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# Negative attitude of highly educated parents and health care workers towards future vaccinations in the Dutch childhood vaccination program

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**Abstract**

*Background:* It is unknown whether further expansion of the Dutch childhood vaccination program with other vaccines will be accepted and whom should be targeted in educational strategies.
*Aim:* To determine attitudes of parents towards possible future vaccinations for their children and the behavioural determinants associated with a negative attitude.
*Design:* Questionnaire study.
*Methods:* Parents of children aged between 3 months and 5 years of day-care centres were asked to fill out a questionnaire. Determinants of a negative attitude to comply with possible future vaccinations against example diseases such as pneumonia or influenza, hepatitis B, TBC, smallpox and SARS were assessed using polytomous logistic regression analysis.
*Results:* Of the 283 respondents, 123 (43%) reported a positive attitude towards all vaccinations, 129 (46%) reported to have a positive attitude to have their child vaccinated against some diseases and 31 (11%) had no intention to comply with any new vaccination. Determinants of a fully negative attitude were a high education of the parent (odds ratio [OR] 3.3, 95% confidence interval [95% CI]: 1.3–8.6), being a health care worker (OR 4.2, 95% CI: 1.4–12.6), absence of religion (OR 2.6, 95% CI: 1.0–6.7), perception of vaccine ineffectiveness (OR 6.9, 95% CI: 2.5–18.9) and the perception that vaccinations cause asthma or allergies (OR 82.4, 95% CI: 8.9–766.8).
*Conclusion:* Modifiable determinants for a negative attitude to comply with new vaccinations are mainly based on lack of specific knowledge. These barriers to vaccinations might be overcome by improving health education in the vaccination program, especially when targeted at educated parents and health care workers.


*Keywords:* Vaccination; Child; Health education; Prevention; Infection

## 1. Introduction

Although in The Netherlands vaccination rates are high among children (97%), a recent report published data showing that over the last 5 years rates have declined by 0.7% for the third vaccination series and such a decline was most noticeable among infants [1]. Since the start of the Dutch vaccination program in 1957, most vaccine-preventable infectious diseases covered by the childhood vaccination program have disappeared or occurrences of such infections have been rare. Apart from individual protection by the vaccines, the high vaccination rates induce herd immunity as well [1,2]. The World Health Organisation stated that 80% of newborns should receive the primary vaccine series of diphtheria, pertussis, tetanus and polio (DTP) and 90% the series of mumps, measles and rubella (MMR) vaccines to maintain herd immunity. To prevent local epidemics the Dutch authorities recommend an even higher vaccination rate of 90% for all vaccine-preventable infectious diseases [1].

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Recently, the Dutch vaccination program has been changed by starting at two instead of three months in 1999, addition of a pertussis vaccine in 2001 for 4-year olds and addition of Meningococcal-C vaccination at the age of 14 months in 2002. In 2003, hepatitis B vaccination was added for children from endemic areas. In the near future, a combined meningococcal-B and pneumococcal vaccination might be incorporated into the program [1].

To date, it is unknown whether further expansion of the vaccination program with other vaccines will be accepted by the target population. Therefore, we conducted a questionnaire study among parents of preschool children to determine the attitude towards compliance with future vaccinations in the Dutch childhood vaccination program and the behavioural determinants associated with a negative attitude.

## 2. Methods

### 2.1. Study population

The study was conducted among parents of children aged between 3 months and 5 years who attended day-care in the centre of the Netherlands with similar vaccine uptake as in the Netherlands as a whole.

### 2.2. Focus group session

By means of a structured focus group interview among parents of children from the day-care centre "Petit Petit", Breukelen, we explored possible determinants of attitudes to comply with vaccinations. In that interview elements that were observed in previous qualitative studies [2,3] and quantitative studies [4–8] were discussed extensively. In general, the parents assessed the child's health as most relevant to have them vaccinated followed by the balance of risks of disease and side effects of vaccination, and the fact that infectious diseases may threaten public health.

### 2.3. Questionnaire

We sent out 800 questionnaires to day-care centres that were associated with the large organisation for day-care "De Blokkentoren" in the centre of The Netherlands. We asked the participants to fill out the questionnaire while focussing on their youngest child. The outcomes of the focus group interview and a questionnaire that was focused on pneumococcal and influenza vaccinations among elderly persons [4] were used to develop the present questionnaire for parents. In all, 54 questions were asked and the majority were based on determinants of health behaviour according to the "Health Belief Model" [9]. We evaluated demography, vaccination status according to the Dutch vaccination scheme (DPTP, HiB, mumps, measles and rubella, Meningococcal-C, diphtheria, tetanus and polio, a-cellular pertussis). Also, we evaluated perceived individual and population protection by vaccination, and possible side effects, self-control of parents, social influence of persons as their doctor or friends as well as their opinion about the current educational program. Finally, we evaluated the attitude of parents towards compliance with example vaccinations that are currently available, but not included in the program for all children such as vaccines against pneumococcal disease or influenza [10,11], hepatitis B [12] and tuberculosis [13] as well as diseases that may occur by bio-terrorism (smallpox) [14] or in case of a pandemic (SARS) [15]. The respondents were asked to answer all propositions on a five-point scale ranging from 'I certainly agree' to 'I certainly disagree' [4].

### 2.4. Outcome measure

According to an earlier study [4], we defined a trichotomous outcome measure. Because the percentage of parents that had a positive attitude towards vaccination against pneumonia or influenza was much lower (36%) than for the other proposed diseases (ranging from 62% [hepatitis B], 64% [SARS], 67% [tuberculosis] to 79% [smallpox]), we choose to evaluate the attitude towards compliance with vaccination against these latter four diseases: (a) positive attitude: intention to comply with these four possible vaccinations; (b) partially negative attitude: intention to have the child vaccinated against some, but not all of the four proposed diseases; and (c) fully negative attitude.

### 2.5. Statistical analysis

We dichotomised the following variables: religion (yes or no), received education (high or low) and the variables on the five-point scale (1–2 [agree] and 3–5 [uncertain and disagree]) in accordance with a previous report [4]. First, we evaluated the univariate associations of potential determinants with both partially negative and fully negative attitude using two separate binary logistic regression analyses. A positive attitude was the reference category. Subsequently, we used the demographical determinants and the behavioural determinants with a $p$-value lower than 0.1 in at least one of the univariate analyses to determine the multivariate associations. Finally, all determinants in the multivariate logistic regression analysis with a $p$-value of 0.05 or lower were used to construct the polytomous logistic regression model [4].

## 3. Results

### 3.1. Study population

Of all 800 questionnaires that were sent out, 283 were returned (response rate 35%). Mean age (S.D.) of the respondents was 35 years (6 years) and 85% were female. Of all respondents, both the father and mother (if applicable) as well as the child were vaccinated according to the Dutch vaccination scheme. The mean number of children was 2.4 per household, the youngest child was 2 years on average.