Systematic Review of Benefit Designs With Differential Cost Sharing for Prescription Drugs

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ABSTRACT

Objectives: To evaluate the effects of health insurance benefit designs that introduced or increased the price difference between prescription drugs representing potential clinical substitutes.

Study Design: Systematic review of peer-reviewed articles.

Methods: Using English-language articles listed in PubMed between 1980 and 2012, we identified articles meeting our inclusion criteria and minimum methodological standards. We compared findings regarding the immediate patient response, total spending, and health outcomes after implementing the price change.

Results: Among the 31 articles identified, the mechanisms varied for creating the price differential between prescription drug substitutes, though they most frequently involved tiered formularies (19) or reference pricing (10). While nearly all studies (29 of 31) reported on patient responses to price changes, only 5 articles comprehensively assessed patient price responses, total spending, and health outcomes. Several studies found that some patients switched to cheaper drugs, but out-of-pocket spending increased on average, suggesting that other patients continued using the more expensive drug (ie, cost shifting to patients). Few studies examined the degree of heterogeneity in behavior responses, especially between patient cohorts for whom the substitute drugs had varying value. Some studies observed long-term effects, but most had limited post intervention observation periods.

Conclusions: Differential cost-sharing designs influence drug use behavior, but there is limited evidence on how these designs affect the overall value of received care. The existing literature provides limited guidance for policy makers or organizational leaders to design benefits. We offer suggestions for future studies to inform policy and practice.

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Insurance plans and payers in the United States are increasingly introducing health insurance benefit designs with embedded financial incentives targeting clinical treatment decisions. These initiatives are part of a larger movement toward benefit designs that seek to change patients' behaviors by aligning patient incentives with clinical goals through financial incentives. Value-based insurance design (V-BID) and consumer-directed health plans are examples of benefit designs that encourage patient involvement in decisions in part by manipulating their price of medical care to better reflect the value of that care.[1,2] The overarching principle of such designs is the difference in out-of-pocket (OOP) price among various treatment substitutes, which creates the financial incentive that could influence the patient's choice of treatment. Moreover, the value of a medical therapy to a patient depends on not only the perceived therapeutic effect, but also on the price of the therapy when compared with other alternative treatments. Hence, the price differential—or the difference in OOP price—of medical treatment substitutes contributes to the patient's perceived value of the medical treatment and may affect patients' medication use and adherence. Recent studies suggest that some types of incentive-based benefit designs could encourage higher-value treatment choices and promote lower growth of medical spending in the United States.[3,4]

Much of the cost-sharing literature has focused on healthcare utilization or adherence when the OOP price for most drugs in a drug class are concurrently increased or decreased.[5] As many medical therapies have a degree of price elasticity, changes in price often affect use. However, crude applications of prices yield crude incentives that fail to reflect the value of the treatment options or the inherent clinical nuance necessary to determine value for real patients. Benefit design managers need to identify novel mechanisms to modify patient behavior and incentivize them to select the appropriate therapies for their condition. To date, insurance

plans have applied incentive-based designs most often to prescription drugs, such as through mechanisms including tiered formularies, reference pricing, or free drugs for chronic diseases.[1,2,6]

Importantly, incentive-based designs are not synonymous with high cost sharing or tiered cost-sharing designs, as many manifestations of the latter designs frequently aim to discourage overuse to address the moral hazard associated with being insured or to shift costs from payers to patients. A common example of these cost-based, rather than value-based, designs is the placement of inhaled steroids into the higher cost-sharing tiers without lower-cost options. Inhaled steroids are critical drugs for the prevention of asthma exacerbations, but until recently, they have all been on patent with no existing generic versions that would have qualified for the lower cost-sharing tiers in many insurance plans.

Even when plans aim to encourage high-value treatments, the implementation is fraught with difficulty as real-world clinical decisions may involve substantial nuance. For example, the true clinical benefits associated with a drug could vary substantially across individuals depending on factors such as prior clinical history, genetic predisposition, or other current medications.[7] Consequently, the potential of heterogeneity in treatment outcomes could mean that the individual value of each treatment and the substitution of seemingly equivalent treatments could differ significantly from simple population-level estimates of value. This potential heterogeneity reinforces the need to assess actual effects of these designs on health outcomes within relevant populations, especially if policy makers encourage, and organizations implement, thoughtful incentive-based designs.[8,9]

Recent studies examining the effects of these designs have mainly focused on the effects of changes of the absolute drug price, but fewer have examined the price differential between substitute drugs.[5,10] This is important because the price differential creates the financial incentive for using one drug over another and influences treatment choices, rather than simply the decision to treat or the cessation of use. Furthermore, other reviews focus on evaluating the immediate or short-term effects of a specific form of benefit design, rather than the downstream effects.[11,12]

Although the literature on cost-sharing plans is extensive, the evidence to support incentive-based benefit designs is just emerging, as several studies suggest the potential to reduce drug spending with limited effects on drug adherence.[6,11,13] Furthermore, the literature on incentive-based benefit designs has grown substantially in the last decade, but to date, there have been no systematic analyses to synthesize the new findings into a meaningful recommendation for administrators and policy makers.

In this study, we define incentive-based health insurance designs as designs that use differential cost sharing for prescription drugs with potential clinical substitutes, present a framework for their evaluation, report findings from a systematic review of the literature, and discuss suggestions for future research. Throughout this process, we take the perspective of a policy maker or organizational decision maker evaluating the evidence base to support decisions about creating new incentive-based programs.

Take-Away Points

To our knowledge, this is the first systematic review of the literature on differential cost-sharing benefit designs that examines the effects of pricing explicit therapeutic substitutes differently to patients.

- We found that these designs influence drug use behavior and healthcare spending, though the evidence is limited on whether they improve the value of care.
- Few studies examine the effects of these designs on clinically relevant subgroups, such as the elderly or patients with multiple comorbidities.
- Reforms, including those preceding and within the Patient Protection and Affordable Care Act, may increase the prevalence of these designs; therefore, understanding their effects is imperative.

METHODS

Definition

Incentive-based benefit designs use differential patient cost sharing to create meaningful incentives that alter drug use behavior. To be effective, these designs must also avoid unnecessary complexity and eschew unintended, clinically significant consequences.[1,8] In their simplest form, these designs create a choice set of substitute drugs that are clinically similar, but have different cost-sharing amounts, which then creates an incentive to choose the lower cost-sharing option.[14] When drug substitutes are more effective or less expensive than other alternatives, they have higher value, because the implied cost per unit of effectiveness is less than that for other choices.

Rationale for the Evaluation Framework

Major outcomes of interest to benefit managers, payers, providers, and policy makers include medical and pharmacy utilization, medical and pharmacy spending, and health outcomes.[5] Because of the heterogeneity of clinical effects, including varying effects with age and clinical comorbidities, a thorough analysis requires

information on the average overall effect and range of effects on relevant clinical subpopulations. Similarly, changes in context also could be relevant. For example, in the pharmacoepidemiologic literature, many studies differentiate between new and preexisting drug users, as the former represent a group making a new decision about treatment and use, whereas the latter often are more clinically heterogeneous in their treatment experiences, disease severity, and trajectory.[5] With the latter, at least some of the patients could have attempted using multiple therapeutic options and failed to achieve satisfactory improvement.

Furthermore, information on both short- and longer-term effects are important since the effects of many prescription drugs could require years to manifest, as is the case with blood-glucose or blood-pressure therapy. As a parallel, many clinical trials differentiate between drugs that only achieve intermediate end points and those that improve overall health outcomes.

Data Selection

We identified quasi-experimental studies that used longitudinal changes in prices and evaluated the before-and-after effects of differential pricing of drug substitutes on drug use behavior, spending, and health outcomes. We explicitly excluded studies that did not include an evaluation of differential incentives on patient behavior (eg, excluded studies that increased all drug prices or made all drugs free). As stated earlier, multiple studies have explored the elasticity of medical treatments, but this study was geared toward examining patients' behavior when patients had a clear choice set of treatments with differing prices. For the initial search, we queried the PubMed database for articles published in English from January 1, 1980, to December 31, 2012, using a combination of 2 sets of keywords for incentive-based designs and behavioral responses: 1) incentive-based design terms included a combination of terms for cost savings, cost sharing, benefit design, formularies, and reference pricing located in the title, abstract, or National Library of Medicine's Medical Subject Headings (MeSH); and 2) behavioral-response keywords included MeSH terms for drug substitution, medication adherence, patient compliance, drug utilization, pharmaceutical services utilization, healthcare utilization, and outcome assessment. We excluded surveys, willingness-to-pay studies, behavior modeling, cross-sectional studies, retrospective cohort studies, case reports, and prior authorization interventions. We also excluded anonymous articles, news articles, editorials, letters, guidelines, interviews, meta-analyses, and other reviews.

After the initial search, we reviewed titles and abstracts to identify articles that analyzed or presented data examining the effects of an insurance benefit design change that introduced or increased differential pricing of substitute prescription drugs. We explicitly excluded articles that did not state the choice set of substitute drugs or the price differential between the drugs. We then reviewed the reference lists of the selected articles for additional studies that met the inclusion criteria. When a single differential pricing intervention resulted in multiple articles, we included all articles if the outcome measures differed across them. Finally, we queried experts in the field about potential articles.

Two researchers independently reviewed studies' eligibility and inter-rater reliability was greater than 95% for article inclusion. We conducted the search according to the 2009 PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for systematic reviews.[15]

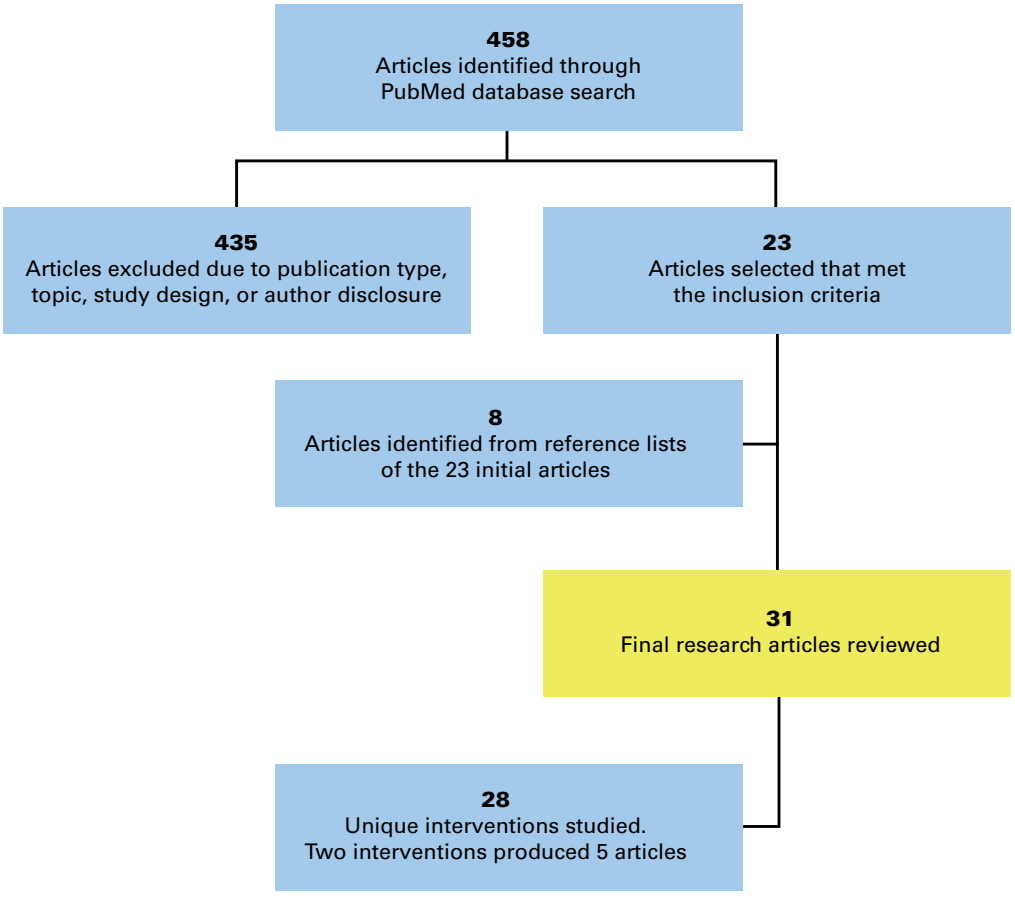
Figure 1 displays the review process, starting from the 458 articles identified during the initial search to the 23 articles selected that met inclusion criteria, as well as the 8 additional articles from the reference list review. There were no additional studies meeting our inclusion criteria from the reference lists of the latter 8 articles. Additional details about the methods are available upon request.

Identifying Outcome Measures

In this review, we had 3 categories of outcomes: 1) behavioral responses, 2) spending, and 3) health outcomes. For the immediate behavioral effects, we first examined drug switching, adherence, and use. As an example, we assessed whether individual articles examined the percentage of patients who changed from one drug to another after the introduction of differential pricing. Similarly, we studied whether individual articles examined adherence either through the proportion of days covered or medication possession ratio.[16] Examples of drug use include prescription fill rate, discontinuation rates, generic use rate, average prescriptions per patient per month, and market share. Because some of these behavior responses reflect both clinician and patient actions and could require follow-up monitoring, we also assessed whether articles reported changes in physician office visits or other clinician interactions.

For spending, we investigated whether individual articles examined patients' OOP price plans' pharmacy, total pharmacy, plans' nonpharmacy, and total spending. All studies included calculated spending from either administrative claims data or government-reported spending. For health outcomes measurements, articles could evaluate

Figure 1. Systematic Review Selection Process



changes in laboratory values, such as cholesterol levels, physiologic outcomes, such as blood pressures, or event rates, such as emergency department (ED) visits and inpatient hospitalization.

We recorded the types of outcomes examined by each article whether the outcomes improved, worsened, or were not statistically significantly different from controls. We assessed whether articles reported both average effects as well as the degree of effect heterogeneity or examined effects within clinically relevant subgroups. We also assessed whether articles considered prior medical history (ie, differentiated between new and existing drug users). From this data, we provided a qualitative summary of the effects across studies.

RESULTS

Review of Studies

Overall, 31 articles met all entry criteria, with 28 unique interventions since 2 studies resulted in 5 articles. The Table lists the reviewed articles as well as details of their study designs. The median observation period was 24 months, with a range of 6 to 100 months, which included the pre- and post intervention periods. Only 13 articles followed post intervention effects beyond 1 year.[17-29]

Most articles reported benefit design changes through the introduction of tiered formularies (19) or reference pricing (10). Less commonly studied interventions included pill splitting, which reduced the effective patient price, and coinsurance implementation, which increased the patients' share of more expensive options. Almost all studies reported on patients' responses (29) and spending (24), but few evaluated any health outcome measures (8). Only 5 articles addressed drug use behavior, medical spending, and health outcomes, thus providing a comprehensive examination of all 3 categories of outcomes.[22,27,30-32] All 5 articles examined outcomes for at least 2 years.

All studies reported the average effect of the studied intervention across the patient cohort, but none reported on the amount of heterogeneity or provided estimates for clin-

Table. Summary of Reviewed Articles

Author and Year	Differential Pricing Intervention	Average Price Difference[a] (before intervention → after intervention)	Drug or Disease Focus	Drug Use Behavior			Spending		Health Outcomes
				Switching	Adherence	Utilization	Pharmacy	Nonpharmacy	
Balkrishnan et al 2001[41]	TF: ↑ generic[b] spending limit, ↓ brand[c] spending limit, ↑ brand co-pay[d]	$6 → $10 per retail co-pay[e]	No			±	–		
Brixner et al 2007[34]	TF: ↑ co-pay in tiers 2 & 3 by $5 or more	$0 → >$5 per retail co-pay	Yes; 5 chronic diseases	+	±	–	–	±	
Choe et al 2007[46]	Pill-splitting with 50% reduction in co-pay per refill	$0 → $5-7 per month	Yes; statins						±
Domino et al 2011[21]	TF: ↑ brand co-pay	$1 → $3 per co-pay	No		–		+	±	
Fairman et al 2003[22]	TF: change from 2- to 3-tiered formulary	$5 → $7-17 per co-pay	No		±	–	±		±
Frank et al[33]	TF: ↓ co-pay on select brands	~$12 → $0 per co-pay	Yes; statins	±	±				
Grootendorst et al 2005[23]	RP: implementation in British Columbia, Canada, in 1994 & 1995	$0 → ~$0.10 per daily use	Yes; NSAIDs	+		–	±		
Hazlet & Blough 2002[45]	RP: implementation in British Columbia in 1995	N/A → N/A	Yes; H2 receptor antagonists			±			±
Hodgkin et al 2008[42]	TF: adopting 3-tiered formulary	N/A →$5-$20 per co-pay	Yes; antide-pressants			–	±		
Huskamp et al 2003[17]	TF: change from 1-tier and 2-tiered to 3-tiered formulary	$0-6 → $6-$22 per co-pay	Yes; 3 com-mon drug classes	+		–	±		
Huskamp et al 2005[18]	TF: change from 1-tier to 3-tiered formulary	$0 → $7-$22 per retail co-pay	Yes; ADHD	+		±	±		
Huskamp et al 2005[20]	TF: change from 2- to 3-tiered formulary	$6 → $6-$12 per co-pay	Yes; 3 com-mon drug classes	+		±	±		
Huskamp et al 2007[19]	TF: 4 plans change from 2- to 3-tiered formulary	$5-$10 → $10-$30 per retail co-pay	Yes; 7 com-mon drug classes	+	±	–	±		
Landon et al 2007[35]	TF: change from 1-tier to 2- or 3-tiered formulary	$0 → $5-$20 per co-pay	No	+		–	±		
Landsman et al 2005[24]	TF: change from 2- to 3-tiered formulary	$5-$10 → $10-$30 per co-pay	Yes; 9 com-mon drug classes	+	–	–			
Mabasa & Ma 2006[25]	RP: implementation of maximum allow-able cost in a Canadian employer group in 2003	CAN $0 → $0.77-$1.12 per day	Yes; proton pump inhibitors	+		–	–		
Meissner et al 2004[39]	TF: ↑ co-pay in tier 1 by $5 and tier 2 & 3 by $10	$10-$20 → $15-$25 per co-pay	Yes; allergic rhinitis		±	±	±		
Motheral & Fairman 2001[32]	TF: change from 2- to 3-tiered formulary	$5 → $7-$17 per retail co-pay	No	±		±	±		±
Motheral & Henderson 1999[43]	TF: 2 plans ↑ generic co-pay by $1-2 & ↑ brand co-pay by $5	$5-$6 → $8-$10 per co-pay	No			±	±		
Nair et al 2003[36]	TF: change from 2- to 3-tiered formulary	~$8 → $10-$25 per co-pay	Yes; 5 chronic diseases	+		±	±		
Rector et al 2003[44]	TF: preferred brand implementation	$0 → $15-$18 per co-pay	Yes; 3 com-mon drug classes			–			

(continued)

Table. Summary of Reviewed Articles *(continued)*

Author and Year	Differential Pricing Intervention	Average Price Difference[a] (before intervention → after intervention)	Drug or Disease Focus	Drug Use Behavior			Spending		Health Outcomes
				Switching	Adherence	Utilization	Pharmacy	Nonpharmacy	
Rodin et al 2009[26]	TF: no-cost generic & ↑ brand co-pay by $5	$25-$40 → $35-$50	Yes; 2 chronic diseases	±	±		±		
Schneeweiss et al 2002[30]	RP: implementation in British Columbia in 1997	CAN $0 → $2-$62 per month supply	Yes; ACE inhibitor	+		–	–	+	±
Schneeweiss et al 2002[38]	RP: implementation in British Columbia in 1997	CAN $0 → $0.10-$8 per MMD	Yes; ACE inhibitor	+		±	–	+	
Schneeweiss et al 2003[27]	RP: implementation in British Columbia in 1997	CAN $0 → $5-$9 per monthly dose	Yes; calcium-channel blockers	+		±	±	+	±
Schneeweiss et al 2007[37]	Change from full drug coverage to $10-$25 co-pay to 25% coinsurance	CAN $0 → $10-$25 → N/A per co-pay	Yes; βετα-blockers	+	±	±	±		
Sedjo & Cox 2008[40]	TF: simvastatin patent expired, generic entry, & ↓ brand co-pay	$20-$40 → $12.50-$22.50 per retail co-pay	Yes; statins		±				
Stargardt 2010[31]	RP: atorvastatin above reference price for statins in 2005	£0 → £18.17-£109.00 per package	Yes; statins	+		±	–	+	–
Thomas et al 1998[47]	RP: ↑ price for simvastatin vs fluvastatin	NZ $0 → up to $50.63 per month	Yes; statins						–
Ubeda et al 2007[28]	RP: implementation in Spain in 2000	0 → 400% increase cost/ DDD	Yes; anti-depressants			±	–		
Wladysiuk et al 2011	RP: ↓ brand price due to increased substitutes in market	ZL87.18-ZL164.2 → ZL77.05-ZL560.20 per pack	Yes; atypical antipsychotics			–	±		

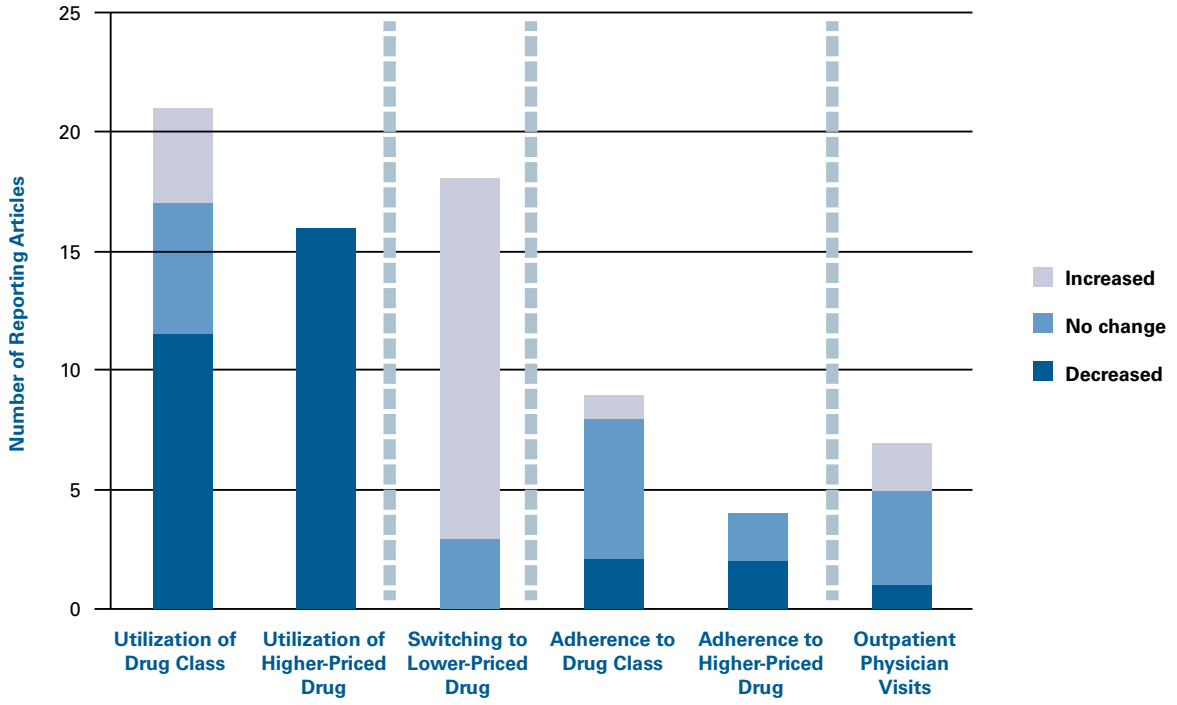
"+" indicates increase; "–", decrease; "±", no change; "↑", increase; "↓", decrease; ACE, angiotensin-converting enzyme; ADHD, attention deficit hyperactivity disorder; CAN, Canada; DDD, defined daily dose; H2, histamine; MMD, median monthly dose; N/A, not explicitly reported; NSAIDs, nonsteroidal anti-inflammatory drugs; NZ, New Zealand; RP, reference pricing; TF, tiered formularies; ZL, Polish zloty.
[a]Price differential between the least and most expensive drug (difference before intervention to difference after intervention).
[b]Generic: generic substitute drugs.
[c]Brand: branded substitute drugs.
[d]Co-pay: patients' out-of-pocket payment for medication.
[e]Retail co-pay: excludes mail order drug prices.

ically relevant subgroups, such as patients receiving drugs for primary or secondary prevention. Moreover, none of these studies differentiated patients who were new users from those who had received the drugs for months or years.

Behavioral Responses

In response to new or increasing differential pricing, there were a variety of behavioral responses, including drug switching and adherence changes (Figure 2). Among the 18 articles reporting any switches between potential drug substitutes, 15 reported increased switching to the cheaper option, and 9 reported decreases in use of the drug class.[17-20,23-27,30-38] Only 9 articles reported on adherence to the drug class, independent of whether patients received the higher- or lower-priced drug, and 6 of these articles found no changes in adherence to the entire drug class.[19,21,22,24,26,34,37,39,40] Among the 4 studies that reported on adherence to the higher-priced drug, however, 2 found decreases in adherence to the more expensive option.[26,31,33,40] Among the 21 articles examining drug utilization, 15 found that patients changed their use of any drug in the affected drug class regardless of whether they used the more or less expensive option.[17-20,22-25,27,28,30-32,34,36-39,41-43] Accordingly, all of the 16 articles that reported on utilization of the higher-priced drug found decreases in use.[17,20,22,23,25,27-29,31,32,35,36,38,41,43,44] Of note, only 3 studies examined medication adherence or utilization for the subset of patients who switched medications compared to similar populations who did not switch medications.[24,26,34] Despite the importance of physician visits with respect to drug prescriptions and follow-up, only 7 articles examined changes in outpatient physician visits.[22,27,30-32,41,45] None of

Figure 2. Differential Pricing Effects on Drug Use Behavior



the articles examined other potential forms of physician interactions, such as telephone follow-up or email communication. Interestingly, 2 of the reporting articles found short-term increases in physician visits immediately after the differential pricing intervention (data not shown), but most found either no change or decreased longer-term physician utilization (5 of 7).[30,31]

Spending Impact

Among the 14 articles reporting patients' OOP pharmacy spending after introducing or increasing pricing differentials among drug substitutes, 13 found increases in patient spending.[17-20,22,23,27,29,32,35,36,39,42,43] Conversely, among the 21 articles reporting on plan pharmacy spending, 19 found decreases (Figure 3).[17-19,21-23,25,27-32,34-36,38,39,41-43] Only 12 articles assessed total, patients', plans', and pharmacy spending, and 9 of these reported overall decreases.[17-19,22,23,26,31,32,35,37,38,42] Most articles (4 of 6) reporting on plans' nonpharmacy spending found increases, while all reporting on overall medical spending showed decreases.[21,27,30,31,34,38] Reassuringly, all articles reporting on spending examined the effects for at least 1 year. The articles generally did not observe spending across clinically relevant subsets of patients.

Health Outcomes Impact

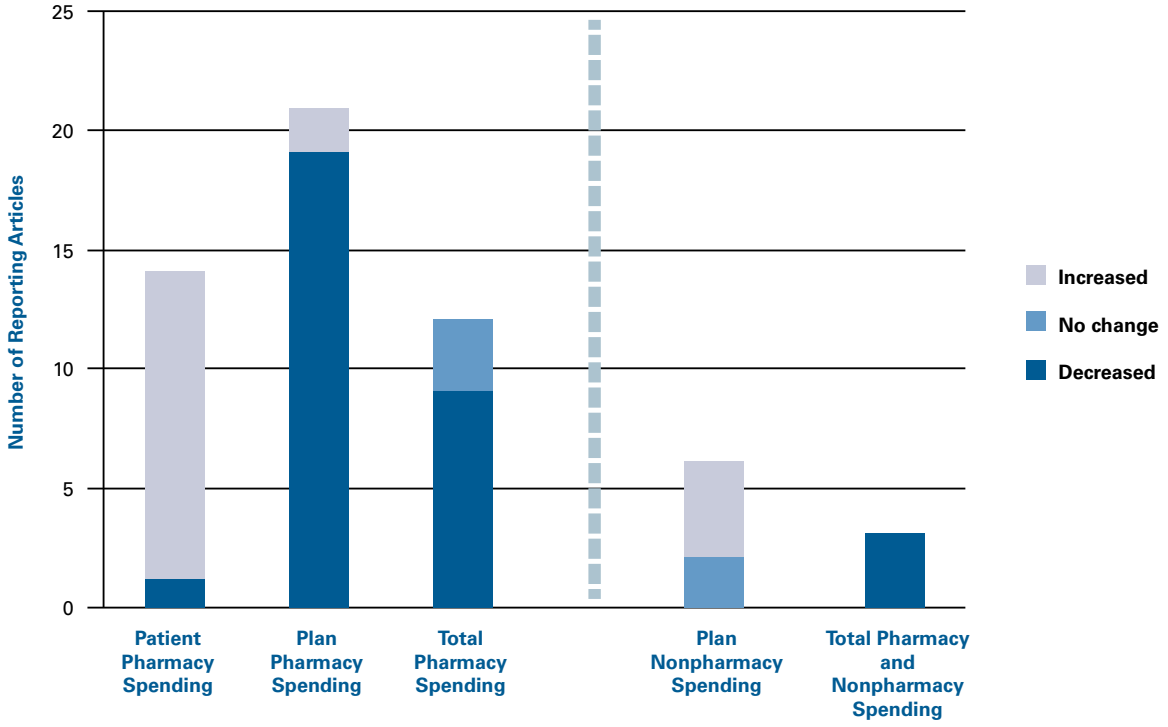
Only 8 articles examined any health outcomes, and 6 of these found no changes in the studied health outcome measures (Figure 4).[22,27,30-32,45-47] All 6 articles that assessed ED visits and 5 of 6 that assessed in-patient hospitalizations found no change compared to controls after the differential drug-pricing intervention.[22,27,30-32,45] Among these studies, all articles that also assessed pharmacy spending found increases in patient pharmacy spending (3 of 3) and decreases in plan pharmacy spending (5 of 5) (data not shown). Two articles used low-density lipoprotein levels to address cholesterol control, and reported mixed findings.[46,47] Among the articles that reported on health outcomes, those that also reported on spending all found increases in patients' pharmacy spending and decreases in plans' pharmacy spending (data not shown).[22,27,30-32]

All of the articles reporting health outcomes focused on the average effects, and none reported on the range of these effects or specific effects for clinically relevant subgroups, such as older patients, patients with multiple comorbidities, or patients at higher or lower risk levels.

DISCUSSION

We examined the existing evidence base on the effects of incentive-based health insurance benefit designs from the perspective of a policy maker or organization decision maker seeking to design a benefit package. We focused on studies in which there was a clear choice set of drug treat-

Figure 3. Differential Pricing Effects on Pharmacy and Nonpharmacy Spending



ments (substitutes) with differential prices, and assessed effects on patient price responses, medical spending, and health outcomes. We identified 31 articles studying differential pricing interventions, which most frequently consisted of tiered formularies and reference pricing. Although all articles reported on at least 1 end point, only 5 articles comprehensively reported effects for the 3 main outcome categories. The median observation period was 24 months.

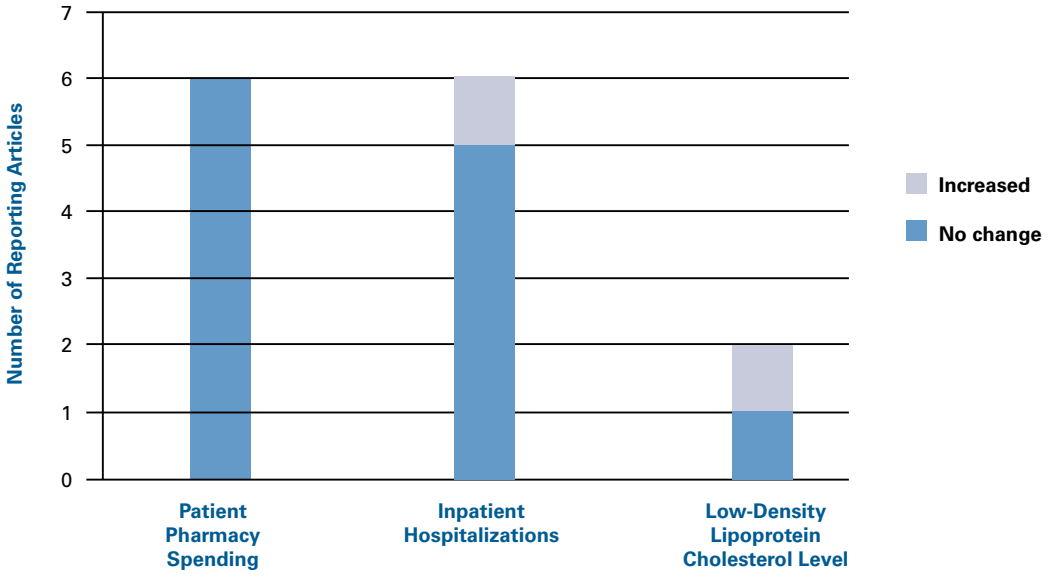
Overall, the reviewed articles suggest that when faced with differential cost sharing, some patients will switch to the cheaper drug option, overall plans' pharmacy spending decreases, and overall patients' OOP pharmacy spending increases. Although these findings may appear to be in conflict, they suggest that some patients continue using the more expensive option, which results in high OOP expenditures. Reports on patients' adherence were mixed but suggestive of decreased adherence to the more expensive option. Similarly, most articles found decreases in utilization of the expensive option. However, on balance, the articles were inconclusive on the overall treatment adherence.

Although the literature on the effects of cost sharing is extensive, there are fewer articles on incentive-based designs. Multiple studies evaluating V-BID policies as incentive-based designs suggest that they can potentially improve medication adherence and utilization in some patient cohorts.[2,6,13,48] This review also suggests potential heterogeneity in the effects depending, not surprisingly, on the details of the design and on the patient population, which is consistent with our call for increased attention to heterogeneity in the effects across clinically relevant subgroups, in addition to examination of average effects.

Limitations

This review has a number of notable limitations. First, the English-language restriction excluded some articles in non–English-speaking countries where many of these changes are occurring.[28,29,31] We used a finite number of search terms, which might limit the articles retrieved. However, we made a number of efforts to ensure that we had included all major articles. Furthermore, including broader search terms may not have contributed articles that would change this study's conclusions. Another limitation of this systematic review was the qualitative approach used to synthesize the outcomes of the studies, which may not have captured nuances in each study's results. Moreover, the studies' populations were heterogeneous with a mixture of elderly, non-elderly, government and private-pay patients, which may mask nuances in outcomes. However, given the paucity of studies, a formal meta-analysis is premature, but the synthesis of studies enhances the generalizability of the study. Lastly, the use of cholesterol levels, ED visits, and in-patient hospitaliza-

Figure 4. Differential Pricing Effects on Health Outcomes



tions as proxies for health outcomes is limited in scope. However, we used the outcomes recorded in the selected articles, and several studies have used these markers to approximate changes in health outcomes.[49-51]

Implications

Differential pricing of drug substitutes is a management and policy tool that has the potential to better align patients', providers', and payers' incentives to increase the value received from health services. To the extent that these tools work by influencing treatment choices, they also represent clinically relevant interventions. Future studies should evaluate the effects of incentive-based benefit designs with respect to patient choices, medical spending, and health outcomes. Moreover, because the decisions affected by these incentives tend to be ones of how to treat, and not whether to treat, explicit consideration of substitutes is necessary. This recommendation could be challenging since many drugs have a range of clinical indications or uses, and many indications have therapeutic options that cross typical therapeutic classes.[52]

To our knowledge, this is the first review of incentive-based formularies to evaluate the effects of health outcome from policy changes. We identified few studies reporting health outcomes and observed a lack of comprehensive assessments, as well as a lack of longer-term follow-up of these policies. Thus, few studies comprehensively examined the benefit designs in a time frame that mirrored true clinical practice. These results are not only clinically relevant for practitioners, but are also financially relevant for policy makers and benefit design managers.[10]

CONCLUSIONS

In conclusion, incentive-based health insurance benefit designs explicitly attempt to influence clinical treatment decisions, yet the evidence base on their use and effects remains limited. Greater attention to outcomes, ranging from the immediate incentive effects to longer-term clinical and economic outcomes on average and for relevant clinical subgroups, is needed to guide the development of these new insurance designs.

Specifically, we recommend that future studies on incentive-based benefit designs incorporate the following features: 1) clearly defined choice sets including all relevant clinical substitutes; 2) calculated price differential across substitutes; 3) short- and longer-term assessment of spending; 4) short- and longer-term assessment of health outcomes; and 5) assessment of both average effects and the range of effects across clinically relevant subgroups. This information will enhance the value assessment of this benefit design tool for future policy and management decisions.

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eAppendix Table. Summary of Selected Outcomes

		Number of Articles Reporting	Number of Articles Reporting Changes	Number of Articles With No Change
Drug Use Behavior (29 articles)	Drug class utilization	21	15	6
	Utilization of higher-priced option	16	16	0
	Switching to lower-priced option	18	15	3
	Adherence to drug class	9	3	6
	Adherence to expensive option	4	2	2
	Outpatient physician visits	7	3	4
Spending (24 articles)	Patient OOP pharmacy spending	14	14	0
	Planned pharmacy spending	21	21	0
	Total pharmacy spending	12	9	3
	Planned nonpharmacy spending	6	4	2
	Total pharmacy and non-pharmacy spending	3	3	0
Health Outcomes (8 articles)	Any health outcome measure	8	2	6
	ED visits	6	0	6
	In-patient hospitalizations	6	0	6
	LDL cholesterol level	2	1	1

ED indicates emergency department; LDL, low-density lipoprotein; OOP, out of pocket.