

Physician Attitudes Toward Combination Vaccine Use in Infants up to 24 Months of Age in the United States

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Background and Research Objectives

- Ten different vaccines are recommended by the US Advisory Committee on Immunization Practices (ACIP) from birth to 24 months
- Parents may choose to not adhere to the recommended childhood immunization schedule by refusing and/or delaying certain vaccines¹⁻³
- ACIP recommendations state that combination vaccines are generally preferred over equivalent individual component vaccines⁴
- Combination vaccines reduce the number of required injections and can improve the compliance and timeliness of vaccination coverage without affecting efficacy or safety^{5,6}
- Research in the early 2000s found that receipt of at least one dose of a combination vaccine was associated with increased vaccination coverage,⁶ and the providers considered the main value of pentavalent vaccines (Diphtheria, Tetanus, Pertussis, Polio, and/or Hepatitis B and Haemophilus influenzae type b [Hib]) to be fewer shots (71%), followed by increased office efficiency (32%)⁷
- The objective of this study was to gain a contemporary understanding of physicians' attitudes toward combination vaccine use in infants and toddlers

Methods

Study Design and Population

- This was a cross-sectional, online survey of US pediatricians and family practitioners (FP) meeting the following criteria:
 - Pediatric or family practice physician
 - Works in a practice that provides vaccines to children aged 0-24 months
 - Spends at least 2 days a week providing patient care
- Quota sampling was used to ensure a representative mix of physicians across different age groups, practice locations, and regions
- Physicians were identified for inclusion based on self-reported characteristics
- The proportion of physicians not using pentavalent combination vaccines was limited to 10% of the total survey sample

Study Survey and Data Analysis

- The study survey collected information on sociodemographic and practice characteristics, attitudes and perceptions towards combination vaccines, and choice of combination vaccines
- We conducted descriptive analyses of survey responses using SAS v9.4

Results

Physician and Practice Characteristics

- Out of 497 physicians who accessed the study link, 124 (25%) fulfilled the eligibility criteria and quotas and agreed to participate in the study. The first 100 respondents that completed the survey were included in the study analysis
- On average, the survey took 21.8 minutes to complete. Characteristics of the physicians are presented in **Table 1**
- The average age of physicians was 50.2 years and most were male (60%), white (66%), practiced in an urban location (88%), and worked in a group practice setting (48%)
- More than half of the physicians reported that their institution or practice has a program to incentivize childhood vaccination according to schedule

Table 1. Physician Characteristics (N=100)

Characteristic	All (N=100)	Family Practice (N=30)	Pediatrics (N=70)
Age in years, mean (SD)	50.2 (8.2)	52.6 (8.9)	49.1 (7.8)
Sex, male, N (%)	60 (60%)	23 (77%)	37 (53%)
Race, white, N (%)	66 (66%)	21 (70%)	45 (64%)
Region, N (%)			
Midwest	23 (23%)	9 (30%)	14 (20%)
Northeast	21 (21%)	5 (17%)	16 (23%)
South	36 (36%)	10 (33%)	26 (37%)
West	20 (20%)	6 (20%)	14 (20%)
Urban practice location, N (%)	88 (88%)	24 (80%)	64 (91%)
Practice type, N (%)			
Solo practice	18 (18%)	7 (23%)	11 (16%)
Group practice	48 (48%)	14 (47%)	34 (49%)
Hospital owned	18 (18%)	7 (23%)	11 (16%)
Federally qualified health center	6 (6%)	2 (7%)	4 (6%)
Academic health center	10 (10%)	0 (0%)	10 (14%)
Payment mix, mean (SD)			
% public insurance	32.7 (25.2)	31.4 (23.3)	33.3 (26.1)
% private insurance	61.6 (26.1)	61.2 (25.7)	61.7 (26.5)
% self-pay	5.7 (6)	7.4 (8)	5.0 (5.8)
Years in practice since completing residency/fellowship, mean (SD)	19.5 (7.2)	21.5 (7.6)	18.6 (6.8)
Number of infants prescribed or administered vaccines to in a month, mean (SD)	75.4 (62.6)	28.9 (33.8)	95.2 (61.7)
Vaccine incentives programs at institution/practice, N (%)			
Pay-for-performance (P4P) programs	29 (29%)	8 (27%)	21 (30%)
Combo10-HEDIS	19 (19%)	1 (3%)	18 (26%)
UDS quality measures	12 (12%)	5 (17%)	7 (10%)
Institutional or local policies/metrics or other quality indicators	23 (23%)	7 (23%)	16 (23%)
No policies on pediatric vaccinations	48 (48%)	18 (60%)	30 (43%)

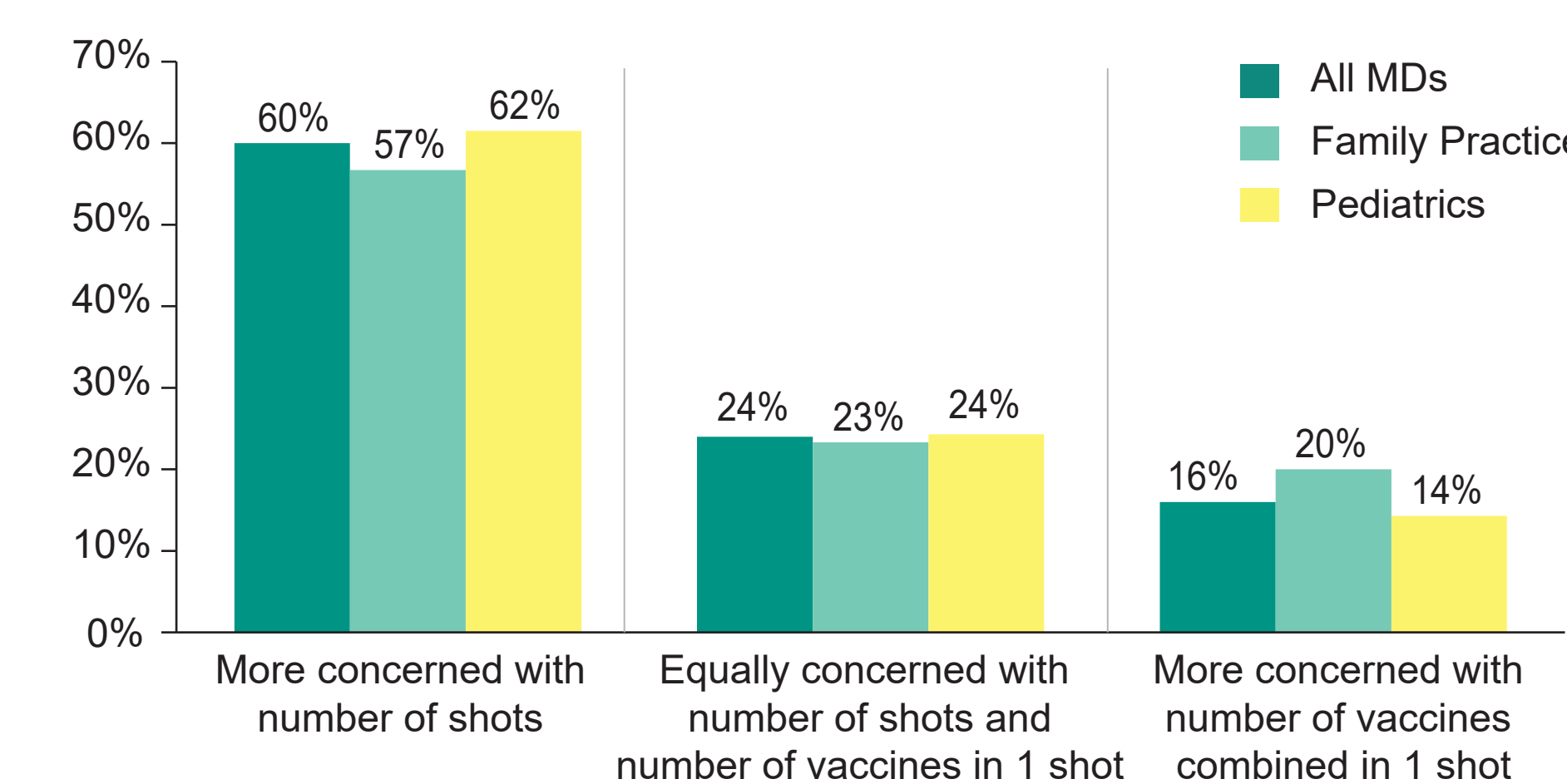
Attitudes Toward Parental Request to Delay or Refuse Vaccines

- Physicians reported always or often encountering parents wanting to delay influenza vaccination (48%), followed by measles, mumps and rubella (MMR) (17%), hepatitis A (HepA) (15%), varicella (13%), hepatitis B (HepB) and rotavirus (each 11%)
- When asked about their response to parents' to delay vaccines, fewer physicians reported that they strongly opposed delays to varicella (58%), influenza (52%), HepB (45%), rotavirus (42%) and HepA (36%) vaccinations, compared to MMR (71%)
- When encountering a parents' requests to delay or refuse a vaccine, physicians reported that they manage it by reassuring parents about safety concerns (64%), telling parents their child will be at risk for vaccine-preventable diseases (61%), and that they vaccinate their own children according to the recommendations (42%)

Attitudes Toward Combination Vaccines

- 71% of the survey physicians (FP: 67%; pediatricians: 73%) reported that they routinely explained what combination vaccines are to parents
- From the perspective of the healthcare provider, physicians reported the maximum number of injections parents would accept at a single office visit as 4 injections (median; range 2-9)
- Physicians perceived that parents are more concerned with the number of injections (60%) than the number of diseases prevented in one shot (**Figure 1**)
- The main reasons for being likely or very likely to use a combination vaccine were to reduce the number of injections (96%), ensure the infant is up-to-date with vaccinations (86%), and reduce the pain that the infant experiences with multiple injections (68%)

Figure 1. Physician Perceptions on the Extent to Which Parents Are Concerned With the Number of Injections Versus Number of Vaccines Combined in One Shot



Choice of Combination Vaccines

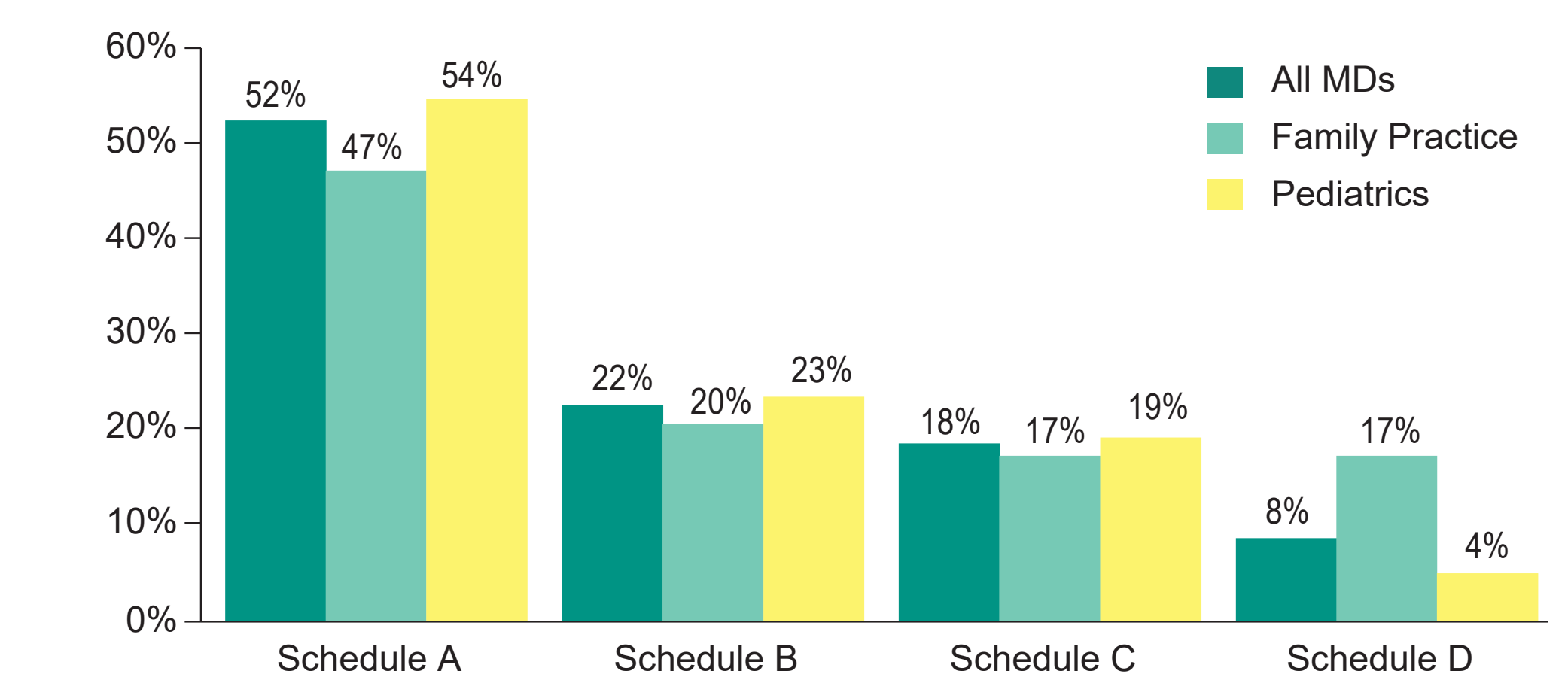
- When deciding which pentavalent vaccine to use, physicians mainly considered how the brand fits into their current vaccine schedule (71%), upfront purchasing costs (64%), and availability as a prefilled syringe (61%)
- When presented with four vaccination schedules (**Table 2**), more than half of the physicians (52%) reported using Schedule A, which includes a pentavalent vaccine and a separate hepatitis B vaccine (**Figure 2**)
- If a new hexavalent (DTaP, Polio, Hib and HepB) vaccine-based schedule was available, 76% of physicians said they would choose it over their current schedule comprising pentavalent or equivalent component vaccines

Table 2. Commonly Used Vaccination Schedules

Age of Child	Schedule A	Schedule B	Schedule C	Schedule D
Month 2	1 pentavalent vaccine (DTaP, Polio & Hib) + 1 HepB vaccine + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 Hib vaccine + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 Hib vaccine + 1 pneumococcal vaccine	1 DTaP vaccine + 1 Polio vaccine + 1 HepB vaccine + 1 Hib vaccine + 1 pneumococcal vaccine
Month 4	1 pentavalent vaccine (DTaP, Polio & Hib) + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 Hib vaccine + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 Hib vaccine + 1 pneumococcal vaccine	1 DTaP vaccine + 1 Polio vaccine + 1 Hib vaccine + 1 pneumococcal vaccine
Month 6	1 pentavalent vaccine (DTaP, Polio & Hib) + 1 HepB vaccine + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 Hib vaccine + 1 pneumococcal vaccine	1 pentavalent vaccine (DTaP, Polio & HepB) + 1 pneumococcal vaccine	1 DTaP vaccine + 1 Polio vaccine + 1 HepB vaccine + 1 Hib vaccine** + 1 pneumococcal vaccine
Total number of injections in 6 months	8 injections	9 injections	8 injections	13-14 injections
I mainly use this:	A	B	C	D

**The Hib vaccine at Month 6 may or may not be needed, depending on the vaccine brand used.

Figure 2 Commonly Used Vaccination Schedules as Reported by Physician



Conclusions

- Physicians believe that parents are more concerned with the number of injections that their child receives than the number of vaccines combined in a single shot
- The main reasons for combination vaccine use are to reduce the number of injections given to children, ensure the child is up-to-date with their vaccines, and reduce the pain that the child experiences with multiple injections
- The choice of pentavalent vaccines among pediatricians and FPs was largely dependent on convenience and cost-related factors
- Over three-quarters of physicians would be inclined to use a hexavalent vaccine schedule, if available

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Disclosures

YTC, TP 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. DJ is an employee of Sanofi Pasteur, Swiftwater, PA, USA. GSM has been an investigator on clinical trials funded by GlaxoSmithKline, Merck, Novartis, Pfizer, Sanofi Pasteur, and Seqirus, and he has received honoraria from these companies for service on advisory boards and/or non-branded presentations.

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