Value-Based Insurance Design: Perspectives, Extending the Evidence, and Implications for the Future

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Abstract

Value-based insurance design (VBID) has been used by employers to encourage use of and increase access to evidence-based health services. The core mechanisms of VBID align patient cost-sharing amounts with the value of care. Value-based principles have also been written into the Affordable Care Act (ACA) by requiring coverage of certain preventive services without a copayment. Findings from studies of VBID programs have demonstrated the impact that value-based programs can have on particular patient populations and conditions. This paper highlights the findings from a series of related investigations examining the impact of an employer-sponsored VBID program in patients with diabetes and asthma. Moreover, we review evidence from value-based diabetes and asthma programs and provide guidance for the design of future programs.

In 2002, the health strategy team at Pitney Bowes created and launched the company's value-based design initiative.[1] Pitney Bowes became the first company in the United States to fully implement this approach, in which the employer sets the amount of cost-sharing for a medical service or treatment according to the value of the intervention rather than its cost. Concurrently, Fendrick and colleagues introduced the value-based insurance concept in the peer-reviewed research literature.[2] In the ensuing years, value-based design has been adopted by many employers, health plans, and payers.[3] With healthcare reform, it is expected that more employers will implement value-based insurance design (VBID), and those with existing value-based designs may consider new approaches that extend beyond their current interventions.

On the surface, the value-based approach is straightforward; however, controversy has emerged as value-based programs highlight a need within our healthcare system to define high-value and low-value services and "make … decisions about not paying for things that don't produce health."[4] Uncertainty has also emerged regarding the investment required by payers when lowering cost-sharing and whether the advantages resulting from increased adherence or improved outcomes are large enough to counterbalance the increase in benefit provision.

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In this paper, we review the current literature on value-based design and expand the research base with results from 2 new investigations. Specifically, we provide (1) a historical perspective on VBID; (2) evidence from VBID for diabetes care; (3) evidence from VBID for asthma care; and (4) a discussion of implications for the future.

Value-Based Insurance Design: A Perspective

VBID, also known as value-based benefit design, is a medical benefit plan design that typically covers evidence-based services (such as antidiabetic medications for patients with diabetes or statins for patients with high cholesterol) through lower or eliminated patient cost-sharing (ie, copayments, coinsurance, and deductibles). In some cases, VBID decreases or eliminates coverage (ie, raises patient cost-sharing) for services that are identified as low value. In contrast to traditional benefit plan design in which cost-sharing is typically based on the cost of providing a specific service or product, the primary mechanism of action of VBID is to align cost-sharing and the clinical value of the service—providing a lower price that patients would pay out of pocket for high-value services and a higher price that patients would pay out of pocket for lower-value services.

VBID is conceptually rooted in primary and secondary prevention by mechanisms designed to avoid complications and slow the progression of disease. VBID also draws on health economic principles, which have shown that patients respond to the level of cost-sharing for medical services.[5-7] VBID has caught the interest of employers because of the focus on overall quality, cost, and utilization, as well as improving clinical care that is most beneficial to patients. In a recent survey of 1300 large employers, more than 81% indicated that they plan to implement a VBID in the future.[8]

Healthcare Reform

The principles of VBID have been adopted into the Affordable Care Act (ACA). Specifically, Section 2713 of the ACA requires that all health plans include certain preventive services without a copayment for the patient, such as screenings for blood pressure, colorectal cancer, and sexually transmitted infection.[9] Section 2713 of the ACA also allows the US Secretary of Health and Human Services to establish guidelines to permit a health insurance plan to use a VBID.[10]

In reports to the US Congress, the Medicare Payment Advisory Commission highlighted VBID as a tool for lowering costs and improving quality of care in Medicare and proposed a provision to allow implementation of VBID innovations, such as varied copayments for treatments based on evidence of their value.[11,12] Finally, the Institute of Medicine's report to the Secretary of Health and Human Services on essential health benefits also references the premise of VBID, and a section of the report is devoted to examining evidence for its approach.[13]

Mechanism of Action

VBID focuses on building cooperation between patients and their providers. As evidence of its impact has emerged, there has been increasing support for VBID based on the effects it may have on practitioners and patients. When well executed, value-based design aligns the interests of patients and providers, resulting in improved health outcomes and fewer downstream events such as complications.[14]

VBID also focuses on prices that patients pay out of pocket as a mechanism to encourage patients to use medications or treatments that are tied to improved health. With improved adherence to treatment regimens, the aim of VBID is to improve current functioning and clinical outcomes, reduce the occurrence of downstream adverse events, and potentially slow the progression of disease. In the case of prescription drugs, evidence has shown that patients who do not follow their prescribed medication regimens to manage their chronic conditions have higher healthcare costs.[15,16]

An Opportunity for Employers

According to the Centers for Disease Control and Prevention, nearly half of all adults in the United States have a chronic condition and these conditions account for more than 75% of healthcare costs.[17] For employers, this translates to an estimated 45 million sick days and $7.4 billion in lost productivity each year.[18] A primary objective for an employer-sponsored benefit design is to stabilize direct and indirect medical costs through chronic disease prevention and disease management (DM).[19] In addition, benefit plans can make use of evidence-based guidelines and medication adherence programs to control the costs of chronic conditions.

A variety of methods exist for employers implementing value-based programs, the diversity of which must be taken into consideration when evaluating the effects of the program. Options may include altering the amount of or eliminating copayments, changing the tiered structure tied to these payments, or adjusting the out-of-pocket exposure required of the patient through coinsurance percentages. **Figure 1** depicts coinsurance, in which the consumer has more direct exposure to the cost of the service than a flat copayment where the price does not vary. For example, if a VBID program lowers all diabetes medications to 10% of the allowed charges (generic and brand name),

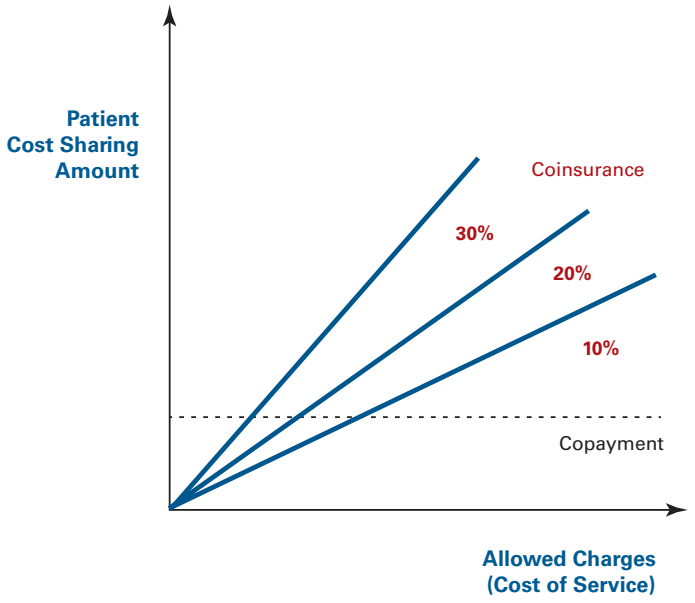
the actual out-of-pocket cost is $10 if the medication is $100 and $25 if the medication is $250. Unlike a flat copayment amount, this type of coinsurance design—which is a focus of this paper—exposes the patient to a range of prices, while still allowing some variation to correspond with the variation in allowed charges.

Key Implementations of VBID

Various implementations of VBID have existed since the mid-1990s. Each program was designed to engage patients, providers, and payers to improve clinical outcomes while enhancing overall healthcare value. Key examples include the following:

- 1996: the City of Asheville, North Carolina, offered free medications and testing equipment only for patients with diabetes who attended educational seminars[20]
- 2002: Pitney Bowes reduced copayments for drugs that treat asthma, diabetes, and hypertension[1]
- 2005: a large firm offered tier 1 medications for free, to treat value-based conditions; tier 2 and 3 drugs were subsidized at 50%[21]
- 2006: a large firm implemented a VBID program for patients with diabetes within a single company; 1 group participated in a disease management program, whereas the other did not[22]
- 2007: Pitney Bowes reduced copayments for statins and clopidogrel for the treatment of cardiovascular disease[23]
- 2008: the Cincinnati Pharmacy Coaching Program provided tailored, pharmacist-based educational services and financial incentives to participants[24]
- 2010: the State of Oregon Public Employee Benefit Boards increased copayments for overused or preference-sensitive services of low relative value, and covered preventive and high-value services at low or no cost[25]
- 2011: a large commercial insurer in the United States provided full prescription coverage for cardiovascular medications following myocardial infarction[26]
- 2012: the Health Alliance Medical Plan altered its formulary tiers and copayments for statins for enrollees covered by employer-sponsored plans[27]

Figure 1. Coinsurance and Allowed Charges



Although the examples above highlight VBID as a trend in health benefit design, evaluations are needed to understand the impact of these programs on utilization, quality, and spending. Research evidence regarding the effectiveness of VBIDs that focus on diabetes and asthma is presented in the next sections.

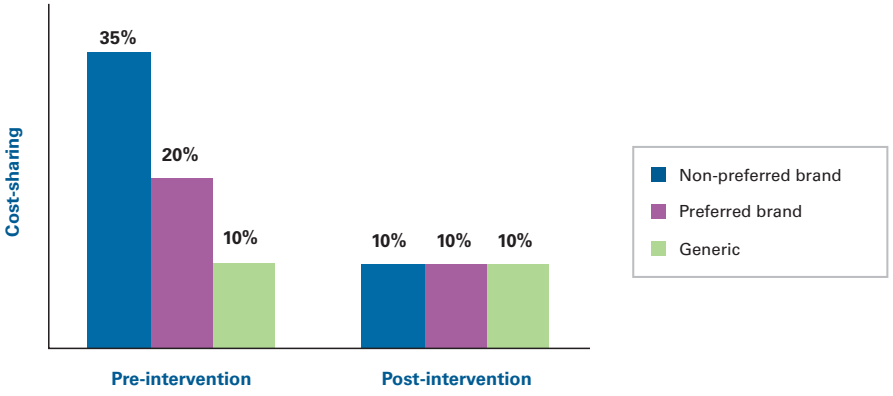
Effectiveness of VBID for Diabetes Care

More than 25 million Americans have diabetes; of these, 7 million are undiagnosed. The total cost of diagnosed diabetes in the United States in 2007 was $174 billion.[28] Studies have repeatedly suggested that the rates at which diabetes guidelines are incorporated into clinical practice are suboptimal.[29-33] Over the past several years, several employers have implemented various interventions that were developed to influence patient behavior and improve clinical outcomes, while attempting to control costs. For optimal impact, multiple interventions are being used together to initiate such changes.

Evaluations of VBID programs for patients with diabetes are showing that changes in cost-sharing can lead to positive behavioral changes in both patients and providers.[22,26,34-39] Such an effect builds a strong case for the continuation of these VBID programs over time.

To demonstrate the effectiveness of VBID for patients with diabetes, we summarize 2 recent studies by Gibson, Mahoney, and colleagues[22,34] and describe results of a new, related investigation herein. The 3 studies isolate different aspects of VBID using similar patient groups and methodology.

Figure 2. Cost-Sharing in the Employer VBID Intervention



VBID indicates value-based insurance design.

VBID and Disease Management: Effects on Medication Use and Cost Savings

The first study examined the effects of a large firm's VBID program on medication use and savings for 4 groups of patients with diabetes.[22] One group opted into a DM program, whereas the other did not, and VBID was introduced to a part of the enrollees in DM and without DM, creating 4 groups (DM/VBID, DM/No VBID, No DM/VBID, No DM/No VBID). The VBID lowered coinsurance rates to 10% for all diabetes medications from the original 3-tiered structure, in which coinsurance rates ranged from 10% to 35% (**Figure 2**). Primary outcome measures were medication possession ratios (MPRs)—a metric representing adherence via refilling prescriptions—and user rates. Measures for spending were total and net payments and patient out-of-pocket costs. Multivariate models were estimated via generalized estimating equations.

Medication Adherence

In each of the 3 years of analysis, MPRs and the percentage of patients adherent to therapy (MPR ≥80%) were higher for those in both VBID and DM. This finding was consistent across all antidiabetic medications.[22] Limited effects were observed in the group of employees with VBID and without DM: the percent adherent to oral antidiabetic medications rose in each of the first 2 years following program implementation.

Utilization

Patients in the VBID with DM combined program received a higher rate of medical services that are recommended in clinical care guidelines than those that were not offered a VBID benefit (DM/No VBID). Significant effects were also observed for those enrolled in both the VBID and DM programs (DM/VBID) compared with those who did not participate in the VBID (No DM/VBID) for glycated hemoglobin and lipid level testing, primary care physician visits, and urinalysis. These effects also increased over time.[22]

Spending

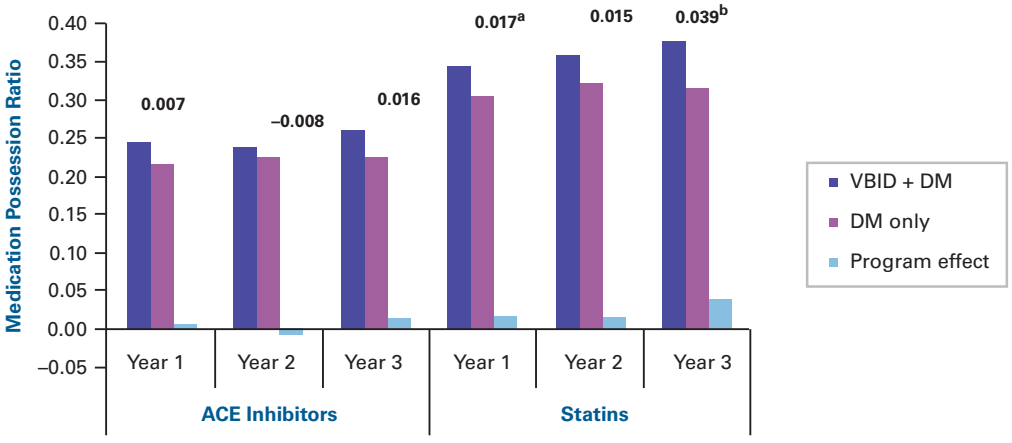
In each of the years following program implementation, diabetes-related prescription drug costs rose while diabetes-related medical spending declined. The program was cost neutral; that is, total prescription drug and medical costs were no different for the VBID and DM group (DM/VBID) compared with the DM group alone (DM/No VBID) after 3 years of implementation. Overall, the combination of VBID and DM produced a diabetes-related return on investment of $1.33 for every dollar the firm spent.

Motivation for Extending the Evidence: Exploring the Impact of a Patient's Exposure to the True Cost of Care

Changing the prices that patients pay out of pocket for particular drug classes is a common approach of value-based prescription benefit programs. However, there is some concern that value-based programs that lower only prices that patients pay out of pocket for brand name drugs will prove to be costly, as patients may replace lower-cost generic medications with higher-cost brand medications. This is contrary to cost-sharing trends that have placed brand name medications at the highest cost-sharing levels. The average cost-sharing amount for generic medications grew 25% (from $8 to $10) between 2001 and 2012.[40]

Using the same study population and the same methodology as in the first study, Gibson and colleagues focused on the group with DM and explored how the change in cost-sharing in the VBID program impacted

Figure 3. Medication Possession Ratio for ACE Inhibitors and Statins, Diabetes VBID



ACE indicates angiotensin-converting enzyme; DM, disease management; VBID, value-based insurance design.
[a]Significance at P <.10.
[b]Significance at P <.05.
Columns for the 2 groups represent average medication possession ratio during the year. The program effect columns represent difference-in-differences calculations (also shown in numeric form) relative to the baseline year.

specific medications.[34] This second investigation answered the following research question: For patients in the DM program, were the VBID effects in the original study consistent across brand name and generic medications?

Medication Adherence

The combined VBID and DM (DM/VBID) program led to increased use of and adherence to oral antidiabetic medications and insulin compared with DM alone (DM/No VBID).[34] Significant effects were observed for generic medication user rates and MPRs after 1 year, and the effects remained relatively stable over the 3 years of the program. Within the first year of the program, the mean MPR was 4.3 percentage points higher for those in both the VBID and DM programs versus those only in the DM program; the effect of the VBID grew slightly over time. For MPRs of brand name medications, a 1.9 percentage point program effect was observed after the first year and increased 1.4 percentage points in the each of the subsequent 2 years, achieving a final difference of 4.7 percentage points by the end of the third year. Adherence to insulin increased by 1 percentage point in the first year and 2.7 percentage points by the end of the third year.

Utilization

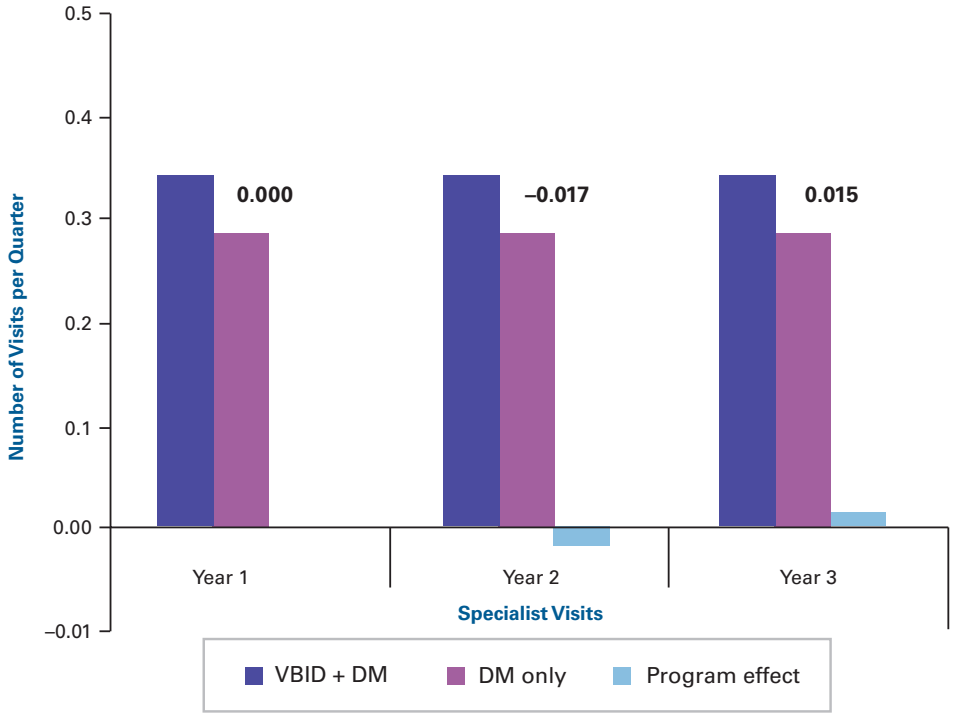
For the generic oral medication class, VBID effects were seen in all 3 years; user rates were 4.2 percentage points higher in the VBID group after the first year, 4.7 percentage points higher after the second year, and 5.3 percentage points higher by the end of year 3 (all P <.01).[34] For brand name oral medications, user rates were 2.7 percentage points higher in the VBID group after the first year, 4.5 percentage points higher after the second year, and 6.2 percentage points higher by the end of year 3 (all P <.01).[34] For insulin, significant changes were not realized until the second year of the program (year 1, P = .14; years 2 and 3, P <.01).

VBID and Disease Management: Medication Adherence and Healthcare Utilization for Cardiometabolic Comorbidities

The first 2 studies by Gibson and colleagues focused on antidiabetic medications and use of primary care services. To examine the impact of VBID on additional cardiometabolic medications, we asked 2 new questions: (1) Would the adherence effects in the original study extend to other cardiometabolic drugs that were not part of the VBID, such as statins and angiotensin-converting enzyme (ACE) inhibitors? (2) Were the effects seen with primary care services in the original study also observed for related specialty services such as cardiology, neurology, endocrinology, and nephrology?

We used the same study population and performed a descriptive analysis. With respect to the first question, use of and adherence to statins in year 3 was greater among dual VBID and DM enrollees than those only enrolled in the DM program. However, there were no significant program effects related to use of ACE inhibitors (**Figure 3**). With respect to the second question, there were no significant program effects related to the number of specialty office visits (**Figure 4**). Given the limited findings from this descriptive analysis, it is not possible to draw any conclusions related to

Figure 4. Specialty Office Visit Utilization, Diabetes VBID



DM indicates disease management; VBID, value-based insurance design.
Specialty office visits are those made to cardiologists, neurologists, endocrinologists, and nephrologists.
Columns for the 2 groups represent average quarterly visits during the year. The program effect columns represent difference-in-differences calculations (also shown in numeric form) relative to the baseline year (2005).

the impact of VBID on additional cardiometabolic medications for this population; however, positive findings have been reported in similar populations when applying VBID to cardiometabolic medications.[26,27]

Effectiveness of VBID for Asthma Treatment

Most VBID programs to date have focused on removing financial barriers to care for a few key chronic conditions for which low adherence to medication or a disease management program can lead to poorer health outcomes and higher costs of care. This has typically included VBID programs for services related to diabetes, hypertension, and asthma.[8] In 2011, it was estimated that 25.9 million Americans had asthma, including 7.1 million children; additionally, 13.2 million Americans experienced an asthma attack. The annual economic cost of asthma is more than $56 billion.[41]

We performed a descriptive analysis to evaluate the effects of a value-based pharmacy access program in patients with asthma; this VBID program was implemented at the same firm as the diabetes VBID program previously described. As with the diabetes program, cost-sharing was lowered to 10% for all asthma medications prescribed for employees and their dependents and the program was applied in conjunction with the DM program put in place by the firm. The structure of the asthma program was similar to the diabetes VBID program; patients opted into an asthma DM program and were offered a VBID program based on their unit or group within the employer.

We analyzed filling behavior, utilization, and spending by the employer and patient. Filling behavior was further analyzed by examining 4 categories of asthma medications: asthma controller medications (used to prevent asthma attacks); reliever medications; and brand name and generic reliever medications. There were no generic controller medications at the time of the study.

The combined VBID and DM program had 773 participants, and the DM-only program had 1346 participants. Participants filled at least 2 prescriptions for asthma medications in the baseline year (2005). Patient characteristics in the 2 groups were similar in terms of age, relationship to employee (employee, spouse,

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Table 1. Asthma Patient Characteristics, Asthma VBID

	VBID + DM	DM Only	*P*
N	773	1346	
Mean follow-up (in quarters)	11.9	11.3	.0062
Mean age	43.4	43.0	.4367
Sex			
Male	39.1%	39.5%	
Female	60.9%	60.5%	.8360
Insurance plan type			
Comprehensive	8.2%	6.2%	
EPO/POS	20.2%	15.1%	
HMO	17.3%	22.7%	
PPO	54.3%	55.9%	.0010
Region			
North East	29.8%	19.2%	
North Central	11.3%	26.1%	
South	45.4%	43.3%	
West	13.6%	11.4%	.0000
Relation to employee			
Employee	49.3%	45.8%	
Spouse	37.9%	42.4%	
Dependent	12.8%	11.7%	.1250
Clinical characteristics			
Charlson Comorbidity Index	0.664	0.662	.9434
Psychiatric diagnosis groups, n	0.211	0.213	.9469

DM indicates disease management; EPO, exclusive provider organization; HMO, health maintenance organization; POS, point of service; PPO, preferred provider organization; VBID, value-based insurance design.

or dependent), and health status (**Table 1**). The VBID and DM group had a slightly longer time of enrollment, and the insurance plan type (comprehensive, exclusive provider organization, point of service plan, health maintenance organization, or preferred provider organization) and regional distribution differed between the 2 groups.

Filling Behavior

In the third year of the program, adherence to reliever medications (ie, MPR) rose 3.6 percentage points (to 19.9%) over baseline (2005) for the VBID and DM group (Figure 5; Table 2) net of trends in the DM-only group. In the third year of the program, adherence to brand name reliever medications increased 5.1 percentage points over baseline in the VBID and DM group net of trends in the DM-only group (Table 2).With respect to trends in reliever medications, user rates declined each year for those with DM only (no VBID) and also declined, but to a lesser extent, for those in the combined program.

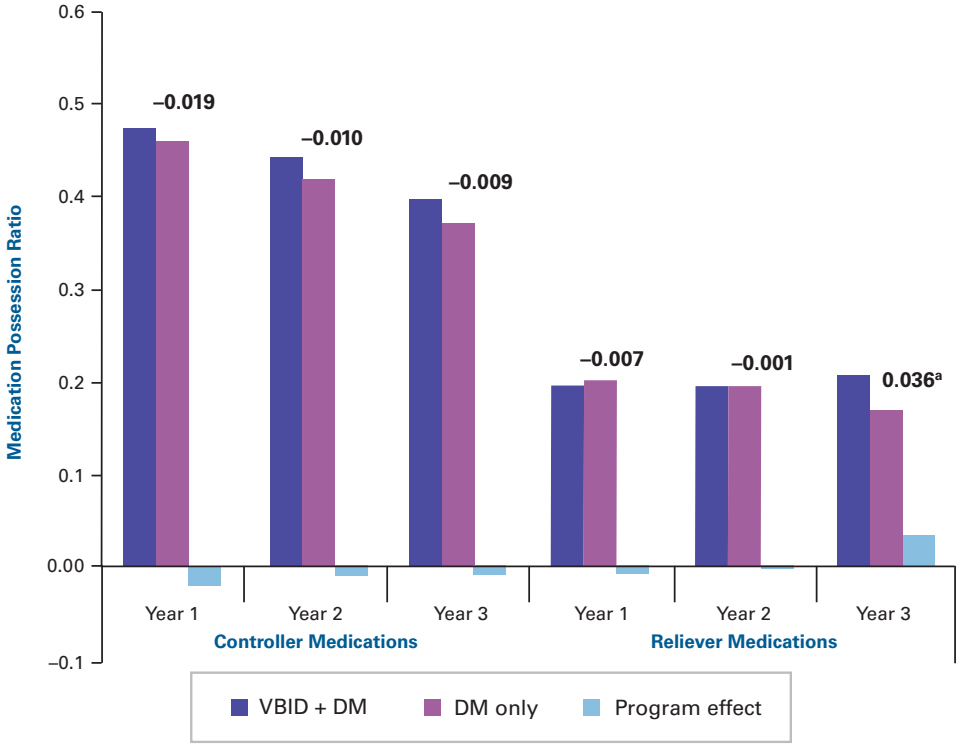
Employer (Net) Spending

Quarterly trends in employer (net) payments showed no differences in total (medical plus drug) spending as the VBID group matured (**Figure 6**; **Table 2**). This was true for all-cause (net) payments and asthma-related (net) payments (Table 2). In the first and third years after implementation of VBID, asthma-related prescription drug spending was higher in the VBID and DM group. In spite of the increase in drug spending for the VBID and DM group, total medical and prescription drug spending for all causes, as well as asthma-related total medical and drug spending, was no higher in the VBID and DM group (Figure 6).

Out-of-Pocket Payments

Trends in out-of-pocket payments showed that the VBID program was operating as planned, and patients enrolled in this program paid a much lower amount for asthma medications in each year. In the first year, quarterly out-of-pocket payments were $22 lower than baseline in the VBID and DM group compared with the contemporaneous trend in the DM-only

Figure 5. Medication Possession Ratio for Asthma Medications, Asthma VBID



DM indicates disease management; VBID, value-based insurance design.
[a]Statistical significance at $P < .05$.
Columns for the 2 groups represent the average quarterly medication possession ratio during the year. The program effect columns represent difference-in-differences calculations (also shown in numeric form) relative to the baseline year (2005).

group, were $25 lower than baseline in the second year, and were $19 lower than baseline by the third year. Trends in asthma-related medical out-of-pocket payments were no different from the comparison group in each of the 3 years; this was an expected result because the medical benefit plan characteristics were the same in the groups with and without VBID.

Conclusions

Our findings from the present study do not differ substantially from previously reported studies (**Table 3**).[21,36,42] Chernew and colleagues did not find a significant increase in inhaled corticosteroid use (controller medication) in the first year after VBID implementation.[21] Gibson et al found a small increase in adherence to asthma medications in the third year after VBID implementation.[36] Kelly et al reported an increase in adherence to asthma medication, but did not use a comparison group to track contemporaneous trends, so it is harder to draw conclusions from this example.[42] In addition to the published research cited above, the VBID registry, which gathers information about all types of VBID programs at any stage of development, reports 3 case studies that experienced improvements in asthma medication adherence.[43]

One limitation of the present study is that it is difficult to classify patients into asthma severity levels and analyze and interpret the findings without clinical data such as peak flow readings. In addition, we measured average adherence, although adherence patterns may vary based on presence or absence of symptoms. Treatment protocols can be different for patients with more severe, persistent asthma than for those with mild or intermittent symptoms. Regular use of controller medication is indicated in the case of severe or persistent asthma, and increasing reliever use specifically for this group of patients indicates uncontrolled asthma.

Implications for the Future: The Long-Term Value of VBID

It has been more than 10 years since the first company-sponsored VBID was implemented by Pitney Bowes in 2002. As more employers develop VBID programs, there will continue to be opportunities to evaluate and enhance their long-term value. Based on our review and expansion of the evidence, there is reason to support

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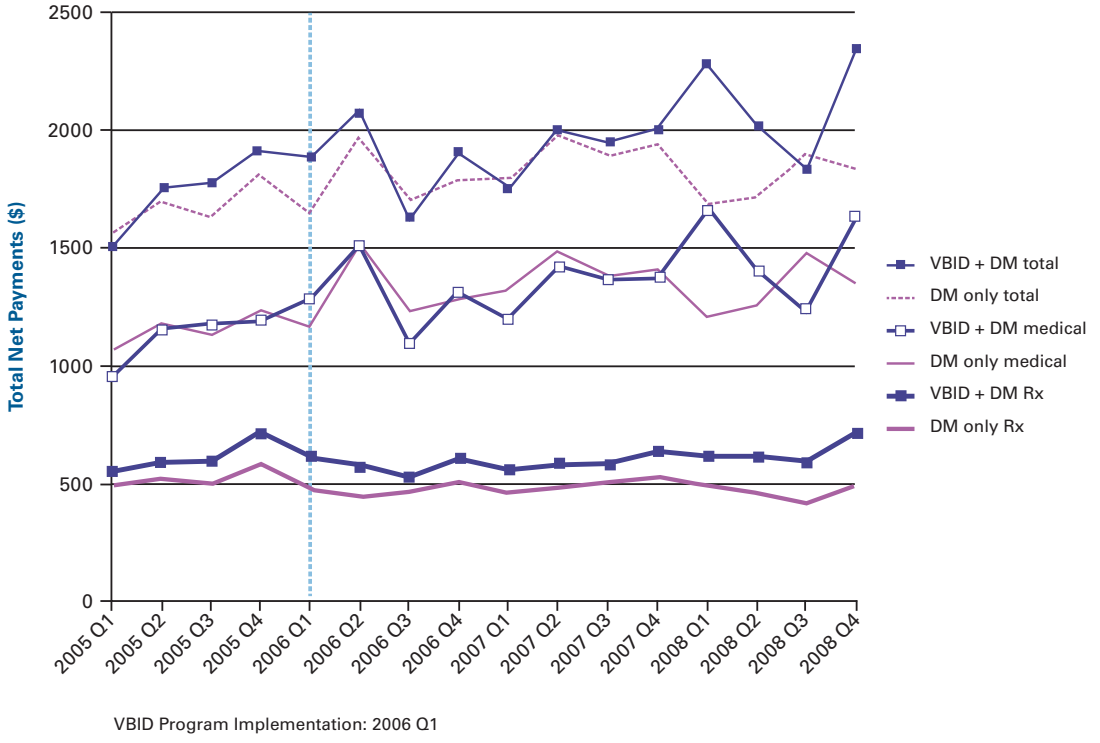
Table 2. Utilization and Spending Trends in the Asthma Cohorts, Asthma VBID

	VBID + DM (n = 773)				DM Only (n = 1346)				Difference in Differences[a]		
	Baseline 2005	Year 1 2006	Year 2 2007	Year 3 2008	Baseline 2005	Year 1 2006	Year 2 2007	Year 3 2008	Year 1 2006	Year 2 2007	Year 3 2008
Filling Behavior (per quarter)											
Medication Possession Ratio											
Controller medications	0.458	0.476	0.443	0.398	0.424	0.461	0.419	0.372	–0.019	–0.010	–0.009
Reliever medications	0.181	0.197	0.197	0.208	0.180	0.203	0.197	0.171	–0.007	–0.001	0.036[b]
Brand name relievers	0.070	0.094	0.164	0.240	0.073	0.091	0.178	0.192	0.006	–0.012	0.051[b]
Generic relievers	0.162	0.165	0.106	0.046	0.153	0.168	0.092	0.039	–0.012	0.004	–0.002
Percent Users (user rates)											
Controller medications	0.530	0.488	0.453	0.399	0.500	0.448	0.411	0.357	0.010	0.012	0.012
Reliever medications	0.343	0.312	0.299	0.297	0.344	0.328	0.300	0.247	–0.016	–0.001	0.050[b]
Inhaled corticosteroids	0.105	0.103	0.068	0.033	0.093	0.090	0.060	0.037	0.000	–0.004	–0.017
Utilization (counts per quarter)											
Inpatient Admissions											
All-cause	0.021	0.021	0.021	0.026	0.019	0.022	0.022	0.018	–0.003	–0.003	0.006
Asthma-related	0.004	0.001	0.001	0.003	0.004	0.004	0.004	0.003	–0.001	–0.002	0.000
Outpatient Visits											
All-cause	5.297	5.15	5.042	4.965	4.884	4.654	4.600	4.337	0.082	0.029	0.214
Asthma-related	0.486	0.414	0.422	0.432	0.565	0.497	0.460	0.422	–0.003	0.041	0.089
Emergency Department Visits											
All-cause	0.108	0.125	0.126	0.139	0.148	0.156	0.151	0.137	0.009	0.015	0.042
Asthma-related	0.014	0.024	0.012	0.024	0.024	0.022	0.029	0.022	0.012	–0.006	0.011
Spending per Enrollee per Quarter (Patient out of pocket per quarter), $											
Prescription Drug Fills											
All-cause	111	115	114	110	98	124	126	116	–22[c]	–25[c]	–19[c]
Asthma-related	30	24	23	21	28	41	43	38	–19[c]	–22[c]	–19[c]
Medical (Inpatient + Outpatient)											
All-cause	125	142	153	160	141	146	151	145	11	18	31[b]
Asthma-related	14	14	11	14	18	15	17	15	2	-2	1
Medical + Prescription Drug											
All-cause	236	257	267	270	239	270	277	261	–11	–7	–12
Asthma-related	44	38	34	35	45	56	59	54	–17[c]	–24[c]	–18[c]
(Net payments per quarter), $											
Prescription Drug											
All-cause	625	576	582	607	526	469	493	473	8	–9	35
Asthma-related	162	179	173	170	151	154	149	138	15[d]	14	21[b]
Medical (Inpatient+Outpatient)											
All-cause	1167	1295	1323	1462	1193	1323	1392	1269	–1	–43	220
Asthma-related	91	75	75	93	120	120	133	143	–16	–28	–21
Medical + Prescription Drug											
All-cause	1792	1871	1904	2069	1720	1792	1884	1742	7	–52	255
Asthma-related	254	253	249	263	272	273	282	282	–1	–14	0

DM indicates disease management; VBID, value-based insurance design.
[a]Difference in differences represents the change in the VBID and DM group minus the change in the DM only group.
[b]Significance at $P < .05$.
[c]Significance at $P < .01$.
[d]Significance at $P < .10$.

Figure 6. Trends in Employer All-Cause Net Payments, Asthma VBID



DM indicates disease management; Rx, medication; VBID, value-based insurance design.
Total Net Payments represent the employer-paid amounts.

a broader diffusion of VBID. As we enter into national healthcare reform, we propose a few key learnings to consider as employers and policy makers embed these strategies into benefit design.

The Design of the Incentive Makes a Difference

The intent of value-based insurance is to adjust out-of-pocket costs based on an assessment of the clinical benefit to a specific patient population. Although a blunt reduction or elimination of copayments has been shown to have an impact on medication adherence and utilization, varying levels of coinsurance also have important implications. More transparent pricing helps consumers and providers weigh the clinical benefit of a medication or treatment along with the price. In our research, we explored the impact of a program that presented the consumer with direct exposure to the cost of the service, which deviated from the more typical VBID approach of setting a lowered, flat copayment for a specific drug or drug class. Across all key results presented in this paper—2 from published studies and our results from the studies in diabetes and asthma—we found that lowering the rate of coinsurance for certain high-value services produced savings or was cost neutral. This suggests that transparency influences provider and patient behavior and may offer an intrinsic motivation for improved health that extends beyond a more extrinsic motivation for short-term cost savings. Copayment elimination or flat copayment reduction may have its place; however, transparency initiatives such as those described in this paper can be integrated in the market with value-based coinsurance design.

Combining Value-Based Programs With Disease Management Enhances Results

The potential impact of VBID can be enhanced if these programs are integrated into broader strategies to improve health outcomes. DM is a systematic, clinical approach to the care of patients with chronic illness. The implementations we reviewed all occurred alongside traditional DM programs, and the findings endorse incorporating VBID into a multipronged approach. Our review and extension of the diabetes VBID suggest that when the clinical focus of DM is aligned with a financial incentive, it creates an environment in which the existing infrastructure for DM can be used as leverage for participation in the VBID (and vice versa). For the diabetes VBID, the combined approach resulted in long-term, sustained improvements in medication adher-

Table 3. Asthma VBID in Peer-Reviewed Published Studies

Reference	Pre Cost-sharing	Post Cost-sharing	Comparison Group	VBID-Applied Medications	Adherence	Utilization	Cost
Chernew et al, 2008[21]	$5 generic; $25 preferred brand; $45 non-preferred brand	$0 generic; $12.50 preferred brand; $22.50 non-preferred brand	Similar, large firm with the same disease management program	5 classes of medications: ACE Inhibitors/ARBs; beta-blockers; diabetes drugs; statins; steroids	1.86% MPR increase; 5.88% increase in adherence for inhaled corticosteroids (P = .134)	Not covered	Not covered
Gibson et al, 2011[36]	20% coinsurance for retail; 10% coinsurance for mail order, $10 minimum and $40 maximum	10% coinsurance for retail; 7.5% coinsurance for mail order	Similar, large firms	Asthma, certain CV medications, and diabetes	Adherence improvement for asthma was not statistically significant until year 3. No effect on user rate or prescription fills for asthma.		Costs for the company were revenue neutral and there was no aggregate change in spending
Kelly et al, 2009[42]	20% retail; 10% mail order coinsurance for all other drugs	10% coinsurance for retail; 7.5% coinsurance for mail order	No comparison group	Asthma, hypertension, diabetes	MPR for controller medications increased from 41% to 50%	Asthma-specific office visits increased 14%; asthma-specific ED visits decreased 92%	40% increase in total net payments for asthma cohorts; 2% decrease in asthma-specific net payments

ACE indicates angiotensin-converting enzyme; ARB, angiotensin receptor blocker; CV, cardiovascular; ED, emergency department; MPR, medication possession ratio; VBID, value-based insurance design.

ence and utilization and cost savings. Integrating these strategies allows care delivery to be organized around the patient's medical conditions and long-term goals. Enhanced effects may also extend to aligning VBID programs with other examples of care delivery and payment reform initiatives, including the patient-centered medical home, provider networks, bundled payments, and shared savings.

Broader Applications of VBID Deserve Additional Inquiry

There is a growing body of literature indicating that VBID is effective for cardiometabolic conditions (eg, diabetes and hypertension). As the impact of VBID is established, VBID is being applied to additional conditions such as asthma (as reviewed within) and chiropractic care for back and neck pain—an area that typically has not been considered in the context of value-based design strategies.[44] Our analysis suggests that it may not always make sense to modify the payment structure in the same way across all conditions or to replicate the VBID for one condition exactly as it was designed for another. In the case of asthma, the "level of precision and clinical targeting" for asthma medications is not as clearly defined as it is for diabetes medications.[3] For example, inhaled corticosteroids are prescribed and highly effective for treating patients with asthma, but they are also prescribed and less effective for treating patients with other conditions.[44] As companies adopt VBID strategies, it will be important to establish the clinical indicators that define value and how to target them appropriately.

Time Is Critical

VBID takes time to realize an effect. Analysis of programs must be sufficiently long to allow for adequate uptake. In our diabetes studies, we found that some behavior and cost changes were seen in the first year of the program; however, the main effects on adherence, utilization, and spending increased over a 3-year time period. Intended effects also may be seen at different treatment points and change over time. For instance, in the asthma study, we found that some significant adherence and utilization trends were observed in the third year of the program.

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