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## HIV vaccine acceptability among immigrant Thai residents in Los Angeles: a mixed-method approach

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### Abstract

This study examined HIV vaccine acceptability among immigrant Thai residents in Los Angeles, California. We combined a qualitative research method (focus groups) with an innovative market research method (conjoint analysis). Focus groups explored social issues, concerns, barriers and motivators associated with HIV vaccine acceptability. Conjoint analysis was used to assess preferences among eight hypothetical HIV vaccines with varying attribute profiles and the impact of various attributes on acceptability. Five main themes were identified in the focus groups regarding acceptance and utilization of preventive HIV vaccines: (1) vaccine characteristics, such as efficacy, physical side-effects and cost, (2) fear of a vaccine, (3) vaccine acceptability and optimism, (4) social and family responses and (5) behavioral disinhibition. Conjoint analysis revealed HIV vaccine acceptability ranging from 7.4 (SD = 19.4) to 85.2 (SD = 24.3) across eight hypothetical vaccines. The vaccine with the highest acceptability had the following attributes: 99% efficacy, no side-effects, 10 years of protection, protects against one sub-type, free, one dose and given by injection. Vaccine efficacy had the greatest impact on acceptability (51.4,  $p = .005$ ), followed by side-effects (11.1,  $p = .005$ ) and duration of protection (8.3,  $p = .005$ ). Despite some apprehensions and concerns, Thai residents perceived an HIV vaccine as making an important contribution to society and to protecting oneself and one's family from HIV infection. Nevertheless, acceptability of a partially efficacious vaccine may be low, suggesting the need for tailored social marketing interventions that might emphasize a collectivistic rather than an individualistic focus. Assessing HIV vaccine acceptability using a mixed-method approach is feasible with Thai residents and should lend itself to HIV vaccine research with other Asian Pacific Islander populations in the US.

### Keywords

Thai; immigrant; HIV vaccine; acceptability; collectivism; qualitative research; conjoint analysis

### Introduction

Asian/Pacific Islanders (APIs) are the fastest growing ethnic group in the US, comprising 4.1% of the population (United States Census Bureau, 2000). California, the state with the largest API population and the largest number of API AIDS cases, accounts for 45% of US AIDS

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cases among APIs (Wortley, Metler, Hu, & Fleming, 2000). Although HIV rates are lower among APIs than other racial/ethnic groups, several factors suggest a need for concern. First, a larger proportion of APIs are younger compared to other racial/ethnic groups (e.g. 30% of APIs under 18 years old versus 24% of whites: Humes & McKinnon, 2000), suggesting increased relative risk of engaging in HIV risk behaviors. Second, high levels of AIDS stigma among APIs may result in underestimates of seroprevalence (Sy, Chng, Choi, & Wong, 1998), lack of communication about HIV risk and delays in accessing HIV testing and HIV treatment compared to other racial/ethnic groups (Eckholdt & Chin, 1997; Mayne, Weatherburn, Hickson, & Hartley, 1999). Third, among US APIs diagnosed with AIDS, 59% are foreign born, indicating high vulnerability among immigrant APIs. Fourth, low levels of public health concern and research fueled by stereotypes of APIs as the “model minority” (Horan & DiClemente, 1993) may minimize awareness of HIV risk and result in an absence of culturally appropriate research and prevention.

A preventive HIV vaccine offers the most viable strategy for controlling the AIDS pandemic. HIV vaccine research has gained substantial momentum in the past decade with over 30 candidate vaccines now in clinical trials in 19 countries (HIV Vaccine Trials Network, 2007). However, the advent of a safe and efficacious vaccine does not guarantee its acceptability.

To prepare for the challenges that may face broad implementation of an efficacious HIV vaccine, we first conducted a survey to investigate HIV vaccine acceptability among ethnically diverse persons at risk for HIV in Los Angeles (Newman, Newman, Duan, Rudy, & Anton, 2004a; Newman, Duan, Rudy, & Johnston-Roberts, 2004b; Newman, Duan, Rudy, Roberts, & Swendeman, 2004c; Newman et al., 2006a). However, HIV vaccine acceptability has not been investigated among APIs in the US. Because of the particularly high rates of HIV in Thailand (Tangcharoensathien et al., 2001), the recent arrival of many Thai immigrants to the US and the fact that California – Los Angeles, in particular – is home to the largest Thai population in the US, the present study examines HIV vaccine acceptability among immigrant Thais in Los Angeles. In addition, as the site of two of the three Phase III HIV vaccine trials ever conducted, coupled with its strong public health infrastructure, Thailand is among the most likely global sites for initial dissemination of an approved vaccine. Formative HIV vaccine acceptability research among Thais in the US may provide important groundwork to support development of population-specific interventions to facilitate HIV vaccine acceptability among Thai communities in the US and a platform for future research in Thailand.

We combined a qualitative research method with conjoint analysis, a well-established market research method (Green, Wind, & Rao, 1999; Kellet, West, & Finlay, 2006). Focus groups were used to explore social issues, concerns, barriers and motivators associated with HIV vaccine acceptability. Conjoint analysis was then implemented to assess consumer preferences among eight hypothetical HIV vaccines with varying attributes.

## Methods

### Setting and procedure

Contacts were made by a bilingual (English-Thai) study coordinator with two community-based organizations serving Thais in Los Angeles. The head monk of a local Thai temple – a center of community life – provided a letter of support for the project. The study received ethics approval from the University of California, Los Angeles internal review board.

Recruitment was conducted in Thai through the two collaborating agencies. Focus groups were held at the temple, a common place where Thai residents congregate. Three focus groups were conducted in Thai with 8–10 participants per group ( $n = 27$ ). All participants were 18 years or

older and gave written informed consent. Participants received a \$20 incentive and lunch coupons. Participants' social and demographic characteristics are presented in Table 1.

Focus groups were led by two trained Thai facilitators. A semi-structured focus group interview guide addressed: (1) HIV vaccine acceptability, (2) HIV vaccine-specific concerns, (3) social and community concerns, and (4) possible behavioral changes after vaccination. At the end of each focus group, vaccine preferences were assessed using conjoint analysis: participants rated their likelihood of accepting vaccination with each of seven hypothetical vaccines. The experimental design for conjoint analysis is presented in Table 2.

## Analysis

**Focus groups**—Focus groups were audio-taped, transcribed in Thai and then translated into English. To increase reliability, two investigators independently coded the transcripts and reviewed the codes with a third investigator (Sandelowski, 1986). After several iterations, 44 codes in 7 “families” (a group of codes with the same theme) were created using ATLAS.ti (version 5.0). Analysis was further refined by identifying the most frequently occurring themes by gender.

**Conjoint analysis**—Conjoint analysis is a decompositional approach in which each HIV vaccine is described as a bundle of attributes. Participants rated composite hypothetical vaccines, thus requiring decisions about the relative importance of different vaccine attributes, which more closely approximates real-world decision making than a series of disparate single-item questions.

Seven dichotomous HIV vaccine attributes were identified by integrating input from focus groups, HIV vaccine experts and HIV vaccine acceptability research (Duan, 2005). A full factorial design for eight vaccines each with seven dichotomous attributes would yield 128 different vaccine scenarios ( $2^7 = 128$ ). We applied a fractional factorial orthogonal design to reduce the number to eight hypothetical HIV vaccines (Ryan, McIntosh, & Shackley, 1998).

Following the focus groups, the hypothetical HIV vaccines were presented simultaneously to each individual in the group in a set of laminated cards. Participants rated their likelihood of accepting each of the eight vaccines on a 5-point Likert-type scale, ranging from highly likely to highly unlikely. Ratings were transformed into a 0–100 scale.

The acceptability of each hypothetical HIV vaccine was derived by averaging individual vaccine acceptability scores across respondents. For each participant, an analysis of variance (ANOVA) model was used to estimate the impact of each vaccine attribute on acceptability. For each vaccine attribute, individual-specific impact scores were then summarized across participants as the attributes mean impact on acceptability; the statistical significance of the mean impact for the attribute was tested using a two-sided one-sample *t*-test.

## Results

### Focus groups

Five main themes were identified in the focus groups regarding acceptance and potential utilization of a preventive HIV vaccine: (1) vaccine characteristics, (2) fear of a vaccine, (3) vaccine acceptability and optimism, (4) social and family responses, and (5) behavioral disinhibition.

**Vaccine characteristics**—Participants identified efficacy, physical side-effects and cost as key characteristics of HIV vaccines that would influence acceptability.

**Efficacy:** Participants were concerned about the level of efficacy of a potential HIV vaccine. A female participant posed the following question: “Can the vaccine really be effective?” A male participant asked, “How effective is it to protect us from the disease when we have sexual relationships with women?” Participants went on to suggest that a future vaccine might not be 100% effective: “I think the government won’t guarantee that the vaccine works 100%,” noted a female participant. Participants were asked what level of efficacy would be acceptable to them: “We can accept 80% effectiveness,” suggested one female. “I don’t know what percentage it should be; I think 70%,” stated another female. Other participants suggested 100% efficacy would be required for acceptance: “We want a-hundred-percent because we don’t want to get AIDS, do we?” offered a female participant.

**Physical side-effects:** Potential side-effects emerged as a significant barrier to adoption. A male participant offered this perspective: “For me it is the side-effects. Side-effects are a difficult issue and cause for concern.” A female explained her concerns: “If the side-effects of the vaccination cause serious illness such as heart attack or cancer, I wouldn’t want to take the risk.” Generally, participants across the groups indicated statements along the lines of: “We are afraid of the side-effects.” At the same time, participants recognized the benefit of having an HIV vaccine available. A female explained: “It is good to have an AIDS vaccination, but it may have some side-effects. We don’t know about the side-effects at first because it is only an experiment. It might take 1–2 years to learn about the side-effects. However, to have an AIDS vaccination is the best thing.”

**Cost:** The cost of an HIV vaccine emerged as a potential barrier to adoption. A male participant offered a class perspective: “Cost is an issue. It shouldn’t be too costly that only the upper class people can afford it and the lower class people can’t.” A female participant stated, “The vaccine must be effective and not pricey.” Participants suggested that it be available at no cost: “The vaccine should be free to protect society,” noted one female participant. Another stated that “The government should pay for it.” Some participants further reported that people will expect an HIV vaccine to be free: “I guarantee no one will go to get a vaccination if it is not free.” Participants suggested specific dollar amounts for an HIV vaccine that were mostly minimal: “two dollars”, “five dollars” and “not more than \$10”. Participants also raised the importance that the vaccine be made accessible outside of the US: “We shouldn’t protect only the people in the US, but also protect and share with the rest of the world as well. The cost of the vaccine also should be affordable so that they can take care of themselves.”

**Fears of a vaccine—**General fears of HIV vaccines and concerns and questions regarding new biomedical products emerged as potential barriers to adoption. One concern centered on the newness of a potential HIV vaccine: “I don’t want to experience the vaccine if it is still new”. Another female added: “If it is too new, I don’t trust it”. In addition, participants expressed general fear of an HIV vaccine: “Most people won’t want to use it because they are afraid of it,” suggested a female. “Even if the vaccine is given for free, I am not going to get it. I am afraid of it,” added another female. In general, participants expressed a wait-and-see attitude regarding their personal comfort in using an HIV vaccine: “If the vaccine has been used about 10 years and we have not heard anything bad about it, then I might use it,” suggested one female. Another female offered a similar view, “Let other people try the vaccine for 5–10 years before we will do anything with it.”

**HIV vaccine acceptability and optimism—**Despite some concerns and fears of the vaccine, cautious acceptance for an HIV vaccine emerged. “People will doubt it at first,” noted a male participant; “They don’t know how effective it is and how long it will work. If it is okay, they will be okay with it.” Participants expressed general trust and confidence in the government and research community: “I think about confirmation, the confirmation from the

government of the vaccine's effectiveness. Then people's belief and trust in the vaccine will follow," stated a male participant." Another male added, "If it is me, I will get vaccinated. The available vaccines will be thoroughly researched and studied." Another male noted, "Yes, I trust them. If the vaccinations are available today, I will get them right away." A female participant reported, "If the vaccination is approved, it should be used."

General optimism was expressed among participants that an HIV vaccine would become available in the future: "I think we will have the vaccine for sure because researchers have continuously been working on it." Another male explained, "Because the disease is difficult to cure, it is not easy and will take time." Participants predicted the availability of an effective vaccine in the next 5–10 years. Male participants suggested, "It might be five years because it was started a long time ago," and "Not longer than ten years." A female participant expressed her confidence in a future vaccine: "We can treat many diseases now. We keep on developing vaccines. We can even treat the diseases that used to kill millions of people."

**Social and family responses**—Participants perceived mostly positive social responses if they were to be vaccinated. When asked what their friends and family would think if they were to be vaccinated, participants expected acceptance and support for taking preventive action: "They would accept it; it would be okay," stated one female. Another female explained, "There is nothing to hide because we are preventing the disease." Participants also felt that getting an HIV vaccine would be seen in a positive light since they are taking steps to protect themselves: "I think there is nothing to be ashamed of. On the contrary, we might look good because we protect ourselves," suggested a male participant. Similarly, a female stated, "I think there is nothing wrong because you are doing it to be cautious. Prevention is better than solving the problem."

Female participants, in particular, noted trust in relationships and altruistic motivations to protect one's family as important factors in the acceptability of an HIV vaccine. Women's likelihood of accepting an HIV vaccine was strongly based on the trust they had in their spousal relationship: "I am not going to accept it myself because my husband doesn't have sexual relationships with other women. If our husband is fooling around with other women, we might accept the vaccine; if our husband is okay, we are not going to have the vaccine." Alternately, another woman explained how a husband being vaccinated may paradoxically result in his faithfulness being questioned: "A husband who doesn't do anything wrong, but all of a sudden he gets the vaccination, this is suspicious."

Female participants suggested that men might accept an HIV vaccine to protect their families: "I think he will protect himself because the family is important. Also, he agrees that he is at risk so he will protect himself." Another woman noted, "The man who is vaccinated cares for his family."

**Behavioral disinhibition**—Behavioral disinhibition emerged as a possible consequence of HIV vaccine availability. A male participant offered the following: "I think getting vaccinations will increase the rate of risk." "They will do the same or even worse than before if they get vaccinated," stated another male. Participants suggested that risk behaviors would increase as a result of individuals feeling protected by the vaccine and thus perceiving themselves to be at lower risk: "I think it [risk behaviors] will get worse because there is prevention so people can do whatever they want," suggested a female participant." Another female added, "People will want to try [risk behaviors] because they have already been protected by the vaccine." A male participant explained that despite weighing the partial effectiveness of an HIV vaccine, people may be more inclined to take risks: "I think people who get vaccinations will take more risk: Usually, people are not afraid of contracting the disease when they use condoms. I think even though they get vaccinations, they are still not

sure about the percentage of the vaccine's effectiveness. However, people will have more confidence in the protection when we have vaccinations. As a result, people will take more risk."

### Conjoint analysis

Acceptability of the eight hypothetical HIV vaccines and the impact of vaccine attributes on acceptability are presented in Table 3. HIV vaccine acceptability ranged from 7.4 (SD = 19.4) to 85.2 (SD = 24.3) across the eight vaccines. The mean acceptability across all eight hypothetical HIV vaccines was 45.6 (SD = 11.6). The vaccine with the highest acceptability had the following attributes: 99% efficacy, no side-effects, 10 years of protection, protects from one type, free, one dose and given by injection. The vaccine with the lowest acceptability offered: 50% efficacy, minor side-effects, 1 year of protection, protects from one type, costs \$250, one dose and given by injection. Vaccine efficacy had the greatest impact among all attributes on acceptability (51.4,  $p = .005$ ); an increase from 50–99% efficacy resulted in a change in acceptability from 19.9 (less than somewhat unlikely) to 71.3 (somewhat likely). Side-effects (11.1,  $p = .005$ ) and duration of protection (8.3,  $p = .005$ ) also had significant impacts on acceptability.

### Discussion

Thai immigrants in Los Angeles reported some apprehensions about HIV vaccines, but indicated that an HIV vaccine would be an important contribution to society, to protecting one's own health and the health of one's family. Acceptability of an HIV vaccine was associated with a general sense of trust and confidence in the government and medical research community. This view is in stark contrast to what has been observed with Latino and African-American populations, who generally report high levels of mistrust, and fear of government and government-sponsored HIV vaccine research (Brooks, Newman, Duan, & Ortiz, 2007; Newman et al, 2004a; Sengupta et al., 2000). In addition, Thai participants expressed optimism around HIV vaccine development, in contrast to what has been suggested by African American and Latino populations, many of whom report that a vaccine or cure is available but is being withheld from the public (Allen et al., 2005; Bogart & Thornburn, 2005; Roberts, Newman, Duan, Rudy, & Swendeman, 2005). Overall, these findings suggest that immigrant Thai residents would accept HIV vaccination. This is consistent with results from a household survey of adults in Thailand, where a majority indicated they would accept HIV vaccination (Suraratdecha, Ainsworth, Tangcharoensathien, & Whittington, 2005).

Nevertheless, participants in the present study expressed a cautionary acceptance and a wait-and-see approach to HIV vaccine uptake, which is also reflected in the modest overall vaccine acceptability of 45.6 in the conjoint analysis. A similar wait-and-see attitude has been noted among Latinos and African Americans, who tend to be more skeptical of the safety and efficacy of new vaccines and medical research (Newman et al., 2004a; Sengupta et al., 2000; Strauss et al., 2001). This wait-and-see attitude or "bandwagoning" is not an uncommon response to vaccines in general (Hershey, Asch, Thumasathit, Meszaros, & Waters, 1994).

HIV vaccine efficacy had the single greatest impact on HIV vaccine acceptability, a finding that is consistent across the conjoint analysis and focus groups. The influence of efficacy, side-effects and duration of protection on vaccine acceptability is consistent with findings among multi-ethnic adults in Los Angeles (Newman et al., 2006b). The impact of efficacy on HIV vaccine acceptability has also been observed among adults in Thailand, who indicated significantly greater demand for a high- rather than a low-efficacy vaccine (Suraratdecha et al., 2005).

Nevertheless, we found variability in the impact of certain attributes across studies. For example, cross-clade protection had a significant impact on acceptability among a multi-ethnic Los Angeles sample (Newman et al., 2006b), but no impact in the present study. These findings reflect the complexities of future HIV vaccine acceptability and suggest the need to assess acceptability among different communities that may have varying preferences and concerns. The wide range of acceptability across vaccines with different attributes and, in particular, the low acceptability of a partially efficacious vaccine – which would require broad population uptake to achieve impact in controlling the epidemic – suggests that formative research and social marketing may be vital to ensuring the success of future HIV vaccines (Newman et al., 2004a,b,c; Duan, 2005).

Focus groups revealed information regarding HIV vaccine attributes not identified in the conjoint analysis. For instance, vaccine cost was identified in focus groups as a potential barrier among immigrant Thais. Participants suggested future vaccines should be available at low or no cost in order to increase access, both in the US and abroad. Similar findings have been observed in Thailand, where demand for HIV vaccines declined with vaccine cost from nearly two-thirds of respondents at a price of 200 Baht (\$5) to less than 15% at a price of 2000 Baht (\$500) or higher (Suraratdecha et al., 2005). Addressing potential barriers to HIV vaccine uptake in advance as part of dissemination efforts may facilitate uptake among low-income and racially/ethnically diverse populations.

Beyond HIV vaccine attributes, focus groups yielded important information about motivations for HIV vaccine acceptability. Thais raised the centrality of family and intimate relationships and the role of altruistic vaccination. Acceptance of an HIV vaccine was viewed as a positive step not only in protecting one's own health but in protecting the health of one's family. HIV remains highly stigmatized in the US, as well as in Thailand (Kittikorn, Street, & Blackford, 2006; VanLandingham, Im-Em, & Saengtienchai, 2005). Data from Thai immigrants suggest that one key to transforming HIV vaccines into a positive light and eschewing stigma may be the promotion of HIV vaccine uptake as an altruistic behavior – to protect one's family and significant others. It may be that the more individualistic emphasis of mainstream US culture is reflected in the larger body of HIV vaccine preparedness research, which tends to emphasize the individual over family or community. Given the likelihood that first generation HIV vaccines may be only partially efficacious (Gilbert et al., 2003; Levy, 2001), appeals to altruism and collectivism may be important components of the messaging surrounding HIV vaccines.

An increase in sexual risk-taking was seen as a potential negative consequence of the advent of a preventive HIV vaccine. This view was particularly true of Thai women. As new biomedical HIV prevention methods begin to emerge, the question of possible behavioral disinhibition will need to be addressed (Newman et al., 2004a,b,c). Because a future HIV vaccine will likely be less than 100% efficacious, its dissemination will need to be provided as part of a comprehensive prevention strategy that includes risk reduction counseling, the meaning of partial efficacy and barrier methods, such as condoms, to ensure that a vaccine increases protection against HIV infection – on an individual and community basis.

Limitations to the present study include the small number of participants recruited from two community-based organizations in Los Angeles. Additionally, the study population did not focus on individuals who engage in high-risk behaviors. Thus, the results may not be generalizable to the larger Thai population in Los Angeles or the US, or to Thai populations that report high-risk behaviors. We did not specifically assess respondents' knowledge and awareness about HIV/AIDS or the HIV epidemic and HIV vaccine trials in Thailand; however, this may affect their concerns about future HIV vaccines. By using semi-structured open-ended questions in addition to a conjoint analysis experiment, we were able to identify and explore, in depth, HIV vaccine concerns among a population that is not represented in HIV vaccine or

HIV prevention research, as well as to explore similarities and differences with other racial/ethnic communities in Los Angeles, and with adults in Thailand.

Future research on HIV vaccine acceptability should delve into possible differences in perspectives among Thais who report high-risk behaviors and the general Thai community as well as contrast the concerns and experiences of Thais in the US and those in Thailand. Finally, no candidate vaccine has yet proven efficacious; thus reported acceptability is limited to a hypothetical vaccine. Nevertheless, we used a mixed method approach and, in particular, incorporated conjoint analysis, which allowed us to more closely approximate reactions to a future vaccine.

To our knowledge, this study represents the first application of conjoint analysis in Thai, and among an immigrant Thai population. Past utilization of conjoint analysis indicated that it may require complicated cognitive processing (Phillips, Johnson, & Maddala, 2002) and little is known about its utility across diverse communities and languages. The present study indicates the feasibility of using conjoint analysis as part of a mixed-method approach and suggests that similar research is possible with other API populations. The latter may reveal similarities and differences of importance to social marketing of HIV vaccines and broader HIV-preventive interventions.

Most disease prevention methods take years after development to achieve widespread acceptance. With over 40,000 HIV incident infections annually in the US alone, proactive steps to reduce the time from HIV vaccine approval to widespread uptake will have an enormous impact in controlling the epidemic.

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**Table 1**Sociodemographic characteristics of focus group participants ( $n = 27$ ).\*

Characteristics	<i>n</i>	
Age in years (mean)	46.4 years	
Gender	(%)	
Male	9	33.3
Female	18	66.7
Marital status		
Single	2	7.4
Married	19	70.4
Divorced	5	18.5
Widowed	1	3.7
Education		
Below high school	2	7.4
High school	3	11.1
Above high school	22	81.5
Number of years in the US (mean)	18.9 years	
Primary language spoken at home	(%)	
Thai	100.0	
Annual income		
Under \$10,000	6	26.1
\$10,000–\$20,000	2	8.7
\$20,001–\$30,000	6	26.1
\$30,001–\$40,000	4	17.4
Over \$40,000	5	21.7
Health insurance		
None	10	37.0
Medi-Cal/Medicare	3	11.1
HMO	7	25.9
Private insurance	7	25.9
Ever tested for HIV		
Yes	13	52.0
No	12	48.0
Results of last HIV test		
HIV-positive	0	0.0
HIV-negative	13	76.5
Uncertain/unsure	4	23.5

\* Notes: Focus Group 1 ( $n = 10$  women); Focus Group 2 ( $n = 8$  women); Focus Group 3 ( $n = 9$  men).

Table 2

Hypothetical HIV vaccine attributes.

Vaccine attributes							
HIV Vaccine number	Efficacy (%)	Side-effects	Duration of protection	Doses	Route	Protection (cross-clade)	Cost (\$)
1	50	None	1 year	4	Injection	Multiple types	0
2	99	None	1 year	1	Oral	Multiple types	250
3	50	Minor	1 year	1	Injection	One type	250
4	99	Minor	1 year	4	Oral	One type	0
5	50	None	10 years	4	Oral	One type	250
6	99	None	10 years	1	Injection	One type	0
7	50	Minor	10 years	1	Oral	Multiple types	0
8	99	Minor	10 years	4	Injection	Multiple types	250

**Table 3**  
Acceptability of hypothetical HIV vaccines and impact of vaccine attributes on acceptability ( $n = 27$ ).

Hypothetical HIV vaccine number <sup>a</sup>	Vaccine attributes							
	HIV vaccine acceptability (mean)	Efficacy (%)	Side-effects	Duration of protection	Protection (cross-clade)	Cost (\$)	Doses	Route
1	85.2	99	None	10 years	One type	0	1	Injection
2	72.2	99	Minor	10 years	Multiple types	250	4	Injection
3	70.4	99	None	1 year	Multiple types	250	1	Oral
4	57.4	99	Minor	1 year	One type	0	4	Oral
5	30.6	50	None	1 year	Multiple types	0	4	Injection
6	23.2	50	Minor	10 years	Multiple types	0	1	Oral
7	18.5	50	None	10 years	One type	250	4	Oral
8	7.4	50	Minor	1 year	One type	250	1	Injection
Mean Impact Score <sup>b</sup>		51.4*	11.1*	8.3*	6.9	6.9	1.9	-6.5

<sup>a</sup>Notes: HIV vaccine numbers assigned in order of decreasing acceptability, not order of presentation to participants.

<sup>b</sup>Mean impact score reflects the impact of each vaccine attribute on acceptability.

\*  $p < .05$  for the one-sample two-tailed  $t$ -test.