, in the sense that demand significantly rises with the income proxy. Respondents with any self-assessed risk of HIV infection have higher demand for a 95% effective vaccine only. Knowing someone with AIDS raises demand for a 50% effective vaccine, while those who understood the demonstration have higher demand than those that did not only for a 95% effective vaccine.

The predicted proportion of respondents, who would buy an AIDS vaccine evaluated over the price range from US$ 5 to US$ 250 and by vaccine efficacy, as calculated from the probit in Table 5, is presented in Fig. 1.

3.6. Reasons for purchasing the vaccine

The respondents who said that they would purchase the vaccine (1633) were asked why. "It's a good precaution to take" was cited by the greatest number of responses (72.1%), followed by "the vaccine benefits me" (12.3%), "the vaccine is not expensive" (11.8%), "I think I'm at risk" (3.3%), and "other" (0.5%). On the other hand, the most commonly cited reason among those who were not willing to purchase the vaccine (879) was "I think I'm not at risk" (69.7%), followed by "have no money" (13.2%), "vaccine has no benefit to me" (10.8%), "not effective" (3.3%), and small numbers on other reasons.

3.7. Willingness to be vaccinated (WTV)

Seventy-eight percent of respondents would be able and willing to purchase the vaccine at some non-zero price or would agree to be vaccinated if the vaccine were offered free. Among respondents not willing to be vaccinated, 78.8% reported that they believed they were not at risk of HIV infection. Table 6 presents the results of a maximum likelihood probit of the probability that the respondent is willing to accept a free vaccine. The probit coefficients have been transformed into marginal effects, evaluated at the mean of all explanatory variables.

The first column pools the responses for the two vaccine efficacies and includes a dummy variable for the 95% effective vaccine. The willingness to be vaccinated is about 5 percentage points higher for a

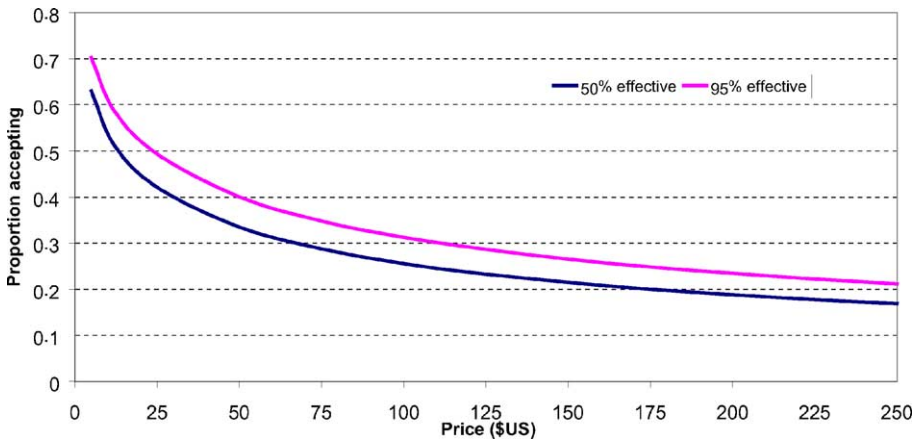

Fig. 1. Predicted proportion of Thai adults 18–60 who would purchase an AIDS vaccine, according to price and vaccine efficacy.

Table 6
Probit of the probability of accepting a free AIDS vaccine

Variable	Both		50% effective		95% effective	
	d*p*/d*x*	*T*	d*p*/d*x*	*T*	d*p*/d*x*	*T*
Vaccine characteristics						
Price (log)	0.001	0.13	−0.002	0.31	0.004	0.81
95% efficacy	0.047	2.61				
Demographic						
Female	0.037	2.96	0.003	0.12	0.067	4.02
Married	−0.005	0.25	−0.022	0.56	0.008	0.32
Age 20–24	0.034	0.61	−0.006	0.06	0.091	1.86
Age 25–29	−0.068	1.25	−0.100	1.04	−0.035	0.53
Age 30–34	−0.093	1.56	−0.099	1.17	−0.079	1.18
Age 35–39	−0.116	1.99	−0.096	1.18	−0.128	2.00
Age 40–44	−0.130	2.08	−0.130	1.37	−0.134	2.00
Age 45–49	−0.187	2.45	−0.179	1.61	−0.186	3.24
Age 50+	−0.249	3.67	−0.246	2.29	−0.247	4.35
Primary	−0.145	1.91	−0.166	1.93	−0.127	1.26
Secondary	−0.239	2.35	−0.294	2.49	−0.190	1.40
University	−0.191	1.94	−0.245	2.02	−0.159	1.28
Vocational	−0.170	1.81	−0.256	1.81	−0.103	0.81
Economic						
Ln HH consumption/capita	−0.011	0.51	−0.009	0.30	−0.011	0.36
Personal risk						
Any risk	0.135	5.80	0.142	5.57	0.123	4.08
Don't know risk	0.081	1.99	0.079	1.32	0.080	2.67
Knowledge						
AIDS curable	0.053	1.19	0.046	0.63	0.052	1.24
Don't know if curable	−0.018	0.84	−0.052	1.58	0.026	1.01
Know someone with AIDS	0.023	1.13	0.0002	0.01	0.038	1.34
Understood demonstration	0.083	4.31	0.115	2.58	0.058	1.84
Pseudo R^2	0.0891		0.0812		0.1205	
Observed *P*	0.792		0.772		0.811	
Predicted *P*	0.815		0.791		0.845	
Sample size	2472		1215		1257	
Joint tests (*P*)						
Age	0.0000		0.0064		0.0000	
Education	0.0568		0.0582		0.5229	
Assets	0.0000		0.0000		0.0000	
Regions	0.0206		0.1024		0.0046	
Self-assessed risk	0.0000		0.0000		0.0002	

Note. Also in the regression but not shown were a set of household assets (air conditioning, car, phone, housing materials, flush toilet, number of rooms) and location (region and urban residence). These coefficients are not shown to conserve space and are available from the authors on request. *T*-statistics reflect the significance of the underlying probit coefficient, not the marginal effect, which is computed at the mean of all variables. All standard errors were corrected to account for correlations across members of the same household.

95% effective vaccine evaluated at the mean of all explanatory variables, compared with a 50% effective vaccine, and vaccine efficacy is highly statistically significant. Neither household resources (consumption per capita), nor the price have any influence on the WTV with a free vaccine—nor should they. This indicates that respondents understood the concept that the vaccine would be available regardless of ability to pay, as the researchers intended, and that the vaccine would truly be available at a zero price (despite prior price discussions).

While women were less likely to purchase an AIDS vaccine, they were more likely to be willing to be vaccinated with a free vaccine than were men. Other factors raising the willingness to be vaccinated are age, education, self-assessed lifetime risk of HIV infection, and understanding the vaccine efficacy demonstration. Personal knowledge of someone with AIDS, and the belief that there might be a cure have no effect on WTV, contrary to expectations.

The second and third columns of Table 6 present separate results for WTV by vaccine efficacy. The results are largely similar to those for the pooled data with a few exceptions. Women have significantly higher WTV for a 95% vaccine than do men, but equal WTV as men for a 50% effective vaccine. The WTV for a 50% vaccine is more nearly equal across age groups, while for a 95% effective vaccine WTV is highest among younger people. Respondents of all education levels are equally likely to be willing to be vaccinated with a high-efficacy AIDS vaccine. Finally, respondents who understood the 50% efficacy demonstration had an 11% higher WTV than those who did not, while those who understood the 95% efficacy demonstration had WTV that was 6 percentage points higher. The variation explained by the explanatory variables for the 95% effective vaccine (pseudo $R^2 = 0.1205$) is greater than for the 50% effective vaccine (pseudo $R^2 = 0.0812$).

3.8. Impact on condom use

At the end of the survey, respondents were asked, "If you were vaccinated with this vaccine that is (50/95) percent effective, do you think you would use condoms to prevent AIDS when you have sexual relations with other(s), who is (are) not your spouse?" Roughly 91% of those who reported that they would agree to

Table 7
Intent to continue condom use among respondents who would agree to be vaccinated and had non-spousal partners

Would recipient use condoms with partners who are not a spouse?	50% effective vaccine	95% effective vaccine
Yes	94.5	86.3
No	4.4	7.5
Don't know	1.1	6.3
Number of respondents	91	80

Note. The difference in the percentage who would use condoms among those accepting a 50% vs. 95% effective vaccine is (marginally) statistically significant at $P = 0.064$.

be vaccinated and who also had non-spousal sexual partners stated that if vaccinated they would continue to use condoms to prevent AIDS when having sexual relations with others, but this varied according to vaccine efficacy—nearly 95% would continue condom use if vaccinated with a 50% effective vaccine, but only 86% if vaccinated with a 95% effective vaccine (Table 7, $P = 0.064$). More respondents would not use condoms at all or were not sure if they would use condoms if vaccinated with a high-efficacy vaccine, compared with one of low efficacy. These results are additional evidence that respondents *did* grasp the increased risk of infection with a low-efficacy vaccine and are aware that a potential benefit of the vaccine is reduced need for condoms.

4. Discussion and conclusions

This study demonstrated that the concept of vaccine efficacy can be successfully conveyed with the proper tools. However, there were nonetheless large differentials in the ability to understand vaccine efficacy by level of education, suggesting that the high comprehension in Thailand is partly due to high average levels of education. Indeed, a recent contingent valuation (CV) survey of AIDS vaccine demand that used identical efficacy demonstration methods to this survey found much lower overall comprehension among adults in Uganda (60%, compared with 90.5% in Thailand) in a population with considerably less education [20]. Thai respondents also had slightly greater difficulty understanding the concept of 95% efficacy than 50% efficacy. An important caveat to these conclusions is that the study used a definition of efficacy that was relatively easy to explain—that among a population of those vaccinated, some will be fully protected and some will be completely unprotected. It might have been considerably more difficult to explain efficacy in an alternative way, in which everyone vaccinated has 50 or 95% protection.

The demand for a low-efficacy vaccine was significantly less than for a high-efficacy vaccine, on average, but still substantial. This is most likely related to the very high awareness of AIDS in Thailand and the large percentage of the population (over 40%) who know someone with AIDS, as is often the case in countries with longstanding and severe AIDS epidemics. Both the previously mentioned CV study in Uganda and one among high-risk groups in Thailand (CSW and IDU) using identical techniques developed by this study, suggest that in populations with a more severe AIDS epidemic the demand for high- and low-efficacy vaccines may be equally high [20,21]. In a similar vein, overall demand and the difference in demand between high- and low-efficacy vaccines might have been quite different in a country with a younger epidemic in which AIDS awareness is lower, the population knows few people with AIDS, and where stigma against those with HIV or who exhibit high-risk behavior may be even greater. The observed levels of vaccine demand in this study are conditioned on public perceptions of the consequences of HIV infection, which are influenced by the availability of treatment. To the extent that improved access to treatment extends the lives and improves the health of AIDS patients (real or perceived), reducing those consequences, the private demand for an AIDS vaccine (and for other preventive measures) may decline.

The demand for an AIDS vaccine is significantly higher (at any price and if free) among those with greater perceived risk of infection. These results suggest that individuals at higher risk of HIV infection will be more likely to seek an AIDS vaccine when it becomes available—a kind of 'self-targeting' of those in greatest need of vaccination. These are the individuals for whom the private benefits are great and, to the extent that they may be engaging in risk behavior, the positive externalities from vaccination are also greatest for the rest of the population.

Since the demand for an AIDS vaccine is influenced by both vaccine price and income levels, high prices and low ability to pay could limit access of those at highest risk. In that case and if the vaccine is too ex-

pensive to be offered for free, government will have an important role to play in ensuring that the vaccine is available to high-risk individuals with low income, while making sure the vaccine is available on the market to those who can afford it, satisfying both equity and efficiency objectives and achieving high benefits to the whole population.

One of the important concerns of policymakers about the introduction of a less than fully effective AIDS vaccine is the potential impact such a vaccine might have on sexual behavior and condom use. Particularly in Thailand, where there is evidence of widespread and almost universal condom use in commercial sex and where the percent of men using sex workers has dropped by perhaps half [5], any drop in condom use or increase in use of commercial sex associated with AIDS vaccine immunization (among those vaccinated or those not) could negate or even reverse the impact of the vaccine in reducing transmission [4,6]. The study indicates that some recipients of an AIDS vaccine would reduce other preventive behaviors, especially if vaccinated with a highly effective vaccine. This reinforces the point that the introduction of an AIDS vaccine will have to be strengthened by widespread public information campaigns and increased promotion of other prevention methods.

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Appendix A. AIDS vaccine scenario and demonstration of effectiveness

Now I would like to talk with you about the ways that AIDS can be transmitted and how people can protect themselves. AIDS is a fatal disease. [*Interviewer: Show card with modes of HIV transmission.*] HIV can be transmitted in all of the following ways: having sexual intercourse with someone who is infected with HIV, receiving a transfusion of infected blood, sharing needles with infected person, being born to an infected mother and being breastfed by an infected mother. There are several ways that a person can prevent becoming infected with AIDS: they can avoid sex with many partners, they can use condom, they can avoid sharing needles and injecting equipment with others. Do you have any questions?

For several years, doctors and medical researchers have been working to develop a vaccine that would prevent people from being infected with the HIV virus, but to date a vaccine does not exist. However, I would like to know what you think you would do if an AIDS vaccine did exist and you could purchase the vaccine. Suppose it were possible to be vaccinated against AIDS. [*Interviewer*: *Show card with vaccine characteristics*.] The vaccine would not protect people already infected with HIV. Assume that this vaccine would be completely safe and have no side effects. Assume that the vaccine was [50/95] percent effective and would last for 10 years.

[*Interviewer: Explain vaccine efficacy using dolls.*] For example, each doll [*Interviewer: Hold a doll.*] represents one person. The 100 dolls in the box represent 100 people who were vaccinated. Those dolls

outside the box are people who were not vaccinated. Since the vaccine was only [50/95] percent effective, the vaccine would completely protect [50/95] of them for 10 years [*Interviewer*: *Put the loop around the 50/95 dolls*]. These are the dolls in the circle in this box. Those [50/95] people could not get infected with HIV or get AIDS. The other [50/5] people or dolls that were placed outside the circle but in the box were vaccinated but will not be protected and would have the same risk of getting infected with HIV, the virus that causes AIDS, as they have now. However, the person who is vaccinated will not know whether or not he/she is protected and can get AIDS. Do you have any questions?

Check questions on effectiveness

I want to make sure that you understand the effectiveness of this vaccine.

First time

1. Show me all the people who are vaccinated [*Interviewer: Did the respondent correctly show all those vaccinated?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

2. Show me all the people who are protected and cannot get HIV/AIDS.
   [*Interviewer: Did the respondent correctly show all those protected?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

3. How many people are vaccinated but not protected and can still get HIV/AIDS?
   [*Interviewer: Did the respondent answer this question correctly?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

   [*Interviewer: Did the respondent answer all three of these questions correctly?*]
   - Yes = 1 **(*Continue the scenario*)** ☐
   - No = 2 **(*Demonstrate effectiveness using the dolls again*)**

Second time

4. Show me all the people who are vaccinated [*Interviewer: Did the respondent correctly show all those vaccinated?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

5. Show me all the people who are protected and cannot get HIV/AIDS.
   [*Interviewer: Did the respondent correctly show all those protected?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

6. How many people are vaccinated but not protected and can still get HIV/AIDS?
   [*Interviewer: Did the respondent answer this question correctly?*]
   - Yes = 1 ☐
   - No = 2
   - Don't know/No answer = 9

   [*Interviewer: Did the respondent answer all three of these questions correctly?*]
   - Yes = 1 **(*Continue the scenario*)** ☐
   - No = 2 **(*Continue the scenario*)**

Suppose that the vaccine was in limited supply and that those who wanted a vaccine would have to pay for it. Everyone would pay the same price out of their own income. If you currently have health insurance, assume that your health insurance would not pay for the vaccine.

Now I would like to ask you whether you would buy this vaccine against AIDS if it were available for a specified price. There is no right or wrong answer. Some people say that they would buy the vaccine while other people say that they would not buy the vaccine for different reasons. However, before making decision [*Interviewer: Show card with items to be considered before making decision*], we would like you to consider the following items, income, your and family's economic status compared to the vaccine price, your risk of getting AIDS, other methods to protect you from AIDS besides a vaccine, such as condoms, and the effectiveness of the vaccine at [50/95] percent for 10 years. Do you have any questions?

[*Interviewer: Keep the demonstration box out but leave the card with vaccine characteristics and the card with items to be considered before making a decision in front of the respondent.*]

7. Suppose the price of the AIDS vaccine were [200/500/1,000/3,000/5,000/7,500/0,000/15,000/20,000/40,000/60,000] Baht. Would you be willing and able to pay for the vaccine for yourself?

Yes	= 1	
Yes, if I had the money	= 2	(***Go to Q 9***)
No	= 3	(***Go to Q 9***)
Don't know/Not sure	= 9	(***Go to Q 9***)

☐

Appendix B. Variable definitions and descriptive statistics

Variable	Description	Mean	S.D.	Minimum	Maximum
Dependent variables					
Willing to purchase for self	=1 if willing and able to purchase a vaccine for oneself at the given price, else=0	0.302	0.459	0	1
WTV[a]	=1 if willing to be vaccinated with a free vaccine, else=0	0.792	0.406	0	1
Demographic					
Female	=1 if female, else=0	0.566	0.496	0	1
Married	=1 if married, else=0	0.695	0.460	0	1
Age 20–24	=1 if aged 20–24, else=0	0.112	0.316	0	1
Age 25–29	=1 if aged 25–29, else=0	0.121	0.326	0	1
Age 30–34	=1 if aged 30–34, else=0	0.133	0.339	0	1
Age 35–39	=1 if aged 35–39, else=0	0.145	0.352	0	1
Age 40–44	=1 if aged 40–44, else=0	0.147	0.354	0	1
Age 45–49	=1 if aged 45–49, else=0	0.119	0.324	0	1
Age 50+	=1 if aged 50–60, else=0	0.179	0.384	0	1
Primary	=1 if highest is primary, else=0	0.542	0.498	0	1
Secondary	=1 if highest is secondary, else=0	0.171	0.377	0	1
University	=1 if highest is university, else=0	0.157	0.364	0	1
Vocational	=1 if highest is vocational, else=0	0.110	0.313	0	1

Variable	Description	Mean	S.D.	Minimum	Maximum
Economic					
Ln consumption/capita	Natural log of consumption/capita	7.856	0.720	6.031	10.635
Ln first bid price	Natural log of first bid price	8.527	1.754	5.298	11.002
Cement	=1 if dwelling is cement, else=0	0.451	0.498	0	1
Air conditioner	=1 if household owns air conditioner, else=0	0.167	0.373	0	1
Car	=1 if household owns car, else=0	0.169	0.375	0	1
Motorbike	=1 if the household has a motorbike, else=0	0.629	0.483	0	1
Phone	=1 if household has private phone hookup in dwelling, else=0	0.484	0.500	0	1
Private piped water	=1 if household has a private water connection in the home, else=0	0.685	0.464	0	1
Private flush toilet	=1 if the dwelling has a private flush toilet, else=0	0.109	0.311	0	1
Rooms	Number of rooms in the dwelling	3.07	1.37	1	9
Geographic					
Bangkok	=1 if Bangkok, else=0	0.320	0.467	0	1
North	=1 if Phayao or Chiang Mai, else=0	0.185	0.388	0	1
Northeast	=1 if Kalasin or Khon Kaen, else=0	0.200	0.400	0	1
Central	=1 if Angthong or Nakhon Sawan	0.128	0.334	0	1
Urban	=1 if municipality, else=0	0.546	0.498	0	1
Personal risk					
Any risk	=1 if self-assessed lifetime risk of HIV is small or large, else=0	0.450	0.498	0	1
Don't know risk	=1 if don't know lifetime risk of HIV, else=0	0.056	0.231	0	1
Knowledge					
AIDS curable	=1 if believes AIDS can be cured, else=0	0.055	0.227	0	1
DK if curable	=1 if don't know whether AIDS can be cured, else=0	0.091	0.288	0	1
Know someone with AIDS	=1 if personally knows someone with AIDS, else=0	0.424	0.494	0	1
Understood demonstration	=1 if answered all three check questions on the demonstration correctly, else=0	0.906	0.292	0	1
95% effective	=1 if received a scenario with a 95% effective vaccine, else=0	0.508	0.500	0	1

[a] Computed off of a sample size of 2472.

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