

Sources and Perceived Credibility of Vaccine-Safety Information for Parents

AUTHORS: Gary L. Freed, MD, MPH,^{a,b,c} Sarah J. Clark, MPH,^{a,b} Amy T. Butchart, MPH,^{a,b} Dianne C. Singer, MPH,^{a,b} and Matthew M. Davis, MD, MAPP^{a,b,d,e}

^aDivision of General Pediatrics, Department of Pediatrics and Communicable Diseases, and ^dDivision of General Internal Medicine, Department of Internal Medicine, University of Michigan Health System, Ann Arbor, Michigan; and ^bChild Health Evaluation and Research (CHEAR) Unit, ^cDepartment of Health Management and Policy, School of Public Health, and ^eGerald R. Ford School of Public Policy, University of Michigan, Ann Arbor, Michigan

KEY WORDS

vaccine, safety, parents, information

www.pediatrics.org/cgi/doi/10.1542/peds.2010-1722P

doi:10.1542/peds.2010-1722P

Accepted for publication Nov 29, 2010

Address correspondence to Gary L. Freed, MD, MPH, University of Michigan, 300 N Ingalls, Building 6E08, Ann Arbor, MI 48109-0456. E-mail: gfreed@med.umich.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2011 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: *The authors have indicated they have no financial relationships relevant to this article to disclose.*

abstract

CONTEXT: The source of health information can have an impact on the manner and frequency of its use. In the arena of vaccine safety, a variety of sources promulgate information from very different perspectives. The spectrum runs from traditional sources such as public health officials and physicians to nontraditional sources, such as celebrities.

OBJECTIVE: To assess what proportion of parents trust vaccine information from different sources and whether different groups of parents vary in their trust of such information.

METHODS: In January 2009, as part of a larger study of parents and nonparents, 2521 online surveys were fielded to a nationally representative sample of parents of children aged ≤ 17 years. The main outcome measure was the source credibility of vaccine-safety information used by parents.

RESULTS: The response rate was 62%. Parents reported trusting their children's doctor for vaccine-safety information most often (76% endorsed a lot of trust), followed by other health care providers (26%), government vaccine experts/officials (23%), and family and friends (15%). In contrast, celebrities were trusted a lot by 2% of the respondents and not at all by 76% of the respondents. Levels of trust in specific sources of vaccine-safety information varied significantly by gender (women $>$ men) and race/ethnicity (Hispanics $>$ other groups).

CONCLUSIONS: Although most parents place a lot of trust in their child(ren)'s physician, parents' trust in non-health professional sources for such information should not be discounted. Those who design public health efforts to provide evidence-based information must recognize that different strategies may be required to reach some groups of parents who use other information sources. *Pediatrics* 2011;127:S107–S112

The source of health information can have an impact on the manner and frequency of its use. Sources may have different credibility with various segments of the population. Such credibility can have a marked impact on the acceptance of information and the degree to which it is trusted and on which it is acted.

In the arena of vaccine safety, a variety of sources promulgate information from very different perspectives. The spectrum runs from traditional sources such as public health officials and physicians to celebrities and parent/child advocacy groups.

In addition, the methods of vaccine-safety information dissemination have become quite varied. Information can be provided through conventional mass-distribution methods such as public safety announcements or more personally through physician-patient/parent discussions at office visits. Information can also be provided through newer media routes including Web sites, blogs, and television drama or interview programs.

It is unknown what proportion of parents receive and/or trust vaccine information from different sources and which methods of dissemination are used most frequently or effectively. It is also unknown if different groups of parents vary in their use and trust of such information. We conducted a national study to address these gaps in understanding.

METHODS

Panel Design

The survey sample was drawn by a survey vendor (Knowledge Networks, Menlo Park, CA) from a national online panel (KnowledgePanel) that contains ~50 000 members. Households were selected for recruitment to this panel by random-digit telephone dialing on the basis of a sample frame of the US

residential telephone population. Telephone exchanges shown in the 2000 US Census to have a high concentration of black and Hispanic households were sampled at a higher rate than those without this high concentration. Sampling was performed without replacement.

Internet Access

Household members who consented to join the panel and did not already have Internet access were provided with free Internet access. Those who already had Internet access and were recruited to the panel were asked to use their own hardware and Internet connections.

Sample

This study is based on a nationally representative sample of parents of children aged 17 years or younger drawn from the panel described above. Only 1 adult per household was included in the sample.

Survey Design

Survey topics included parental trust in various sources of information about vaccines and their dissemination routes. Degree of trust in a source was rated as a lot, some, or not at all. Respondents were also given the option to state if they did not use or view a particular dissemination route. In December 2008, the survey vendor pilot-tested the draft survey with 100 respondents and sent the deidentified responses to the survey team in an electronic file. The research team revised items if respondent comments indicated that an item was poorly understood. The survey vendor revised the online survey per the research team's direction before fielding the main survey.

Data Collection

In January 2009, as part of a larger study of parents and nonparents, 2521

online surveys were fielded. Panel members who had been selected for the pilot version of the survey were not eligible to be selected for the main survey data collection.

A 31-day field period (January 2009) was used for data collection. During this period, up to 4 e-mail reminders were sent to panel members who were selected for this survey sample but who had not yet responded. Respondent gender, race, and income data were taken from panel profile data collected during panel enrollment and verified annually. At the close of data collection, the survey vendor sent deidentified survey and demographic data to the research team in an electronic file.

The study was approved by the University of Michigan medical institutional review board.

Data Analysis

All analyses were conducted by the research team by using SAS 9.1 (SAS Institute, Inc, Cary, NC) and Stata 10 (Stata Corp, College Station, TX). Post-stratification weights provided by the survey vendor were used to match the national (US) population distribution on gender, age, race/ethnicity, education, census region, and metropolitan area. Frequency distributions were calculated on all weighted items. Bivariate analyses (χ^2) were conducted on the weighted items to test the relationships between demographic characteristics and survey responses regarding vaccine information-dissemination sources and methods.

RESULTS

Study Sample

Of the 2521 surveys fielded, 1552 parents responded to the survey (62% response rate). Demographic characteristics of the respondents are listed in Table 1.

TABLE 1 Weighted Sample Characteristics

Demographic	%
Parent gender	
Female	58
Parent race/ethnicity	
White	67
Black	11
Hispanic	15
Other	7
Parent education	
Less than high school	10
High school	29
Some college	31
Bachelor degree or more	30
Household income	
Less than \$30 000	20
\$30 000–\$60 000	33
\$60 000–\$100 000	30
\$100 000 or more	17
Parent age	
<30 y	20
30–40 y	39
>40 y	41
Region of the country	
Northeast	15
Midwest	23
South	38
West	23

Parents’ Trust of Vaccine-Safety Information Sources

The person whom parents report trusting the most for vaccine-safety information is their child(ren)’s doctor. The great majority of parents report trusting their child’s doctor a lot (76%). The sources next most likely to be trusted a lot were other health care providers (26%) and government vaccine experts/officials (23%). Many other sources for vaccine-safety information were frequently reported to be trusted some, including family and friends (67%) and parents who believe their child was harmed by a vaccine (65%). Celebrities were trusted a lot for vaccine-safety information by 2% of the respondents and some by 24% (Table 2).

The information medium endorsed most frequently as being trusted a lot for vaccine-safety information was Web sites from doctor groups such as the American Academy of Pediatrics (27%). Many parents reported that

TABLE 2 Parental Report of Levels of Trust of Certain People for Vaccine-Safety Information

	A Lot, %	Some, %	Not at All, %
My child(ren)’s doctor	76	22	2
Other health care providers	26	70	4
Government vaccine experts/officials	23	61	16
Family and friends	15	67	18
Parents who believe their child was harmed by a vaccine	8	65	27
Celebrities	2	24	74

they do not use or do not view several potential sources of vaccine-safety information (Table 3).

There were significant differences seen according to gender with regard to trust placed in specific sources for vaccine-safety information. Mothers differed from fathers in that they were more likely to report some or a lot of trust in vaccine-safety information provided by parents who claim their child was injured by vaccines, celebrities, television shows, and magazines/news articles (Table 4).

There were also differences in trust of specific people for vaccine-safety information among parents of different races/ethnicities. White and Hispanic parents were more likely than black parents to trust family and friends a lot or some, and Hispanic parents were more likely than white or black parents to trust celebrities a lot or

some for vaccine-safety information (Table 5).

DISCUSSION

Among the most important findings in this study is that the source most trusted by parents for vaccine-safety information is their child(ren)’s doctor, which is consistent with the results of several previous studies.^{1–4} However, other investigators have found that a significant number of parents feel that physicians do not provide enough information^{4,5} and that public health officials are not trustworthy.⁶ These parents’ beliefs may be reflected in our observation that at least some parents place trust in non-traditional sources of safety information, such as celebrities, and in parents who believe that their child was harmed by a vaccine. Usually, these sources use anecdotal information or personal accounts rather than population-based data or large clinical studies on which to base their perspectives. This conflict between health professionals and non-health professionals as information sources regarding vaccine safety is shaping the national dialogue on the issue.

Health Professionals as Sources of Vaccine-Safety Information

The source reported as being trusted a lot by the greatest proportion (27%) of our respondents was Web sites from doctor groups such as the American Academy of Pediatrics. Web sites from

TABLE 3 Parents’ Trust of Certain Sources for Vaccine-Safety Information

	A Lot, %	Some, %	Not at All, %	Do Not Use/View, %
Web sites from doctor groups like the American Academy of Pediatrics	27	38	6	29
Government Web sites	7	42	13	38
Magazine/news articles about a child believed to be harmed by a vaccine	3	48	21	28
Television programs reporting a child was harmed by a vaccine	3	46	22	29
Web sites from companies that make vaccines	2	30	26	42
Web sites from groups that oppose vaccines	1	30	23	46

TABLE 4 Variation in Parents' Trust of Vaccine-Safety Information According to Gender

	Male, %	Female, %	<i>P</i>
Trust parents who claim their child was injured by vaccines			.0002
A lot	5	10	
Some	61	67	
Not at all	34	22	
Trust celebrities			.0007
A lot	1	3	
Some	18	28	
Not at all	81	69	
Trust television shows about a child injured from vaccines			.007
A lot	1	5	
Some	43	47	
Not at all	25	19	
Do not view	30	28	
Trust magazines/news articles about children injured from vaccines			.0006
A lot	1	4	
Some	43	52	
Not at all	26	18	
Do not view or use	30	26	

TABLE 5 Variation in Parents' Trust of Vaccine-Safety Information According to Race/Ethnicity

	White, %	Black, %	Hispanic, %	Other	<i>P</i>
Trust family and friends					.0001
A lot	14	16	22	4	
Some	71	45	62	73	
Not at all	15	39	16	23	
Trust celebrities					.0002
A lot	1	0	8	1	
Some	23	24	32	14	
Not at all	76	76	60	85	

doctor groups were the only source trusted by >10% of the sample, which is consistent with the finding that physicians themselves were the source trusted a lot most often in our study. These findings highlight the importance of the trust parents place in their physician and also speaks to the potential strategies that might be used to disseminate evidence-based vaccine information. It would seem that ensuring a strong physician-parent relationship and using physicians in public roles (eg, public service announcements) would be appropriate to consider. At the least it will be essential that primary care physicians have the information and tools they need to effectively communicate issues of immunization safety to parents.

In this context, it is concerning that only 23% of the parents reported that they place a lot of trust in government vaccine experts/officials. These are some of the leading experts in our nation regarding immunization. Efforts to increase the level of public trust placed in these officials is integral to the dissemination efforts of accurate vaccine information. Further studies to determine the origin of the lack of trust and concrete steps that can be taken to address it should be conducted. In the meantime, it may be effective to have physician groups (working in concert with government officials) to be the lead voice regarding innovations in the immunization schedule, rather than government bodies themselves.

Non-Health Professionals as Sources of Vaccine-Safety Information

Although most parents place a lot of trust in their child(ren)'s physician,⁷ the proportion of parents who trust non-health professional sources for such information should not be discounted.⁸ Many non-health professional sources, increasingly celebrities, have taken it on themselves to play the role of experts regarding vaccine safety. These people have raised or propagated concerns regarding vaccines, usually on the basis of their personal perceptions and experiences, that often contradict health officials' and physicians' messages regarding vaccine safety. The results of our study reveal that 26% of parents placed at least some trust regarding vaccine-safety information with celebrities and 73% placed at least some trust in parents who believe that their child was harmed by a vaccine. Even if only a fraction of these parents receive, believe, and act on potential misinformation provided by such sources, there may be an adverse impact on immunization rates, the risk of vaccine-preventable illnesses for individual children, and public health.

Although many public health and medical professionals may not want to acknowledge the potential impact that celebrities and television shows have on parents' acceptance of vaccines, our results indicate the broad influence that these sources may have. Studies in the United Kingdom have revealed the impact of the media, politicians, and other nonprofessionals on public opinion regarding vaccine safety.⁹ Parents have reported difficulty in determining who to trust when safety information among sources is contradictory.⁹

The finding that only 74% of our respondents reported that they do not trust celebrities for vaccine-safety information is sobering. The role of ce-

lebrities in society is powerful, and the efforts of some to take on the role of expert in matters of public health is concerning. Celebrities are rarely trained in the ability to discern and critique the scientific literature, and they are not often expert in epidemiology, immunology, or toxicology. Nevertheless, network and cable news reporters have occasionally turned to celebrities to play this role and positioned them as experts as well. The public is little served by such efforts.

Strategies for information dissemination used by public health authorities have included positioning physician and/or public health authorities to counter celebrity efforts to discredit vaccines. One option for an alternative strategy for public health officials may be to engage in more proactive social marketing campaigns such as those described recently by Opel et al.¹⁰ Such efforts, combined with the use of newer media such as social-networking sites and Twitter, should be explored.

Of significant importance are the gender differences observed with regard to trust placed in sources for vaccine-safety information. Our finding that women are more likely than men to place trust in nonprofessional sources for vaccine-safety information should be noted by both public health officials and health care providers. Anecdotally, women are more likely than men to be the parent who brings the child to physician visits and more likely to be the parent to make health care decisions for the children. Vaccine information developed for parents should be designed with these findings in mind.

REFERENCES

1. Gust DA, Darling N, Kennedy A, Schwartz B. Parents with doubts about vaccines: which vaccines and reasons why. *Pediatrics*. 2008; 122(4):718–725
2. Smith PJ, Kennedy AM, Wooten K, Gust DA, Pickering LK. Association between health care providers' influence on parents who

The finding that 40% of the Hispanic parents place a lot or some trust in celebrities should also be noted by public health officials. It is especially important given the fact that Hispanics are both the largest and the fastest-growing minority population in the United States. It is unclear from this study whether such celebrities are in the Spanish-language entertainment milieu or in the mainstream English-language medium. Further study should be undertaken to better understand this finding so that those who design public health information-dissemination strategies may take this into account. In contrast to our findings, other investigators have reported that black parents were more likely than white parents to have negative attitudes toward immunization and their child's health care provider.^{11,12}

Our findings also indicate that many parents are using, and place at least some trust in, a variety of Web sites for vaccine-safety information, including those from groups that oppose vaccines. This phenomenon was first noted by Wolfe et al,¹³ who found that vaccine-opposition Web sites rely heavily on emotional appeals to convey their messages. Indeed, almost as many parents place some trust in these Web sites as place trust in government Web sites. It seems that much can be done to better position and promote the Web sites of both government and physician groups as sources of evidence-based vaccine-safety information.

Our findings must be interpreted in light of some limitations. One potential limita-

tion is response bias, given that the data were collected from a self-administered survey. We attempted to minimize response bias by inviting panel members with a description of the survey that did not mention immunization or vaccine safety and by including the vaccine-safety questions among questions on other unrelated topics. Another limitation is that sensitive questions about attitudes and behaviors were asked, but we believe that social-desirability bias was reduced by the fact that the respondents knew that their anonymity was ensured.

CONCLUSIONS

A variety of sources provide vaccine-safety information, and parents have many options regarding where to seek it. Our results indicate that different groups of parents seek and trust information from all of these sources. Those who design public health efforts to provide evidence-based information must recognize that different strategies may be required to reach some groups of parents who are currently using other information sources. In particular, because the parents of many of today's infants are more facile with electronic means of communication and social-networking Web sites, newer methods of promulgation should be explored.

ACKNOWLEDGMENT

This research was conducted as part of the CS Mott Children's Hospital National Poll on Children's Health (www.med.umich.edu/mott/npch).

have concerns about vaccine safety and vaccination coverage. *Pediatrics*. 2006; 118(5). Available at: www.pediatrics.org/cgi/content/full/118/5/e1287

3. Leask J, Chapman S, Hawe P, Burgess M. What maintains parental support for vaccination when challenged by anti-vaccination

messages? A qualitative study. *Vaccine*. 2006;24(49–50):7238–7245

4. Gust DA, Kennedy A, Wolfe S, Sheedy K, Nguyen C, Campbell S. Developing tailored immunization materials for concerned mothers. *Health Educ Res*. 2008;23(3): 499–511

5. Gust DA, Kennedy A, Shui I, Smith PJ, Nowak G, Pickering LK. Parent attitudes toward immunizations and healthcare providers the role of information. *Am J Prev Med.* 2005; 29(2):105–112
6. Salmon DA, Moulton LH, Omer SB, DeHart MP, Stokley S, Halsey NA. Factors associated with refusal of childhood vaccines among parents of school-aged children: a case-control study. *Arch Pediatr Adolesc Med.* 2005;159(5):470–476
7. Cooper LZ, Larson HJ, Katz SL. Protecting public trust in immunization. *Pediatrics.* 2008;122(1):149–153
8. Benin AL, Wisler-Scher DJ, Colson E, Shapiro ED, Holmboe ES. Qualitative analysis of mothers' decision-making about vaccines for infants: the importance of trust. *Pediatrics.* 2006;117(5): 1532–1541
9. Hilton S, Petticrew M, Hunt K. Parents' champions vs. vested interests: who do parents believe about MMR? A qualitative study. *BMC Public Health.* 2007;7:42
10. Opel DJ, Diekema DS, Lee NR, Marcuse EK. Social marketing as a strategy to increase immunization rates. *Arch Pediatr Adolesc Med.* 2009;163(5):432–437
11. Shui IM, Weintraub ES, Gust DA. Parents concerned about vaccine safety: differences in race/ethnicity and attitudes. *Am J Prev Med.* 2006;31(3):244–251
12. Shui I, Kennedy A, Wooten K, Schwartz B, Gust D. Factors influencing African-American mothers' concerns about immunization safety: a summary of focus group findings. *J Natl Med Assoc.* 2005;97(5): 657–666
13. Wolfe RM, Sharp KL, Lipsky MS. Content and design attributes of antivaccination Web sites. *JAMA.* 2002;287(24): 3245–3248

Sources and Perceived Credibility of Vaccine-Safety Information for Parents
Gary L. Freed, Sarah J. Clark, Amy T. Butchart, Dianne C. Singer and Matthew M. Davis

Pediatrics 2011;127;S107

DOI: 10.1542/peds.2010-1722P originally published online April 18, 2011;

Updated Information & Services

including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/127/Supplement_1/S107

References

This article cites 12 articles, 3 of which you can access for free at:
http://pediatrics.aappublications.org/content/127/Supplement_1/S107#BIBL

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Infectious Disease
http://www.aappublications.org/cgi/collection/infectious_diseases_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<http://www.aappublications.org/site/misc/Permissions.xhtml>

Reprints

Information about ordering reprints can be found online:
<http://www.aappublications.org/site/misc/reprints.xhtml>

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



PEDIATRICS[®]

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Sources and Perceived Credibility of Vaccine-Safety Information for Parents

Gary L. Freed, Sarah J. Clark, Amy T. Butchart, Dianne C. Singer and Matthew M. Davis

Pediatrics 2011;127;S107

DOI: 10.1542/peds.2010-1722P originally published online April 18, 2011;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

http://pediatrics.aappublications.org/content/127/Supplement_1/S107

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 2011 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN[®]

