Primary Care Physician Perspectives on Reimbursement for Childhood Immunizations

abstract

OBJECTIVES: The purpose of this research was to explore physicians’ attitudes and behaviors related to vaccine financing issues within their practice. Amid the increasing number of vaccine doses recommended for children and adolescents, anecdotal reports suggest that physicians are facing increasing financial pressures from vaccine purchase and administration and may stop providing vaccines altogether to privately insured children. Whether these sentiments are widely held among immunization providers is unknown.

METHODS: We conducted a cross-sectional mail survey from July to September 2007 of a random sample of 1280 US pediatricians and family physicians engaged in direct patient care. Main outcome measures included delay in the purchase of specific vaccines for financial reasons; reported decrease in profit margin from immunizations; and practice consideration of whether to stop providing all vaccines to privately insured children.

RESULTS: The response rate was 70% for pediatricians and 60% for family physicians. Approximately half of the respondents reported that their practice had delayed the purchase of specific vaccines for financial reasons (49%) and experienced decreased profit margin from immunizations (53%) in the previous 3 years. Twenty-one percent of respondents strongly disagreed that “reimbursement for vaccine purchase is adequate,” and 17% strongly disagreed that “reimbursement for vaccine administration is adequate.” Eleven percent of respondents said their practice had seriously considered whether to stop providing all vaccines to privately insured children in the previous year.

CONCLUSIONS: Physicians who provide vaccines to children and adolescents report dissatisfaction with reimbursement levels and increasing financial strain from immunizations. Although large-scale withdrawal of immunization providers does not seem to be imminent, efforts to address root causes of financial pressures should be undertaken. Pediatrics 2009; 124:S466–S471

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KEY WORDS
finance, reimbursements, immunization, vaccine, private providers

ABBREVIATIONS
PCV7—heptavalent pneumococcal conjugate vaccine
AAP—American Academy of Pediatrics
FP—family physician
AMA—American Medical Association
MD—allopathic physician
DO—osteopathic physician
HPV—human papillomavirus vaccine
MCV4—meningococcal conjugate vaccine

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When heptavalent pneumococcal conjugate vaccine (PCV7) (Prevnar [Wyeth, Collegeville, PA]) was added to the recommended childhood immunization schedule in 2000,1 the number of vaccine doses universally recommended for children through 6 years of age increased from 19 to 23,2 whereas the overall cost of purchasing these vaccines nearly doubled.3 Most physicians were quick to adopt the PCV7 recommendation,4,5 but concerns were raised regarding the high price of the vaccine, as well as delayed or inconsistent insurance coverage for it.5–7 Davis et al8 postulated that physicians’ response to the financial challenges posed by PCV7 had implications for future recommendations of costly vaccines.

Since the PCV7 recommendation, the recommended childhood/adolescent immunization schedule has continued to expand,9 with 5 newly recommended vaccines,10–14 5 vaccines with expanded recommendations,15–17 and 4 newly licensed combination vaccines.18–21 The private sector cost to purchase all doses of the vaccines universally recommended for children and adolescents has risen to more than $1500 per child in 2008 compared with approximately $600 in 2000.22 Although recent research has highlighted the impact of increased vaccine costs on public sector vaccine financing,23 little is known about the impact on physicians in the private sector. Information has come mainly from articles in the lay press24–27 or through physician groups.28,29 The American Academy of Pediatrics (AAP) has voiced concerns over vaccine financing, stating that it is, “alarmed that the soaring costs of vaccines combined with lower reimbursements from insurance companies will lead to under-immunization of the nation’s children and unnecessary outbreaks of diseases.”28 Anecdotal reports calculated within the AAP suggesting that physicians will no longer provide vaccines to their patients (David Tayloe Jr, MD, president-elect, AAP, personal communication, May 5, 2008).

The extent to which private physicians are facing serious financial pressures because of vaccines is unknown. Also unknown is the likelihood that physicians will discontinue providing immunizations altogether. This study was designed to explore private provider attitudes and practices related to vaccine financing on a national level.

METHODS
Sample
We drew a national random sample of 750 pediatricians and 750 family physicians (FPs) from the American Medical Association (AMA) Physician Masterfile through a contracted vendor. The AMA Physician Masterfile is the most comprehensive database of physicians licensed to practice in the United States and includes both AMA members and nonmembers. Our sampling frame included all allopathic (MD) and osteopathic (DO) physicians self-described as a pediatrician or FP in office-based, direct patient care. Excluded were physicians with any subspecialty board certification, age ≥70 years, currently in residency training, or employed at federally owned medical facilities (ie, Veterans’ Affairs).

After review of the 1500 records in the AMA Masterfile sample, we excluded 6 FP s who were found to not meet the inclusion criteria. We also excluded 93 pediatricians and 101 FPs located in universal purchase states, which supply childhood vaccines to private immunization providers for administration to all children regardless of insurance status.30 Physicians in these states would not typically purchase childhood vaccines in the private market, thus making the topic of the survey not relevant to their practice.

Survey Design
The 4-page, 21-item survey instrument addressed whether the respondent’s practice currently purchases quadrivalent human papillomavirus vaccine (HPV), meningococcal conjugate vaccine (MCV4), or Pediarix (ie, a pentavalent vaccine that combines antigens for diphtheria, tetanus, pertussis, hepatitis B, and polio) and, if not, reasons for not purchasing; whether the practice has delayed purchasing any new vaccines in the previous 3 years due only to financial concerns; whether the practice has experienced a decrease in profit margin from childhood/adolescent immunizations; respondent attitudes regarding reimbursement for vaccine cost and administration; the extent to which the practice has considered no longer providing vaccines to insured patients; and practice characteristics.

An additional question targeted respondent decision-making involvement in the practice with respect to vaccine purchase, asking, “To what extent are you involved in decisions about vaccine purchase for your practice?” Respondents who reported that they are “directly involved in vaccine purchase decisions” were defined as “decision-makers.” Those who said they were “only indirectly involved” or “not involved at all” were classified as “non-decision-makers.”

We pilot tested the survey instrument to ensure clarity and ease of administration with a randomly selected subset of 10 pediatricians and 10 FPs from the 1300 charts in our sample (leaving 1280 charts for the actual survey mailing). Pilot surveys were not included in the analyses. The institutional review board of the University of Michigan Medical School approved this study.

Survey Administration
The initial survey mailing was sent in July 2007 to 1280 physicians (647 pedi-
atricians and 633 FPs) and included a personalized cover letter, the survey instrument, and a $5 cash incentive. Two additional mailings to nonrespondents occurred at ~4-week intervals.

Data Analysis
We generated univariate frequencies for each variable and then performed \( \chi^2 \) analyses to examine associations between variables, with a 2-tailed \( \alpha \)-level of .05 as the threshold for statistical significance. All of the analyses were conducted by using SAS 8.2 (SAS Institute, Inc, Cary, NC).

Bivariate analyses focused on variation in survey responses by physician specialty (pediatricians versus FPs) and by respondent decision-making involvement with respect to vaccine purchase (decision-makers versus non–decision-makers). Response options (eg, 5-point Likert scale) generally were not combined for data analyses, so that we could explore variation in respondents selecting the strongest positions (eg, “strongly disagree”).

RESULTS
Response Rate
Of the 1280 physicians in the mailing sample, 72 were excluded because mailing materials were returned as undeliverable (33 pediatricians and 39 FPs). Survey materials were returned by 784 (430 pediatricians and 354 FPs) of the remaining 1208 physicians, for an overall response rate of 65% (70% pediatricians and 60% FPs). Respondents were more likely than nonrespondents to be MDs (versus DOs; \( P < .01 \), board certified (\( P < .01 \)), and in group practice (\( P < .0001 \)).

In response to the initial screener question, 148 respondents (45 pediatricians and 103 FPs) indicated that they do not provide immunizations to patients aged 0 to 18 years, leaving 636 eligible respondents (385 pediatricians and 251 FPs) and an eligible response rate of 60%. Of these 148, 68% (\( n = 100 \)) do not provide any primary care to this population. Of the 636 eligible respondents, 597 (94%) indicated that their practice purchases private stock of vaccine (ie, vaccines purchased for privately insured patients); this group of 597 respondents was the focus of the analyses reported here.

Respondent and Practice Characteristics
The majority of the 597 respondents were male, MDs, board certified, and directly involved in decision-making regarding vaccine purchase. Most respondent and practice characteristics varied by physician specialty (Table 1).

Vaccine Purchase
Most respondents report that their practice purchases HPV (84% \( [n = 501] \)) and MCV4 (87% \( [n = 519] \)); fewer purchase Pediarix (57% \( [n = 339] \)). Practices of pediatricians were more likely than those of FPs to purchase HPV (89% vs 77%; \( P \leq .001 \)) and MCV4 (97% vs 73%; \( P \leq .0001 \)).

Almost half (49% \( [n = 288] \)) of respondents reported their practice had “delayed the purchase of a new vaccine due only to financial concerns” in the previous 3 years. This did not differ by specialty. Decision-makers were more likely than non–decision-makers to report that such a delay had occurred (62% vs 35%; \( P \leq .0001 \)). The vaccines most commonly cited for delayed purchase were HPV (67% \( [n = 194] \)) and MCV4 (34% \( [n = 97] \)).

Profit Margin From Immunizations
More than half (53% \( [n = 310] \)) of the respondents reported that their practice had experienced a decrease in profit margin from providing pediatric immunizations in the previous 3 years (Table 2). A “significant decrease (>20%)” in profit margin was reported by 21% \( (n = 123) \) of respondents overall and by more decision-

### Table 1: Respondent and Practice Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total ( (N = 597) ), n (%)</th>
<th>Pediatrician ( (N = 357) ), n (%)</th>
<th>FP ( (N = 240) ), n (%)</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male gender</td>
<td>335 (56)</td>
<td>176 (49)</td>
<td>157 (65)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>152 (25)</td>
<td>86 (24)</td>
<td>66 (28)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>40–55</td>
<td>321 (54)</td>
<td>181 (51)</td>
<td>140 (58)</td>
<td>.0574</td>
</tr>
<tr>
<td>&gt;55</td>
<td>124 (21)</td>
<td>90 (25)</td>
<td>34 (14)</td>
<td></td>
</tr>
<tr>
<td>MD (vs DO)</td>
<td>549 (92)</td>
<td>342 (96)</td>
<td>207 (86)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Board certified</td>
<td>526 (88)</td>
<td>318 (89)</td>
<td>208 (87)</td>
<td>.0574</td>
</tr>
<tr>
<td>Decision-maker for practice</td>
<td>312 (52)</td>
<td>202 (57)</td>
<td>110 (46)</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Practice type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo or 2-physician practice</td>
<td>172 (29)</td>
<td>103 (29)</td>
<td>69 (29)</td>
<td>2288</td>
</tr>
<tr>
<td>Single specialty group practice</td>
<td>268 (45)</td>
<td>170 (48)</td>
<td>98 (41)</td>
<td></td>
</tr>
<tr>
<td>Multispecialty group practice</td>
<td>140 (23)</td>
<td>76 (21)</td>
<td>64 (27)</td>
<td></td>
</tr>
<tr>
<td>Other practice type</td>
<td>15 (3)</td>
<td>7 (2)</td>
<td>8 (3)</td>
<td></td>
</tr>
<tr>
<td>Practice affiliation/ownership</td>
<td>411 (68)</td>
<td>258 (73)</td>
<td>153 (64)</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Private, independent practice</td>
<td>104 (18)</td>
<td>54 (15)</td>
<td>50 (21)</td>
<td></td>
</tr>
<tr>
<td>Hospital/medical center</td>
<td>80 (13)</td>
<td>44 (12)</td>
<td>36 (15)</td>
<td></td>
</tr>
<tr>
<td>Annual newborn enrollment</td>
<td></td>
<td></td>
<td></td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>&lt;50</td>
<td>152 (26)</td>
<td>18 (5)</td>
<td>134 (57)</td>
<td></td>
</tr>
<tr>
<td>50–100</td>
<td>108 (18)</td>
<td>61 (17)</td>
<td>47 (20)</td>
<td></td>
</tr>
<tr>
<td>101–200</td>
<td>108 (18)</td>
<td>83 (24)</td>
<td>25 (11)</td>
<td></td>
</tr>
<tr>
<td>&gt;200</td>
<td>218 (38)</td>
<td>190 (54)</td>
<td>28 (12)</td>
<td></td>
</tr>
</tbody>
</table>

* Other ownership/affiliation includes university health systems, practice networks, and health maintenance organizations, as well as miscellaneous responses.
makers than non–decision-makers. There was no difference by specialty. The 2 most commonly cited contributors to this decreased profit margin were “practice costs for immunization have increased” (64% [n = 212]) and “limited to no mark-up for vaccine purchase” (63% [n = 210]).

Perceptions on Reimbursement

With regard to the adequacy of reimbursement for vaccine purchase and in payments for administration fees (Table 3), 21% (31% decision-makers versus 9% non–decision-makers; P ≤ .0001) strongly disagreed that reimbursement rates for vaccine purchase were adequate, whereas 17% (25% decision-makers versus 8% non–decision-makers; P ≤ .0001) strongly disagreed that reimbursement rates for vaccine administration were adequate. Overall, 65% said that they would not give a vaccine if the reimbursement price was less than the purchase price, with 40% (53% decision-makers versus 26% non–decision-makers; P ≤ .0001) strongly agreeing with this statement. There were no differences in these 4 items by physician specialty.

Respondents were asked, “In the past year, to what extent has your practice seriously considered whether to stop providing all vaccines to privately insured patients due to vaccine cost/administration fee/reimbursement issues” (Table 4). Overall, 65 respondents (11%) said that they had seriously considered or discussed it, with higher proportions among FPs and decision-makers. Among decision-makers only, 34% of FP versus 7% of pediatricians reported that their practice had seriously considered no longer providing vaccines to privately insured children.

**DISCUSSION**

A key finding from our study is that, in the previous year, 5% of pediatricians and 21% of FPs (11% of all respondents) have seriously considered whether to stop providing all vaccines to privately insured patients. Because pediatricians provide the vast majority of vaccines in this country, the immediate potential for a significant contraction in the nation’s capacity to provide vaccines seems small. That is the good news. However, any decrease in the number of physicians providing vaccines to children should be of concern and could have a significant impact on the US infrastructure for administering vaccines.

A unique aspect of our study was the identification of respondents’ involvement in decision-making regarding vaccine purchase within their practices. We hypothesize that the reported intentions and/or concerns of decision-makers are more likely to reflect potential action on the part of practices. In our study, the proportion of those experiencing and perceiving financial difficulty was higher among respondents who reported that they are directly involved in making decisions for their practice regarding vaccine purchase. The fact that 34% of decision-makers in family medicine practices (vs 7% in pediatric practices) have seriously considered whether to stop providing all vaccines to privately insured patients may be a harbinger of future actions among a significant group of FPs. Given the decline in the proportion of children’s primary care visits made to FPs, the relevance of

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**TABLE 2** Respondents’ Experience With Decreased Profit Margin From Immunizations

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (N = 588), %</th>
<th>Decision-Makers (N = 312), %</th>
<th>Non–Decision-Makers (N = 284), %</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, a significant decrease (&gt;20%)</td>
<td>21.0</td>
<td>30.0</td>
<td>11.0</td>
<td>≥ .0001</td>
</tr>
<tr>
<td>Yes, a moderate decrease (10%–20%)</td>
<td>21.0</td>
<td>27.0</td>
<td>14.0</td>
<td></td>
</tr>
<tr>
<td>Yes, a small decrease (&lt;10%)</td>
<td>11.0</td>
<td>10.0</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>No decrease</td>
<td>11.0</td>
<td>10.0</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>36.0</td>
<td>23.0</td>
<td>50.0</td>
<td></td>
</tr>
</tbody>
</table>

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**TABLE 3** Reimbursement Attitudes for All Respondents (N = 597)

<table>
<thead>
<tr>
<th>In General, for My Practice …</th>
<th>Proportion Who, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Reimbursement for vaccine purchase is adequate.</td>
<td>21</td>
</tr>
<tr>
<td>Reimbursement for vaccine administration is adequate.</td>
<td>17</td>
</tr>
<tr>
<td>Reimbursement for vaccine purchase and administration is timely.</td>
<td>10</td>
</tr>
<tr>
<td>We would not give a vaccine if reimbursement was less than the purchase price.</td>
<td>5</td>
</tr>
</tbody>
</table>

---

**TABLE 4** Extent to Which Practice Has Seriously Considered Whether to Stop Providing All Vaccines to Privately Insured Patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall (N = 585), %</th>
<th>Specialty, %a</th>
<th>Decision-Maker Status, %a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pediatricians (N = 353)</td>
<td>FP (N = 232)</td>
</tr>
<tr>
<td>Seriously considered</td>
<td>11</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>Considered but not seriously</td>
<td>23</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Never considered</td>
<td>66</td>
<td>72</td>
<td>56</td>
</tr>
</tbody>
</table>

a P ≤ .0001 for differences by specialty and decision-making status.
immunizations to their practice and their tolerance for marginal financial return may result in fewer FPs providing vaccines in the future. Although this may not result in a significant contraction in the nation’s private-sector capacity for immunization delivery, discontinuation of immunization delivery by FPs, who are the predominant source of children’s primary care in rural areas, may have a significant impact on rural children’s access to immunization.

Importantly, although a significant decline in access to vaccines does not seem to be on the immediate horizon, the results of this study are consistent with the sentiment reported in the lay press that some physicians are having financial difficulties related to providing immunizations to privately insured children. Almost half of respondents have delayed introducing ≥1 new vaccines for financial reasons in the previous 3 years, and more than half reported that their practice experienced a decrease in profit margin from immunizations within the same time frame. In addition, many perceive reimbursement for both vaccine purchase and administration as inadequate.

However, it is important to keep such concerns in perspective. Concerns regarding reimbursement for medical services provided by physicians in general, and pediatricians specifically, have been reported across a variety of medical services, including tobacco cessation counseling, developmental assessments, adolescent gynecology, and mental health diagnosis and treatment. With specific regard to immunizations, financial concerns of providers are not new. A 1998 study found that more than half of physicians in both urban and rural areas of Colorado believed that reimbursement was inadequate. These studies do not diminish the importance of the views of the physicians in our study but rather ground them in controversies regarding reimbursements for a variety of services.

Discontinuation of physicians from providing immunizations should not be the only end point of concern. Almost half of the physicians in this study had delayed purchase of a recommended vaccine due only to financial concerns. Although the length of the delay was not specified, this implies that at least some children either did not receive recommended vaccines, and therefore remained at risk for vaccine-preventable diseases, or that they may have been referred to the public health system for vaccination.

As with other studies using mailed surveys, the potential for response bias is the main limitation. Respondents may be more interested in vaccine finance issues or have other unmeasured characteristics that differ from nonrespondents. Our response rate is on the higher end relative to other studies using physician surveys, suggesting that our sample was neither more nor less likely to answer questions about vaccine finance issues than about other topics. In addition, although we found that our respondents were more likely to be MDs, board certified, and in group practice, this is consistent with the demographic make-up of physicians who provide care to children and unlikely impacts the generalizability of our results. Recall bias for certain items may have occurred. For questions using a Likert scale, we varied the phrasing of questions to be either in the positive or negative frame to avoid bias.

CONCLUSIONS

Physicians report dissatisfaction with reimbursement levels for vaccine purchase and administration and indicate that they are under increasing financial strain from immunizations. Although large-scale withdrawal of immunization providers does not seem to be imminent, efforts to address the root causes of these financial pressures, particularly for FPs, should be undertaken.

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