# Parental Perceptions of the Childhood Vaccination Schedule and Combination Vaccines in the United States

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## Background

- In the United States, 10 different vaccines (HepB, RV, DTaP, Hib, PCV13, IPV, Influenza, MMR, Varicella, and HepA) are recommended by the US CDC Advisory Committee on Immunization Practices (ACIP) from birth to 18 months
- Adherence to the recommended vaccination schedule offers optimal individual and community protection and maximizes the impact on population health[1]
- Despite the benefits of vaccinations, parents may choose not to adhere to the recommended schedule by either refusing or delaying certain vaccines[2-5]
  - Common reasons include confusion over the schedule, children having too many shots at one time, safety concerns, perceived immune overload, vaccine hesitancy, vaccine resistance, and the belief that vaccinations are unnecessary[2,6-8]
- Combination vaccines reduce the number of required injections and can improve the completeness and timeliness of vaccination coverage[9,10]
- Recent studies evaluating parental attitudes and preference towards combination vaccines in the United States are limited

## Objective

- The objective of the study was to gain a contemporary understanding of parents' attitudes towards the recommended childhood vaccination schedule and combination vaccine use in infants, anticipating the availability of a hexavalent vaccine

## Methods

### Study Design and Population

- This was a cross-sectional, online survey of US parents of infants aged 0-24 months meeting the following criteria:
  - Aged ≥18 years
  - Involved in vaccine decision making for their infant
  - Accompanied the child to ≥1 vaccination visit
  - Able to read English
- Parents who were unwilling to vaccinate their child under any circumstances were excluded from the survey
- Quota sampling was used to ensure a representative mix of parents by age and region
- Survey participants were compensated for their time
- The study protocol was granted an exemption from review by the Advarra Institutional Review Board

### Study Survey and Data Analysis

- The survey attempted to understand parental attitudes and perceptions towards the recommended vaccination schedule and combination vaccines, physician-parent interactions, and delay or refusal of vaccines
- Descriptive analyses of survey responses were conducted using SAS v9.4 software

## Results

### Parent Characteristics

- A total of 100 parents answered the survey
- On average, parents were 30.7 years old, 68% of respondents were female, and 91% were White (**Table 1**)
- When asked about vaccination, 58% of parents had done their research and believed that getting their child vaccinated was best for their child (**Table 1**)
- 19% of parents did not feel the need to research vaccinations because they considered their health care provider to be the expert (**Table 1**)

### Table 1. Parent Characteristics

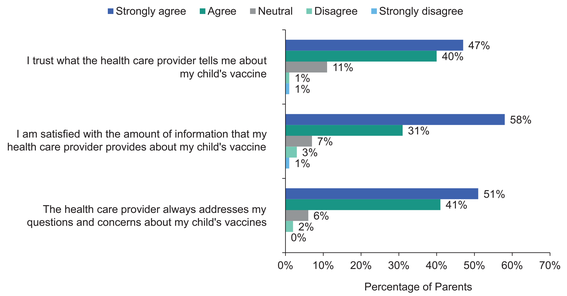
| Characteristics | Parents (N = 100) | Characteristics | Parents (N = 100) |
|---|---|---|---|
| Age, in years, mean (SD) | 30.7 (4.9) | Employment status[a] | |
| Female | 68 (68%) | Full-time (≥40 hours/week) | 59 (59%) |
| White | 91 (91%) | Part-time (<40 hours/week) | 18 (18%) |
| Region | | Homemaker | 20 (20%) |
| Midwest | 21 (21%) | Income level[b] | |
| Northeast | 16 (16%) | <$30,000 | 9 (9%) |
| South | 39 (39%) | $30,000-$59,999 | 35 (35%) |
| West | 24 (24%) | $60,000-$99,999 | 33 (33%) |
| Marital status | | >$100,000 | 21 (21%) |
| Married or domestic partner | 87 (87%) | Type of insurance for youngest child | |
| Single, never married | 10 (10%) | Public | 50 (50%) |
| Divorced/separated | 3 (3%) | Private | 43 (43%) |
| Education level | | No insurance (out-of-pocket) or other | 7 (7%) |
| Secondary or high school (or GED) | 23 (23%) | | |
| College or university degree (2- or 4-year) | 52 (52%) | | |
| Advanced or graduate or postgraduate degree | 25 (25%) | | |
| Thoughts about vaccination | | | |
| • I have done my research and I believe that getting my child vaccinated is what is best for him or her | 58 (58%) | | |
| • I don't feel the need to research vaccinations because my health care provider is the expert | 19 (19%) | | |
| • I have concerns about vaccines but believe that getting my child vaccinated is what is best for him or her | 21 (21%) | | |
| • I have concerns about vaccines, so I have declined or plan to decline certain vaccines for my child | 2 (2%) | | |

[a]For employment status, 2 (2%) parents selected "student" and 1 (1%) parent selected "unemployed."
[b]For income level, 2 (2%) parents selected they "prefer not to answer."

### Attitudes Towards Health Care Providers

- 87% of parents trust (strongly agree or agree) what the health care provider tells them about their child's vaccines (**Figure 1**)
- 89% of parents were satisfied (strongly agree or agree) with the amount of information that their health care provider shared about their child's vaccines
- 92% of parents thought (strongly agree or agree) that the health care providers always addresses their questions and concerns about their child's vaccines

### Figure 1. Attitudes Towards Health Care Providers




### Source of Vaccination Information and Decision-Making

- Almost all (96%) parents obtained vaccination information from their child's health care provider, 63% went online for information, 45% asked friends or family, and 18% asked their child's day care or teacher for information on vaccination
- Among parents of children who attend day care or preschool (N=52), their child's day care or preschool vaccination requirements always or very often influenced their decision to vaccinate their child

### Table 2. Delay or Refusal of Vaccines

| Question | Responses | Parents (N = 100) |
|---|---|---|
| To what extent do you follow your child's health care provider's recommendations? | I follow the health care provider recommendations for all my child's vaccinations | 84 (84%) |
| | I follow some of the health care provider recommendations for my child's vaccinations | 16 (16%) |
| Have you ever asked your child's health care provider to delay or refuse certain vaccines? | Yes | 33 (33%) |
| | No | 67 (67%) |
| How often do you ask your health care provider to delay or refuse certain vaccines?[a] | All the time | 14 (42%) |
| | Often | 8 (24%) |
| | Sometimes | 4 (12%) |
| | Rarely | 7 (21%) |

[a]Question asked only among the parents (N = 33) who replied "Yes" to the question, "Have you ever asked your child's health care provider to delay or refuse certain vaccines?".

### Delay or Refusal of Vaccines

- 84% of parents reported following their health care providers recommendations for all childhood vaccinations (**Table 2**)
- One-third of parents had ever asked to delay or refused vaccines for their child (**Table 2**)
  - The most commonly reported reasons for delay were to avoid pain and crying from multiple injections and the thought that too many vaccines would overwhelm their child's immune system (**Table 3**)
- The most common reasons for refusal were religious beliefs and thinking the vaccine is not needed (**Table 3**)

### Table 3. Reasons for Delay or Refusal of Vaccines

| Responses | Reason for Delay (N = 28) | Reason for Refusal (N = 23) |
|---|---|---|
| I wanted to avoid crying and pain from multiple injections | 23 (82%) | 10 (44%) |
| I thought that too many vaccines would overwhelm child's immune system | 18 (64%) | 8 (35%) |
| The location to get the vaccine was too far or hard to get to | 11 (39%) | 9 (39%) |
| I missed or forgot about the appointment due to work/personal reasons | 14 (50%) | NA |
| My child was not feeling well during the appointment (ie, fever) | 13 (46%) | NA |
| Religious beliefs | NA | 13 (57%) |
| I refused the vaccine(s) for my older child and he/she is fine without it | NA | 11 (48%) |
| I did not think the vaccine was needed | NA | 12 (52%) |
| I did not think the vaccine(s) was safe for my child | NA | 5 (22%) |
| Other reasons | 1 (4%) | NA |

NA, not applicable.

### General Attitudes Towards Combination Vaccines

- One-third of parents reported that their child had not received a combination vaccine or that they did not know if their child had received a combination vaccine (**Table 4**)
- Parents reported a median of 3 injections (range 2-4) as the maximum they would be comfortable with their child receiving at a single office visit (**Table 4**)

### Table 4. General Attitudes Towards Combination Vaccines

| Question | Responses | Parents (N = 100) |
|---|---|---|
| What is the maximum number of shots that you are comfortable with your child getting at a single visit? | Mean (SD) | 2.95 (1.61) |
| | Median (Q1-Q3) | 3.0 (2.0-4.0) |
| | Range | 1.0 to 10.0 |
| Are you aware that there are vaccine products available that combine multiple vaccines into a single shot? | Yes | 84 (84%) |
| | No | 16 (16%) |
| Has your child ever received a combination vaccine? | Yes | 67 (67%) |
| | No | 27 (27%) |
| | I don't know | 6 (6%) |

SD, standard deviation; Q, quartile.

## Limitations

- Self-reported information was used to determine eligibility for the survey
- Response bias, the tendency to answer questions on a survey untruthfully, may have affected the survey results
- The sample of participants recruited from online panels may not be representative of the overall US population

## Discussion and Conclusions

- Most parents trust and follow their provider's recommendations; this suggests that healthcare providers are in a strong position to influence vaccination decisions.
- Among parents who asked to delay vaccines, the most common reason was to avoid their children's crying and pain from multiple injections.
- Over 80% of surveyed parents were aware of combination vaccines; however, one-third were unaware that their children had received one.

## References

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## Disclosures

TP, YTC and MG are employees of Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., Kenilworth, NJ, USA, and own stock in Merck & Co., Inc., Kenilworth, NJ, USA. XN, JA, and JB are full-time employees of Pharmerit, the institution that received funding from Merck & Co., Inc. GSM has been an investigator on clinical trials funded by GlaxoSmithKline, Merck, Novartis, Pfizer, Sanofi Pasteur, Swiftwater, PA, USA, and Seqirus, and has received honoraria from these companies for service on advisory boards and/or non-branded presentations.DJ is an employee of Sanofi Pasteur, Swiftwater, PA, USA. This study was funded by MSP Vaccine Company - a joint venture between Merck Sharp & Dohme Corp., a subsidiary of Merck & Co., Inc., NJ, USA and Sanofi Pasteur Inc., Swiftwater, PA, USA.



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