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Consumer-Directed Health Plans Reduce The Long-Term Use Of Outpatient Physician Visits And Prescription Drugs

ABSTRACT Consumer-directed health plans (CDHPs) are designed to make employees more cost- and health-conscious by exposing them more directly to the costs of their care, which should lower demand for care and, in turn, control premium growth. These features have made consumer-directed plans increasingly attractive to employers. We explored effects of consumer-directed health plans on health care and preventive care use, using data from two large employers—one that adopted a CDHP in 2007 and another with no CDHP. Our study had mixed results relative to expectations. After four years under the CDHP, there were 0.26 fewer physician office visits per enrollee per year and 0.85 fewer prescriptions filled, but there were 0.018 more emergency department visits. Also, the likelihood of receiving recommended cancer screenings was lower under the CDHP after one year and, even after recovering somewhat, still lower than baseline at the study’s conclusion. If CDHPs succeed in getting people to make more cost-sensitive decisions, plan sponsors will have to design plans to incentivize primary care and prevention and educate members about what the plan covers.

Health insurance premiums for employment-based health benefits outpaced wages and inflation every year between 1998 and 2010, rising 177 percent compared to 52 percent for worker earnings.1 This represents a major financial challenge for employers that offer health benefits to their employees. Many of these firms have responded by implementing various approaches to control these increases. Approaches have included measures that hold premiums down by shifting a greater share of costs to consumers, such as imposing coverage limits and increasing coinsurance and deductibles. Another set of approaches attempts to constrain premium growth by reducing burden of illness with chronic condition management, wellness programs, and regular use of preventive care.2

Consumer-directed health plans (CDHPs) are an innovation that some employers have used to manage health care costs and increase personal accountability for health. CDHPs combine high deductibles with tax-preferred savings or spending accounts that workers and their families can use to pay their out-of-pocket health care expenses. These accounts allow people to accumulate funds on a tax-preferred basis—the funds may include contributions from the employer, the employee, or both, depending on the plan’s structure. Employees can choose between using the funds for their health care cost sharing or saving the money for the future.

The theory behind CDHPs is that as participants are exposed to a high deductible before insurance benefits are triggered, enrollees will be induced to make better health care use decisions, such as not going to an emergency department (ED) when a visit to a physician would suffice. The plan’s incentives should support...
health improvement (for example, proper diet and exercise) and the use of high-value care (for example, routine physicals) that could reduce future health care needs. Furthermore, the availability of the savings account introduces an element of trading off health care services today for future savings that can be used when health care services are needed. Prior research has found that CDHPs lead to 5–14 percent reductions in participants’ health care spending.4

There are several concerns surrounding CDHPs. First, patients may lack comprehensible, timely, and trustworthy information that is essential for making informed decisions under such arrangements.5 In addition, high deductibles could lead patients—especially those of lower socioeconomic status—to skimp on preventive and other necessary health care services in order to save money.6,7

Employers first introduced these kinds of plans in 2001 with health reimbursement arrangements. They began offering high-deductible health plans with health savings accounts in 2004 as authorized by the Medicare Modernization Act of 2003. Health reimbursement arrangements and health savings accounts both involve funds set aside on a tax-preferred basis for use on medical expenses; they also have important differences that are explained in the online Appendix.8 By 2012, 31 percent of employers offered either a health reimbursement arrangement or health savings account-eligible plan. These plans covered about twenty-five million people, or about 14.6 percent of the privately insured market.1

Although usually offered alongside more traditional designs, CDHPs are slowly increasing as employers’ only health insurance offering. According to a recent survey of employers with at least 1,000 full-time employees, the percentage of firms with only CDHPs has grown from 5 percent in 2007 to 8 percent in 2012 and is expected to increase to 14 percent by 2013.2

This article assesses the impact on health services use when employers fully replace all existing health plan options with a CDHP. Using claims data from a large midwestern manufacturer that made such a benefit design change, we estimated the CDHP’s effects on hospitalization, ED use, physician visits, and prescription drug fills, as well as on preventive cancer screenings. Although we did not explicitly address the cost effects related to changes in utilization and preventive screening, that is a focus of future research.

Prior research in this area has generally found low-to-moderate reductions in such measures of services use, although follow-up periods have been short—making longer-term inference difficult. Importantly, these past studies have also been limited by the potential for selection bias, because enrollees were often given a choice between CDHPs and more traditional options. This meant that those who chose CDHPs might have fit a particular profile, making it difficult to discern the independent effects of the CDHP. A thorough review of this body of work is provided in the online Appendix.8

Our study adds to this literature by following CDHP enrollees for four years post-CDHP adoption (the longest study period examined thus far). Moreover, individual selection bias is less likely in our study because the employer fully replaced its preferred provider organization (PPO) with the CDHP. Our analysis further safeguards against obtaining and reporting biased results by making use of a matched comparison group.

Findings from the present study will be of great policy value. The availability of CDHPs both as a choice and on a full-replacement basis is expected to continue to increase under the Affordable Care Act. For example, recent regulatory decisions related to employer contributions to health reimbursement arrangements and health savings accounts, combined with the excise tax on high-cost health plans that takes effect in 2018, make CDHPs more attractive to employers because they may keep costs below the threshold that triggers the tax. It is therefore important to understand the long-term implications of increased reliance on CDHPs for the use of health care services and spending.

**Study Data And Methods**

**Objectives** As stated above, the objective of the present study was to estimate the impact of a full-replacement CDHP on health services use. The utilization measures that we studied were the number of inpatient hospital admissions, inpatient hospital days, ED visits, outpatient physician office or clinic visits, and prescriptions filled, on a thirty-day adjusted basis. Cancer screening indicators were mammogram (for females ages forty and older); cervical cancer screening (for females ages twenty-one and older); and a colorectal exam (for males and females ages fifty and older).

**Data Sources** Data were derived from pharmacy and medical claims and enrollment information on individuals continuously insured from January 1, 2006, through December 31, 2010, by one of two employers. The first was a large midwestern manufacturer that fully replaced its PPO coverage with a CDHP, including a health savings account, on January 1, 2007. From this employer we drew observations on
**EXHIBIT 1**

Structure Of The Consumer-Directed Health Plan Benefit For The Study-Group Employer

<table>
<thead>
<tr>
<th></th>
<th>Low deductible option ($)</th>
<th>High deductible option ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANNUAL HEALTH INSURANCE DEDUCTIBLE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>1,250</td>
<td>2,150</td>
</tr>
<tr>
<td>Family</td>
<td>2,150</td>
<td>4,300</td>
</tr>
<tr>
<td><strong>ANNUAL EMPLOYEE PAYROLL CONTRIBUTION TO PREMIUM (2007)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>271</td>
<td>0</td>
</tr>
<tr>
<td>Family</td>
<td>2,184</td>
<td>1,417</td>
</tr>
<tr>
<td><strong>ANNUAL EMPLOYER CONTRIBUTION TO HEALTH SAVINGS ACCOUNT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>Family</td>
<td>1,300</td>
<td>1,300</td>
</tr>
</tbody>
</table>

**Source**: Authors’ analysis of plan data from large midwestern employer.

13,278 active workers and their dependents under age sixty-five to form the study group. All CDHP members were given a choice of two deductible and contribution structures, shown in Exhibit 1, with a trade-off between deductible levels and employee contributions toward premiums. Enrollees overwhelmingly (89 percent) selected the option with higher deductible levels and no employee contribution toward the premium.

**Analyses** The second employer—a larger, national firm engaged in both the manufacturing and services sectors—maintained its traditional PPO coverage throughout the five-year study period. A comparison group was constructed using a matching process in which we paired study-group subjects with individuals in this second employer group based on calendar year 2006 (that is, pre-period) values of the following variables: sex, age, geographic region, and health status. Additionally, pre-period values of the eight utilization indicators (described above)—dependent variables in our analysis—were also balanced across the study and comparison groups. Using this process, 10,509 members (79 percent) of the study cohort were successfully matched and were used in the ensuing analysis.

In addition to the comorbidity and demographic characteristics noted above, our multivariate models also included a flag for whether or not the individual was the policyholder; household size (that is, the number of members covered by the policy); the number of years of tenure with the employer; and indicators for CDHP, post-CDHP-adoption year, and their interactions.

Pre-period (2006) variable means were presented and tested across the study and comparison groups. In addition, standardized differences were examined to evaluate whether adequate covariate balance was attained via the match process. Multivariate models were used to estimate the impact of the CDHP on the outcomes over time. Specifically, we used the difference-in-differences method with a negative binomial model for the measures of health services use and a probit for the dichotomous cancer screening variables. Standard errors were clustered at the policyholder level, rendering inference more conservative. All analyses were conducted using the statistical software Stata/MP, version 12.0.

**Limitations** The present study had several limitations. First, a single manufacturing employer with a large, captive workforce was examined. Results thus might not be generalizable to other employers or the broader market. Given that the workforce was mostly located in the Midwest, regional, sociodemographic, and company cultural characteristics may have influenced behavior under the CDHP in a way that could also limit the study’s generalizability.

Although estimation of CDHP impacts four years after adoption was a key strength of the present study, it also required plan participants to have maintained continuous eligibility throughout the study period. This requirement reduced the sample size by about 20 percent each year as a result of employee turnover. Consequently, the eligibility criterion may limit the generalizability to similarly restricted cohorts.

Second, deductible size makes a difference in utilization. In this study, most plan participants chose the CDHP with the higher amounts offered, which were higher than national averages for CDHPs at the time. Third, although the CDHP cohort was matched to comparison members from a second employer, the possibility remains that derived effects might still be biased if unobserved variables associated with CDHP were also correlated with health services use (for example, changes in the provider networks or patient communications). For a more in-depth description of the data and methods, see the online Appendix.

**Study Results**

**Sample Characteristics** Exhibit 2 presents mean values for all variables in 2006. As intended by the matching process, few significant differences were detected between the CDHP and comparison groups. In fact, no standardized differences exceeded 10 percent—a threshold below which covariate balance is generally considered adequate. Both cohorts were 54 percent male and had equal representation in each of the age categories. Average age was thirty and thirty-one for the CDHP and comparison groups,
respectively. Household size was 3.3 people; policyholders made up 39–40 percent of the sample; and tenure with the employer was thirteen to fourteen years. As noted above, nearly the entire sample was located in the Midwest.

On average, individuals in both groups had 0.02 inpatient hospitalizations, 0.04 inpatient hospital days, and 0.11–0.12 ED visits during 2006. Outpatient physician office and clinic visits in that year were slightly higher at baseline among CDHP members (3.1) than among the comparison group (2.8). Individuals filled 8.5 (CDHP) to 8.6 (comparison) prescriptions during the year. Finally, by design of the match, cancer screening rates were identical across the two employers: 63.8 percent breast, 58.4 percent cervical, and 23.5 percent colorectal.

**TRENDS IN HEALTH SERVICES USE** Exhibit 3 shows trends in health services use for the CDHP and comparison groups over the five-year study period (a graphical version is available in the online Appendix). Inpatient hospital admissions, inpatient hospital days, and ED visits increased in both groups in the first year post-CDHP. Although they reached higher levels in the comparison group during 2007, the measures tended to converge after that (although for ED visits the two groups moved in the opposite direction for the last two years of the study, with the CDHP group trending up and the comparison group trending down). Outpatient visits dropped precipitously in the CDHP group during 2007 (compared to an increase in the comparison group); however, these lines also converged by the time the study ended. After a divergence in 2007 between the CDHP group and the comparison group on prescription drug fills (CDHP fell, comparison group rose), the trends were upward...
and similar for both for the remaining three years; the comparison group used more prescriptions than the CDHP cohort in 2010.

All three rates of cancer screening, which were covered at zero out-of-pocket cost for both CDHP and comparison group members, fell in 2007 for both groups, but to a much greater degree among the CDHP members. The courses that these cancer screening rates took following the introduction of the CDHP in the study group varied, but they all converged by the end of the study period toward rates that were below those observed in 2006, with use a bit higher in the CDHP group. Finally, noteworthy drops occurred for both groups in the rates of cervical cancer screening from 2009 to 2010, which was likely due to a modification of recommendations by the American College of Obstetricians and Gynecologists.22

**IMPACT OF THE CDHP ON HEALTH SERVICES USE**

Exhibit 4 reports the difference-in-differences estimates of the impact of the CDHP on the eight measures of health services use derived in the multivariate models (standard errors are provided in the online Appendix).8 All effects are presented relative to pre-CDHP implementation (2006) levels. Although no significant effects were detected for inpatient hospitalizations and days, the CDHP was associated with an increase in ED visits of 0.012 (p < 0.10) and 0.018 (p < 0.05) after three and four years, respectively. For outpatient visits and prescription drug fills, CDHP had a significant (p < 0.01) negative impact that persisted over the four years after the CDHP’s adoption. Specifically, numbers of physician office and clinic visits were lower by 0.48 after one year (in 2007) and 0.26 after four years (in 2010). Moreover, enrollees filled 1.37 and 0.85 fewer prescriptions after one and four years, respectively, under the CDHP.

All rates of cancer screening were significantly (p < 0.05) lower for CDHP members after one year. The likelihood of receiving breast, cervical, or colorectal cancer screening, when treatment guidelines recommended it, was four percentage points lower under the CDHP compared to the comparison group. These declines did not persist beyond the first year of implementation.

**Discussion And Policy Implications**

In this study, a large manufacturer fully replaced its PPO coverage with a CDHP (with a health savings account). Relative to a matched comparison group whose members did not face the same change in health insurance, active workers in the CDHP significantly reduced their physician office visits and prescription drug use after the plan was implemented, and these reductions were sustained throughout the study period. This is consistent with the expectation that CDHPs will tend to dampen demand for some medical services. We did not study the effects on costs, outcomes, or health status, but these should be foci of future studies to further understand the effects of reduced utilization that result from these types of insurance arrangements.

**HOSPITALIZATION**

The absence of utilization changes for hospitalizations runs counter to an expectation of reduced utilization. However, it is not surprising, since hospitalizations involve clinical conditions of greater severity, acuteness, and high patient concern, which means that patients may be less sensitive to the costs of these services. Inpatient services are also significantly more costly than outpatient care, which serves to blunt the incentive to avoid care created by the initial high deductibles in CDHPs.

**EMERGENCY DEPARTMENT USE**

We did find that ED visits increased slightly in year 3 of the CDHP relative to the matched comparison group. This is contrary to expectations, and it is more difficult to understand these changes,
Especially because we did not find that they were associated with higher inpatient use. The increase in ED use might stem from the long-term implications of reductions in physician office visits and prescription drug use after the CDHP was implemented. Fewer physician office visits may lead to the writing of fewer prescriptions, which could in turn mean that individuals with chronic conditions are less adherent to recommended medication therapy. The intent is for CDHPs to reduce the use of discretionary rather than essential care. However, more research is needed to better understand what may have caused the longer-term increase in ED use.

**Prescription Drugs** When it comes to the initial decline in prescription drug use, this may be the result of fewer outpatient office visits or simply the introduction of the CDHP. However, it is unknown whether people only reduced unnecessary prescriptions or reduced the use of necessary pharmaceutical services. If the latter occurred, it may explain the longer-term increase in ED use.

**Cancer Screening** Contrary to one of the goals of CDHPs, which is to encourage preventive care, recommended cancer screening declined in the first year of the CDHP introduction. With the exception of cervical cancer screening, which fell sharply following a change in screening guidelines, the rates for the CDHP group did rebound and steadied over the remaining years of observation. However, it is worth noting that after the first year of the CDHP, there was no difference in cancer screening rates between the CDHP group and the matched comparison group.

Declines in cancer screening rates during the first year of the CDHP may reflect reductions in the use of outpatient visits in that first year. This is notwithstanding the fact that expenses associated with the cancer screenings examined were not subject to patient cost sharing but were covered at 100 percent. Given that this employer designed its health plan so that participants would not skimp on preventive cancer screenings, the reduction in cancer screenings was a surprising finding and may suggest that enrollees did not sufficiently understand their health insurance coverage.

It is also possible that the observed reductions in preventive cancer screenings occurred because plan participants reduced physician office visits since they were subject to the deductible and not considered preventive services. If this was the case, allowing CDHPs with a health savings account to exempt primary care services from the deductible could mitigate the negative impact on preventive services such as cancer screening.

**Recommendations for Employers** Given these findings, employers should consider providing periodic, ongoing communications to enrollees regarding services that are exempted from the deductible. This may improve screening rates. However, as long as visits to obtain prescriptions for screening services are subject to the deductible, additional information about screening services might not be sufficient. Plans might also consider monitoring the use of recommended preventive services in order to address nonuse that is not attributable to factors such as changes in eligibility for...
recommended services or screening recommendations.

**POLICY CONSIDERATIONS** Employers are increasingly adopting CDHPs in place of other types of health benefit plans as a way of managing the rising cost of providing health care coverage through the promotion of efficient use of health services. These plans are intended to control costs by exposing participants to a combination of a high deductible and a savings account. Because of the high deductible, enrollees should be induced to make better health care use decisions. The savings account introduces an element of trading current health services for future health services, which is expected to cause plan participants to reduce their use of discretionary health care.

It is essential to understand short- and long-term patterns in the use of appropriate preventive, acute, and chronic care as a result of increased use of CDHPs. Several policy considerations may promote judicious use of higher-value health care services and less use of low-value services in CDHPs.

If CDHPs are to succeed in getting people to make more cost-sensitive decisions about the use of health care services and to engage in health-promoting activities such as using recommended preventive services, plan sponsors will have to design plans to provide incentives for primary care and prevention, intensely educate members about plan coverage, and provide needed information to assess options. Employers and insurers will need help from public policy makers to allow employers more discretion over health savings account–eligible plan designs. For example, primary care coverage could be exempted from the deductible, so that high-value preventive services not subject to the deductible would not be affected by changes to coverage of other health care services.

Unlike health savings accounts, health reimbursement arrangements provide the flexibility to permit coverage of medications, primary care, and other essential services in the deductible corridor at the discretion of the plan sponsor. Policy makers, working with plan sponsors, should continue to consider ways to provide timely, accurate, and usable price and quality information so that consumers can make informed decisions about health care services use at the point of service.

**FUTURE RESEARCH** Ultimately, the longer-term impact of CDHPs on health status, outcomes, and spending has not been documented. A number of related questions for future research have not been addressed in the literature or in this article. First, what are the role and effects of the health savings account? Does the incentive to save money in the account reduce necessary health care in the short run, potentially increasing costs in the long run? Second, do people with health savings accounts reduce contributions over time as they build up account balances? Third, as people build up account balances, do the higher balances negate the impact of the high deductible? Finally, if people skimp on necessary care after the adoption of the CDHP, are the risks of complications and associated spending higher in the long run?

Earlier findings from this work were presented at the EBRI-ERF Policy Forum, Innovations in Employment-Based Health Benefits: Lessons Learned for Public Policy, Washington, D.C., December 15, 2011; and at the EBRI-ERF Policy Forum, “Post” Script: What’s Next for Employment-Based Health Benefits, Washington, D.C., December 13, 2012. Indirect funding for this work as part of a much larger program at the Employee Benefit Research Institute was provided by the following organizations: American Express, Blue Cross Blue Shield Association, Boeing, CVS Caremark, General Mills, Healthways, IBM, John Deere & Co., JP Morgan Chase, Mercer, and Pfizer.
NOTES


8 To access the Appendix, click on the Appendix link in the box to the right of the article online.


10 Codes included diagnostic and screening mammography/radiography of the breast by computer-sliced detection with or without further physician review.

11 Codes included diagnostic and screening cervical or vaginal cytology—Pap smears.

12 Codes included colorectal screening through stoma, occult blood test, or sigmoidoscopy.

13 The employer had approximately 40,000 plan members with at least one year of continuous health insurance coverage.


18 A total of 4,893 distinct clusters were represented in the CDHP cohort and 5,196 in the comparison group. Cluster size was remarkably comparable across groups.

19 The average deductible for employee-only coverage was $1,923 in 2007, as compared to the higher deductible option of $2,150 used by the employer in this study. Claxton G, Gabel J, DiJulio B, Pickreign J, Whitmore H, Finder B, Jacobs P, Hawkins S. Health benefits in 2007: premium increases fall to an eight-year low, while offer rates and enrollment remain stable. Health Aff (Millwood). 2007;26(5):1407–16.

20 Statistically significant differences were evaluated using the nonparametric rank test described in Kruskal WH, Wallis WA. Use of ranks in one-criterion variance analysis. J Am Stat Assoc. 1952;47:583–621.


22 Between 2006 and 2009 the American College of Obstetricians and Gynecologists (ACOG) recommended that women ages 21–29 have an annual cervical cancer screening and that women ages 30 and older be screened every two to three years, once they have had three consecutive negative tests. ACOG changed its recommendation in 2009 such that women ages 21–29 should have an exam every two years and those ages 30 and older should have an exam every three years. With regard to breast cancer screening, prior to 2009 the American Cancer Society recommended that women ages 40 and older have a mammogram every year. However, in late 2009 the US Preventive Services Task Force issued new guidelines. It now recommends that women ages 40–49 not get routine mammography screening and that women ages 50–74 have a mammography screening every two years. The Task Force does recommend that women who are at high risk for breast cancer because of family history continue routine annual screening.
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M. Christopher Roebuck is president of RxEconomics. Roebuck’s key areas of interest include estimating the effects of pharmacy benefit design on prescription drug use and cost and quantifying reductions in medical services use and cost from medication adherence. In addition, he has significant experience in developing prescription-based predictive models and examining issues of plan choice and expenditures under Medicare Part D. Roebuck earned an MBA in finance from the University of Miami and a doctorate in public policy from the University of Maryland, Baltimore County.