

# A Review of Conjoint-Analysis Studies of Vaccine Preferences

Christine Poulos

RTI Health Solutions, Research Triangle Park, NC, United States

## BACKGROUND

- Studies that quantify preferences for vaccines help vaccine producers and policymakers understand what drives vaccine demand and decisions to vaccinate.
- Vaccine demand, along with a variety of other factors, including public health regulation and vaccine supply, influences vaccine effectiveness.
- Understanding vaccine preferences, and likely vaccination behavior, is particularly important in the following circumstances:
  - Number of vaccines available increases
  - Vaccines have low cost-effectiveness
  - Vaccines are not mandatory or free
- Estimates of individuals' preferences for vaccines may be used to understand acceptable tradeoffs among vaccine features and to predict likely vaccination behavior.
  - Conjoint-analysis studies quantify preferences for multiattribute goods.
  - The studies are increasingly being used to quantify preferences for health interventions,<sup>1</sup> including vaccines.
  - The studies posit that the benefit of a vaccine is a weighted sum of the positive and negative features of the treatment.
  - The weights reflect individuals' perceived relative importance of each vaccine feature.

## OBJECTIVE

- An ongoing literature review aims to summarize the published literature on conjoint-analysis studies of preferences for features of vaccines and vaccination.
- This poster presents preliminary findings and discusses next steps.

## METHODS

- In 2015, PubMed was searched to identify articles about conjoint-analysis studies of vaccine preferences.
- Searches were constructed using the following terms: vaccine, discrete choice, conjoint analysis, conjoint, and preference.
- Inclusion criteria for studies:
  - Described a conjoint-analysis study of individual or societal preferences for vaccines
  - Focused on human vaccines
  - Original research
  - Written in English
- Exclusion criteria for studies:
  - Preference studies using methods other than conjoint analysis
  - Reanalysis of previously published study data
- For each study, information on study features was extracted and summarized.

## RESULTS

- Overall, 278 abstracts were identified for review, and 34 were ultimately included in study (Figure 1).
  - The number of conjoint-analysis studies of vaccines published each year has been increasing (Figure 2).

Figure 1. Summary of Literature Review Process

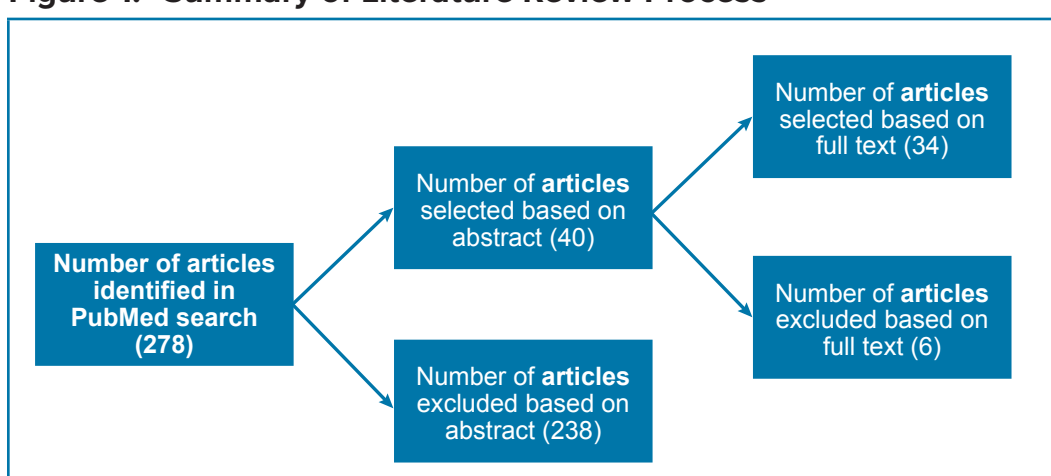
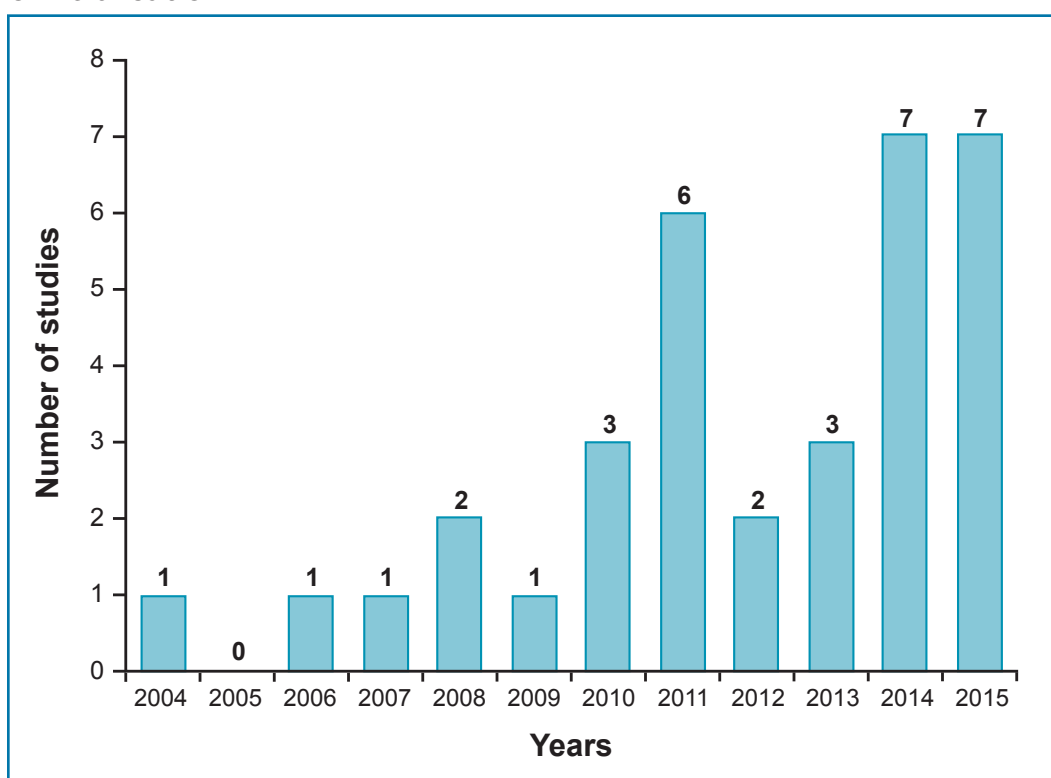


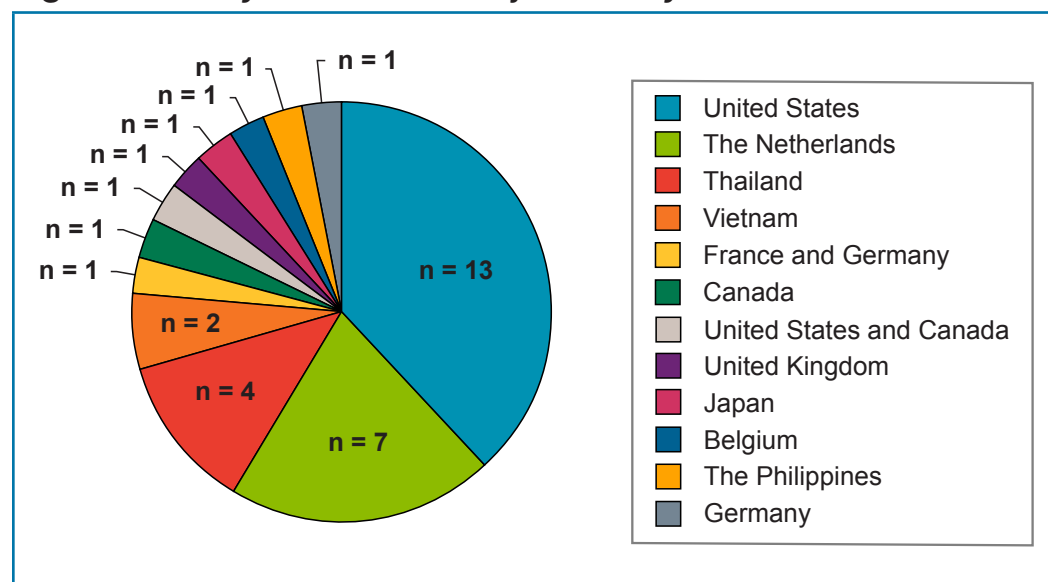
Figure 2. Number of Conjoint-Analysis Studies of Vaccines, by Year of Publication



## Study Locations

- Most studies were conducted in the United States, followed by the Netherlands, Thailand, and Vietnam (Figure 3).

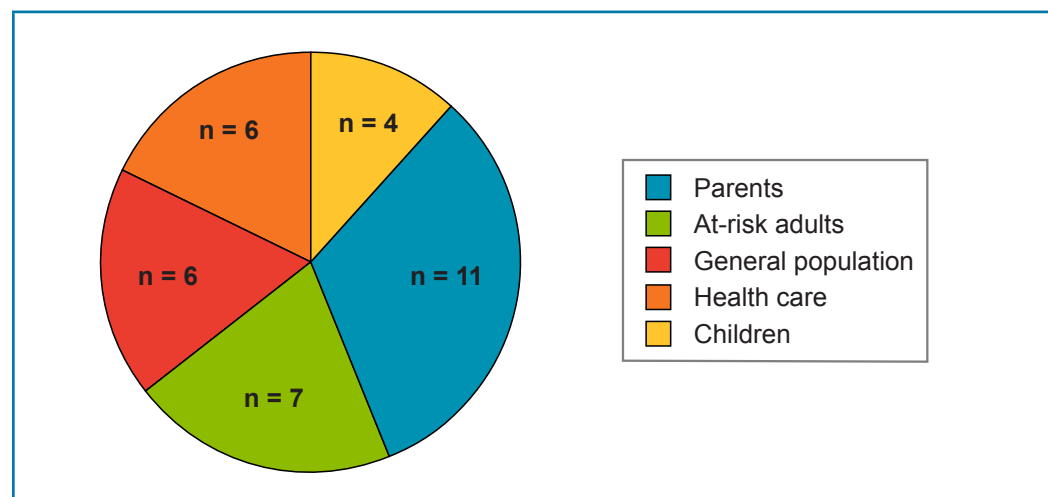
Figure 3. Study Location in Conjoint-Analysis Studies of Vaccines



## Study Populations

- Studies of parents' preferences were most common, followed by studies of adults at risk for particular health conditions (Figure 4).

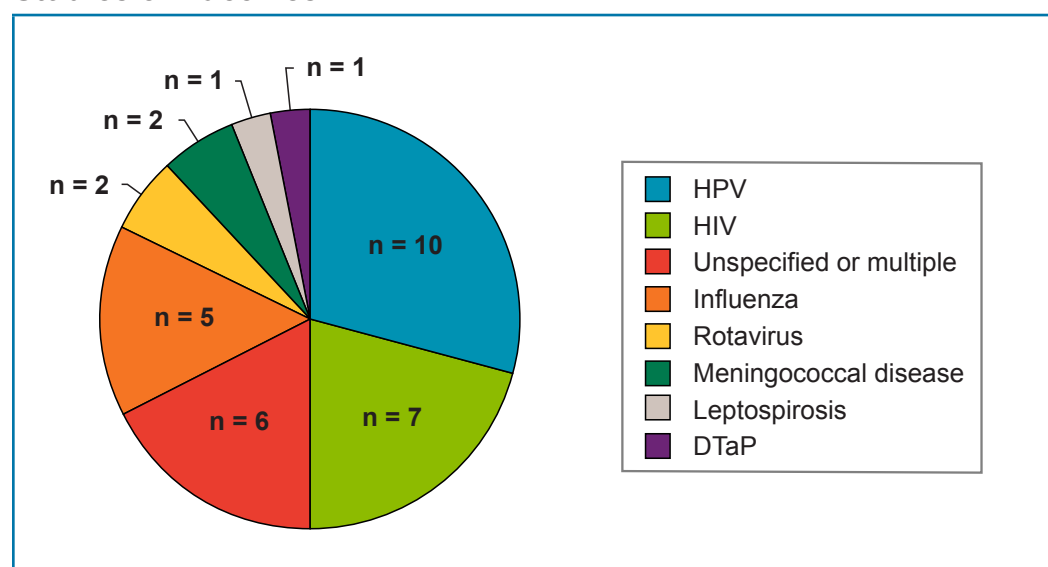
Figure 4. Types of Study Populations in Conjoint-Analysis Studies of Vaccines



## Types of Vaccines

- Most conjoint-analysis studies (28) quantified preferences for one particular vaccine (Figure 5).
- Six studies focused on multiple vaccines or unidentified vaccines.

Figure 5. Types of Vaccines Examined in Conjoint-Analysis Studies of Vaccines

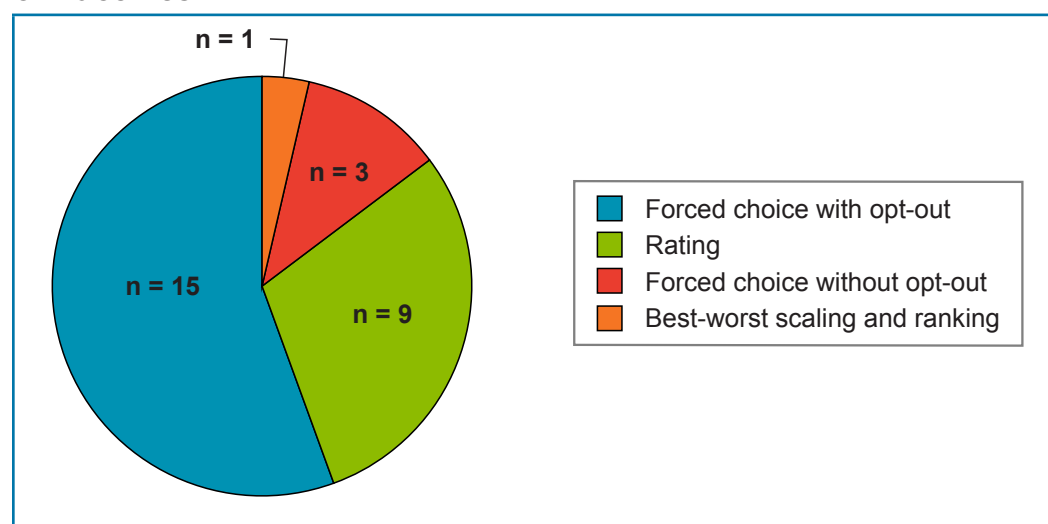


DTaP = diphtheria, tetanus, and pertussis; HIV = human immunodeficiency virus; HPV = human papillomavirus.

## Format of Choice Questions

- Of 28 studies (excluding those of health care providers), 18 employed forced-choice questions including two or three vaccine alternatives (Figure 6).
- Most of these studies (15 out of 18) allowed respondents to opt out of the vaccine choice.
- One study used a best-worst scaling question to identify the best and worst hypothetical vaccine profiles, in combination with ranking of the remaining vaccine profiles.
- In eight studies, respondents were asked to rate hypothetical vaccines using a Likert scale.

Figure 6. Format of Choice Questions in Conjoint-Analysis Studies of Vaccines

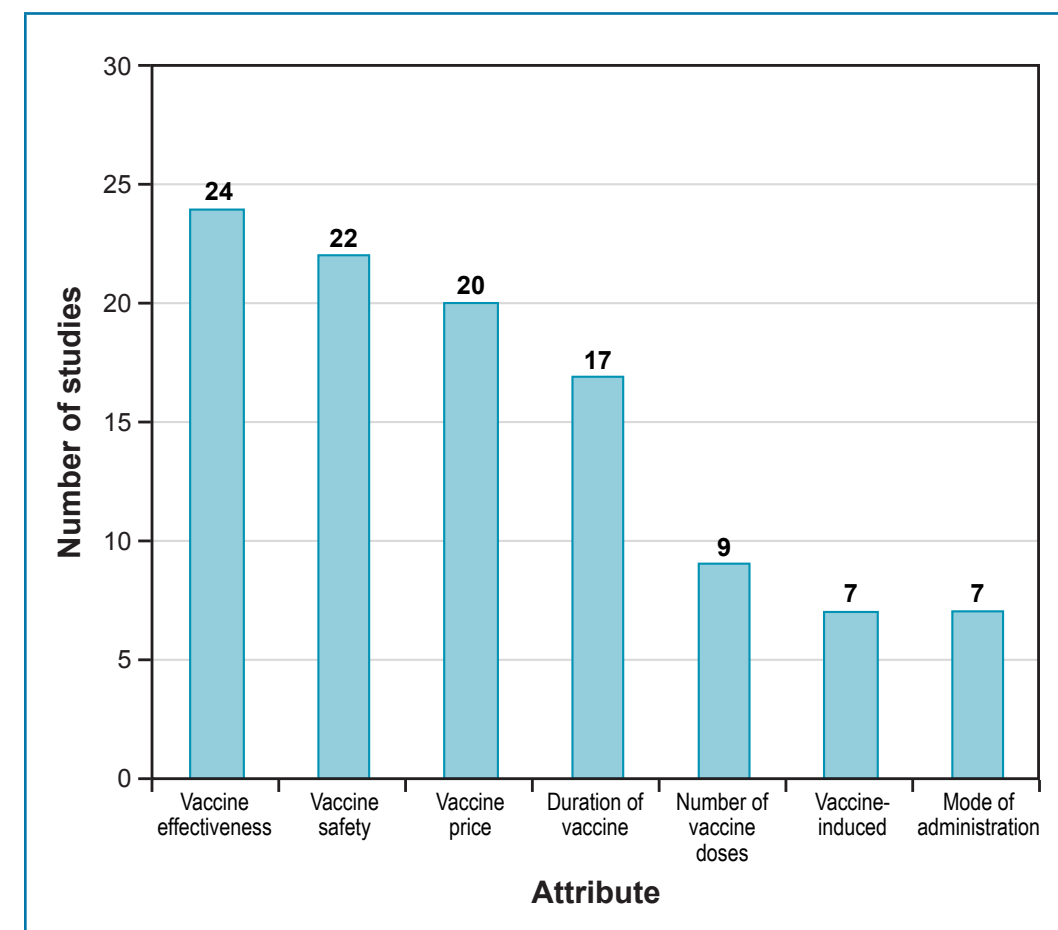


## Vaccine Attributes

- The majority of studies included vaccine efficacy or effectiveness (89%), safety of vaccines (79%), vaccine price (71%), and duration of vaccine effectiveness (61%) (Figure 7).
- An additional 19 vaccine attributes were used by only one to four studies.
- The types and definitions of vaccine features included in the studies varied significantly across studies.

- For example, of the 24 conjoint-analysis studies that included a vaccine-effectiveness attribute, 22 described vaccine effectiveness quantitatively and 2 described it qualitatively.
  - Seven studies presented more than one description of vaccine effectiveness.
  - Most studies (n = 17) described vaccine effectiveness in terms of a percentage reduction in the disease incidence.
    - Five of these studies also described effectiveness in terms of a change in the frequency of the disease (1 additional study used this description alone).
  - Five studies described effectiveness in terms of the percentage of vaccinated people who were protected against disease.
    - Two studies described effectiveness in terms of the number of vaccinated people who were protected against disease.
  - Eight studies used a graphic to facilitate the description of effectiveness.

Figure 7. Conjoint-Analysis Studies of Vaccines That Include Selected Vaccine Attributes



Note: This graph excludes attributes used in the 6 studies conducted with health care providers.

## DISCUSSION AND CONCLUSIONS

- The number of published conjoint-analysis studies of vaccine preferences has been increasing.
  - The studies are diverse in terms of types and definitions of vaccine features, study population, and the type of vaccine examined, though over one-half of the studies focus on vaccines against sexually transmitted diseases.
  - Most studies have been conducted in developed countries.
  - Most studies have been conducted in the United States, but the number of studies conducted in other countries has been increasing.
- The study results depend on the format of the choice question.
  - Most studies used a forced-choice question format, and most allowed respondents to indicate that they would prefer to opt out of vaccination.
    - Using random utility theory, the forced-choice data may be analyzed to estimate the preference weights (utility levels) associated with attribute levels and the importance (changes in utility) associated with changes in attribute levels.
    - Using random utility theory also makes possible the calculation of estimates of marginal rates of substitution, willingness to pay, risk tolerance, and (when opt-out choices are permitted) likely uptake based on estimated preference weights.
  - About one-quarter of the studies used questions to rate vaccine acceptability.
    - Like forced choice, ratings make possible the rigorous evaluation of factors influencing choice.
    - Ratings cannot be used to estimate marginal rates of substitution, willingness to pay, or predicted uptake.
- While stated preferences may differ from revealed and actual preferences, these study outputs are used to better understand individuals' likely vaccination behavior.
- The review is ongoing. The next steps include completing the review of articles identified to date, searching additional sources, and preparing a written report of the findings.

## REFERENCE

1. Marshall D, Bridges JFP, Hauber AB, Cameron R, Donnalley L, Fyie K, et al. Discrete-choice experiment applications in health – how are studies being designed and reported? An update on current practice in the published literature between 2005 and 2008. *Patient*. 2010 Dec 1;3(4):249-56.

## CONTACT INFORMATION

Christine Poulos, PhD  
Senior Economist

RTI Health Solutions  
200 Park Offices Drive  
Research Triangle Park, NC 27709

Phone: +1.919.541.7130  
Fax: +1.919.541.7222  
E-mail: cpoulos@rti.org