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# Evidence about Utilization and Expenditures

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## Risk Segmentation Related to the Offering of a Consumer-Directed Health Plan: A Case Study of Humana Inc.

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**Objective.** To determine whether the offering of a consumer-directed health plan (CDHP) is likely to cause risk segmentation in an employer group.

**Study Setting and Data Source.** The study population comprises the approximately 10,000 people (employees and dependents) enrolled as members of the employee health benefit program of Humana Inc. at its headquarters in Louisville, Kentucky, during the benefit years starting July 1, 2000, and July 1, 2001. This analysis is based on primary collection of claims, enrollment, and employment data for those employees and dependents.

**Study Design.** This is a case study of the experience of a single employer in offering two consumer-directed health plan options (“Coverage First 1” and “Coverage First 2”) to its employees. We assessed the risk profile of those choosing the Coverage First plans and those remaining in more traditional health maintenance organization (HMO) and preferred provider organization (PPO) coverage. Risk was measured using prior claims (in dollars per member per month), prior utilization (admissions/1,000; average length of stay; prescriptions/1,000; physician office visit services/1,000), a pharmacy-based risk assessment tool (developed by Ingenix), and demographics.

**Data Collection/Extraction Methods.** Complete claims and administrative data were provided by Humana Inc. for the two-year study period. Unique identifiers enabled us to track subscribers’ individual enrollment and utilization over this period.

**Principal Findings.** Based on demographic data alone, there did not appear to be a difference in the risk profiles of those choosing versus not choosing Coverage First. However, based on prior claims and prior use data, it appeared that those who chose Coverage First were healthier than those electing to remain in more traditional coverage. For each of five services, prior-year usage by people who subsequently enrolled in Coverage First 1 (CF1) was below 60 percent of the average for the whole group. Hospital and maternity admissions per thousand were less than 30 percent of the overall average; length of stay per hospital admission, physician office services per thousand, and prescriptions per thousand were all between 50 and 60 percent of the overall average. Coverage First 2 (CF2) subscribers’ prior use of services was somewhat higher than CF1 subscribers’, but it was still below average in every category. As with prior use, prior claims data indicated that Coverage First subscribers were healthier than average, with prior total claims less than 50 percent of average.

**Conclusions.** In this case, the offering of high-deductible or consumer-directed health plan options alongside more traditional options caused risk segmentation within an employer group. The extent to which these findings are applicable to other cases will depend on many factors, including the employer premium contribution policies and employees' perception of the value of the various plan options. Further research is needed to determine whether risk segmentation will worsen in future years for this employer and if so, whether it will cause premiums for more traditional health plans to increase.

**Key Words.** Consumer-directed health plans, cost sharing, risk segmentation, risk selection

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In this article we examine what happened when one employer expanded its employee health benefit offerings to include a “consumer-directed” option—a benefit design that gives enrollees some first-dollar coverage but asks them to accept greater financial risk, often in return for lower monthly premiums. Our analysis is restricted to this single employer and its early experience with the consumer-directed option. The richness of the data allows us to examine the characteristics of those who chose this option in a comprehensive manner not usually possible.

Because consumer-directed plans may be most attractive to employees who expect to have relatively low health care costs, offering such plans may cause risk segmentation. If such segmentation occurs and plan sponsors do not adjust their contributions to counteract it, premiums for comprehensive health insurance products could become less affordable to the extent that those products primarily attract less-healthy employees. In this analysis, our question is not whether risk segmentation is problematic for the specific employer we studied, but whether it occurred.

## BACKGROUND

Consumer-directed health plans (CDHPs) are a relatively new form of health care benefit design, hailed by some as a solution to two problems. The first problem is the pinch felt by employers who face rising health benefit costs and are desperate for something that will help them bring their health care

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expenditures under control (without seeming to shift the entire cost burden back to their employees). The second problem is that the quality of care Americans receive is far from what it could or should be, according to a consensus of health care stakeholders, including the Institute of Medicine (2001). For example, a recent groundbreaking report notes that Americans are likely to receive appropriate and necessary care just half the time (McGlynn et al. 2003). Consumer-directed health plans are meant to address both these problems by encouraging consumers to make more cost- and quality-conscious health care choices.

To understand the attractiveness of CDHPs, we must be clear about the position in which employers find themselves. Employers sponsor health insurance for more than half the population of the United States—161 million adults and children in 2002 (Fronstin 2003). Premiums have risen at a double-digit average annual rate in recent years (Mercer Human Resource Consulting 2003; Hewitt Associates 2003), putting significant pressure on labor costs at a time of generally weak consumer demand. But what are employers to do? Broadly speaking, effecting change in markets means putting pressure on the supply side (physicians, hospitals, and other providers), on the demand side (employees and their families), or on both. In the early 1990s, employers faced cost trends similar to today's and chose a supply-side solution—managed care. However, many argue that managed care, if not dead, is in critical condition (Robinson 2001; Draper et al. 2002). It is the victim of a semantics battle in which neither employers nor employees could separate appropriate care management from the heavy-handed utilization review and provider negotiation tactics of many insurers who called themselves “HMOs” and their products “managed care.”

If employers believe that restraining costs through supply-side managed care techniques is no longer a viable strategy, they have little choice but to turn to the demand side of the market. Here, however, they must tread carefully, because health benefits are a highly visible and personal element of employee compensation. As recent collective-bargaining strikes—both threatened and actual—attest, increasing the share of costs borne by employees can raise the possibility of significant morale problems (see, for example, Armour and Appleby 2003). Moreover, we have not yet found a demonstrably superior way to shift costs. Simply increasing employees' share of premiums does little by itself to address underlying cost trends. Furthermore, the strategy may backfire (from a policy perspective) if it leads employees to drop coverage. Increasing point-of-service cost sharing will generally reduce employees' use of services—and thus premiums—but not necessarily in a desirable way.

To fill the void left by the retreat of managed care—and to put a “kinder, gentler” face on increased employee cost sharing through the promise of lower premiums—insurers have developed the so-called consumer-directed health plan. The origins and types of CDHPs have been well documented elsewhere (Gabel, Lo Sasso, and Rice 2002). These plans differ in their details but share three common elements:

- Greater point-of-service cost sharing—usually in the form of a much higher deductible—than in the typical PPO or HMO product;
- Reimbursement arrangements (sometimes called “allowances” or “accounts”) that give enrollees at least some shelter from high cost sharing and that may or may not allow unspent dollars to be used for other purposes or carried forward to subsequent years; and
- Improved decision-making tools (often web-based) that ostensibly help enrollees spend their money more wisely.

The proponents and detractors of the CDHP concept have been both numerous and vocal. Proponents argue that CDHPs will slow growth in health care costs by reducing cost-unconscious demand for services, as well as improve quality of care as informed consumers use fewer unnecessary services and seek out higher-quality providers. Consumer-directed health plans may also provide a politically acceptable way for employers to cap their overall exposure to health care costs by establishing a low-cost benchmark plan and requiring employees choosing more expensive health plans to pay for that choice.<sup>1</sup>

Opponents view CDHPs—and high-cost-sharing plans generally—as fostering risk selection. They express concern that degradation of risk pools could leave older or sicker employees, who might prefer comprehensive coverage, to face much higher premiums. (Premiums would be higher not just because of richer coverage, but also because of the enrollees’ worse health status.) Further, although CDHP enrollees might be healthier than average, those who do get sick may be exposed to unaffordable out-of-pocket expenses. Finally, CDHPs may not be as effective in constraining costs as some would hope. In most designs, the very sickest patients (who account for the lion’s share of health care costs) will continue to have the bulk of their care paid for by fairly conventional insurance.<sup>2</sup>

Whether CDHPs will be widely adopted and, if so, whether the outcome will reflect proponents’ hopes or opponents’ fears remains to be seen. Drawing on the experience of Humana Inc.—a major national health insurer that

began offering a CDHP to its own employees in 2001—we begin to address these questions. We examine the potential for risk segmentation by comparing the people who chose the new option with those who did not.

## METHODS

The study population comprises about 10,000 people (employees and dependents) enrolled as members of the employee health benefit program of Humana Inc. at its headquarters in Louisville, Kentucky, during the benefit years starting July 1, 2000, and July 1, 2001. This analysis is based on claims, enrollment, and employment data for those employees and dependents. Claims data provided measures of members' prior use of services and associated costs. Enrollment data provided information about subscriber and member demographics and premium contributions. Employment data provided information about subscribers' salary, used here as a proxy for family income.

Further detail about the claims data may be useful. Prior claims were available for all Humana products studied, but *only* for in-network use (in the case of HMO products, out-of-network use was not permitted). Humana Chief Actuary John Bertko estimates that typically 10 percent of use under preferred provider organization (PPO) products is out-of-network.<sup>3</sup> In addition, for the PPO products studied, claims data were not available for use that occurred before the deductible was reached. As a result, PPO claims may be slightly underreported relative to HMO claims.

To simplify our analysis, the study population was restricted to employees and their dependents who were members of any of the offered health benefit plans for the full 24-month study period. Because dependents are not given a unique member identifier that would allow us to distinguish them from subscribers (employees) themselves, we assumed that all dependents of 24-month subscribers were also enrolled for the full 24 months. Therefore, the total member-months used in this analysis may be somewhat overcounted, to the extent that subscribers added or subtracted dependents from coverage at times other than during open enrollment (for example, for the birth of a child, a marriage, or a divorce). We do not believe that this small uncertainty in member-months detracts from our conclusions.

By restricting our study to 24-month employees and dependents, we eliminated from the analysis about one-quarter of total members in each year. The percentage of excluded members was similar across all plan types (HMOs, PPO, and consumer-directed). Therefore, we do not believe that this

restriction biased our analysis of the characteristics of one plan’s membership versus another. It does mean that we cannot comment on whether the risk segmentation and other patterns observed in this study are also found among people who were enrolled for fewer than 24 months, for example, new hires and those who left employment during the study period.

## THE HUMANA CASE

In study year one—the benefit year that began July 1, 2000—Humana employees had three health plan options from which to choose: a health maintenance organization and two preferred provider organizations. In study year two—the benefit year that began July 1, 2001—Humana modified these options (see below) and also introduced two new consumer-directed health plans, Coverage First 1 (CF1) and Coverage First 2 (CF2). Both Coverage First options included higher deductibles than the traditional options and both incorporated a “health reimbursement arrangement” (HRA) that effectively provided enrollees with first-dollar coverage for their first \$500 worth of care. The employee share of the premium for the Coverage First options was also significantly lower than for other plans.

Humana introduced the entire set of new options, labeled “SmartSuite,” to its employees primarily to rein in its own employee health benefits costs.<sup>4</sup> A second, but no less important, reason for introducing SmartSuite internally was to test the product before offering it to customers in the midsize employer market. This practice is not uncommon among health insurers because it allows them to iron out operational problems associated with a new product.

The introduction of SmartSuite was accompanied by other changes intended to help control employee health benefit costs. These changes, summarized in Table 1, complicate our interpretation of employees’

Table 1: Major Changes to Employee Health Benefit Choices

<i>Year One</i>	<i>Year Two</i>
<ul style="list-style-type: none"> <li>• 3 choices</li> <li>• 2 PPOs, 1 HMO</li> <li>• Employer contribution: 79% of chosen plan</li> <li>• All plans have 3-tier drug benefit</li> </ul>	<ul style="list-style-type: none"> <li>• 5 choices</li> <li>• 2 PPOs, 1 HMO, 2 “consumer-directed” plans</li> <li>• Employer contribution: fixed at 79% of richer PPO</li> <li>• All plans have 4-tier drug benefit</li> <li>• Increased cost sharing at the point of service; out-of-pocket maximum increased in some plans</li> <li>• Introduction of online “Wizard”</li> </ul>

enrollment decisions, but we do not believe that they alter our fundamental conclusions. Key among these was a change in Humana's premium contribution. In study year one, before the introduction of SmartSuite, Humana contributed 79 percent of the premium for each employee's chosen plan. In effect, employees were exposed to only 21 percent of the difference in premium among plans, potentially making them less sensitive to cost in choosing a plan. In study year two, the company made a fixed-dollar contribution equal to 79 percent of the premium for the richer PPO. Employees choosing the more expensive plans therefore had to pay 100 percent of the difference in premium (between the employer's fixed contribution and the premium of the chosen plan) out of their own pocket. This change did not have a large impact on employees' share of premium in year two, but its impact could increase over time, as total premium costs increase.

Other changes from year one to year two included moving from a three-tier to a four-tier prescription drug benefit, as well as general increases in point-of-service cost sharing across the board. One other notable difference was the addition of the "Wizard" in year two. This online decision-making tool helped employees choose an appropriate health plan from among the SmartSuite options, guiding them through a series of questions about their preference for paying premiums versus cost sharing and about their expected health care use (and that of their family) in the coming year. The Wizard then recommended the health plan that would best meet an employee's preferences and needs.

The Appendix to this paper (available online) summarizes the major cost sharing and other changes made to the PPOs and the HMO between year one and year two. In general, cost sharing at the point of service increased, including the introduction of a \$100 per day hospital copayment in all three plans.<sup>5</sup> The "Standard PPO" was the thinner of the two PPOs in both years. The richer PPO—known in year one as the "Enhanced PPO"—went from a dual-option to a triple-option plan and was renamed the "Tiered PPO" in year two. (The three options were: remaining within the Humana provider network; choosing a provider within an expanded ChoiceCare network; or, going out-of-network.) Cost sharing in the HMO product stayed fairly constant, other than the per diem hospital copayment and a \$5 increase in the office visit copayment. Although benefits under all three plans declined somewhat, premiums remained flat, ranging from \$15 to \$20 per semimonthly pay period for single coverage.

The two Coverage First plans featured similar mechanics but the particulars differed somewhat (see Table 2). Employees choosing either plan

Table 2: Major Features of the Coverage First Plans\*

	Coverage First 1	Coverage First 2
Allowance for first-dollar coverage <sup>^</sup>	\$500 per year (member also pays \$20 for each nonpreventive office visit)	\$500 per year (member also pays \$20 for each nonpreventive office visit)
Deductible (in/out)*	\$1,000/\$1,000	\$2,000/\$2,000
Preventive care (in/out) after deductible	80%/60%	100%/80%
Office visit (in/out)	\$20/60%	\$20/80%
Hospital (in/out) after deductible	80%/60%	100%/80%
Pharmacy	4-tier: in-network copays — \$10 for low-cost drug, \$20 for high-cost drug, \$40 for nonpreferred drug, 25% coinsurance for injectables. Additional 30% surcharge for nonnetwork pharmacies.	4-tier: in-network copays — \$10 for low-cost drug, \$20 for high-cost drug, \$40 for nonpreferred drug, 25% coinsurance for injectables. Additional 30% surcharge for nonnetwork pharmacies.
Out-of-pocket maximum (in/out)*	\$2,000/\$3,000	NA/\$3,000
Premium <sup>^^</sup>	\$5.00	\$6.62

\*Where indicated, cost sharing is shown as “in-network/out-of-network” for a single person.

\*\*Family deductibles and out-of-pocket maximums are three times the single person’s rate.

<sup>^</sup> Allowance may not be spent out of network and does not roll over.

<sup>^^</sup> Premiums shown are semimonthly for a single employee. Premiums for employee plus spouse, employee plus child(ren), and family are calculated by multiplying the single premium by 2.0, 1.9, and 3.2, respectively.

received an allowance that could be used to pay for health care services. Once that allowance was spent, Coverage First enrollees paid for 100 percent of their care out of pocket until a deductible was satisfied. After that, traditional PPO coverage kicked in. The deductible amount and the depth of coverage beyond the deductible differed between the two plans.

Two features distinguish the Coverage First plans from many other consumer-directed plans built around health reimbursement arrangements (HRAs). First, unspent Coverage First allowance funds could not be rolled over to the next year. Second, the allowance could be used only *within the Humana network* and only *for covered services*. (Many HRAs permit payment for services from any licensed provider, including those such as chiropractors who may not otherwise be covered by the plan.) This lack of fungibility runs counter to the notion of making enrollees price sensitive—because allowance

dollars cannot be stored up and have no alternative use, enrollees have no incentive to conserve them. The Coverage First plans create true price sensitivity only after the HRA is exhausted and before the higher deductible is met (when coinsurance kicks in).<sup>6</sup>

Employees choosing the CF1 plan received a \$500 allowance, meaning that other than paying \$20 copays for nonpreventive office visits, their first \$500 of care was covered at 100 percent. Enrollees whose costs exceeded that amount then had to meet a \$1,000 deductible, meaning that they paid out of pocket for their *next* \$1,000 in claims (or until their *total* claims reached \$1,500). After that, they were responsible for 20 percent of any additional in-network claims (40 percent out of network), up to an out-of-pocket limit of \$2,000, after which all care was once again covered at 100 percent. The CF2 plan also had a \$500 allowance, but its deductible was higher (\$2,000), and its cost sharing lower (none in-network, and 20 percent out of network).

Mental health and pharmacy benefits were not paid for out of the Coverage First allowance, nor did they count toward deductibles or out-of-pocket limits. As with the PPOs and HMO that Humana offered, pharmacy and mental health benefits under Coverage First were administered under freestanding benefit plans. Other things being equal, this should have reduced segmentation because it meant none of the plans would have been differentially more attractive than others based on members' expected use of mental health or pharmacy services.

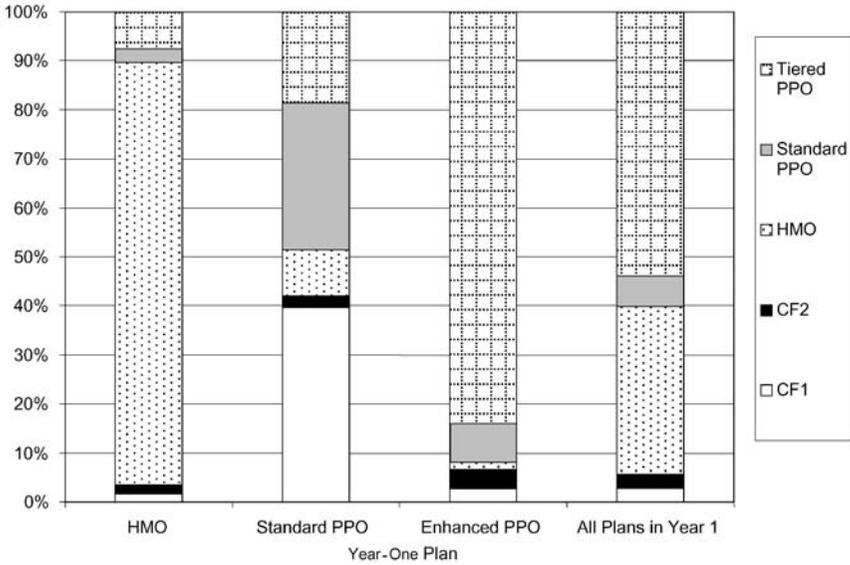
## FINDINGS

### *Enrollment Patterns*

On average over the two-year study period, there were about 4,300 subscribers (employees), and about 10,000 total members (employees plus dependents). In year one, the Enhanced PPO was the most popular plan (with nearly 60 percent of total enrollment), followed by the HMO (with nearly 40 percent), and the thinner of the two PPOs, the Standard PPO (with just over one percent).

In year two, the Coverage First products were introduced, and each attracted just under 3 percent of members. These members were drawn from both the Enhanced (now called "Tiered") PPO and the HMO, so that membership in these two plans fell to 53 percent and 34 percent, respectively. In year two, enrollment in the Standard PPO increased to 7 percent of the total. We believe this increase reflected members switching from the richer

Figure 1: Where Did Year-One Members Go in Year Two (by Percent of Members)?



PPO once they saw that the latter’s benefits had been reduced, while the premium had remained the same.

Figure 1 illustrates the “migration” of members from year one plans to year two plans, in percentages. Table 3 shows the same information in both percentages and absolute numbers. Despite—or perhaps because of—all the changes in benefits, most enrollees stayed where they were: about 85 percent of HMO and Enhanced PPO members (2,479 and 3,795 members,

Table 3: Where Did Year One Members Go in Year Two (by Percent and Number of Members)?

Year One Plan	Year-Two Plan									
	CF1		CF2		HMO		Standard PPO		Tiered PPO	
	%	#	%	#	%	#	%	#	%	#
HMO	1.6	47	1.8	51	86.3	2,479	2.8	81	7.5	215
Standard PPO	39.7	34	2.3	2	9.3	8	30.1	26	18.5	16
Enhanced PPO	2.8	125	3.8	170	1.6	71	7.9	357	84.0	3,795
All Plans	2.8	206	3.0	223	34.2	2,559	6.2	464	53.8	4,025

respectively) reenrolled in the same plan in year two. The exception is the Standard PPO—in which enrollment was initially very low—where only 30 percent of members (26 people) reenrolled in year two.

Members who left the HMO or the Enhanced PPO to enroll in Coverage First split fairly evenly between CF1 and CF2. Of those who were enrolled in the HMO in year one, 1.6 percent (47 members) left to enroll in CF1 and 1.8 percent (51 members) in CF2. Of those who were enrolled in the Enhanced PPO in year one, 2.8 percent (125 members) left to enroll in CF1 and 3.8 percent (170 members) in CF2. By contrast, 39.7 percent of year one Standard PPO members (34 members) chose CF1 in year two, while only 2.3 percent (2 members) chose CF2. Notwithstanding the small numbers involved, this disparity is notable.

*Risk Segmentation: Are Coverage First Enrollees Healthier?*

We looked at two types of information to help determine whether healthier-than-average people had chosen the Coverage First plans: demographic characteristics and claims data. Demographic characteristics are a poor predictor of health risk compared with claims and diagnostic data, but they are often used as a proxy for health status when clinical data are not available (Lee and Rogal 1997; Kronick et al. 1996; Wilson et al. 1998). Moreover, a number of CDHP sponsors have used demographic data to suggest that these plans have not disproportionately attracted low-risk members. Having access to both types of data allows us to see whether they yield the same conclusions. We found that although demographic data did not reveal favorable risk selection in the Coverage First plans, better measures of risk based on prior use and prior cost unanimously indicated risk segmentation taking place, to greater or lesser degrees, depending on the measure chosen.

*Demographic Data.* We compared the age, sex, family size, and salary of Coverage First subscribers with those of other plans (recall that “subscribers” refers to employees, while “members” refers to both employees and dependents). These characteristics suggested only a small degree of difference among the subscribers in the various plans and no clear evidence of risk segmentation.

As shown in Table 4, CF1 subscribers were slightly younger than the entire group (an average of 37.4 years versus 38.2 years), while CF2 subscribers were the same age as the entire group average of 38.2 years. The HMO subscribers were the youngest, averaging 36.1 years. Taken together, Coverage First subscribers were relatively less likely to be women than were

Table 4: Demographic Overview of Year-Two SmartSuite Plans

<i>Plan</i>	<i>Subscribers</i>	<i>Members</i>	<i>Average Subscriber Age</i>	<i>Percent of Subscribers Female</i>	<i>Average Family/Contract Size</i>	<i>Average Subscriber Salary Grouping</i>
CF1	135	273	37.4	57.7	2.0	2.5
CF2	136	276	38.3	55.7	2.0	2.7
HMO	1,479	3,340	36.1	74.9	2.3	2.0
Standard PPO	293	700	36.4	63.4	2.4	2.3
Tiered PPO	2,239	5,168	39.8	68.5	2.3	2.4
All Plans	4,282	9,757	38.2	69.7	2.3	2.2

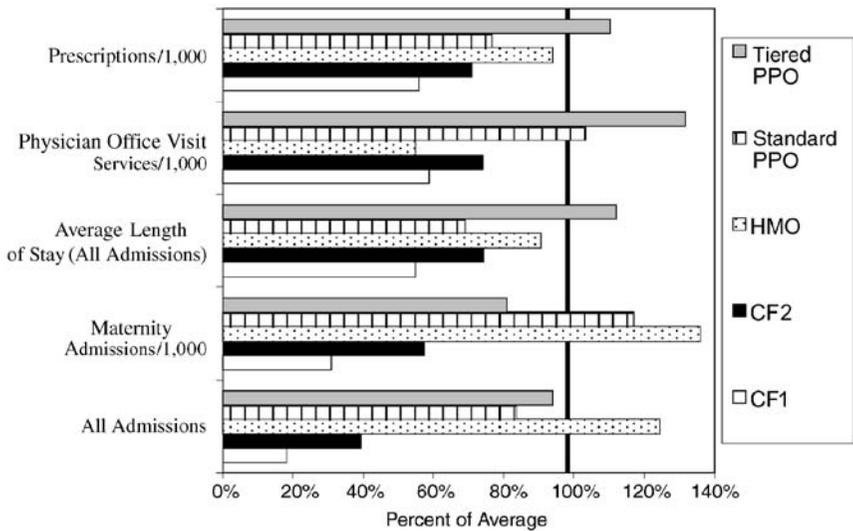
subscribers in other plans. Although the majority of subscribers were women across all plan types (reflecting the fact that Humana's workforce is more female than average for American employers), the percentage female was lower in CF1 and CF2 (58 percent and 56 percent, respectively) than in the group as a whole (70 percent). Again, the HMO option stood out—this time for having the highest percentage (75) of female subscribers.

Compared with the average, Coverage First subscribers were less likely to cover children or a spouse under the plan. The average contract size under both Coverage First plans was 2.0, reflecting a higher than average number of single subscribers. In contrast, the average family size for the group as a whole was 2.3, as was the average contract size for both the HMO and Tiered PPO.<sup>7</sup>

Finally, Coverage First subscribers had slightly higher salaries than average. We classified employees' annual salaries using a four-category scale: a salary of less than \$25,000 received a 1; a salary from \$25,000 to \$50,000 received a 2; a salary from \$50,000 to \$100,000 received a 3; a salary of more than \$100,000 received a 4. The group average was 2.2, while CF1 and CF2 subscribers had average salaries of 2.5 and 2.7, respectively. HMO subscribers had the lowest average salaries (2.0), while PPO subscribers were slightly above average (2.3 and 2.4 for the Standard and Tiered plans, respectively). These data are consistent with higher-income workers being more apt to take on greater financial risk.

*Claims Data.* To address the issue of health risk more directly, we analyzed enrollees' use of services and spending prior to the introduction of SmartSuite. Specifically, we characterized the health risk of enrollees in study year two according to their use of services and spending during study year one (in whichever plan they were enrolled at that time). We tracked people according to their unique enrollment number and examined claims

Figure 2: Prior Year Use of Services, by Year Two Plan

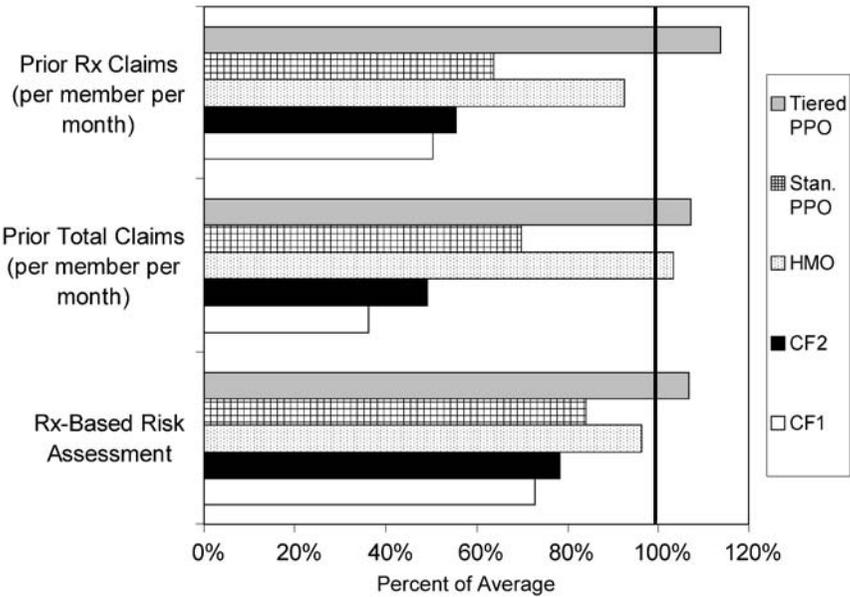


experience for people continuously enrolled in both years. Because the prior year’s use and spending reflect both health risk and benefit design, we also examined pharmacy use, which was less likely to be influenced by benefit design, as all enrollees’ pharmacy benefits were similar in year one.

Figure 2 shows that Coverage First enrollees’ use of services in study year one was unambiguously lower than that of their counterparts in other plans. For each of five services, usage in year one by people who subsequently enrolled in CF1 was less than 60 percent of the average for all people in year one (represented in Figure 2 as 100 percent). Hospital and maternity admissions per thousand were less than 30 percent of the overall average; length of stay per hospital admission (a crude measure of case complexity), physician office services per thousand, and prescriptions per thousand were all between 50 and 60 percent of the overall average. The CF2 subscribers’ prior use of services was somewhat higher than CF1 subscribers’, but it was still below average in every category. Interestingly, CF2, the Coverage First plan that might appear to provide less protection against risk (as reflected in its lower premium and larger deductible), attracted the relatively higher-use group of enrollees.<sup>8</sup>

The disparity of Coverage First enrollees’ prior-year service use is seen clearly by noting that enrollees in each of the other three plans exceeded the average in at least one category of prior use, while neither of the Coverage

Figure 3: Pharmacy-Based Risk Assessment Scores and Prior Claims, by Year Two Plan



First plans exceeded the average in any category. For example, HMO members had the highest previous rate of hospital admissions (including maternity admissions), and Tiered PPO members had the highest use of physician-related services (including prescriptions per thousand).<sup>9</sup> The higher rate of maternity admissions among HMO enrollees is unsurprising given their younger age, greater likelihood of being female, and relatively larger families; it is less clear why HMO enrollees also had a higher rate of hospital admissions overall, particularly because HMOs have traditionally been known for keeping members out of hospitals by substituting outpatient for inpatient care.

Figure 3 shows prior spending as measured by paid claims, which reflect both Humana’s and the member’s share of costs. As with prior use, these data suggest that Coverage First subscribers were healthier than average, as evidenced by lower prior total claims. Their claims spending was, on average, less than 50 percent of the group total. (As in Figure 2, total spending by the whole group is shown as 100 percent.)

Some of the difference in prior spending across plans could be attributable to differences in the way plans priced their services in year one.

However, any such effect would be minimized by the fact that all year-one members were in plans administered by Humana and subject to its fee schedules and other reimbursement arrangements—at least to the extent that members used Humana, rather than out-of-network, providers. Such out-of-network use was prohibited under the HMO, but may have taken place to greater or lesser degrees under the two PPOs. To verify this conjecture—and to gain additional perspective on prior year service use—we also looked at prior spending under the pharmacy plan, which had a similar design for all members in year one. These results (also shown in Figure 3) are consistent with those based on prior total spending, with Coverage First members having prior-year pharmacy spending about 50 percent of average.

The availability of data on pharmacy use also allowed us to explore a more sophisticated measure of health risk using a pharmacy-based risk assessment tool.<sup>10</sup> Much has been written elsewhere about the validity of such tools, which use pharmacy data from one year as a marker for conditions that are expected to be high cost in the future (Roblin 1998; Gilmer et al. 2001; Fishman et al. 2003). A prescription for insulin, for example, signals that a person has diabetes, which in turn allows a future predicted cost to be imputed to that person. By comparing future expected costs of a subgroup to costs for the group as a whole, a risk assessment score can be developed. A score of 1.0 indicates a group of average risk; a score less than 1.0 indicates a healthier than average group; and a score greater than 1.0 indicates a group that is less healthy than average.

The distribution of pharmacy-based risk assessment scores across plan types is much tighter than the distribution of raw service use (pharmacy or other), as shown in Figure 3. This narrowing of the distribution is subject to different interpretations. It could simply reflect the loss of measured variation that occurs when individual values are replaced by group averages. (That is, prior use of services for the relatively small numbers of Coverage First enrollees is likely more variable than the use of services by the larger population on which the risk assessment tool is calibrated.) Alternately, it could mean that apparent segmentation is not as large when measured with a sophisticated risk measure than when measured by use of services. In either case, our conclusion that risk segmentation is pronounced stands: CF1 and CF2 members' risk assessment scores were 73 percent and 78 percent, respectively, of the average risk score for all enrollees.

Readers may wonder why we did not test whether the observed differences in prior use and spending were statistically significant. Briefly, when one has a census of a population (as we did for Humana's headquarters

employees and their dependents), any uncertainty about differences in characteristics of population subsets will be attributable to nonsampling error (bookkeeping mistakes, for example), not sampling error (drawing a sample of CF enrollees that is unrepresentative of an underlying CF population). There is no underlying population at Humana against which to test significance, nor are we generalizing the results to a broader population. Therefore, a test of statistical significance would not be meaningful. Instead we simply offer the caution that while our results accurately reflect what happened for this employer during this specific time period, we cannot say with certainty that the observed differences in prior use and spending are attributable *only* to differences in health status, nor that the same differences would be observed in subsequent years or in other settings.

### *The “Switcher” Effect*

Some would argue that the risk segmentation we observed is to be expected in the initial years of the offering of a new product. We could hypothesize that those most likely to leave a plan with which they are familiar and switch to another tend to be people with few health care needs. We wondered whether “switchers” in general tend to be a healthy group, and if so, whether the risk segmentation effect we saw was simply due to the fact that Coverage First subscribers were, by definition, switchers.

To answer this question, we looked at prior costs for two sets of people: those who switched from any plan in year one to a Coverage First plan in year two (by definition, all CF subscribers are included); and those who switched from any plan in year one to any other *non-CF* plan in year two. We also compared both these groups of switchers to all year-two members (both switchers and nonswitchers). While switchers did have lower prior spending than average for year-two enrollees, regardless of which plan they had switched into, prior spending for non-CF switchers was double that of CF switchers. From this we can conclude that switchers in general appear to be healthier than average, but that this is insufficient to explain the disproportionately healthier-seeming status of CF1 and CF2 enrollees.

## DISCUSSION

The finding that offering a consumer-directed plan alongside traditional HMO and PPO coverage led to risk segmentation—with healthier-seeming people

choosing the high-deductible option—raises two questions. First, what should we make of the apparent contradiction between our results and the claims of proponents of CDHPs or the findings of other researchers? Second, should we care about the degree of risk segmentation we found?

That CDHPs of the kind offered by Humana may attract a relatively healthier enrollment pool should come as no surprise; in return for lower premiums, the Coverage First options provide less financial protection against significant illness. Notwithstanding the claims of some proponents that CDHPs should be more attractive to sicker enrollees because they offer maximum choice of provider, the “bridge” between the allowance and the point when traditional coverage kicks in can be daunting to people with predictably higher health spending. Moreover, in the Humana case, funds in the reimbursement account do not roll over as they do in some other HRAs, so there is no opportunity to increase financial protection over time.

Where we found significant risk segmentation, other researchers have not. For example, Stephen Parente and his colleagues studied the University of Minnesota’s experience in offering a CDHP, concluding that no risk segmentation occurred and that the consumer-directed plan was not disproportionately chosen by the young and healthy (see Parente, Christianson, and Feldman 2004, this issue). One issue is that the methods used to measure risk segmentation in that study differed from ours. We used prior use and spending as proxies for health status; the Parente team used self-reports of chronic illness (a measure that was highly correlated with the Adjusted Diagnosis Group measure of health status). A debate about the best tool for measuring health status is well beyond the scope of this paper, but clearly, no tool is perfect. Therefore, we are not surprised to see different results based on the use of different tools—prior claims, self-reports, and demographic characteristics. (Indeed, the Humana experience illustrates this clearly: there is little if any evidence of segmentation on the basis of age or sex, while measures of prior use and spending provide solid evidence of segmentation.) In addition, as noted before, the evidence in this and other articles is drawn from case studies of early adopters and should be viewed with appropriate caution.

To determine whether the degree of risk segmentation we found matters, we must answer two questions. First, do we care about the possible consequences of risk segmentation? Second, at what point does segmentation trigger those consequences?

We should care about the consequences of risk segmentation for two reasons. First, it creates inequity by making it difficult (or impossible) to pool

people with predictably different health risks. Therefore, whether segmentation is a problem depends on one's views about the appropriateness of having people with predictably low health care costs (for example, young employees) subsidize people with predictably high health care costs (for example, older employees or those with chronic illnesses). Second, because insurers' ability to offset segmentation through risk adjustment is imperfect, consumers' ability to choose efficient plans will be confounded by premiums that reflect differences in efficiency *and* in risk profile. Thus, there is a potential efficiency loss as well.

To the extent that people have different tastes for financial risk (unrelated to their health status), the availability of multiple products is superior to having only a one-size-fits-all product. From this perspective, variation in benefit design is good because it encourages efficiency. The problem arises when variation in benefit design encourages people to sort themselves not just by their taste for risk, but also by their likelihood of incurring a loss (that is, their health risk). Such adverse selection can lead to "death spirals" that make some benefit designs unsupportable.

The challenge, then, is how to obtain the efficiency gains of variation in benefit design (more choices) without incurring the equity costs (the loss of cross-subsidization). For a self-insured employer such as Humana—or an employer purchasing a "total replacement" product from a third-party insurer—the effects of risk segmentation can be mitigated by adjusting the employer contribution or plan payments, effectively subsidizing employees who choose higher-cost plans and taxing those who choose lower-cost plans. (Humana does intend for SmartSuite to be a total replacement product.) However, if the only answer to increasing market segmentation is a move toward total replacement strategies (with or without risk adjustment), we have to ask whether this type of competition is desirable for all market stakeholders. We do not attempt to answer this question here but rather note that such competition stands in stark contrast to the "managed competition" model of consumer choice advocated by Enthoven (1988, 1993, 2003) and others (Enthoven and Kronick 1989), and its potential implications are not well understood.

While total replacement may be one possible solution for a single employer, the same does not necessarily hold for the broader insurance market where there is no entity to risk-adjust payments. Thus, the introduction of a consumer-directed plan (or any plan with substantial cost sharing), which primarily attracts employers with relatively healthy employees, would result in the employees of other firms paying higher premiums to maintain comprehensive coverage or accepting lower benefits to maintain premiums. In the limit, some employers might well be priced out of the market.

Is the degree of risk segmentation we saw with Humana's consumer-directed plan sufficient to cause concern? On one hand, one must be careful not to read too much into a case study, particularly one limited to the initial experience with a new plan offering.<sup>11</sup> As time passes, regression to the mean will likely offset some of the initial selection. On the other hand, the magnitude of the differences in apparent health status we found was large, with Coverage First enrollees having prior-year use of services and risk scores 25 to 50 percent lower than enrollees in Humana's other plans. This compares with a difference in total premiums of about 15 percent.

If the differential in health status persists, and if Humana were to price the SmartSuite offerings on an actuarially fair basis, then premiums for the Coverage First options would fall, and premiums for the traditional options would rise. To counteract this effect and to maintain the fundamental concept of group insurance, however, Humana plans to price SmartSuite premiums with a tighter spread than the actual claims experience. While this type of cross-subsidization of premiums across benefit type is feasible under the single carrier replacement model, it is nevertheless not clear whether other insurers—or self-insured employers—will follow Humana's lead. Over time, therefore, one would expect the risk profile of enrollees in the traditional options to deteriorate.

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## NOTES

1. This third hoped-for impact of CDHPs is not necessarily unique to them, but rather to the employer contribution strategy known as "defined contribution." Defined contribution can be compatible with any type of benefit design, but it is seen as being particularly compatible with CDHPs.
2. The structure of most CDHPs—first-dollar coverage, followed by a gap in coverage up to a deductible, followed by traditional coverage—provides little or no change in incentives once a person requires hospitalization. A single, typical hospitalization will put someone well beyond the deductible in most plans.

3. Personal communication with Humana Chief Actuary John Bertko, 2004.
4. Personal communication with Humana Chief Actuary John Bertko, 2003.
5. The \$100 daily hospital copay is limited to the first 10 days, after which there is no further cost sharing under the HMO, and there is coinsurance under the PPOs.
6. The situation is similar to what is observed with Section 125 flexible spending accounts. Faced with using or losing funds at the end of a calendar year, people may make discretionary health care purchases (for example, eyeglasses) whose value to them is well below their cost. Lack of fungibility may thus have the perverse effect of encouraging greater consumption of services than would otherwise have taken place.
7. The data do not necessarily indicate that Coverage First subscribers actually *have* smaller families than other subscribers, but rather that they *cover* fewer family members under their own plan. It is possible that they have the same size families as others but that they choose to cover their dependents under a spouse's plan, or not to cover them at all. Our data did not allow us to make this determination, as Humana does not collect information about dependents not covered under its own employee plans.
8. In fact, CF1 and CF2 were actuarially equivalent—according to Humana—and provided the same amount of protection against hospitalization. However, an employee choosing among them would most likely not understand this.
9. We include prescriptions per thousand in “physician-related” use because we assume that in most cases, the writing of a prescription involves a visit to a physician or other physician service.
10. Specifically, we used the Pharmacy Model of the Ingenix Predictive Model™. See <http://www.ingenix.com>.
11. Enrollment in the Coverage First plans was fairly low during our study period—5.6 percent of total membership—but take-up was close to 20 percent the following year, when Humana offered the CF plans to their employees outside of Louisville. That suggests a degree of satisfaction among CF enrollees. It also offers the chance for further study.

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