

# Influence of Pay-for-Performance Programs on Information Technology Use Among Child Health Providers: The Devil Is in the Details

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## ABSTRACT

**OBJECTIVE.** Pay-for-performance programs are used to promote improved health care quality, often through increased use of health information technology. However, little is known about whether pay-for-performance programs influence the adoption of health information technology, especially among child health providers. This study explored how various pay-for-performance compensation methods are related to health information technology use.

**METHODS.** Survey data from 1014 child health providers practicing in Florida were analyzed by using univariate and multivariate techniques. Questions asked about the adoption of electronic health records and personal digital assistants, as well as types of activities that affected child health provider compensation or income.

**RESULTS.** The most common reported method to affect respondents' compensation was traditional productivity or billing (78%). Of the pay-for-performance-related methods of compensation, child health providers indicated that measures of clinical care (41%), patient surveys and experience (34%), the use of health information technology (29%), and quality bonuses or incentives (27%) were a major or minor factor in their compensation. In multivariate logistic regression analyses, only pay-for-performance programs that compensated directly for health information technology use were associated with an increased likelihood of electronic health record system adoption. Pay-for-performance programs linking measures of clinical quality to compensation were positively associated with personal digital assistant use among child health providers.

**CONCLUSIONS.** Pay-for-performance programs that do not directly emphasize health information technology use do not influence the adoption of electronic health records among Florida physicians treating children. Understanding how different pay-for-performance compensation methods incentivize health information technology adoption is important for improving quality. *Pediatrics* 2009;123:S92–S96

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### Key Words

electronic health record, incentives, child health provider

### Abbreviations

HIT—health information technology

CHP—child health provider

EHR—electronic health record

CI—confidence interval

P4P—pay-for-performance

PDA—personal digital assistant

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**P**AY-FOR-PERFORMANCE (P4P) PROGRAMS aim to improve quality of care by rewarding health care providers with incentives for achieving a specified level of performance on  $\geq 1$  predefined measure.<sup>1</sup> Some programs also emphasize the anticipated cost savings of such improvements.<sup>2</sup> Outcomes that are potentially rewarded include clinical measures such as immunization rates, efficiency measures such as generic drug prescribing rates and hospital admission rates, and patient satisfaction.<sup>3</sup>

Overall, a growing number of health plans are developing and implementing P4P programs.<sup>2</sup> For example, a survey found that a majority of health maintenance organizations offer P4P programs to physicians.<sup>4</sup> However, the development of P4P programs in the United States is still in its infancy, particularly in child health care.<sup>1,5</sup> Moreover, the specific combination of compensation methods and incentive measures applied to providers varies greatly between programs.<sup>6</sup> Some programs target specific diseases, some target only high-volume providers, and others target all physicians and hospitals.<sup>2</sup> The size of the incentive also varies across programs, usually ranging from 1% to 10% but sometimes constituting as much as 40% of the provider's income.<sup>1,2</sup>

An increasingly popular approach to improving quality is the use of health information technology (HIT), such as electronic health record (EHR) systems and personal digital assistants (PDAs).<sup>7</sup> Many P4P programs for physicians have incentives that promote the use of HIT, either directly or indirectly.<sup>8–10</sup> For example, P4P programs that reward physicians for achieving certain quality outcomes typically require that the physicians document their ability to meet predetermined benchmarks. To take full advantage of such bonuses, physicians would likely use an EHR system to

facilitate the reporting requirements of program participation. Information regarding the impact of such approaches is limited, however, and it is not clear how effective these programs are in promoting HIT adoption, especially among providers serving pediatric populations.<sup>3,11</sup> The purpose of this study was to explore the extent to which differing compensation methods for physicians are associated with the use of HIT applications, including EHRs and PDAs. Understanding this relationship is important because it should help policymakers understand the extent to which P4P programs may influence the adoption of HIT among child health providers (CHPs).

## METHODS

In spring 2005, a survey was sent to 14 921 physicians practicing in ambulatory clinical settings in Florida. The 5-page questionnaire captured information regarding the use of various HIT tools, with specific questions focusing on EHR and PDA use in the office practice location. The overall physician sample included all allopathic and osteopathic primary care physicians and a 25% stratified random sample of other specialists with an active medical license that appeared in the Florida Department of Health licensure database. A subset of this sample, including pediatricians, pediatric subspecialists, and family physicians, was sent a 7-page questionnaire. The additional survey questions, which were the focus of the current study, addressed quality-of-care issues, including compensation methods and participation in P4P programs. The instrument also asked respondents to indicate what proportion of their practice was made up of children <18 years of age. CHPs were defined as all general pediatricians and pediatric specialists and all family physicians who indicated that  $\geq 20\%$  of their patients were children. The focus of the present study was on responding CHPs, but the entire protocol received institutional review board approval from our university committee.

Univariate, bivariate, and logistic regression analyses were used to identify factors associated with the adoption of EHRs and PDAs by CHPs. The primary independent variables included information regarding physician compensation methods (patient surveys, measures of clinical care, use of clinical information technology, quality bonuses, or billing). On the basis of the literature, other independent variables were used as covariates, including physician and practice characteristics (age, race/ethnicity, specialty, level of HIT sophistication, practice size, practice type, practice setting, volume of Medicaid patients, and level of sophistication with HIT).<sup>12</sup> The dependent variables included whether physicians routinely and personally used an EHR or PDA.

Bivariate analyses of physician characteristics, including practice setting, practice size, provider type, high-volume Medicaid practice, and level of self-perceived sophistication, revealed correlations with HIT adoption and PDA use. Significant variables were included in multivariate logistic regression models, to control for differences among groups. Finally, a series of logistic

TABLE 1 Practice Characteristics of CHPs (N = 1014)

	n (%)
Provider type	
General pediatrician	606 (59.8)
Family physician ( $\geq 20\%$ children)	138 (13.6)
Pediatric subspecialist	270 (26.6)
Practice setting	
Academic	88 (8.9)
Hospital	107 (10.8)
Other	798 (80.4)
Practice size	
Solo practitioner	247 (25.7)
2–9 physicians	581 (60.5)
10–49 physicians	104 (10.8)
$\geq 50$ physicians	29 (3.0)
High-volume Medicaid ( $>50\%$ )	300 (31.9)
Unsophisticated user of HIT	209 (21.2)

Numbers may not add up to 100% because of rounding or missing data.

regression models were used to test the associations between the use of EHRs and PDAs and the 5 forms of compensation. Because of concerns regarding inflated regression coefficients attributable to multicollinearity, the various compensation measures were not included simultaneously in any of the models.<sup>13</sup>

## RESULTS

### Demographic Features

In the larger survey of all physicians, 4203 surveys were available for analysis, yielding a 28.2% response rate. Of those, 1014 responses were from CHPs. The response rate among CHPs, individually and collectively, did not differ from the overall rate. We were unable to detect the presence of response bias in our sample in a formal analysis that was published previously.<sup>14</sup>

Demographic and practice characteristics of CHPs are presented in Table 1. The majority of CHPs were pediatricians, were working in a setting outside academic settings and hospitals, and were working in practices with  $\leq 9$  providers. Nearly one third of responding physicians were in practices where Medicaid reimbursement covered  $\geq 50\%$  of their patients. Finally, 1 in 5 providers indicated that they were not sophisticated users of information technology.

### Compensation Methods

CHPs were asked about the types of activities that affected their own compensation or income in a major or minor way. The method most likely to affect respondents' compensation was traditional productivity or billing, which was indicated by 78% of CHPs as being either a major or minor factor in their compensation or income (Table 2). Of the P4P-related methods of compensation, approximately one third of CHPs indicated that measures of clinical care (41%) or patient surveys and experience (34%) were major or minor factors. Finally, use of clinical information technology and quality bonuses or incentives were identified as major or minor factors affecting compensation by 29% and 27% of CHPs, respectively.

**TABLE 2 Compensation Methods for CHPs in Florida**

	<i>n</i> (%)
Productivity or billing	
Not a factor	215 (22.3)
Minor factor	175 (18.2)
Major factor	572 (59.5)
Measures of clinical care	
Not a factor	562 (59.0)
Minor factor	262 (27.5)
Major factor	129 (13.5)
Patient surveys and experience	
Not a factor	630 (65.8)
Minor factor	252 (26.3)
Major factor	75 (7.8)
Use of clinical information technology	
Not a factor	675 (71.4)
Minor factor	217 (23.0)
Major factor	53 (5.6)
Quality bonus or incentive payments	
Not a factor	697 (73.4)
Minor factor	198 (20.8)
Major factor	55 (5.8)

Respondents were asked to indicate to what extent each of the listed compensation methods was used in determining their own compensation or income.

In multivariate analysis, the only form of compensation significantly related to routine use of an EHR was direct compensation for the use of clinical information technology (Table 3). In comparison with those who did not indicate that it was a method for their own compensation, those who reported it as a minor factor were 1.63

**TABLE 3 Relationship Between Compensation Factors and HIT Adoption Among CHPs**

Compensation Factors	Adjusted Odds Ratio (95% CI)	
	EHR Use	PDA Use
Patient surveys and experience (model 1)		
Not a factor	1.00	1.00
Minor factor	0.97 (0.64–1.45)	1.26 (0.92–1.74)
Major factor	1.01 (0.51–2.00)	1.08 (0.63–1.86)
Measures of clinical care (model 2)		
Not a factor	1.00	1.00
Minor factor	0.97 (0.65–1.47)	1.57 (1.14–2.17)
Major factor	1.12 (0.65–1.93)	1.03 (0.66–1.61)
Use of clinical information technology (model 3)		
Not a factor	1.00	1.00
Minor factor	1.63 (1.07–2.50)	0.97 (0.69–1.36)
Major factor	3.49 (1.79–6.78)	1.15 (0.69–2.15)
Quality bonus or incentive payments (model 4)		
Not a factor	1.00	1.00
Minor factor	0.94 (0.60–1.47)	1.08 (0.76–1.53)
Major factor	1.06 (0.48–2.33)	1.21 (0.65–2.25)
Productivity or billing (model 5)		
Not a factor	1.00	1.00
Minor factor	1.31 (0.74–2.32)	1.16 (0.74–1.83)
Major factor	1.43 (0.91–2.24)	1.14 (0.80–1.61)

Survey respondents were asked to indicate the extent to which each compensation factor was used in determining their own compensation or income. Each model controlled for the level of HIT sophistication, practice size, provider type, practice setting, and Medicaid volume.

times (95% confidence interval [CI]: 1.07–2.50 times) more likely and those who reported it as a major factor were 3.26 times (95% CI: 1.62–6.57 times) more likely to report routinely using an EHR system.

The only form of compensation significantly associated with the use of a PDA was the use of measures of clinical care. In comparison with providers who did not indicate this as a compensation factor, those who indicated it to be a minor factor were 1.57 times (95% CI: 1.14–2.17 times) more likely to report routinely using a PDA. There was no statistically significant association between those who indicated that this type of compensation was a major factor and PDA use.

## DISCUSSION

Innovative programs that are trying to incentivize improvements in quality by rewarding physicians for superior care are gaining in popularity.<sup>15</sup> Collectively, these P4P programs may increase directly or indirectly the use of HIT among physicians, because electronic applications facilitate participation by physicians in these incentive programs. The purpose of this study was to examine whether physician participation in P4P programs was positively associated with the adoption of EHR systems or PDAs among physicians who care for children in Florida.

Of several examined compensation mechanisms that are part of P4P programs, only direct incentives for the use of HIT were associated with physician use of EHR systems in Florida. This suggests that P4P programs that do not emphasize the use of HIT do not ultimately encourage physicians to overcome the barriers to EHR adoption that are common in medical practices that serve children disproportionately.

Adopting an EHR system can be a very costly endeavor, encompassing both extensive hardware and software purchases.<sup>16</sup> Previous work suggested that physicians caring for children, especially pediatricians, are significantly slower than other doctors to adopt EHRs into their office practices.<sup>17</sup> There are several reasons why CHPs may be more reluctant to take on the expense of an EHR system, including the cost, the complexity of the system, and the significant staff training and workflow adjustments that are necessary.<sup>18</sup> An additional barrier is that many of the available products do not meet the needs of CHPs, because often they do not offer key pediatric functionalities (such as weight-based dosing).<sup>19</sup> This may serve to increase the threshold that pediatricians must reach before committing to the expense of purchasing an EHR system. Therefore, indirect incentives for EHR use (eg, measures of clinical care) may be insufficient to spur adoption.

Congruent with previous literature findings, we found that different P4P compensation factors affected the adoption of HIT applications differently.<sup>11</sup> For example, whereas direct incentives to use HIT were associated with EHR use, PDA use increased among respondents who were compensated by programs with rewards for measures of clinical care. PDAs are relatively inexpensive and have been found to be useful for activities such as accessing evidence and recommendations about

which services patients should receive.<sup>20</sup> In addition, there is minimal technical skill or training required to use a PDA, and the benefits of using the device are almost immediately apparent. Furthermore, measures of clinical care have been in use for at least a decade.<sup>20,21</sup> The association of PDA use and compensation linked to clinical care measures may reflect CHPs' perception that PDA functions help them achieve higher quality of care by reminding them of recommended services.

In our study, nearly one third of Florida's CHPs reported being affected by the use of alternative forms of compensation related to P4P programs. Often, these forms of compensation were reported in combination with one another. In Massachusetts, 89% of physician groups reported having P4P incentives in  $\geq 1$  commercial health plan contract.<sup>9</sup> The trends in Florida and Massachusetts confirm the findings of a national study that found greater use of P4P programs in the Northeast than in the South.<sup>4</sup> The availability of P4P programs varies across the country but their numbers continue to grow, despite a limited and conflicting body of evidence regarding such programs' effectiveness in improving quality of care.<sup>6,15,22,23</sup>

Even with the new information presented in this study, several limitations are worth mentioning. First, given the cross-sectional nature of our data, the statistical analyses we used were not designed to detect causality. Instead, the results we presented should be interpreted as associations. Second, we did not achieve an optimal response rate in the original survey on which these results are based. When the data were tested formally for response bias, however, no bias was detected.<sup>14</sup> In addition, our study focused on CHPs practicing in 1 state. Generalization to other specialties and to physicians working in other locales should be performed with caution. Future research should expand the monitoring of the relationship between P4P programs and the adoption of HIT to other geographic areas and specialties. Lastly, it should be noted that, in 2003–2004, Florida's Medicaid program provided 3000 high-volume Medicaid prescribers with PDAs to allow real-time access to preferred drug lists, individual prescription histories, and drug interaction or screening tools. The extent to which CHPs enrolled in that program also participated in our study is not known. That program did not include P4P components, however, and might only have influenced overall PDA adoption among CHPs in the state. Given the program's lack of emphasis on P4P, it is unlikely that the program played a factor in our findings pertaining to PDA use.

The use of HIT, in itself, has been well recognized as a method for improving quality<sup>24</sup> and is perceived as an efficient strategy to document performance improvements to capture P4P payments.<sup>2</sup> The assumption is often made that quality incentives alone can potentially spur the adoption of EHRs and other HIT.<sup>25</sup> Our study suggests, however, that incentives for achieving certain quality benchmarks are not sufficiently attractive to incentivize the costly acquisition of an EHR system, at least among CHPs at the early end of the EHR adoption curve. At least for CHPs, incentives that targeted HIT adoption

specifically seemed to influence the decision to pursue the use of EHRs more directly.

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