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# Preferences for Influenza Vaccines for Children: Do Children and Parents Agree?

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## Introduction

- In 2009, the Advisory Committee on Immunization Practices (ACIP) expanded their recommendations for annual influenza vaccine to include school-aged children through 18 years of age.<sup>1,2</sup>
- Two types of influenza vaccine are currently approved in the US.
  - Trivalent inactivated influenza vaccine (TIV) – a vaccine containing inactivated or killed influenza virus that is administered by intramuscular injection. The most common side effects in children include soreness at the injection site, low-grade fever, and aches.<sup>1</sup> Approved for eligible children aged ≥6 months. Refer to product-specific prescribing information for additional information.<sup>3-6</sup>
  - Live attenuated influenza vaccine (LAIV) – a vaccine containing live, attenuated influenza virus that is administered intranasally. The most common side effects in children include runny nose and low grade fever. LAIV is approved for eligible children ≥ 2 years of age. Refer to product-specific prescribing information for additional information.<sup>7</sup>

## Objective

- To explore preferences for pediatric influenza vaccine attributes and the relative importance of the attributes from the perspective of parents and children

## Methods

- Quantitative web surveys were developed for parents of children 2–12 years of age and for children 8–12 years of age.
  - Surveys were based on focus groups with parents, in-person 1-on-1 interviews, clinician consultation, and literature review.
- Children 8–12 years of age and parents of children 2–12 years of age were sampled from August through September 2009 from a nationwide online panel, KnowledgePanel® (Knowledge Networks, Inc., Cranford, NJ), which includes more than 40,000 US residents.
- Surveys included items assessing the importance of influenza vaccine attributes and side effects, and preference for the child to receive influenza vaccine via nasal spray or injection.
- A series of choice tasks (conjoint) were included: respondents were asked to choose between two hypothetical vaccine product profiles with attributes and levels reflecting the available vaccines (Tables 1 and 2).
- IRB approval was obtained before study initiation. Before beginning the survey, parent participants and parents of participating children provided informed consent. Children 12 years of age provided informed assent before completing the survey.
- Statistical Analysis Software (SAS), Version 9.0 (SAS Institute, Cary, NC), was used for the analysis. Frequencies and descriptive statistics were calculated for all variables.
- Analysis of conjoint tasks was performed with Sawtooth Software (Sequim, Washington). A hierarchical Bayes approach computed individual-level utility estimates for each attribute level. Relative importance values were calculated for each influenza vaccine attribute and the market simulator was used to estimate market share between LAIV and TIV.

- Data from approximately 15% of the children's sample and 9% of the parents' sample were excluded from conjoint analysis because of incorrect responses to items that evaluated their ability to understand conjoint tasks.

Attribute	Level 1	Level 2
Efficacy (Works _)	Very Well	Well
Runny/Stuffy Nose (_ chance of a runny/stuffy nose for a day)	No	Low
Sore Arm (_ chance of a sore arm for a day)	No	Low
Mode (It's a _)	Shot	Nose Spray

Attribute	Level 1	Level 2	Level 3
Efficacy (Results in _ fewer cases of flu [vs no vaccine])	90%	70%	50%
Runny/Stuffy Nose (_ chance of a runny nose/nasal congestion for a day)	0%	15%	30%
Sore Arm (_ chance of a sore arm for a day)	0%	15%	30%
Mode	Shot	Nasal spray	N/A
Mercury-containing preservative (_ a mercury-containing preservative)	Has	Does not have	N/A
Virus Type (Made with a _)	Killed virus (like the polio vaccine)	Live weakened virus (like the chicken pox vaccine), but does not cause the flu	N/A

## Results

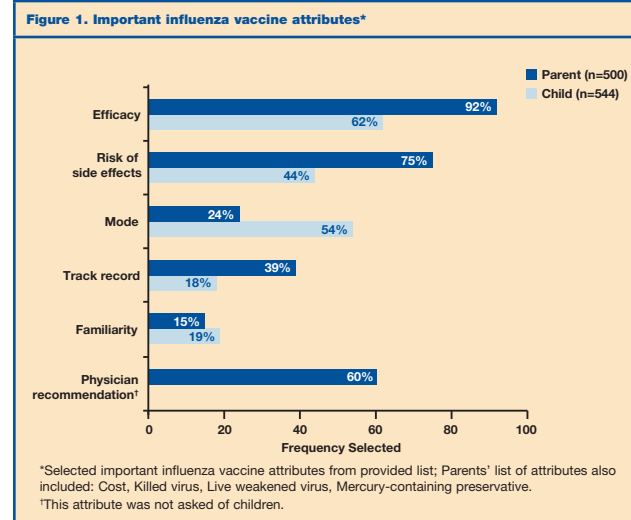
- 544 children aged 8–12 years and 500 parents of children aged 2–12 years completed Web surveys. Sociodemographic information for the children and parents can be found in Tables 3 and 4, respectively.

Characteristics	n (%)
Age, y	
8	104 (20)
9	113 (21)
10	112 (21)
11	109 (20)
12	106 (20)
Sex	
Male	277 (51)
Female	266 (49)
Racial/Ethnic Background	
White, Non-Hispanic	401 (74)
Black, Non-Hispanic	44 (8)
Other, Non-Hispanic	19 (4)
Hispanic	41 (8)
2+ Races, Non-Hispanic	36 (7)
Parents' Household Income	
Less than \$30,000	58 (11)
\$30,000 to \$59,999	154 (28)
\$60,000 to \$99,999	192 (35)
\$100,000 or more	140 (26)
Consenting Parent's Highest Level of Education Completed	
Less than high school	18 (3)
High school	108 (20)
Some college	116 (21)
Associate's degree	59 (11)
College degree	148 (27)
Graduate degree	95 (18)

Characteristics	n (%)
Age, y	
Mean (SD)	37.4 (6.82)
Median	37
Minimum, Maximum	22, 68
Sex	
Male	214 (43)
Female	286 (57)
Racial/Ethnic Background	
White, Non-Hispanic	391 (78)
Black, Non-Hispanic	20 (4)
Other, Non-Hispanic	21 (4)
Hispanic	49 (10)
2+ Races, Non-Hispanic	19 (4)
Household Income	
Less than \$30,000	51 (11)
\$30,000 to \$59,999	127 (25)
\$60,000 to \$99,999	185 (37)
\$100,000 or more	137 (27)
Highest Level of Education Completed	
Less than high school	19 (4)
High school	103 (21)
Some college	86 (17)
College degree	196 (39)
Graduate degree	96 (19)
Current Employment Status	
Working	365 (73)
Unemployed	37 (7)
Retired	1 (1)
Disabled	16 (3)
Other	81 (16)

## Importance of Influenza Vaccine Attributes

- When asked to choose important influenza vaccine attributes from a predefined list, efficacy was most frequently selected by parents and children (Figure 1).

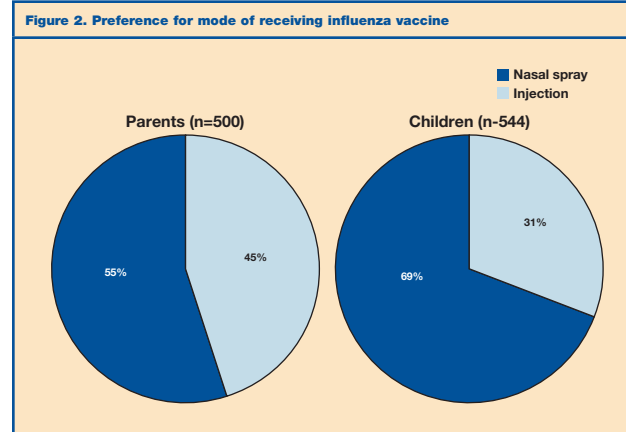


- A majority of children selected efficacy (62%) and mode (54%) as important vaccine attributes.
- Parents most frequently chose efficacy (92%), followed by risk of side effects (75%) and physician recommendation (60%).
- When asked to select the single most important vaccine attribute, 45% of children chose efficacy followed by 31% of children who chose mode.

- Parents gave the highest mean importance ratings (using a 5-point scale where 1=A little important to 5=Extremely important) to efficacy (mean 4.44), whether the vaccine contains a mercury-containing preservative (4.36, selected as important by 51%), and physician recommendation (4.03).

## Preference for Mode of Receiving Influenza Vaccine

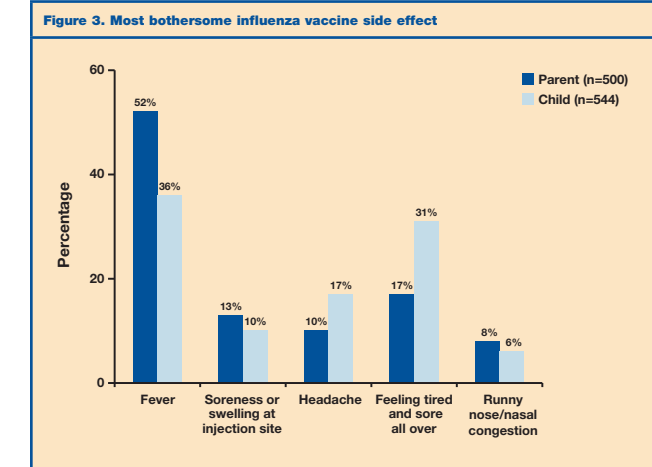
- With all other attributes being equal, most children (69%) would choose to receive the influenza vaccine as a nasal spray instead of by injection. Parents slightly preferred the nasal spray over the injection (55% vs 45%) for their child (Figure 2).
- Children most frequently selected the following reasons for choosing the nasal spray: "It won't hurt" (80%), "I don't like shots" (69%), "It's easier than a shot" (56%), and "My arm won't be sore afterwards" (56%).
- Parents most frequently selected "It wouldn't hurt" (81%), "My child doesn't like shots" (75%), and "It would be easier than a shot" (60%).



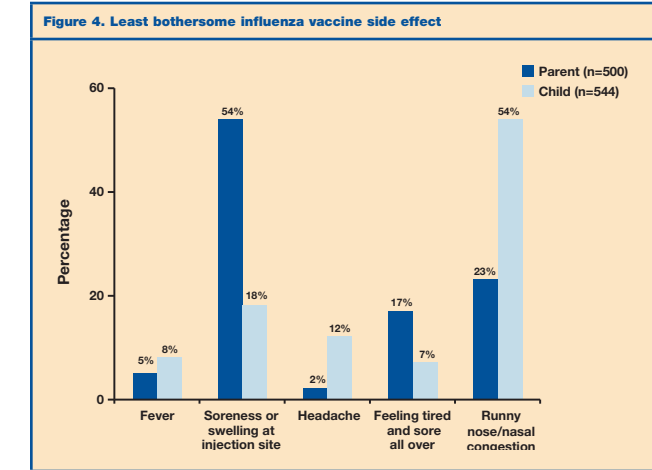
- Among children and parents who prefer injections, familiarity was often selected as an important reason (31% and 45%, respectively).
- Children most frequently selected the following reasons for preferring the shot: "I don't like the feeling of things in my nose" (51%), "I'm used to shots" (50%), and "I don't mind getting shots" (50%).
- Parents most frequently selected "I'm used to shots/shots are more familiar to me" (59%), "I don't know what the nose spray would be like" (43%), and "The nose spray wouldn't be as effective (might not get the full dose)" (41%).
- In an additional scenario, parents and children who preferred the shot were asked to choose either the nasal spray or injection when the child would be getting 2 other shots at the same time.
- 20% of children and 17% of parents who originally chose the injections would change their choice to the nasal spray given this scenario.

## Influenza Vaccine Side Effects

- 'Fever' was selected most frequently by both parents and children as the worst side effect of influenza vaccination (52% and 36%, respectively; Figure 3).



- Parents most frequently selected 'soreness or swelling where you got the shot' (54%) as the least bothersome side effect, while children most frequently selected runny/stuffy nose (54%) as least bothersome (Figure 4).



## Choice (Conjoint) Tasks

### Choice Tasks

- Relative importance of influenza vaccine attributes (Table 5)
  - Efficacy was an important influenza vaccine attribute for both parents and children.

- Mode was the main driver in preference for children, with a relative importance of 40.5%, followed by efficacy (30.6%).
- For parents, efficacy had the highest relative importance with 36.0%. Mercury-containing preservative was similar (35.7%).
- In contrast with children's preferences, mode only had a relative importance of 6.5% for parents.

Attribute	Relative Importance*, %	
	Children (n=464)	Parents (n=491)
Efficacy	30.64	36.02
Runny nose/nasal congestion	14.39	10.01
Sore Arm	14.47	6.87
Mode	40.51	6.49
Mercury-containing preservative	—	35.74
Virus type	—	4.88

\*Ratio data, ie, 10% is twice as important as 5%.

## Conclusions

- Influenza vaccine efficacy is a key driver of preference for parents and children.
- Risk of side effects (for parents) and mode of delivery (for children) were also key drivers.
- In conjoint analysis, efficacy was still most important to parents, while mode was given the highest relative importance in children.
- Parents and children agreed that fever was the most bothersome side effect, although their opinions regarding least bothersome side effects differed.
- For children 8 years of age and older, parents and physicians should consider engaging them in the decision-making process and discussing vaccine attributes prior to influenza vaccination.
- Future studies may want to examine whether increasing awareness among parents and children regarding available influenza vaccines for children and their varying attributes increases vaccination rates.

## References

- Fiore AE, et al. *MMWR Recomm Rep*. 2009;58:1-52.
- Centers for Disease Control and Prevention (CDC). Children, the Flu, and the Flu Vaccine. Available at: <http://www.cdc.gov/flu/protect/children.htm>. Accessed January 10, 2010.
- Fluzone®. (Influenza Virus Vaccine), Full Prescribing Information. Swiftwater, PA: sanofi pasteur, 2009.
- Afluria®. (Influenza Virus Vaccine), Full Prescribing Information. Parkville, Australia: CSL Limited, 2009.
- Fluarix®. (Influenza Virus Vaccine), Full Prescribing Information. Research Triangle Park, NC: GlaxoSmithKline, 2009.
- Flulaval®. (Influenza Virus Vaccine), Full Prescribing Information. Quebec City, Canada: ID Biomedical Corporation, 2009.
- FluMist®. (Influenza Virus Vaccine Live, Intranasal), Full prescribing information. Gaithersburg, MD: MedImmune; 2009.

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