

# **Farmers' Preferences and Attitudes Toward Porcine Reproductive and Respiratory Syndrome (PRRS) Vaccination in Vietnam**

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## **Abstract**

Vietnam is a major pork producing country in Asia, but the pig farmers' livelihood is threatened by Porcine Reproductive and Respiratory Syndrome (PRRS). Although vaccination is the most practical method of choice for PRRS control, the vaccination percentage is very low. To help inform PRRS vaccine development and policy, our research employed the choice experiment (CE) method to assess pig farmers' attitudes toward and willingness to pay (WTP) for a PRRS vaccine. The results showed a high positive WTP value for the PRRS vaccination program in Vietnam. This study provides insight into the possibility of increasing the PRRS vaccination percentage.

Key words: CE, PRRS, vaccine, Vietnam, WTP.

## **Introduction**

Porcine reproductive and respiratory syndrome (PRRS) is a very contagious, economically devastating viral disease affecting swine. Since 2007, the Vietnamese pig-farming sector has been affected by this syndrome, which has caused more than 300,000 swine deaths and affected 26/60 provinces during 2008 (Zhang et al., 2013). Since pig production is the major source of income for most farmers in Vietnam, HP-PRRS severely damaged these farmers' livelihoods (Zhang and Kono, 2012).

To control PRRS in Vietnam, a stamping out (SO; culling all infected pigs) control strategy was applied in Vietnam during the outbreak period, and the government provided a culling subsidy to encourage pig farmers to cull infected pigs. However, an epidemiological and economic modeling study by Zhang et al. (2014) demonstrated that SO combined with vaccination is more economically efficient than SO alone.

The primary problem of PRRS vaccination in Vietnam is that the vaccination percentage on farms is very low. Only a small part of large commercial pig farms apply the PRRS vaccine. In addition, another problem of PRRS vaccination is that, although certification of classical swine fever (CSF) and foot-and-mouth disease (FMD) vaccination are currently required to sell pigs in Vietnam, no certification of PRRS vaccination is required to sell pigs. Furthermore, the government provides a culling subsidy for all culled pigs, but PRRS vaccination is not a condition for the subsidy. Therefore, there is no incentive for farmers to accept PRRS vaccination.

To successfully diffuse PRRS vaccination in Vietnam, it is essential to investigate the pig farmers' preferences for key attributes in the design of a PRRS vaccination program. However, to the best of our knowledge, there has been no such study to date. The purpose of the present study was to use field research to assess the pig farmers' preferences for PRRS vaccination in Vietnam using a Choice Experiment (CE) approach. We hoped that the present findings will help to inform vaccine policy for diffusing PRRS vaccination in Vietnam.

## Materials and method

For data collection, a survey was conducted in villages by staff members of the Hue University of Agriculture and Forestry using an interview-based questionnaire between February 25<sup>th</sup> and March 4<sup>th</sup>, 2013.

Table 1. Attributes and levels for CE

Attribute	Levels
Vaccine administration	Accept=1, Not Accept=0
Culling subsidy	25%, 50%, 75%, 100%
Price of vaccine (VND)	30,000, 40,000, 50,000

Table 2. Hypotheses in CE question

Hypothesis	Explanation
Vaccine efficacy	This vaccine was developed in Vietnam. If pigs are vaccinated, over 90% of vaccinated pigs can be protected from PRRS outbreaks.
Certification	Pigs can obtain PRRS-vaccinated certification when administered the PRRS vaccination and can be sold at market price with this certification.
Culling subsidy	If a PRRS outbreak occurs after the vaccination is administered, farmers can receive a culling subsidy from the government. If the vaccination is not administered, no subsidy will be paid, even if an outbreak occurs.
Price	Dose per pig price. Veterinary service charge is included.

Following the CE design process of Bennett and Balcombe (2012), three attributes were ultimately selected for the CE design. The attribute of vaccine administration had 2 levels, the attribute of culling subsidy had 4 levels, and the attribute of price had 3 levels, generating 24 full-profile cards for respondents to fill out (Table 1). Prior to answering the survey, the respondents were provided with an explanation of the hypotheses in the CE question (Table 2).

An analysis of CE data follows the behavioral framework of random utility theory, which describes discrete choices in a utility maximizing framework. We applied the random parameter logit (RPL) model in the present analysis. The RPL provides a flexible and computationally practical method for analyzing the results from CE surveys. The specification and estimation of the RPL model follows Revelt and Train (1998), to which the reader is referred for details.

## Result

To understand the pig farmers' understanding of and concern about PRRS outbreaks on their farms and in the whole country, attitude statement questions were also included on the

questionnaire. The respondents were asked to score on a scale of 1-5 the extent to which they agreed or disagreed with each statement, where 1 = strongly disagree and 5 = strongly agree. Responses to those attitude questions are shown in Table 3 below.

Table 3. Mean score of attitude statement questions

Statement	Mean scores		
	Non-affected	Affected	t-test values
①PRRS is a major risk for the pig farming industry in Vietnam	4.8	4.2	2.74 ***
②My farm has a high risk of PRRS outbreak	2.0	2.2	-0.80
③The PRRS vaccine can greatly reduce the risk of PRRS outbreak	4.2	3.6	2.47 **
④I can prevent PRRS outbreaks by myself	2.2	1.9	0.93
⑤Humans can be infected with the PRRS virus from infected pigs	4.5	3.5	3.59 ***

Note: Superscripts denote significant differences (unpaired *t*-test; statistical significance levels: \*\*\*1%; \*\*5%) between “Non-affected” and “Affected” samples.

Overall, these scores reflect the pig farmers’ relatively low concern about the possibility of a PRRS outbreak on their farms. Interestingly, non-affected farmers thought that there is a higher risk of PRRS outbreak in Vietnam than affected farmers, and affected farmers thought that the PRRS vaccine alone cannot prevent a PRRS outbreak. That is, they had less confidence in the effectiveness of the PRRS vaccine than non-affected farmers. On the other hand, the present results suggest that affected farmers are more knowledgeable about PRRS than non-affected farmers through the PRRS experience (for example, statement ⑤ is incorrect: PRRS is a disease of pigs, and humans cannot be infected).

Table 4. CE estimates of WTP for PRRS vaccination

	WTP (Standard error) Unit: VND		Sample size
	Vaccine administration	For 1% increase in culling subsidy	
Non-affected	32,892 (8309)***	187 (68)***	51
Affected	35,764 (9759)***	176 (55)***	50
Pooled sample	35,243 (5101)***	187 (44)***	101

Note: VND=Vietnamese Dong. Statistical significance level: \*\*\*1%. The corresponding standard errors are shown in parentheses.

Table 4 shows the results from the RPL model estimation of WTP for each of the vaccine attributes. The WTP results confirm that farmers have heterogeneous preferences for

PRRS vaccination. The farmers' mean WTPs were 35,746 VND and 32,892 VND for vaccine administration in the Affected and Non-affected samples, respectively, and 176 VND and 187 VND for a 1% increase in the culling subsidy.

## **Discussion**

The results of the present CE study indicate that Vietnamese pig farmers show a high preference for the PRRS vaccine. However, their mean WTP is lower than the potential cost of the vaccine (40,000 VND/dose), which may be one of the reasons why the PRRS vaccination ratio remains low in Vietnam. To increase the vaccination ratio, one practical solution is government support for decreasing the vaccine price and/or for providing a culling subsidy to vaccinated farms to cull infected pigs.

In addition, as mentioned in the *Introduction* above, there is no incentive for farmers to accept PRRS vaccination because they can sell their pigs without certification of PRRS vaccination, and because all farmers are eligible to receive a culling subsidy, regardless of whether they accept PRRS vaccination. The present CE results indicate that PRRS-vaccinated certification to sell pigs and a culling subsidy only for vaccinated pigs are appropriate incentives for vaccination administration. The certification system for PRRS-vaccinated pigs is a priority for PRRS control.

Furthermore, most of Vietnamese farmers do not have sufficient knowledge to encourage PRRS control. Therefore, more explanation of PRRS vaccination to farmers by local veterinarians is needed. To accomplish this, greater government attention is essential. To help diffuse the vaccine, as suggested by the results shown in Table 3, we recommend a training seminar with an explanation of the PRRS vaccine, government support for vaccination, and instruction on the disease.

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