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Financial Sustainability of Vaccine Delivery in Primary Care Practices

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Abstract

Objectives—Vaccines represent a significant portion of primary care practices' expenses. Our objectives were to determine among Pediatric (Ped) and Family Medicine (FM) practices: 1) payment for vaccine purchase and administration and estimated profit margin by payer type, 2) strategies used to reduce vaccine purchase costs and increase payment, and 3) whether practices have stopped providing vaccines due to financial concerns.

Methods—A national survey from April to September 2011 among Ped and FM private, single-specialty practices not in Universal Purchase states.

Results—The response rate was 51% (221/430). Depending on payer type, 61% to 79% of practices reported that payment for vaccine purchase was at least 100% of purchase price and 34% to 74% reported that payment for vaccine administration was at least \$11. Common strategies to reduce vaccine purchase cost were online purchasing (81% Ped, 36% FM), prompt pay (78% Ped, 49% FM), and bulk order (65% Ped, 49% FM) discounts. Few practices used strategies to increase payment, reporting rarely/never negotiating with health plans for payment for vaccines (56% Ped, 67% FM) or administration fees (56% Ped, 65% FM). When asked if they had stopped purchasing vaccines due to financial concerns, 12% of Ped and 23% of FM responded 'yes', and 24% of Ped and 26% of FM responded 'no, but have seriously considered'.

Conclusions—Physicians report variable payment for vaccination services from different payer types. Physicians, especially FM, may benefit from increased use of strategies to reduce vaccine purchase costs and increase payment for vaccine delivery.

Keywords

Vaccines; Immunizations; Primary Care; Adolescents; Children

INTRODUCTION

Vaccinating youth to protect them from morbidity and mortality due to vaccine preventable infections is a cornerstone of pediatric primary care and one of the greatest achievements in public health in the 20th century.¹ Despite its critical importance, delivering vaccines to all youth can be a challenge for pediatric (Ped) and family medicine (FM) practices because of the high cost of purchasing, storing, tracking, and administering vaccines in a complicated, multi-payer system.²⁻⁵

Practices must obtain and store at least 12 vaccine products to provide all Advisory Committee on Immunization Practices (ACIP) recommended vaccines for youth.⁶ While around half of the vaccine supply for children in the U.S. is purchased by the federal government through the Vaccines for Children (VFC) program and distributed to VFC providers, slightly less than half is purchased by Ped and FM serving privately-insured patients. The private sector purchase price for these vaccines ranges from about \$21 for one diphtheria, tetanus, and acellular pertussis vaccine to \$178 for 9-valent human papillomavirus vaccine.⁷ In addition to the up-front purchase cost of vaccines, practices

incur additional product-related expenses: personnel costs, storage costs, insurance costs, and recovery costs due to inventory waste.^{8,9} Next, practices must deliver the vaccines to their patients incurring expenses including the physician and staff time, medical equipment, and professional liability insurance.^{8,9} Practices recover these expenses by receiving payment for vaccine purchase and administration; however the amount practices pay to purchase vaccines and the amount they are paid for vaccine product and administration vary widely.¹⁰⁻¹²

A cause of variation in vaccine costs and payments for privately-insured patients is that practices typically must negotiate with manufacturers or distributors for purchase prices and with health plans for payment for vaccine administration.⁸ VFC vaccines are provided at no cost to VFC providers, but these providers do not receive any additional payment for the expenses associated with vaccine storage and tracking. Medicaid payments for VFC vaccine administration are set by states with matching from the federal government.^{8,13} The Affordable Care Act (ACA) of 2010 included provisions to maintain and improve children's access to vaccines including requiring non-grandfathered private health plans to cover all ACIP recommended vaccines without a co-pay in the next plan year that occurs one year after their recommendation, and increasing Medicaid payment for vaccine administration for two years.^{14,15}

While previous studies have collected detailed vaccine expense and payment data from Ped and FM in a limited number of states¹², we conducted this study in 2011 using a national sample of Ped and FM practices to describe payment for vaccination-related expenses and profitability of vaccine delivery on a national level as a baseline during the early implementation phase of the ACA. Our objectives were to determine and compare among Ped and FM practices: 1) levels of payment for vaccine purchase and administration and estimated profit margin for vaccine delivery by payer type, 2) strategies used to reduce vaccine purchasing costs and increase payment for vaccine purchase and administration, and 3) whether practices have stopped providing vaccines to patients due to financial concerns.

METHODS

Study Population

Networks of physicians were recruited from the American Academy of Pediatrics (AAP) and American Academy of Family Physicians (AAFP). The physicians agreed to respond to several surveys annually as part of the Vaccine Policy Collaborative Initiative (VPCI), a program designed collaboratively with the Centers for Disease Control and Prevention (CDC) to perform rapid assessments of primary care providers' attitudes about vaccine-related issues. Physicians were excluded if they were in training, did not practice in the United States, and practiced less than 50% of the time in a primary care setting. After obtaining twice the number of recruits needed for each network, a quota strategy was applied to assure the representativeness of the samples. A 36-cell sampling matrix was constructed to determine proportions of membership physicians falling into "cells" created by crossing the following characteristics if available for each Academy: region of the country, practice setting, and practice location. Cells were then filled by randomly selecting from all of the recruits to yield a total of approximately 400 physicians in each network. In a

previous evaluation, demographic characteristics, practice attributes, and reported attitudes about a range of vaccination issues were similar when network physicians were compared with physicians of the same specialty randomly sampled from the American Medical Association master physician listing.¹⁶

This analysis includes physicians who classified themselves as working in single-specialty, private practices because our preliminary data suggested that physicians working in multi-specialty practices, sites within a health maintenance organization (HMO) or managed care organization (MCO), and sites in an academic or public health setting were not knowledgeable about vaccine financing issues. Physicians living in universal purchase (UP) states, that is, with a system to collectively purchase vaccines for all children regardless of insurance type, were excluded because many of the questions on the survey were not relevant to them. At the time of this survey, 13 states collectively purchased some or all vaccines: Alaska, Hawaii, Massachusetts, Maine, North Carolina, New Hampshire, New Mexico, Rhode Island, South Dakota, Vermont, Washington, Wisconsin, and Wyoming. Among all network physicians, 56% (232/413) of Ped and 46% (198/427) of FM worked in single-specialty, private practices and did not practice in these 13 states.

Questionnaire Design

The questionnaire was developed in collaboration with the CDC and with input from national vaccine experts. It was pre-tested in advisory committees of Ped and FM from across the U.S. and was pilot tested among 39 Ped and FM. The questionnaire comprised 2 sections—the first specifically for physicians and the second for these physicians or another member of the practice who was most knowledgeable about vaccine financing. Results from the first section have been published previously.² The second section is the focus of this manuscript; it included a series of 22 questions regarding payment for *vaccine purchase* by private fee for service (FFS) insurance, private preferred provider organizations (PPO), MCOs or HMOs, and the Children’s Health Insurance Program (CHIP). These questions used five categorical response options ranging from ‘less than 80% of purchase price’ to ‘greater than 120% of purchase price’ as well as ‘payment is too variable to answer’ and ‘do not see patients in this category’ options. A second series of questions asked about reimbursement for *vaccine administration* by payer type with response options ranging from ‘most pay less than or equal to \$5’ to ‘most pay greater than or equal to \$25’. The questionnaire also included items about providers’ perceptions of profit margin for vaccine delivery by payer type. Practices were asked how often they used a variety of methods to purchase vaccines and negotiate payment for vaccine purchase and administration. Practices were also asked whether they had stopped purchasing one or more vaccines due to financial concerns in the past year. Those who answered ‘yes’ or ‘no, but have seriously considered’ were asked to indicate the level of importance for a series of reasons. Finally, practices were asked whether they had stopped providing certain vaccines to patients based on payer type.

Survey Administration

The survey was administered between April and September 2011 by internet or regular mail depending on physician preference. The internet group received an initial email with a link to the survey and up to 11 email reminders to complete the survey or provide the contact

information for another person in the practice who could. The internet non-responders also received up to four paper surveys by mail. The mail group received an initial mailing and up to 6 mail requests to complete the survey or provide the contact information for a person who could. If a physician in the e-mail or mail group provided the name of a more knowledgeable person in the same practice, that person was contacted with up to 3 emails, 3 mailings, and 2 phone calls.

Analysis

Internet and mail surveys were pooled for all analyses, as provider attitudes have been found to be comparable when obtained by either method.¹⁷⁻¹⁹ Comparisons were made between Peds and FM using Chi-square or Mantel-Haenszel Chi-Square tests as appropriate.

RESULTS

Among the target population for our study, single-specialty private practices not in UP states, the overall response rate was 51% (221/430) with 56% of Ped practices (129/232) and 46% of FM practices (92/198) responding (Table 1). There were no significant differences between respondents and non-respondents for key characteristics. One Ped and 5 FM reported that they did not provide vaccines to patients 0 to 18 years old and were excluded from further analyses. The majority of surveys (64% Ped, 60% FM) were completed by staff physicians or managing partners. The remainder were completed by office managers (31% Ped, 26% FM), nurses (2% Ped, 6% FM), and medical assistants in charge of immunizations (2% Ped, 3% FM).

Level of Payment for Vaccine Purchase and Administration and Estimated Profit Margin

Table 2 shows practices' estimated payments for vaccine purchase and administration by payer type. Some respondents (5 to 20%) noted that payment was too variable to answer these questions. FM reported lower payment by MCO/HMOs and CHIP when compared to Ped ($p < 0.05$). After excluding respondents who reported 'payment is too variable to answer', the proportion of practices reporting that payment for vaccine purchase was 100% or more of purchase price was 79% (95% CI 73-85) for FFS, 77% (70-83) for PPO, 68% (60-75) for MCO/HMO, and 61% (49-72) for CHIP. For vaccine administration, FM reported a lower level of payment by Medicaid when compared to Ped ($p < 0.05$). After excluding respondents who reported 'payment is too variable to answer', the proportion of practices reporting that payment for vaccine administration was \$11 or more was 74% (95% CI 67-80) for FFS, 74% (67-80) for PPO, 57% (49-65) for MCO/HMO, 37% (27-47) for CHIP, and 34% (26-42) for Medicaid.

When practices were asked how their profit margin for vaccine delivery had changed in the previous three years (since January 2008), 25% of Peds and 15% of FM reported an increase, 38% of Peds and 49% of FM reported no change, and 37% of Peds and 36% of FM reported a decrease ($p = 0.16$ for comparison between specialties).

Strategies to Reduce Vaccine Purchase Cost and Increase Payment

Among the 96% of practices (207/216) that saw patients with any type of private insurance, respondents reported using several strategies to purchase vaccines for privately insured patients with Ped more likely to report using most strategies (Figure 1). The most commonly used strategies were online purchasing discounts (81% Ped and 36% FM always/frequently used, $p < 0.0001$ for comparison between Ped and FM), prompt pay discounts (78% Ped, 49% FM, $p = 0.0001$), bulk order discounts (65% Ped, 49% FM, $p = 0.04$), group purchasing (69% Ped, 42% FM, $p = 0.0006$), and promotional pricing (69% Ped and 33% FM, $p < 0.0001$). The majority of practices reported rarely negotiating with health plans regarding payment for vaccines (56% Ped, 67% FM, $p = 0.10$) and rarely negotiating regarding administration fees (56% Ped, 65% FM, $p = 0.11$). When asked to what extent vaccines were a focus of negotiation with health plans, 26% of Ped and 44% of FM responded 'not at all', 20% of Ped and 36% of FM responded 'a little', 27% of Ped and 19% of FM responded 'moderately', and 27% of Ped and 1% of FM responded 'a major focus'.

Decision to Stop Providing Certain Vaccines Due to Financial Concerns

When asked if they had stopped purchasing one or more vaccines for youth due to financial concerns, 12% of Ped and 23% of FM responded 'yes', 24% of Ped and 26% of FM responded 'no, but have seriously considered', and 64% of Ped and 51% of FM responded 'no' ($p = 0.06$ for comparison between Ped and FM). Among physicians who reported stopping or seriously considering stopping the purchase of one or more vaccines ($n = 89$), the most important reasons were inadequate payment for the cost of the vaccine, the upfront costs of purchasing the vaccine, and inconsistent coverage of the vaccine across payers (Figure 2). When asked if they had stopped giving certain vaccines to patients *based on payer type*, 18% of Ped and 9% of FM responded 'yes', 14% of Ped and 26% of FM responded 'no, but have seriously considered', and 68% of Ped and 65% of FM responded 'no' ($p = 0.04$ for comparison between Ped and FM).

DISCUSSION

Many private, single-specialty practices report that payments from all types of payers fail to cover the costs of vaccine delivery. Depending on payer, 21 to 39% of practices reported that they were paid less than the vaccine purchase price. Using the lowest cost estimate for vaccine administration¹², \$11, most practices indicated that Medicaid and CHIP payment was less than the cost of vaccine administration. Using the American Academy of Pediatrics' (AAP) recommended level of payment for first vaccine administration⁹, \$25, more than 75% of practices indicated that *all* payer types provided less than the cost of vaccine administration. Despite using strategies to increase profitability, some practices reported stopping purchase of certain vaccines due to cost and stopping administration of certain vaccines to patients with certain types of insurance which may create disparities in vaccine coverage and, ultimately, vaccine preventable disease incidence.

Findings from our survey are similar to studies of the cost and profitability of vaccine delivery conducted in 2007.¹⁰⁻¹² These studies found notable variation in vaccine purchase price across practices and variation in payment for vaccine purchase and administration

across vaccines, payer types, and practices. The variability in payment across payers and across different vaccines may make it difficult for practices to assess whether they are profiting or losing money by delivering vaccines. In Freed and colleagues' 2007 study, about half of practices reported that they had experienced a decrease in profit margin in the previous 3 years.²⁰ In 2011, we found that about one-third of practices reported a decrease in profit margin. This difference could have several causes including differences in study design and practices' challenges with determining profitability given the complex multi-payer system, health plans may have increased payment due to policy changes, and practices may have employed strategies to decrease the cost of vaccine delivery.

In 2009, the National Vaccine Advisory Committee (NVAC) published recommendations 'to create optimal approaches to vaccine financing in both the public and private sectors'.²¹ NVAC recommended that medical providers take advantage of volume ordering discounts when purchasing vaccines from manufacturers by participating in purchasing pools with other providers. While many practices in our survey reported doing this, 24% of Ped and 39% of FM reported that they rarely participated in a pool. NVAC also recommended that professional medical societies should provide their members with technical assistance, and the AAP has done this. The AAP recommends that practices benchmark vaccine price against CDC pricing, participate in pools for vaccine purchasing, and negotiate with health plans to improve payment for vaccine delivery and provides several resources to help practices implement these strategies.²² We found a minority of practices reported benchmarking against CDC pricing and negotiating with vaccine manufacturers, distributors, or health plans.

Expecting practices to use multiple strategies to reduce the cost of vaccine purchase and increase payment for vaccine purchase and administration could put a heavy burden on primary care providers. Compared to Ped, FM practices must stock a larger number of vaccines so they can provide vaccines for all ages, which could further increase the burden of negotiating for the best price. Because they serve a wider age range with fewer patients in each group, they may need a smaller number of each type of vaccine, which could make it harder to negotiate for lower vaccine purchase prices or take advantage of bulk purchasing discounts.⁴ While FM provide less than 25% of all office visits for youth, visits to FM are more common for youth covered by Medicaid, living in rural areas, and living in the Midwest and western regions of the U.S.²³⁻²⁵ FM are faced with more challenges to making vaccine delivery profitable compared to Ped, and we found they were less likely to use strategies to increase profitability. Therefore, interventions and policies for FM to help improve profitability of vaccine delivery to prevent disparities in access to vaccines are needed.

This study was conducted in the early implementation phase of the ACA. While the ACA did make changes to improve access to vaccines for Americans, some primary care practices continue to have vaccine financing challenges such as adequate payment for vaccine purchase and reducing variability of payment by private health plans. In 2013 and 2014 (after we conducted our study), the ACA increased payment for vaccine administration by Medicaid to levels closer to estimates needed for financial sustainability. For example, in Colorado, payment for first vaccine administration increased from \$6.59 to \$21.68.²⁶ Since

this payment increase was not a permanent change, our findings regarding Ped and FM perceptions of Medicaid payments are likely to still be relevant. Further study is needed to determine if the increase was associated with key outcomes such as increased financial sustainability of vaccine delivery.

To our knowledge, ours is the first study to describe payments for vaccine purchase and administration by payer type, profitability of vaccine delivery, and the use of strategies to decrease vaccine purchase cost and increase payments among a national sample of primary care practices. However, our study did have several limitations. It was limited to private, single-specialty Ped and FM practices that were not in UP states; therefore, it may not be generalizable to multi-specialty and other practice settings. Our study was conducted during the early implementation phase of the ACA and did not address whether the ACA provisions described above actually improved access to vaccines. Respondents' attitudes and practices may have differed from non-respondents, and the response rate was acceptable (around 50%) but not optimal. The sentinel physicians in our national networks may differ from physicians overall, though our prior work suggests this is not the case. Our survey results represent reported practices and estimates of vaccine costs and payments; we did not observe actual practices or review specific vaccine purchasing or payment data. Finally, some respondents may not have been familiar enough with vaccine financing to respond accurately.

Conclusion

Vaccinating youth is a cornerstone of pediatric primary care; however some primary care practices may be providing vaccines at a net loss, which is unlikely to be sustainable. Many practices are burdened by a complex system that may make it difficult for them to determine the profitability of delivering vaccines and compel them to use a variety of strategies to decrease costs and increase payment for vaccine delivery. Reform is still needed.

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ABBREVIATIONS

Peds	Pediatricians
FM	Family Medicine physicians
ACIP	Advisory Committee on Immunization Practices
VFC	Vaccines for Children
ACA	Affordable Care Act
AAP	American Academy of Pediatrics

AAFP	American Academy of Family Physicians
CDC	Centers for Disease Control and Prevention

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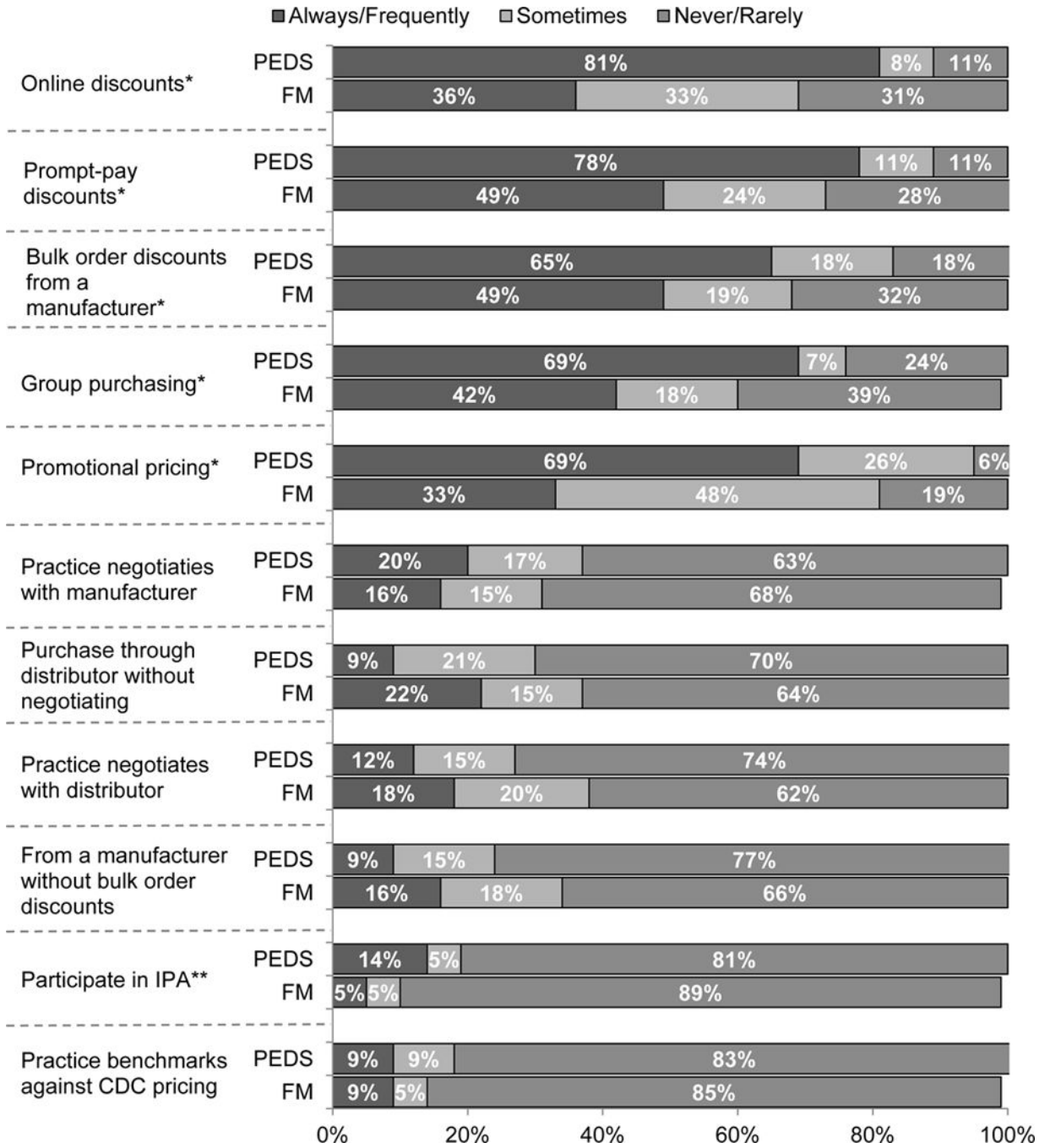


Figure 1. Practices' Reported Strategies for Purchasing Vaccines for Privately Insured Patients (n=127 Ped, n=80 FM)

*p<0.05 for comparison between specialties (Mantel-Haenszel Chi-Square) – Ped more likely to use all strategies; **IPA = independent practice association; Note: Percentages may not add up to 100% due to rounding

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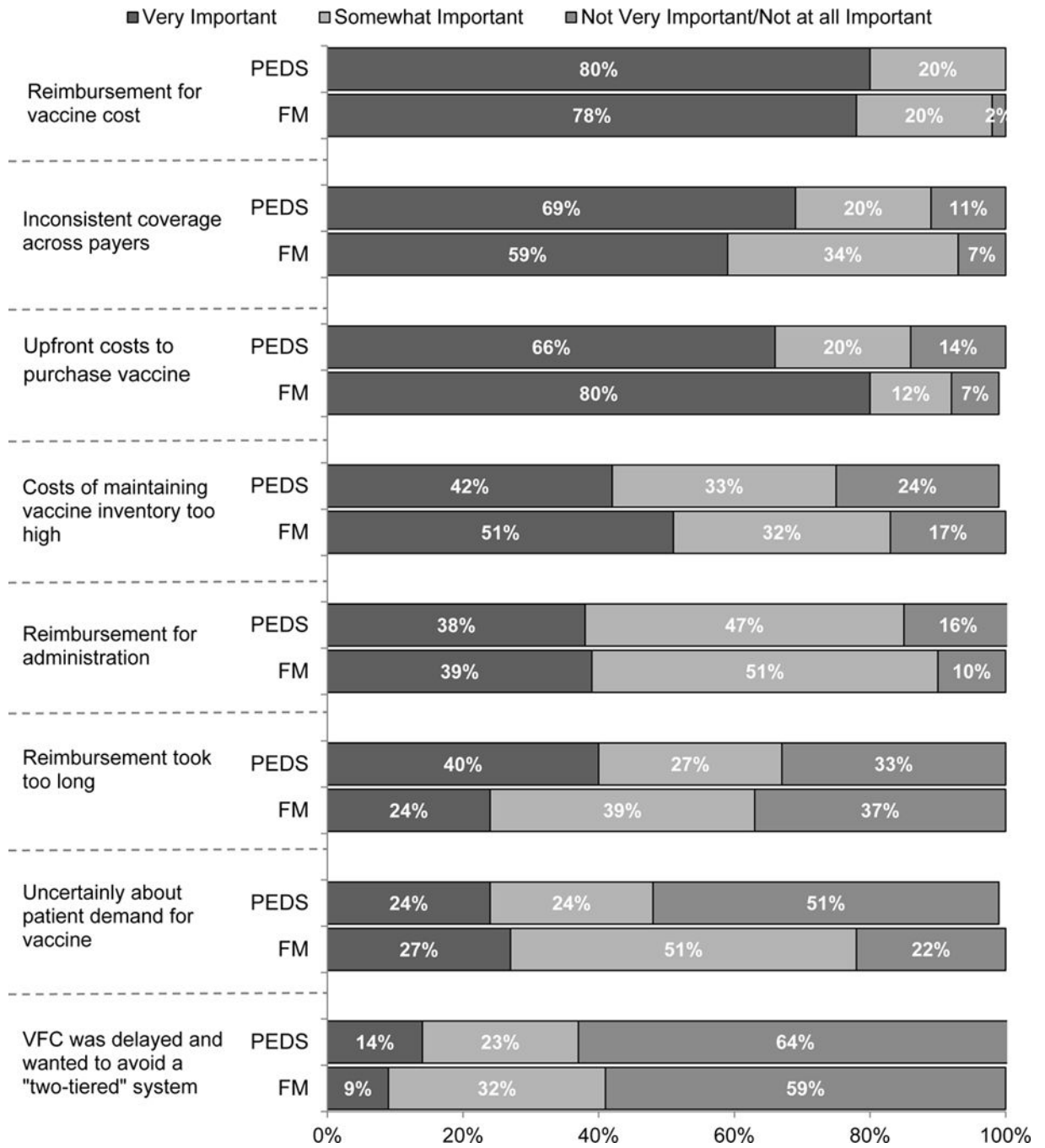


Figure 2. Practices' Reported Reasons for Seriously Considering or Stopping Purchase of One or More Vaccines (n = 89)

Note: Percentages may not add up to 100% due to rounding

Table 1

Characteristics of survey respondents and non-respondents by specialty.*

Variable	Family Medicine (n=198)			Pediatrics (n=232)		
	Responder (n=92)	Non-Responder (n=106)	P-value	Responder (n=129)	Non-Responder (n=103)	P-value
Male gender	60%	67%	0.29	48%	38%	0.15
Location						
Urban	34%	22%		42%	50%	
Suburban	40%	50%		49%	42%	
Rural	27%	28%	0.14	9%	9%	0.50
Region						
Midwest	29%	25%		18%	20%	
Northeast	14%	12%		25%	27%	
South	33%	49%		43%	34%	
West	24%	14%	0.10	15%	19%	0.59
Mean (sd) age in years	52 (9)	54 (11)	0.61	51 (9)	50 (12)	0.23
Median number of providers	4	3	0.23	5	5	0.79

* Only private, single specialty practices that are not in a Universal Purchase state were included. sd = standard deviation

Practices' reported level of payment for vaccine purchase and vaccine administration by payer type.*

Table 2

Payment for vaccine purchase	Fee-for-service (n=202)	PPO (n=200)	MCO/HMO (n=185)	Medicaid** (n=98)	CHIP (n=98)
< 80% of purchase price	5%	5%	7%	n/a	11%
80% – 99% of purchase price	12%	15%	21%	n/a	19%
100% – 109% of purchase price	41%	46%	43%	n/a	40%
110% – 119% of purchase price	20%	16%	12%	n/a	8%
> 120% of purchase price	6%	4%	4%	n/a	0%
Payment is too variable to answer	16%	15%	14%	n/a	21%
Payment for vaccine administration	Fee-for-service (n=201)	PPO (n=199)	MCO/HMO (n=180)	Medicaid (n=156)	CHIP (n=108)
Most pay <=\$5	3%	3%	11%	19%	20%
Most pay \$6–10	19%	20%	26%	44%	37%
Most pay \$11–17	35%	33%	27%	25%	25%
Most pay \$18–24	22%	23%	16%	6%	6%
Most pay >=\$25	7%	8%	6%	1%	3%
Payment is too variable to answer	14%	14%	13%	5%	9%

* Peds and FM combined. Physicians responding “Do not see patients in this [payer] category” were excluded from the analyses for that category. MCO/HMO = managed care organization/health maintenance organization; PPO = preferred provider organization; CHIP = Children’s Health Insurance Program

** Medicaid is not included for vaccine purchase since vaccine is provided to practices through the vaccines for children (VFC) program.