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USE OF WELL-CHILD VISITS IN HIGH-DEDUCTIBLE HEALTH PLANS

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Abstract

Objective—To examine how enrollment in high-deductible health plans (HDHPs) affects use of well-child visits relative to traditional plans, in plans where preventive care is exempt from the deductible.

Study Design—Pre-post comparison between groups.

Methods—We selected children aged ≤ 18 years enrolled in a large Massachusetts health plan through employers offering only one type of plan. Children were in traditional plans for a 12-month baseline period between 2001 and 2004, then were either switched by a decision of the parent's employer to an HDHP or kept in the traditional plan (controls) for a 12-month follow-up period. Preventive and other office visits were exempt from the deductible and subject to co-payments as in traditional plans. The primary outcome was whether the child received well-child visits recommended for the 12-month period. Using generalized linear mixed models, we compared the change in receipt of recommended well-child visits between baseline and follow-up for the HDHP group relative to controls.

Results—We identified 1,598 children who were switched to HDHPs and 10,093 controls. Between baseline and follow-up, the mean proportion of recommended well-child visits received by HDHP children decreased slightly from 0.846 to 0.841, and from 0.861 to 0.855 for controls. In adjusted models, there was no significant difference in the change in probability that recommended well-child visits were received for HDHP children relative to controls (p=0.69).

Conclusions—Receipt of recommended well-child visits did not change for children switching to HDHPs which exempt preventive care from the deductible compared to those remaining in traditional plans.

Keywords

consumer-directed healthcare; cost sharing/co-payments; benefit design; insurance type; pediatrics; healthcare utilization

BACKGROUND

Rising health care costs have led to greater cost-sharing requirements in health insurance plans. Among the newer cost-sharing strategies are high-deductible health plans (HDHPs). Such plans have lower premiums than traditional plans and attempt to control costs by requiring that enrollees assume more responsibility for health care costs through annual deductibles that often exceed $1,000 per individual and $2,000 per family. Adoption of HDHPs has risen among employers and employees, including those with children.[1–3] In 2007, 18% of privately-insured children were enrolled in HDHPs.[4] Prevalence of HDHPs is likely to rise as such plans have been part of health reform proposals to make lower-cost coverage available.

HDHP proponents believe that increased responsibility for health care costs will lead enrollees to reduce unnecessary care, use more cost-effective services, and increase preventive care use.[5–7] Others worry that out-of-pocket costs in HDHPs may lead to underuse of needed care. More than twenty years ago, the RAND Health Insurance Experiment showed that adults and children used fewer services of all types, including preventive care, with increased cost-sharing and deductibles.[8] Some recent data in adults show that use of preventive services in HDHPs is similar to traditional plans.[3, 9, 10] However, other data suggest a reduction in preventive services such as screening colonoscopy.[9, 11, 12] Current research on the effects of HDHPs on children's health care use is limited, although the response to cost-sharing may differ between children and adults.[13]

Many HDHPs exempt pediatric preventive services such as well-child visits and immunizations from the deductible, although anywhere from 8–53% of enrollees in HDHPs have plans where preventive care is subject to the deductible.[3, 14] Exempting important services such as preventive care from high levels of cost-sharing, a strategy known as value-based insurance design, has been suggested as a means of preserving their use in the presence of increased cost-sharing.[15, 16] However, the complexity of HDHPs may cause confusion for enrollees over which services are or are not subject to the deductible, making them more likely to forgo services they mistakenly believe are subject to the deductible.[17] Enrollees in HDHPs that exempt preventive visits from the deductible may also be dissuaded from seeking them because of unexpected deductible costs for laboratory or other services that arise during preventive visits.[18]

Our study sought to examine whether children in HDHPs that exempt preventive services from the deductible were as likely to receive recommended well-child visits as children in traditional plans.

METHODS

Design and Setting

This study was designed as a pre-post comparison between groups, comparing children who were switched into HDHPs with those who were kept in traditional health plans. The study used health plan enrollment and claims data from Harvard Pilgrim Health Care, a non-profit New England health plan with more than one million members who receive care in a variety of organizational settings. This study focused on employer-sponsored plans in Massachusetts.

In March 2002, Harvard Pilgrim began offering HDHPs with family deductibles ranging from $1,000 to $4,000 per year. The benefit structure was similar across HDHPs studied. Services subject to the deductible included emergency department visits, diagnostic tests, hospitalizations, and therapeutic procedures (e.g. physical therapy). Office visits (including

well-child visits) were subject to a $20 co-payment and were excluded from the deductible, i.e., families paid only the co-payment and not the full cost, even if the deductible limit had not been reached. Prescription drugs were also exempt from the deductible and subject to co-payments. Preventive services such as immunizations, routine hemoglobin and lead levels, and tuberculosis screening were covered at no cost. A Health Reimbursement Arrangement (HRA) (an account for out-of-pocket health care expenses) was available but offered by few employers. In contrast, traditional health maintenance organization (HMO) plans in Harvard Pilgrim lacked deductibles and had co-payments for emergency department visits and office visits (including well child visits), full coverage for preventive care and diagnostic tests, and limited cost-sharing for hospitalizations. Office visits and prescription drugs had co-payments that were similar to those in the HDHPs, with most office visit co-payments between $10–20.

This study was approved by the institutional review board of Harvard Pilgrim Health Care.

Study Population

As part of a larger study of families in HDHPs,[19] we identified families with at least one child ≤ 18 years who were enrolled together in the same health plan account in a traditional Harvard Pilgrim HMO for a 12-month baseline period anytime between April 2001 and June 2004, and then were switched to an HDHP for a follow-up period of at least 12 months. Families were excluded if: 1) a family member was ≥ 65 years of age; or 2) a family member did not have continuous enrollment through the same employer for the 24-month period. We identified a control group of families with at least one child ≤ 18 years who remained in a traditional Harvard Pilgrim HMO plan for at least 24 months. In order to reduce selection effects, we limited our study to families who were insured through employers offering only one type of health plan, i.e. they did not offer a choice between Harvard Pilgrim and other health plans, or a choice between different types of Harvard Pilgrim plans (89% of families in this population). In this way, the choice to switch to an HDHP (or to remain in a traditional HMO) was made at the employer level, not at the employee level. National data suggest that enrollees without a choice of plans constitute half of the population in HDHPs.[3]

We selected all eligible families that were switched by the employer to an HDHP. For each HDHP family, we selected eight control families whose employer continued to offer only a traditional HMO plan; control families were matched only on the basis of contemporaneous enrollment periods and were otherwise randomly selected.. The date the family switched to an HDHP was assigned as the index date separating the baseline and follow-up periods. Controls were assigned the same index date as their matched HDHP family. Some control families were subsequently excluded if a family member no longer met the age or continuous enrollment criteria for the 24-month period around the assigned index date. Children aged < 18 years on the index date were selected from this population for the study sample.

Variables

Primary outcome variable—The primary outcome of interest was whether recommended well-child visits were received by a child in a 12-month period (baseline or follow-up) based on an algorithm adapted from other studies.[20–22] Well-child visits were identified from claims data as having either: 1) one of the following Current Procedural Terminology codes: 99381, 99382, 99383 – 99385, 99391, 99392, 99393 – 99395, or 99432; or 2) one of the following International Classification of Diseases, 9th Revision (ICD-9) codes: V20.2, V70.0, V70.3, V70.5, V70.6, V70.8, or V70.9.[23] Based on the child's age and recommendations of the American Academy of Pediatrics (AAP),[24] we determined the

minimum number of well-child visits that should be received over the prior 12 months (Table 1). In calculating the minimum number of visits recommended, we allowed a one-month grace period for receiving visits through the 24-month visit.[21] However, a child receiving a visit more than one month late could still end up receiving the recommended number of visits by the end of the 12 month period. For the yearly visits after the 24-month visit, we allowed the child to have a visit anytime over a 12-month period.[22] As AAP recommendations do not include visits at age 7 or 9 years, we did not require a well-child visit for children aged 7.00 to 9.99 years. Based on the child's age at the end of the baseline and follow-up periods, we calculated the number of well-child visits received and the number recommended for that 12-month period.

Predictor variables—The primary predictor variable was whether the child was switched to a HDHP or remained in a traditional plan. Other covariates included clinical and neighborhood-level socioeconomic variables. We used geocoded addresses from enrollment files to obtain data on each family's census block group from the 2000 United States Census. We defined a family's neighborhood (census block group) as high poverty if ≥10% of residents had incomes below the federal poverty level;[25] as low education if ≥25% of residents aged 25 years and older lacked a high school degree,[25, 26] and as predominantly black if ≥ 66% of residents were black.[27] Using Harvard Pilgrim data, the parent's employer was categorized as small (≤50 employees) or large (>50 employees).

We used the Johns Hopkins Adjusted Clinical Group (ACG) System to measure morbidity for each child using age, gender, and ICD-9 diagnosis codes from claims from the 12-month baseline period.[28–30] This assigns a morbidity weight standardized across a reference population of adults and children that is scaled around an average morbidity of 1.0, with higher scores indicating sicker patients.[28, 29, 31, 32] We identified chronic conditions during the baseline period using the Chronic Condition Checklist created by researchers at the Johns Hopkins School of Public Health. The Checklist uses ICD-9 codes from claims data to identify conditions expected to last more than 12 months and have a substantive impact on future health or functional status.[33]

Statistical Analyses

For bivariate analyses, we used chi square tests to compare baseline child characteristics between the HDHP group and controls, and Fisher's exact test in cases where frequencies were small. In unadjusted and adjusted analyses, we modeled the probability of receiving recommended well-child visits using logistic regression. Generalized linear mixed models were used to account for multiple recommended visits per child, for multiple children per family, and for subjects being measured in both baseline and follow-up periods. The model included study group (HDHP or control), study period (baseline or follow-up), and an interaction term between the two. The interaction term reflects the difference between groups in the baseline-to-follow-up difference, or the difference in differences, and is the key element of interest. For adjusted analyses, co-variates in the model were chosen a priori and included: age; gender; number of children in the family; whether the child's neighborhood was high poverty, low education, or predominantly black; morbidity weight; presence of a chronic condition; office visit co-pay; and index year. In order to make the findings more interpretable, we used this model to calculate the predicted probabilities of receiving recommended well-child visits in the baseline and follow-up periods for children in the HDHP and control groups. To illustrate the range of predicted probabilities, we calculated predicted probabilities for children of different ages. Other co-variates were held at their mean or modal values. We then used the model-derived predicted probabilities for the HDHP and control groups for the baseline and follow-up periods to calculate the difference between the HDHP and control groups in change from baseline to follow-up

[(Predicted Probability HDHP $_{\text{follow-up}}$ − Predicted Probability HDHP $_{\text{baseline}}$) − (Predicted Probability Control$_{\text{follow-up}}$ − Predicted Probability Control $_{\text{baseline}}$)]. If children were aged 7.00 – 9.99 years at the end of the baseline or follow-up periods, they were not included for that study period, as there is no recommended visit for seven and nine-year-olds.

RESULTS

We identified 1,598 children who were switched to HDHPs through 126 employers and 10,093 control children who remained in traditional plans through 945 employers. Employers ranged in size from less than nine employees to more than 1000. Table 2 shows the characteristics of children in the HDHP and control groups in the baseline year when both groups were in traditional plans. Although few children lived in neighborhoods that were low-education or predominantly black, children in the control group were significantly more likely than those in the HDHP group to be from such neighborhoods, a finding consistent with other data that HDHP enrollees are more likely to have higher education and less likely to be black.[3, 34] Children in the control group were also more likely to have above-average morbidity, but there was no significant difference in the percentage with a chronic condition. Children in the HDHP group were significantly more likely than control children to have parents who worked for small employers. There were no significant differences between the HDHP and control groups in other measured characteristics.

In unadjusted analyses for children in the HDHP group, the mean proportion of recommended well-child visits received declined from 0.846 in the baseline year to 0.841 in the follow-up year (data not shown). For control children, the mean proportion of recommended well-child visits received declined from 0.861 to 0.855. Compared to controls, the change in proportion of recommended well-child visits received from baseline to follow-up for HDHP children was minor (only 0.001 higher) and not significant (p=0.968 from the model without co-variates).

In adjusted analyses, we did not see a significant change in the receipt of recommended well-child visits from baseline to follow-up for children switching to a HDHP relative to children staying in a traditional plan (p= 0.69 for the interaction term) (Table 3). Of note, receipt of recommended well-child visits was significantly associated with younger age, living in a high-poverty and low-education neighborhood, and having a chronic condition. Compared to changes from baseline to follow-up for controls, the predicted probability of receiving recommended well-child visits after switching to a HDHP was only slightly smaller (Table 4). This finding was similar across age groups, ranging from 0.001 less for children < 3 years, to 0.008 less for 13–18 year-olds.

DISCUSSION

This study found that use of recommended well-child visits did not significantly change for children switching to an HDHP compared to those remaining in traditional plans. In these HDHPs where well-child visits were not subject to the deductible, differences in receipt of recommended well-child visits compared to traditional plans were minimal.

Our study confirms in a pediatric population the findings from studies in adult populations that show no change in preventive care use in HDHPs that exempt such services from the deductible.[9, 10] This is reassuring given other data that preventive care and office visits may decrease in HDHPs even when exempt from the deductible, perhaps due to confusion about which services are subject to the deductible or attempts to avoid other associated costs where the deductible might apply.[17, 18] We do not know if families in our study incurred unexpected deductible costs during well-child visits from services such as laboratory tests

that *were* subject to the deductible. These indirect effects of deductible policies merit further research.

Our findings do not necessarily imply that concerns about underuse of services such as well-child visits are unfounded where HDHPs do not exempt preventive care from the deductible.[35, 36] Regulations for federally-qualified HDHPs with tax-exempt HSAs specify that preventive services are permitted but not required to be exempt from the deductible.[37] Up to 53% of employees in HDHPs have a deductible that applies to all services, including preventive care.[3, 38] Data from the RAND Health Insurance Experiment showed that increased cost sharing decreases use of highly effective services such as preventive care as well as less effective services for both adults and children.[8]

When cost-sharing is applied differentially such that specific important services have little or no cost-sharing, use of these services has been shown to be preserved.[16, 39] Our study supports this idea in that well-child visits were maintained in HDHPs when they were exempt from the deductible. However, our study was not able to examine use of well-child visits in HDHPs where they were subject to the deductible. Other studies have found that use of adult preventive services in HDHPs is maintained for services exempt from the deductible but is reduced for preventive services that are subject to the deductible.[9]

The theory that HDHPs might *increase* use of preventive services does not seem to be supported in the case of well-child visits.[5, 7] While those who choose to enroll in HDHPs may be more likely to be activated health care consumers who engage in healthy behaviors,[5] we found no evidence to indicate that HDHPs foster this activation.[40]

Limitations

Because this study examined enrollees in a single health plan, our conclusions may not generalize to HDHPs offered by other insurers in other regions with different benefit policies. In particular, our study did not include HDHPs with HSAs. However, most HDHP enrollees nationally do not have such accounts to pay for out-of-pocket costs.[3, 41] In addition, the HDHPs we studied exempted not just preventive care but all office visits from the deductible; policies that exempt only specific preventive services from the deductible may have a different effect. Because health plan enrollment is not random, the lack of a randomized design may have biased our results. This bias is mitigated by use of a strong, quasi-experimental design and our deliberate focus on a population without member-level choice of health plan. However, employer-level selection effects may still exist.[19] We did not have individual-level data on income, education, and race/ethnicity for our subjects. However, we were able to use census block group data as a proxy for family socioeconomic variables, which can provide reasonable estimations of individual-level socioeconomic measures.[25–27, 42] Based on these data, our population appears to have relatively high socioeconomic status, as would be expected in a commercially insured population. Our results may not generalize to more socioeconomically vulnerable children in HDHPs for whom underuse of services due to increased cost-sharing or misunderstanding about plan design may be more problematic.

Implications

Our results may allay fears that enrollment in HDHPs will lead to reductions in children's use of important preventive services, at least in a situation where such services are exempt from the deductible. This may be reassuring to families, employers, insurers, and policy makers who seek lower-cost health insurance options, but it also suggests the need to carefully consider whether important preventive services are part of the deductible when designing and adopting HDHPs. Value-based insurance design, the idea of decreasing cost-

sharing for high value services rather than applying deductibles and cost-sharing broadly as a blunt instrument, may have particular relevance for HDHPs.[15] Because of the potential for confusion about nuanced benefit designs in HDHPs, plan descriptions and decision support systems will need to provide clear, readily available information about which services are subject to the deducible. Because of their lower cost, enrollment in HDHPs is likely to grow as part of state and national efforts to expand insurance coverage;[43] their design and effects on health care utilization should be carefully monitored.

Conclusions

In HDHPs where preventive care is exempt from the deductible, there does not appear to be a reduction in use of recommended well-child visits. Further research should assess the effects of HDHP enrollment on children's use of important preventive and other services, especially when they are subject to the deductible.

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Table 1

Minimum number of recommended well child visits over the prior 12 months for children in different age groups

Age at end of 12-month period	Minimum number of visits recommended in prior 12 months
12 – 13 months	5
14 – 17 months	4
18 months	3
19 – 20 months	4
21 – 23 months	3
24 months	2
25 – 26 months	3
27 – 29 months	2
30 – 35 months	1
3 – 6 years	1
7 – 9 years*	0
10 – 18 years	1

*No well child visit is recommended for 7 and 9-year-old children

Table 2

Baseline Characteristics of Children in the Study Population

	HDHP Group % (n = 1,598)	Control Group % (n = 10,093)	p value
Age (Years)			
< 3	9.3	9.2	
3 – 6	22.2	24.4	
7 – 12	39.6	37.8	0.259
13 – 18	29.0	28.7	
Male	51.1	50.4	0.610
Number of children in the family			
1	18.3	16.1	
2	47.3	46.8	
3	24.4	27.1	0.080
4	7.8	7.7	
≥ 5	2.2	2.4	
High poverty neighborhood *	12.0	11.5	0.543
Low education neighborhood †	4.3	6.1	0.006
Predominantly black neighborhood‡	0.1	0.6	0.002§
Above-average morbidity¶	16.4	22.3	< 0.001
Chronic condition	20.9	22.0	0.313
Small employer (≤ 50 employees)	83.1	57.5	< 0.001

*≥10% of residents below poverty level

†≥ 25% of residents over age 25 without high school degree

‡≥ 66% of residents are black

§p value by Fisher's exact test due to small frequencies (all others by chi square)

¶child's morbidity weight from the Johns Hopkins Adjusted Clinical Group (ACG) System is above the standardized average of 1.0, indicating above-average morbidity

Table 3

Characteristics Associated with Receiving Recommended Well-Child Visits

	Adjusted Odds Ratio (95% CI)
Study group: HDHP (vs. control)	0.82 (0.67–0.99)
Study period: follow-up (vs. baseline)	1.00 (0.91–1.09)
Interaction: study group * study period	0.95 (0.76–1.20)
Age (Years)	
< 3	ref
3 – 6	0.47 (0.39–0.58)
7 – 12	0.19 (0.16–0.23)
13 – 18	0.13 (0.11–0.15)
Male	0.96 (0.88–1.06)
Number of children in the family	1.00 (0.94–1.06)
High poverty neighborhood*	0.74 (0.61–0.89)
Low education neighborhood†	0.61 (0.48–0.77)
Predominantly black neighborhood‡	0.93 (0.51–1.71)
Morbidity weight§	1.01 (0.98–1.05)
Chronic condition	1.17 (1.04–1.32)
Office visit co-payment ($)	1.01 (0.999–1.02)
Index year	1.01 (0.94–1.09)

*≥10% of residents below poverty level

†≥ 25% of residents over age 25 without high school degree

‡≥ 66% of residents are black

§Based on the Johns Hopkins Adjusted Clinical Group (ACG) System.

Table 4

Predicted Probabilities for Receiving Recommended Well-Child Visits

	Predicted Probability				
	HDHP Group		Control Group		Difference in Baseline to Follow-up Changes
Age (years)	Baseline	Follow-up	Baseline	Follow-up	HDHP vs. Controls†
<3	0.97	0.97	0.98	0.98	−0.001
3–6	0.94	0.94	0.95	0.95	−0.003
7–12	0.86	0.86	0.88	0.88	−0.006
13–18	0.80	0.80	0.83	0.83	−0.008

Adjusted values are based on a generalized linear mixed model that included the above variables and the following co-variates: gender; number of children in the family; neighborhood poverty, education, and race; morbidity weight; presence of a chronic condition; office visit co-pay; and index year.

$p<0.001$ for receipt of recommended well-child visits for each age group compared to age < 3 years.

$p=0.690$ for interaction term for study group (HDHP vs. control)*study period (baseline vs. follow-up).

Predicted probabilities were calculated for different values of the listed variables, and set to mean or modal values for the remaining covariates.

† Model-derived predicted probabilities for the HDHP and control groups for the baseline and follow-up periods were used to calculate the difference between the HDHP and control groups in change from baseline to follow-up [(Predicted Probability $\text{HDHP}_{\text{follow-up}}$ − Predicted Probability $\text{HDHP}_{\text{baseline}}$) − (Predicted Probability $\text{Control}_{\text{follow-up}}$ − Predicted Probability $\text{Control}_{\text{baseline}}$)].